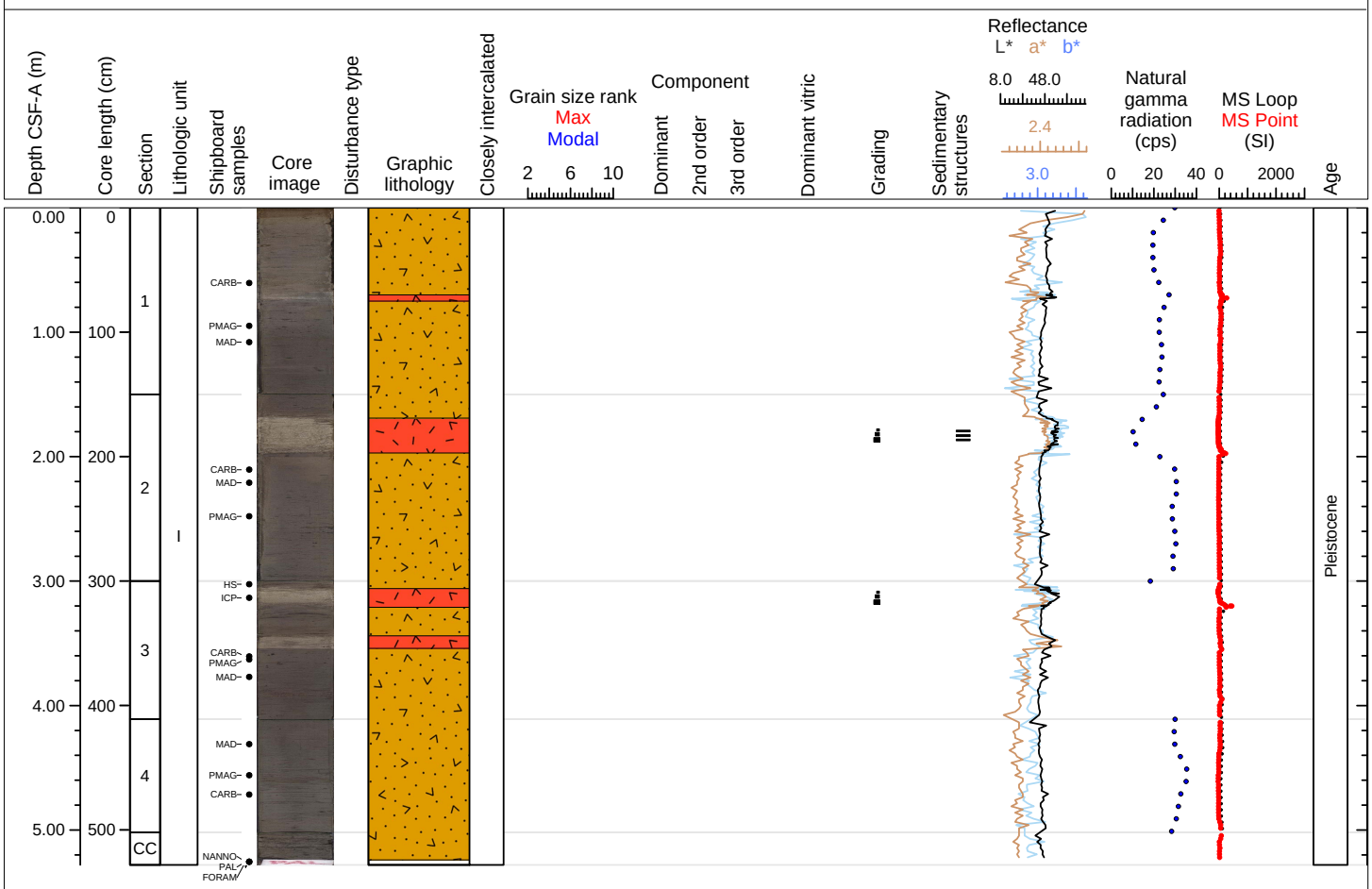
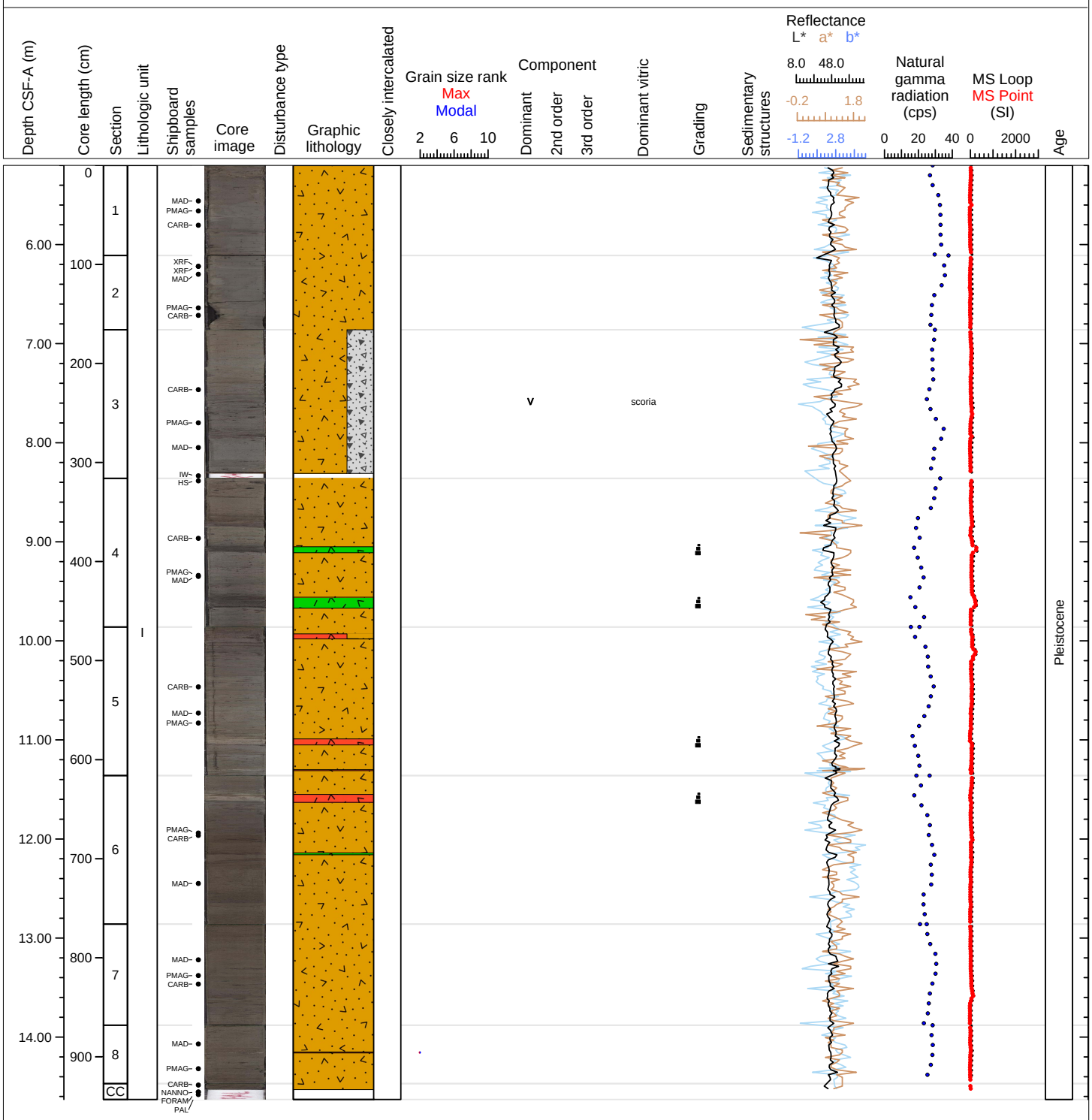
Hole 350-U1437B Core 1H, Interval 0.0-5.28 m (CSF-A)

tuffaceous mud with discrete layers of evolved ash



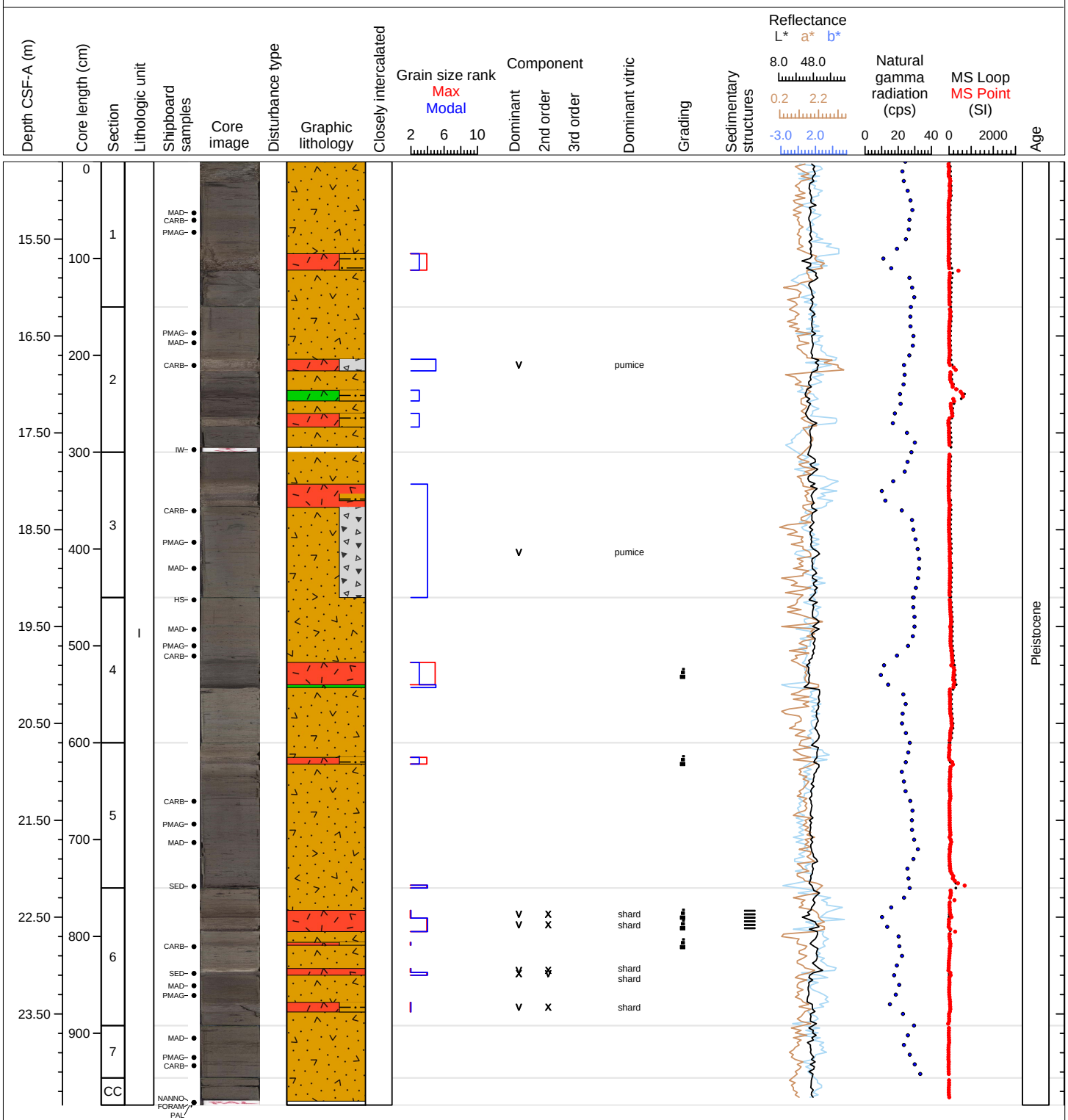
Hole 350-U1437B Core 2H, Interval 5.2-14.63 m (CSF-A)

tuffaceous mud and discrete layers of mafic and evolved ash



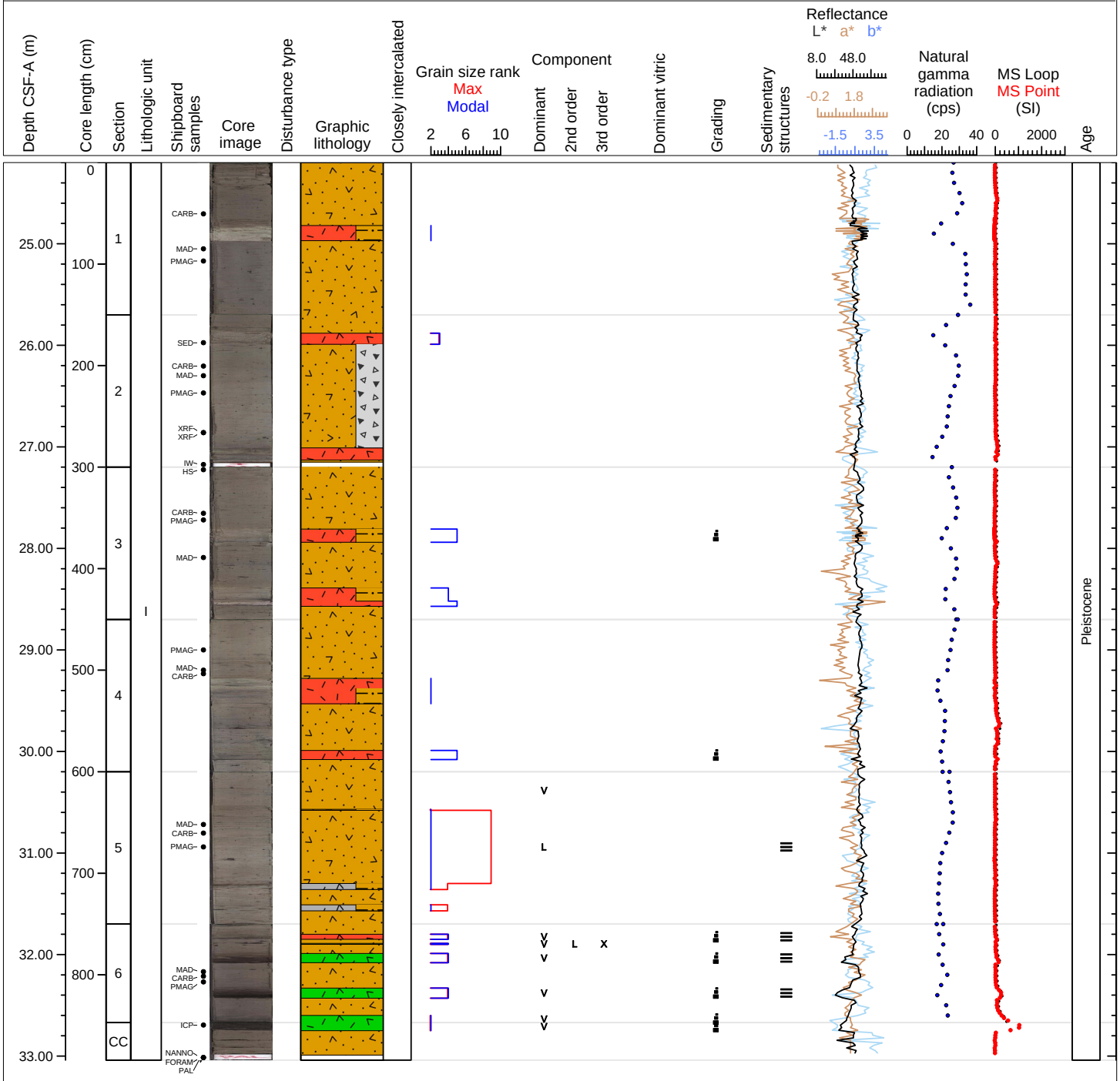
Hole 350-U1437B Core 3H, Interval 14.7-24.44 m (CSF-A)

tuffaceous mud and discrete layers of mostly evolved ash



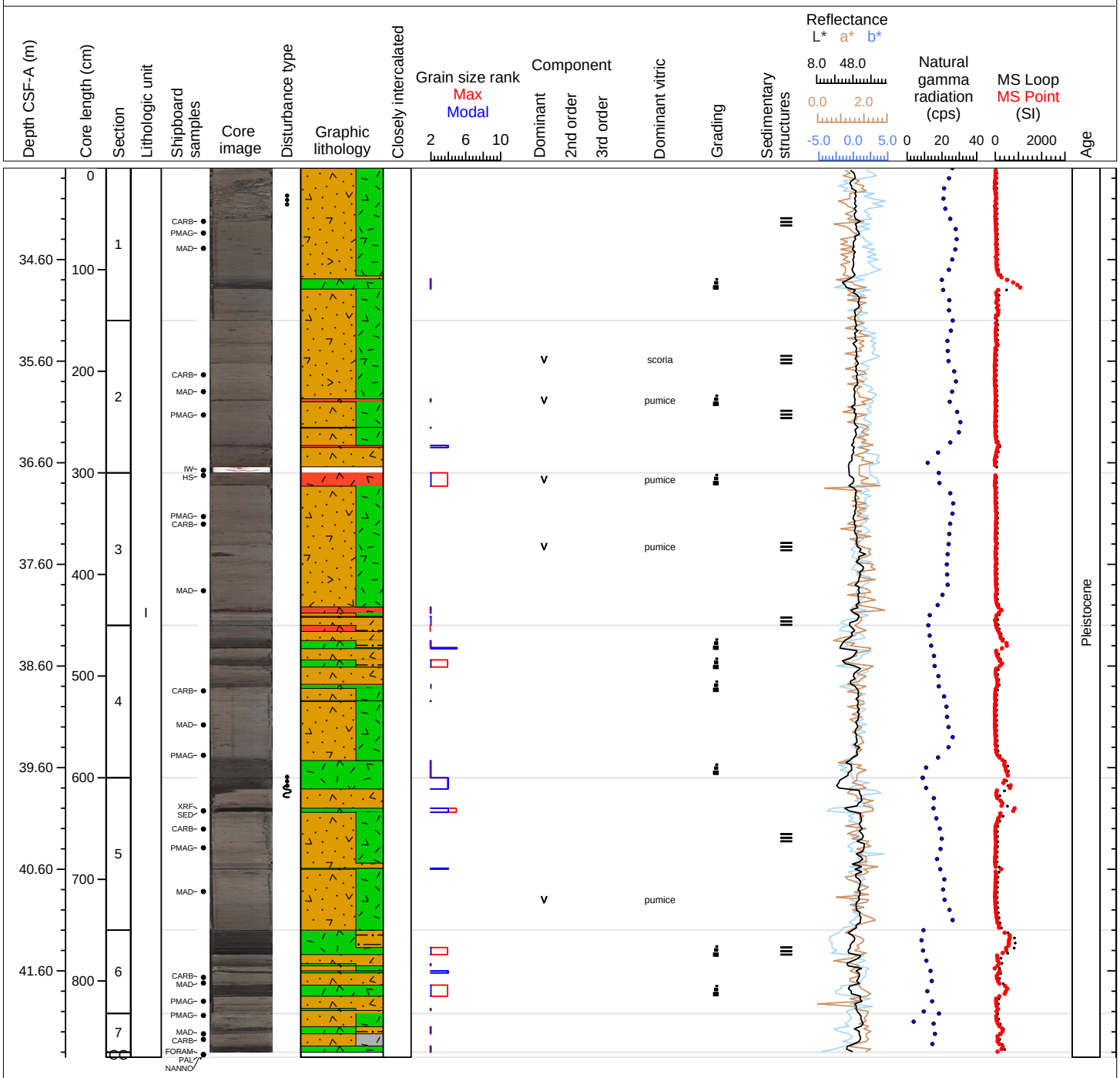
Hole 350-U1437B Core 4H, Interval 24.2-33.04 m (CSF-A)

tuffaceous mud with discrete layers of evolved ash in the upper parts, bimodal ash intervals in the middle and mafic ash layers in the base of the core.



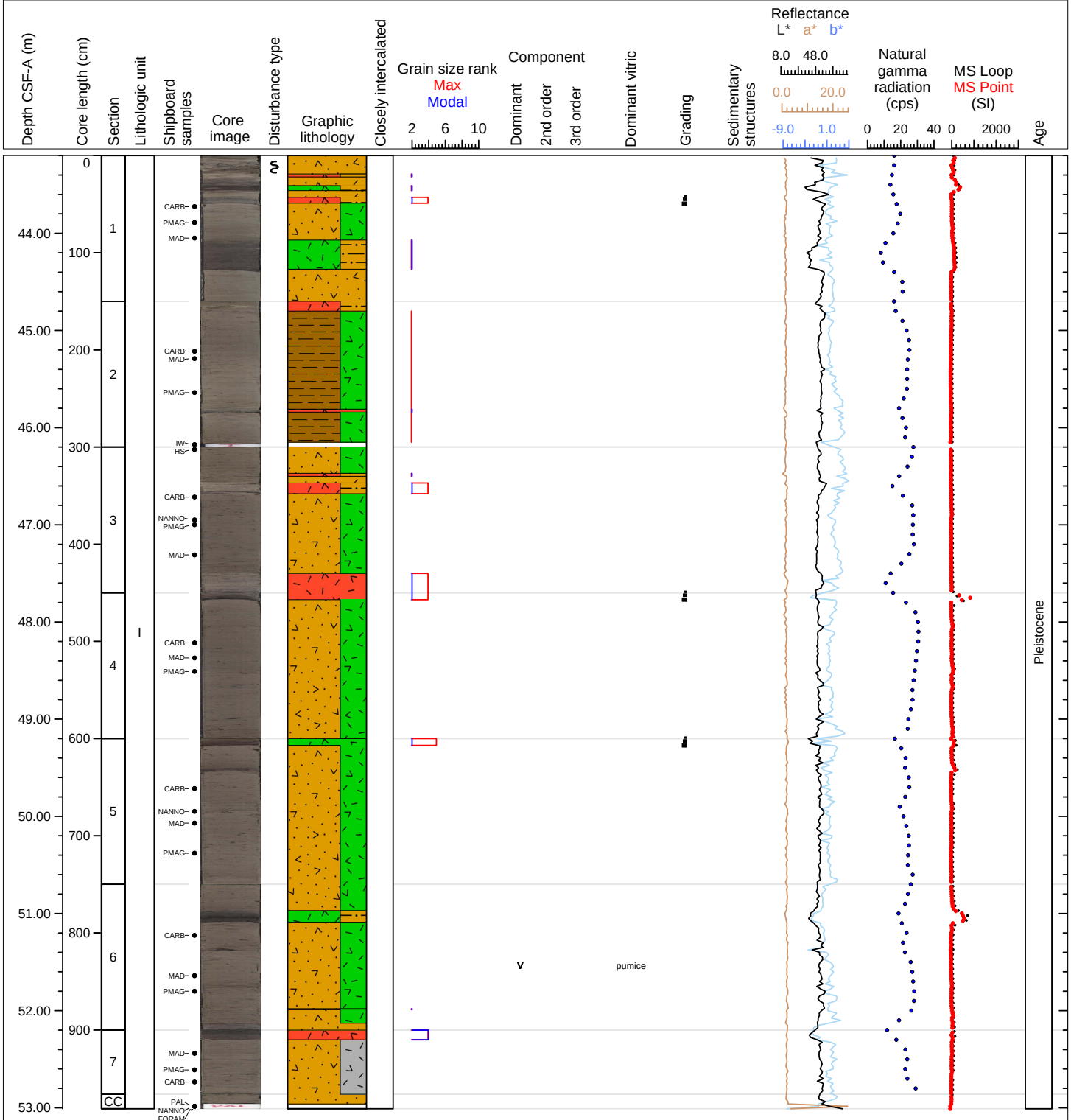
Hole 350-U1437B Core 5H, Interval 33.7-42.45 m (CSF-A)

tuffaceous mud and layers of evolved and mafic ash



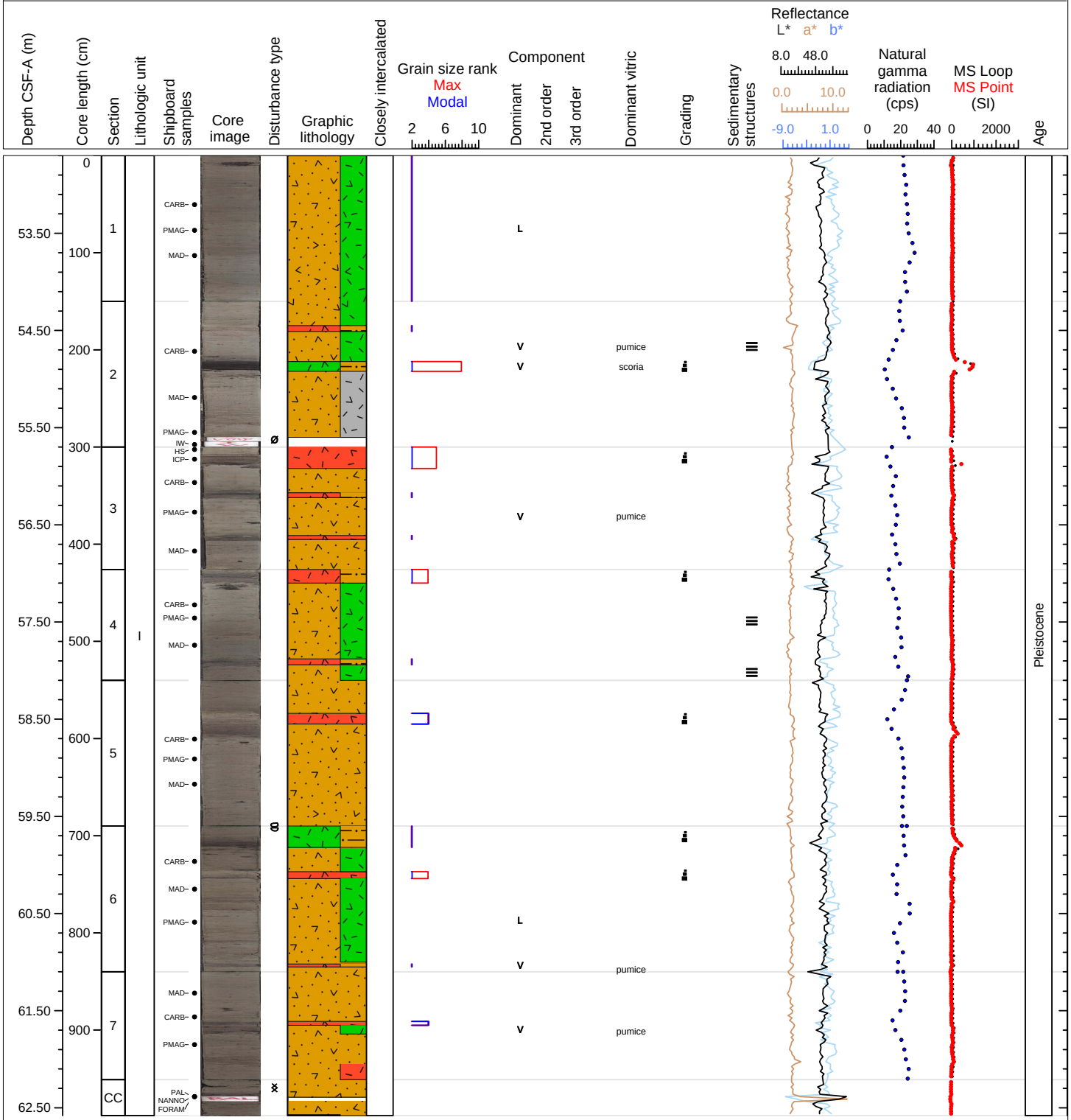
Hole 350-U1437B Core 6H, Interval 43.2-53.01 m (CSF-A)

tuffaceous mud and layers of evolved ash and a few mafic ash layers



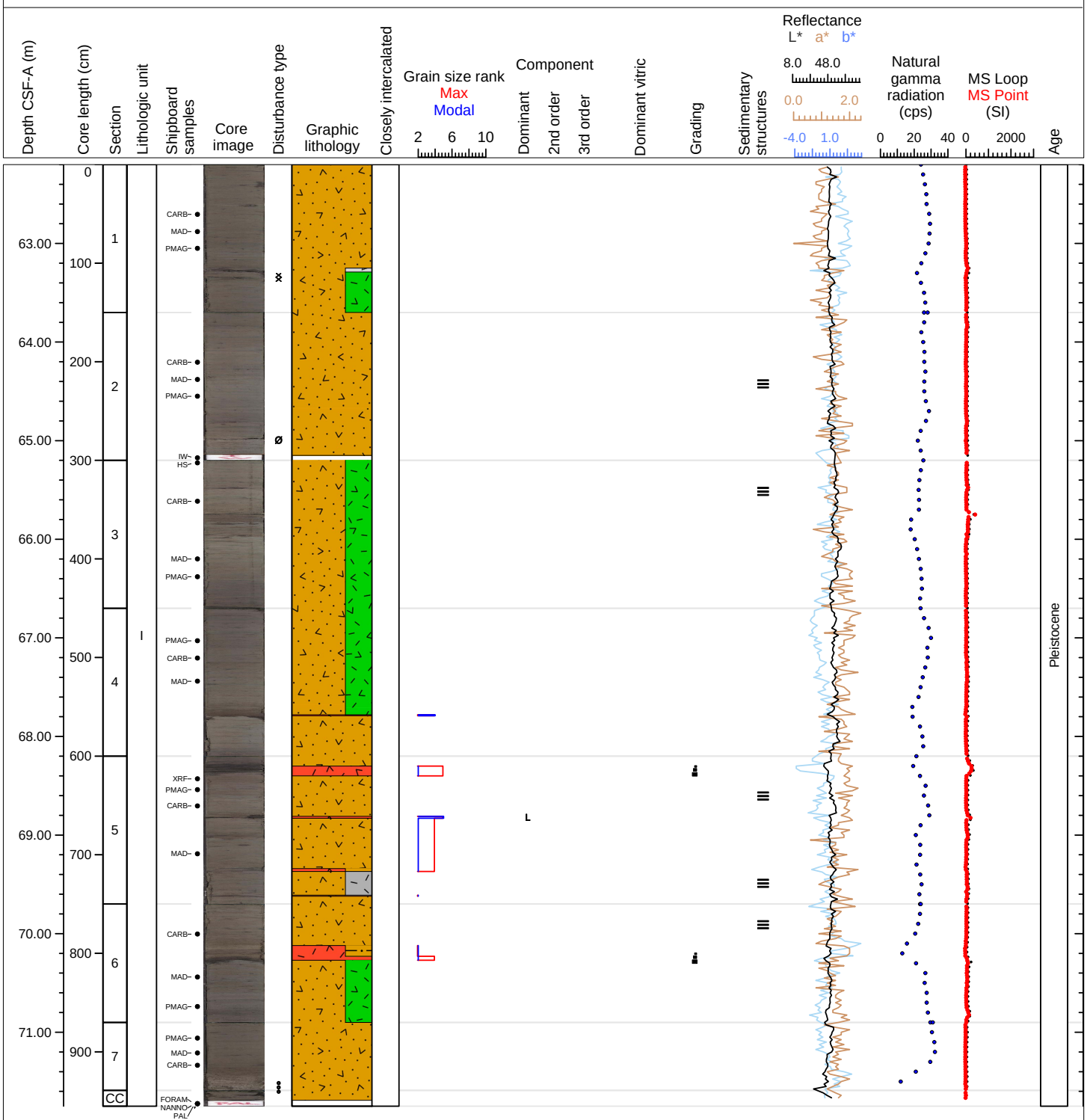
Hole 350-U1437B Core 7H, Interval 52.7-62.58 m (CSF-A)

tuffaceous mud and layers of evolved ash and a few mafic layers



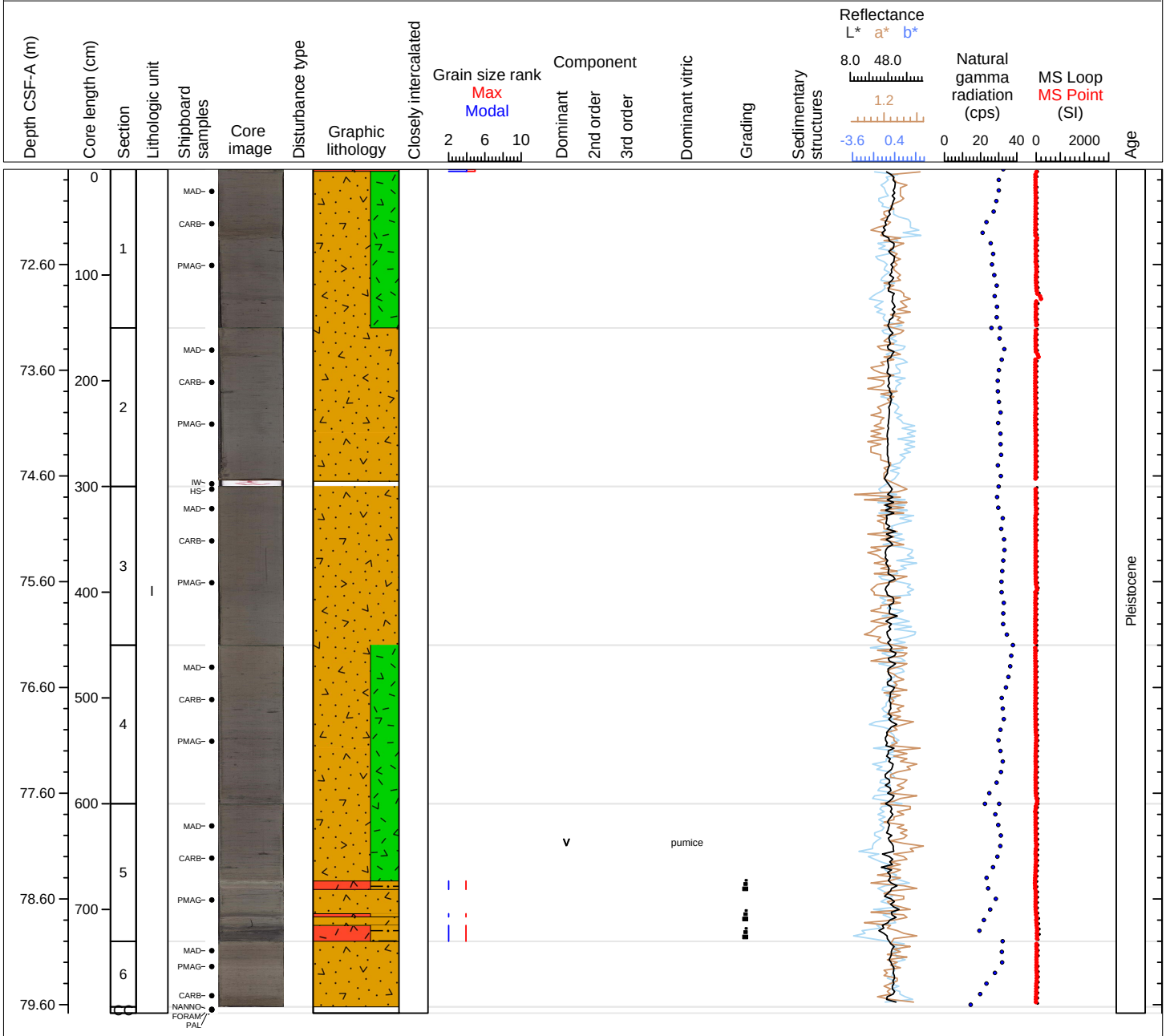
Hole 350-U1437B Core 8H, Interval 62.2-71.75 m (CSF-A)

tuffaceous mud and layers of evolved ash



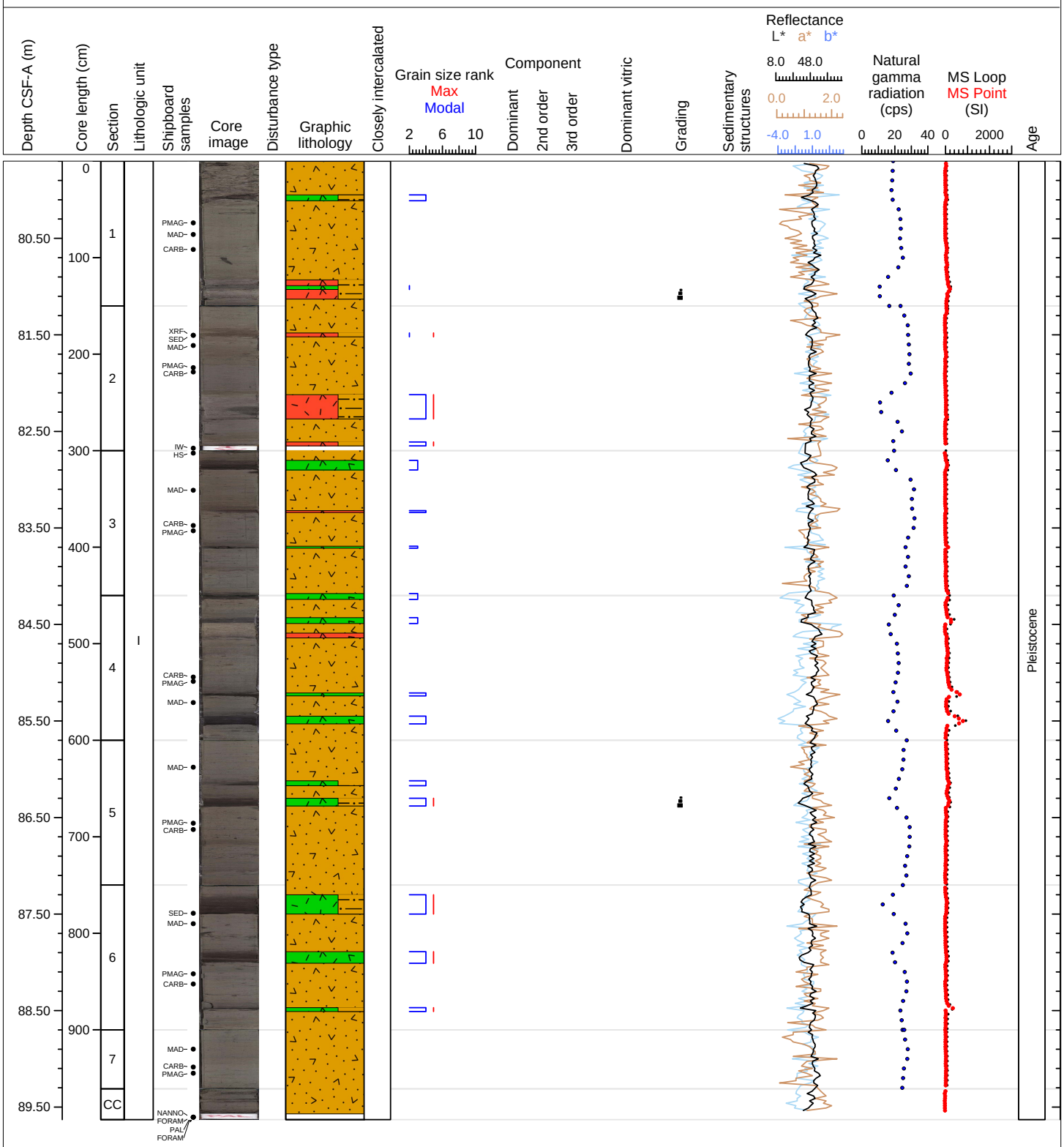
Hole 350-U1437B Core 9H, Interval 71.7-79.68 m (CSF-A)

monotonous thick tuffaceous mud with occasional evolved ash layers



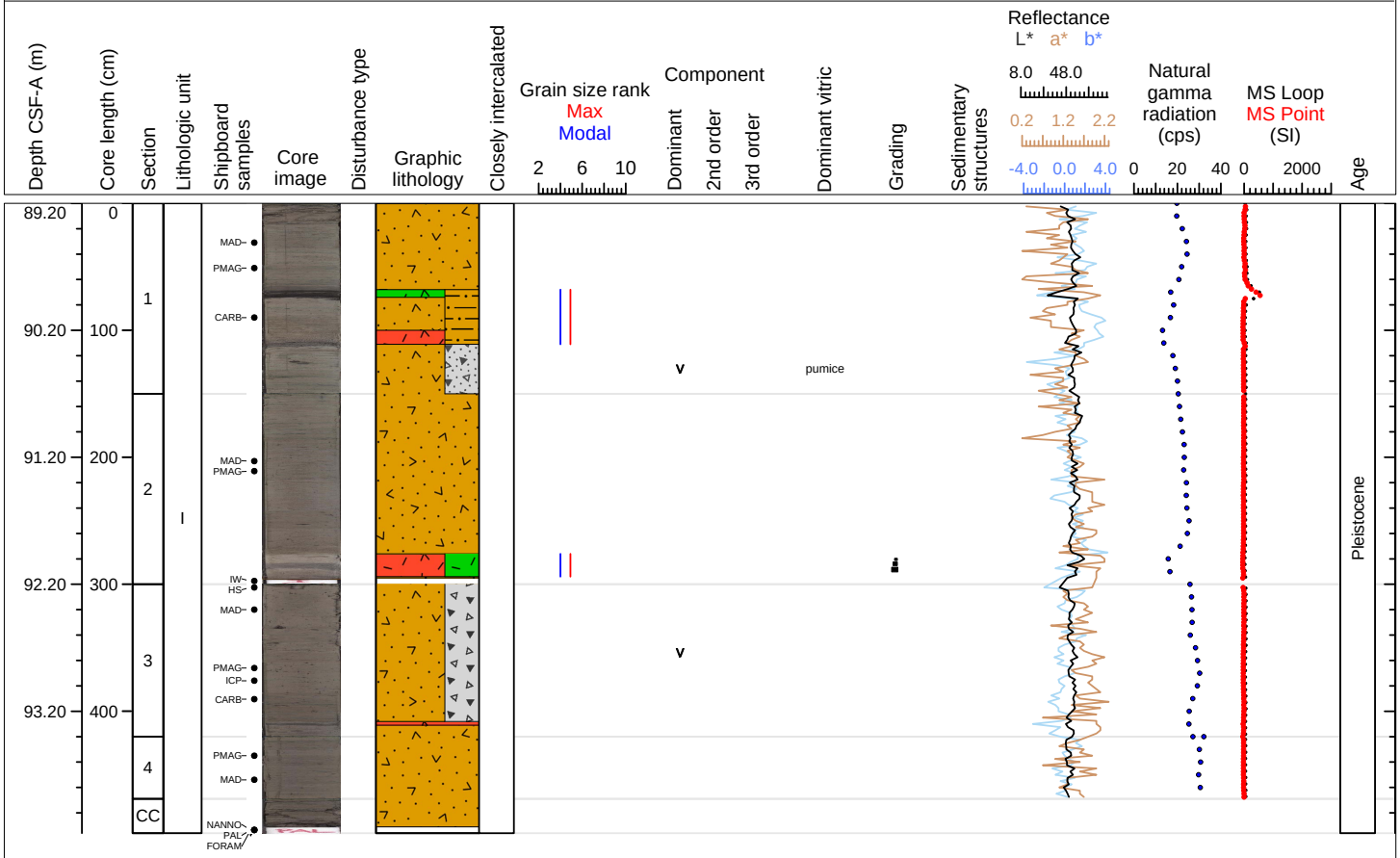
Hole 350-U1437B Core 10H, Interval 79.7-89.63 m (CSF-A)

monotonous tuffaceous mud with abundant mafic ash layers, few evolved ashes



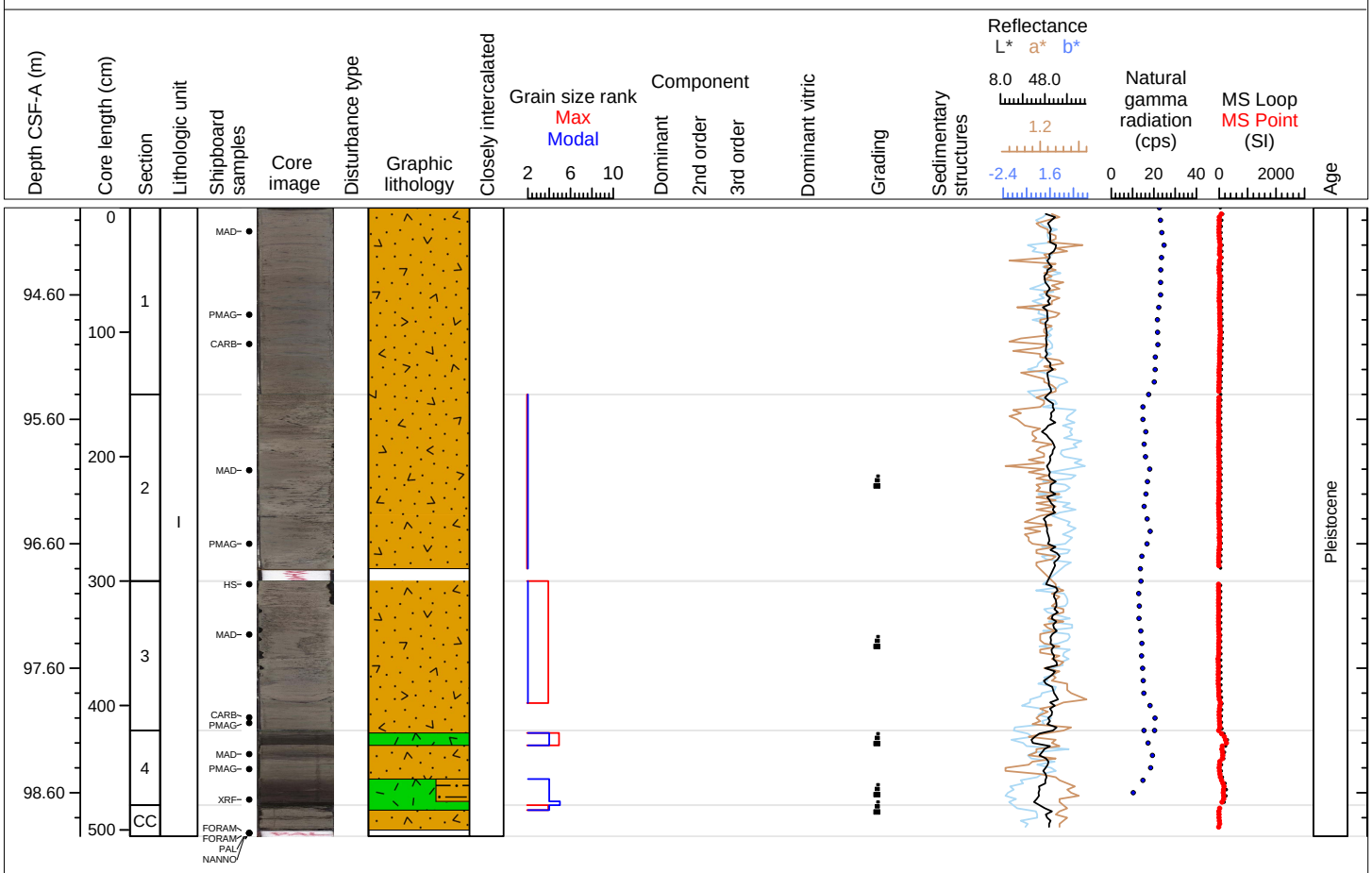
Hole 350-U1437B Core 11F, Interval 89.2-94.16 m (CSF-A)

monotonous tuffaceous mud with a few evolved ash layers



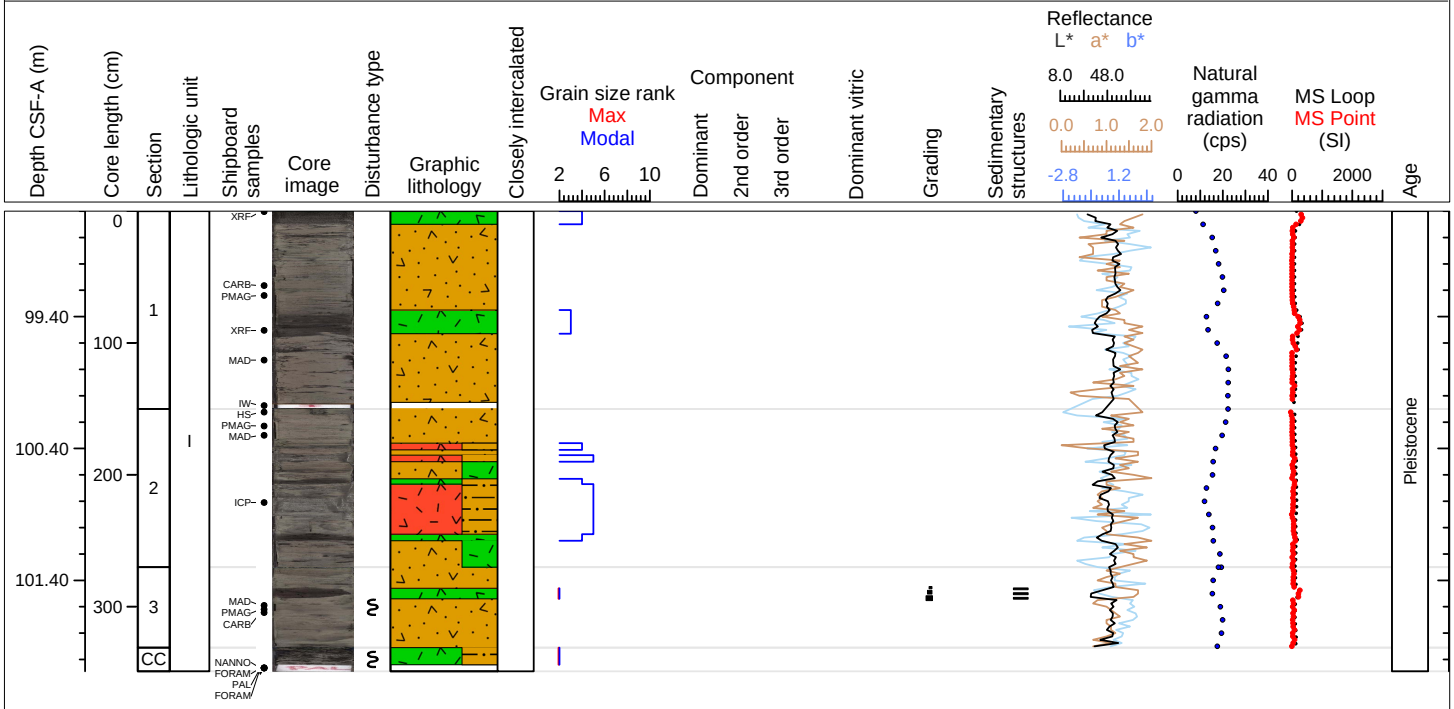
Hole 350-U1437B Core 12F, Interval 93.9-98.95 m (CSF-A)

monotonous tuffaceous mud with a 250 cm thick evolved tuffaceous silt, and minor mafic ash layers



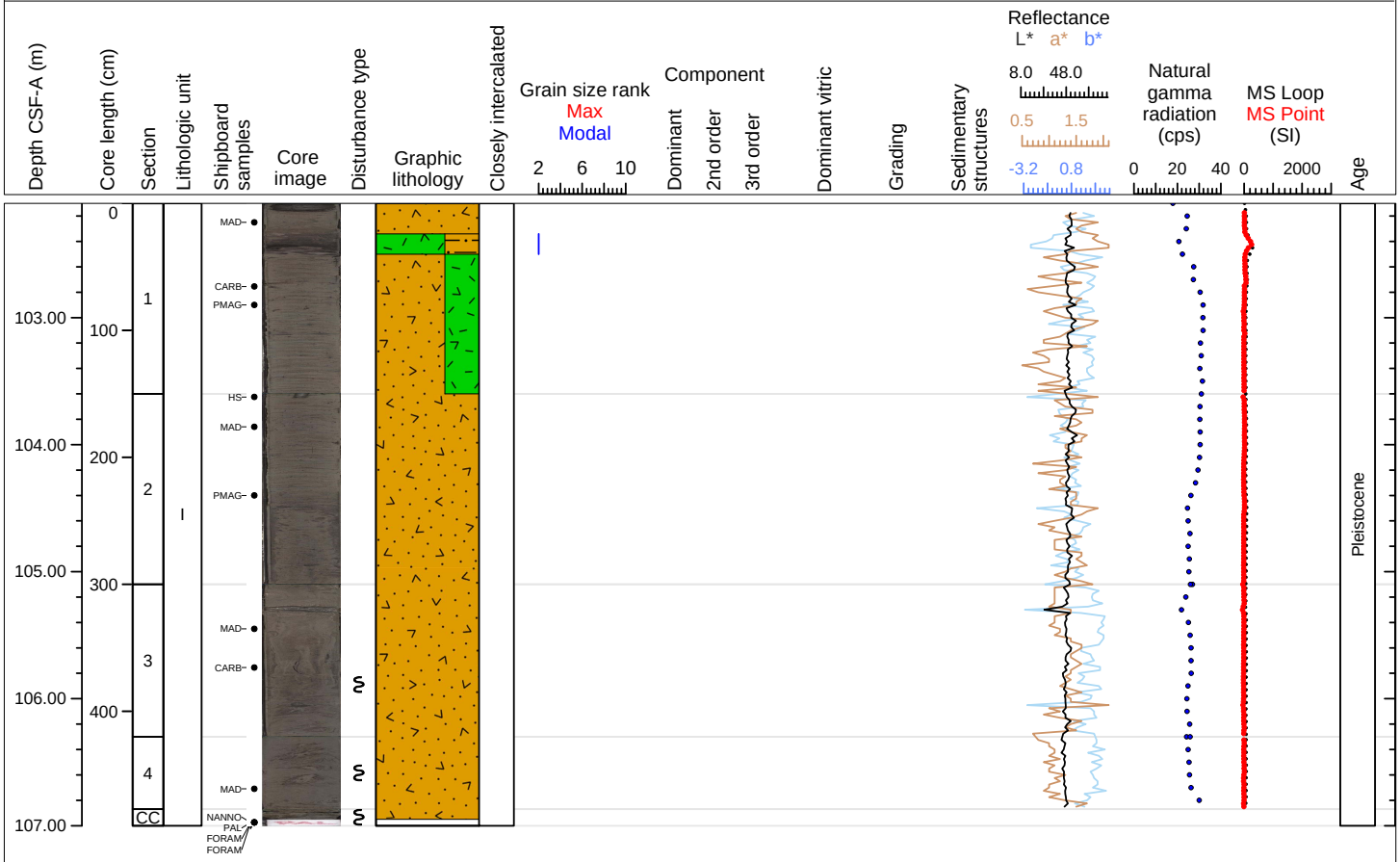
Hole 350-U1437B Core 13F, Interval 98.6-102.09 m (CSF-A)

monotonous tuffaceous mud with many mafic ash layers and few evolved ashes



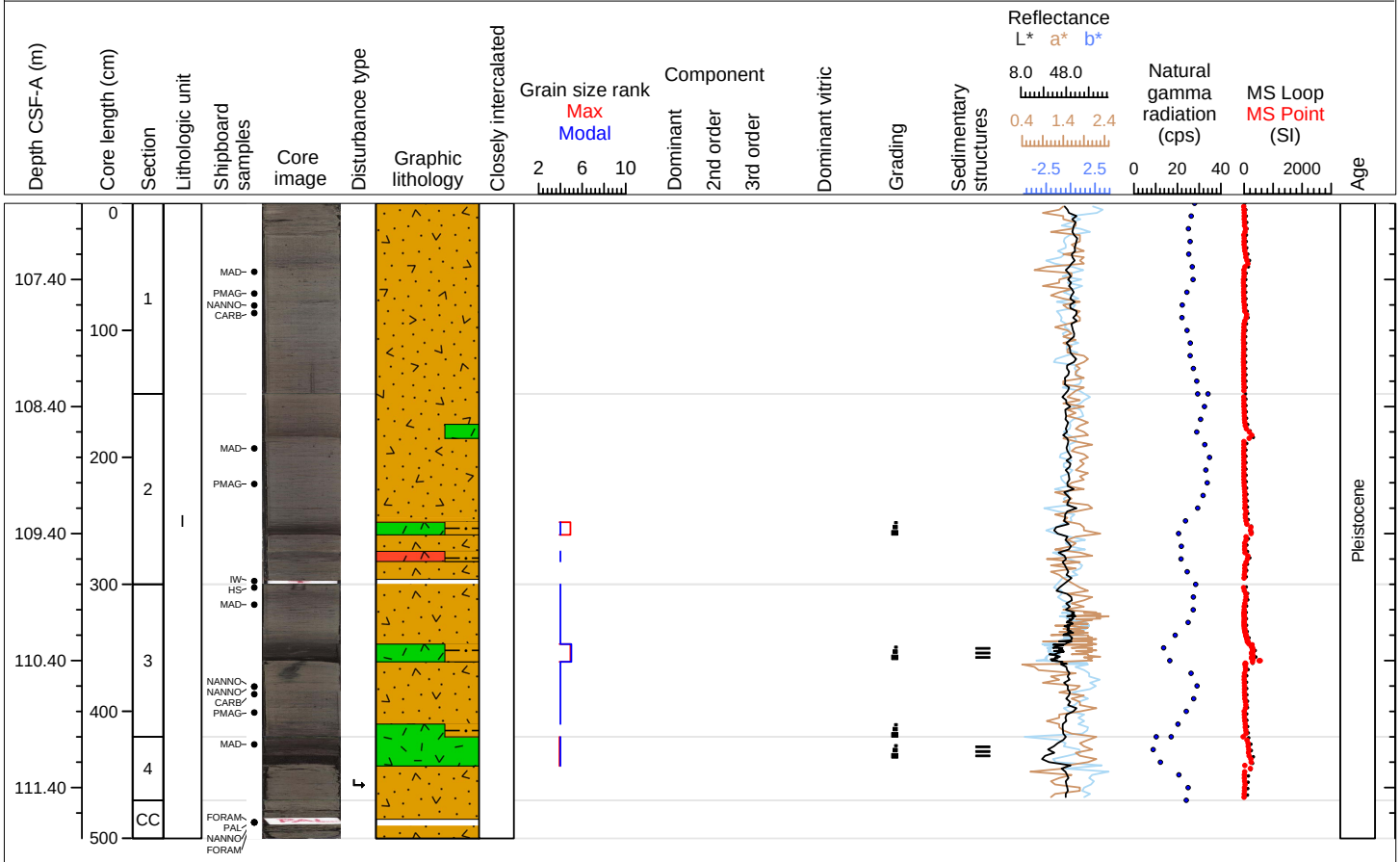
Hole 350-U1437B Core 14F, Interval 102.1-107.0 m (CSF-A)

monotonous tuffaceous mud with a single mafic ash layer



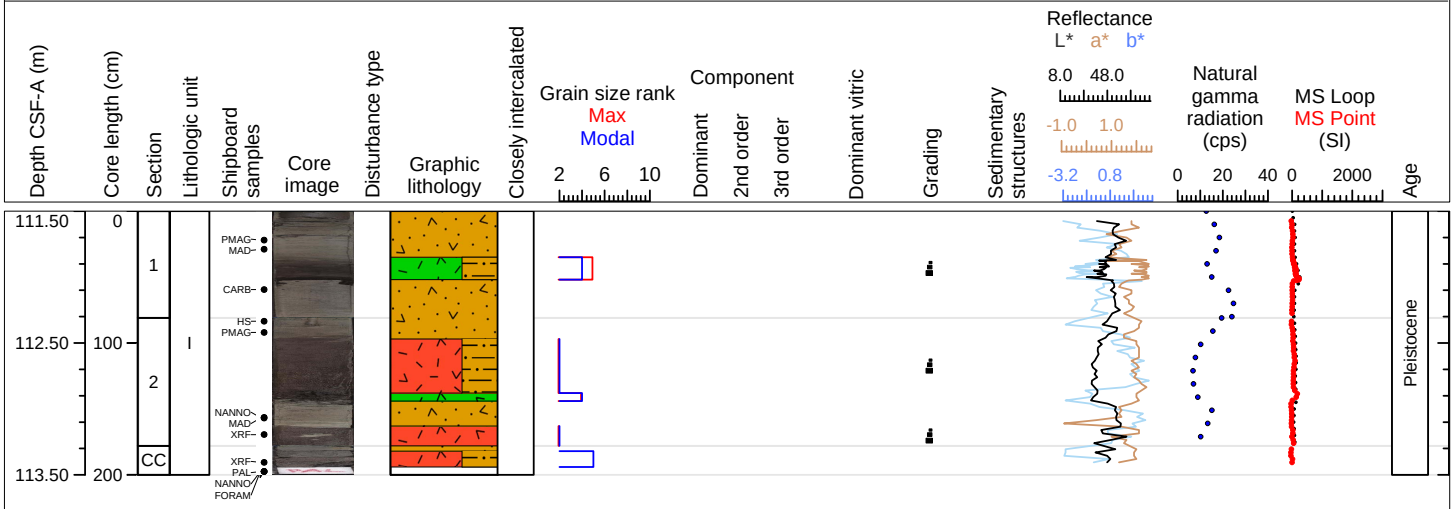
Hole 350-U1437B Core 15F, Interval 106.8-111.8 m (CSF-A)

monotonous tuffaceous mud with a few mafic ash layers and a single evolved ash layer



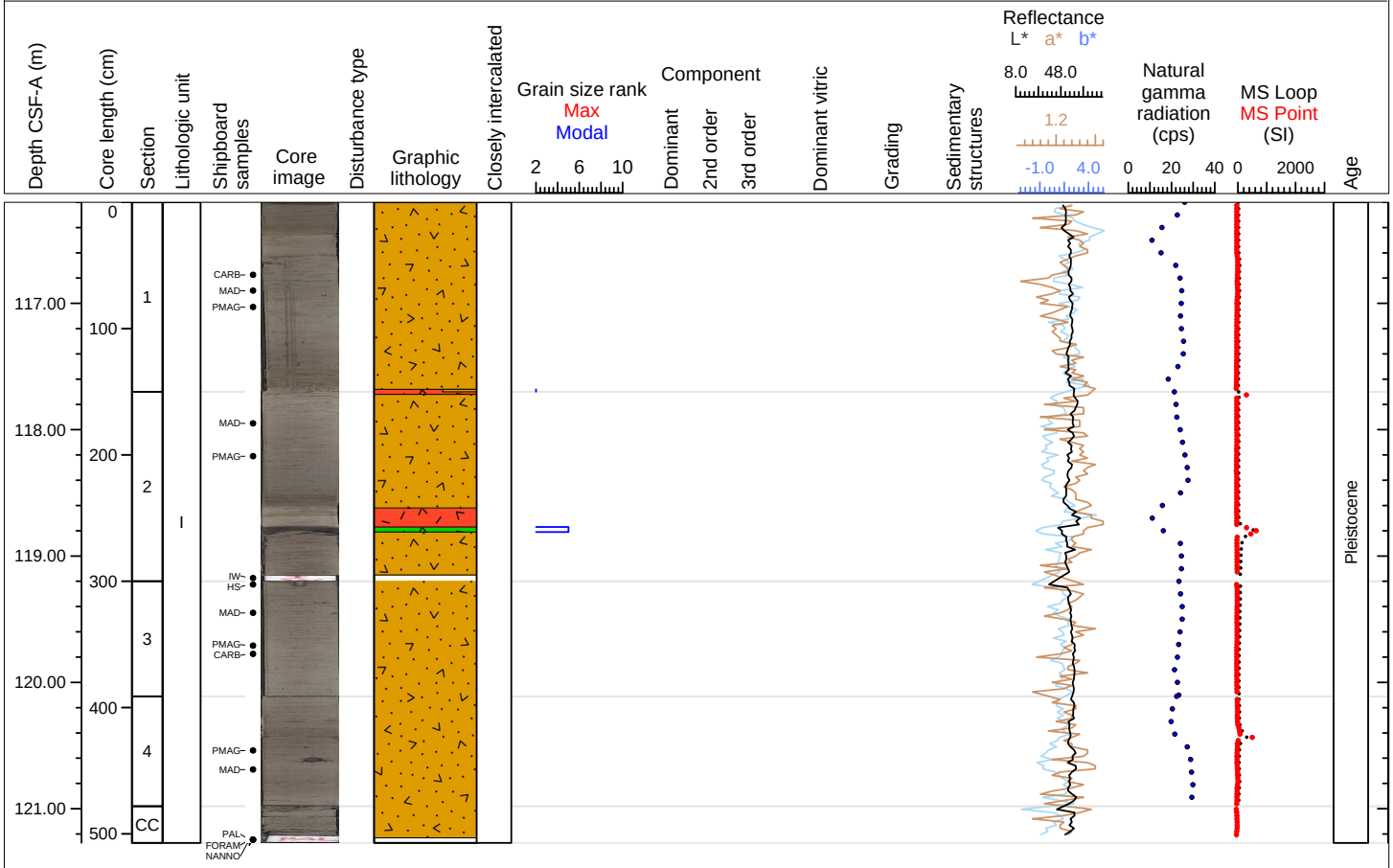
Hole 350-U1437B Core 16F, Interval 111.5-113.5 m (CSF-A)

tuffaceous mud with mafic and evolved ash layers



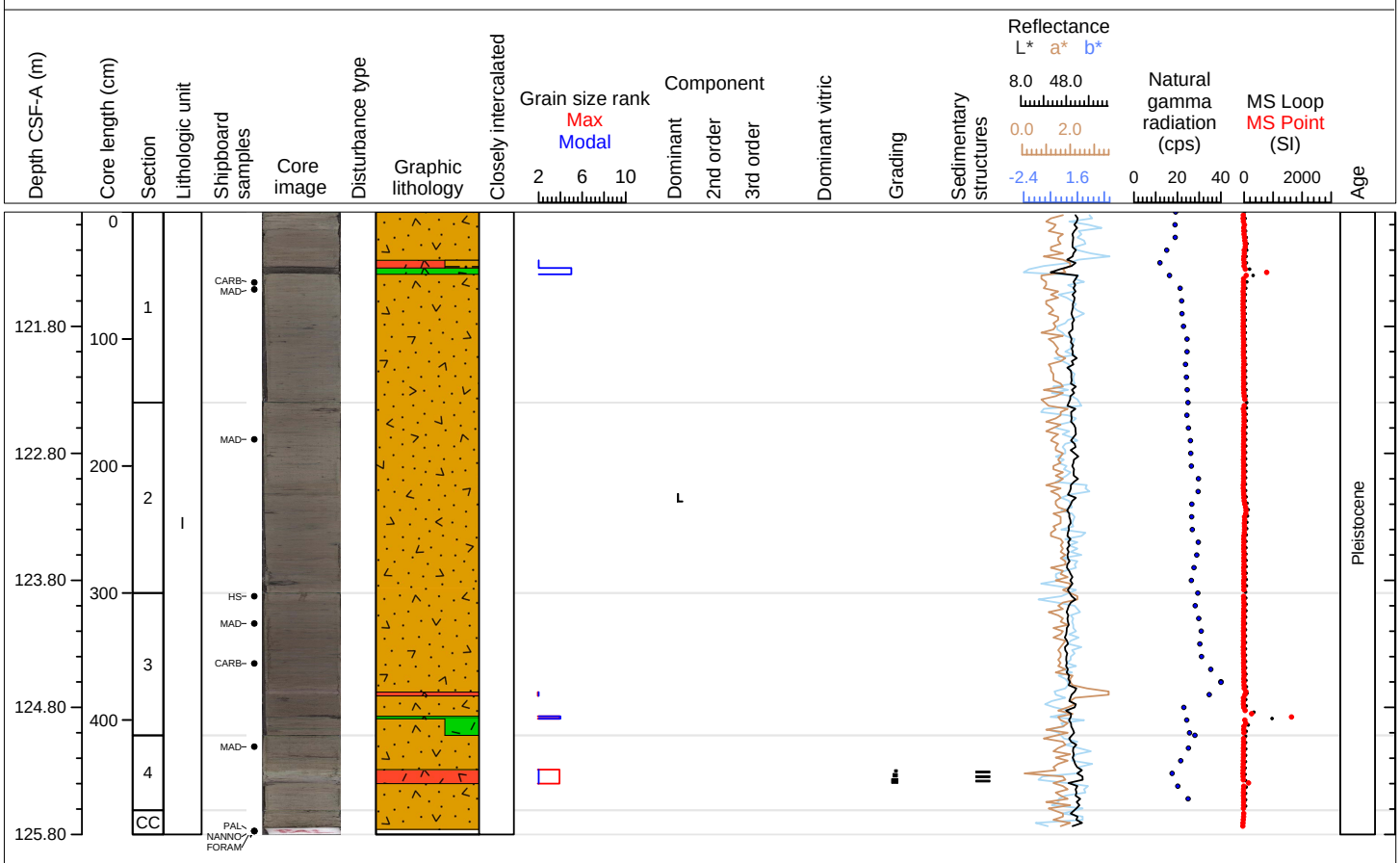
Hole 350-U1437B Core 17F, Interval 116.2-121.27 m (CSF-A)

monotonous tuffaceous mud with several evolved ash layers



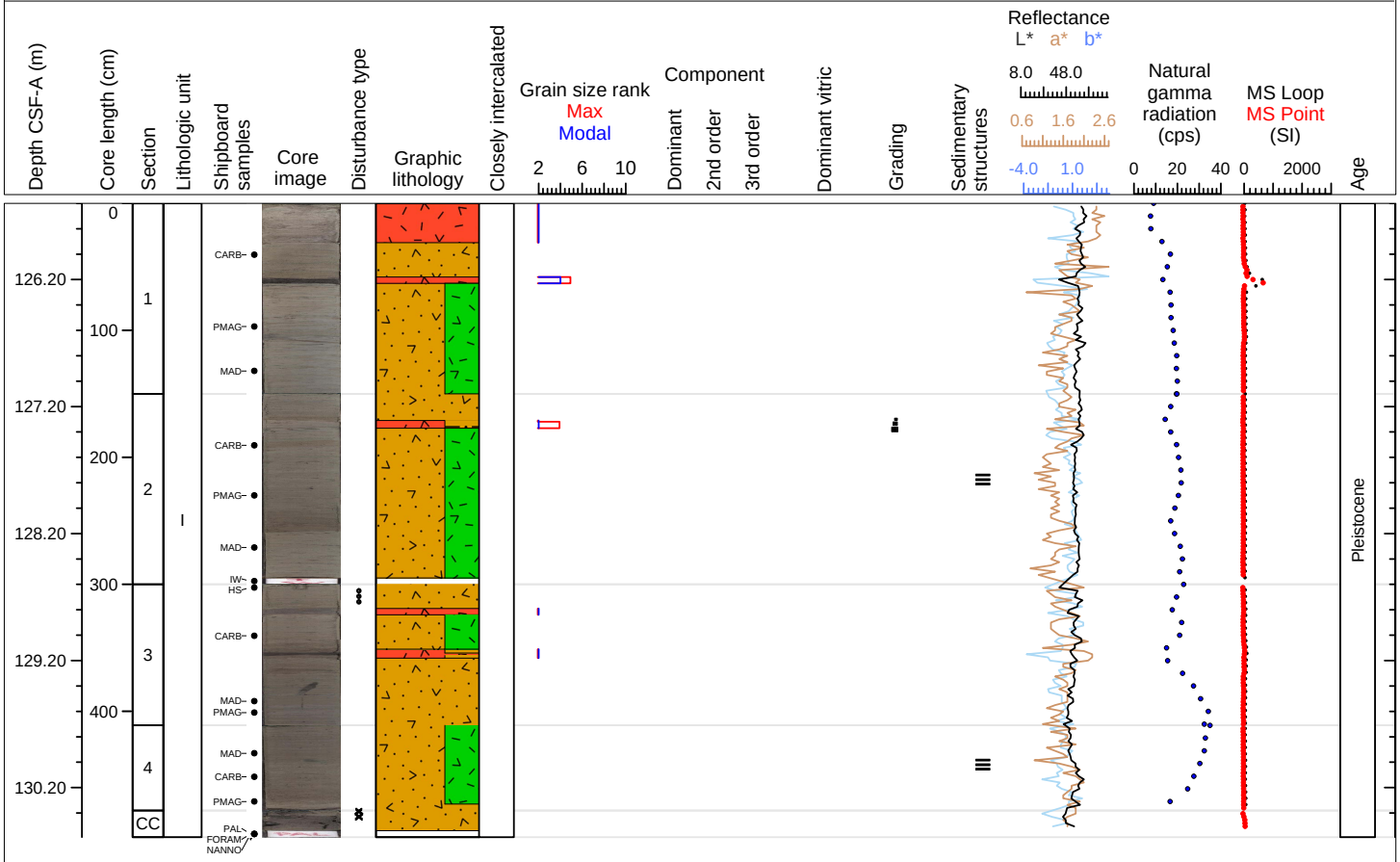
Hole 350-U1437B Core 18F, Interval 120.9-125.8 m (CSF-A)

monotonous tuffaceous mud with several mafic and evolved ash layers



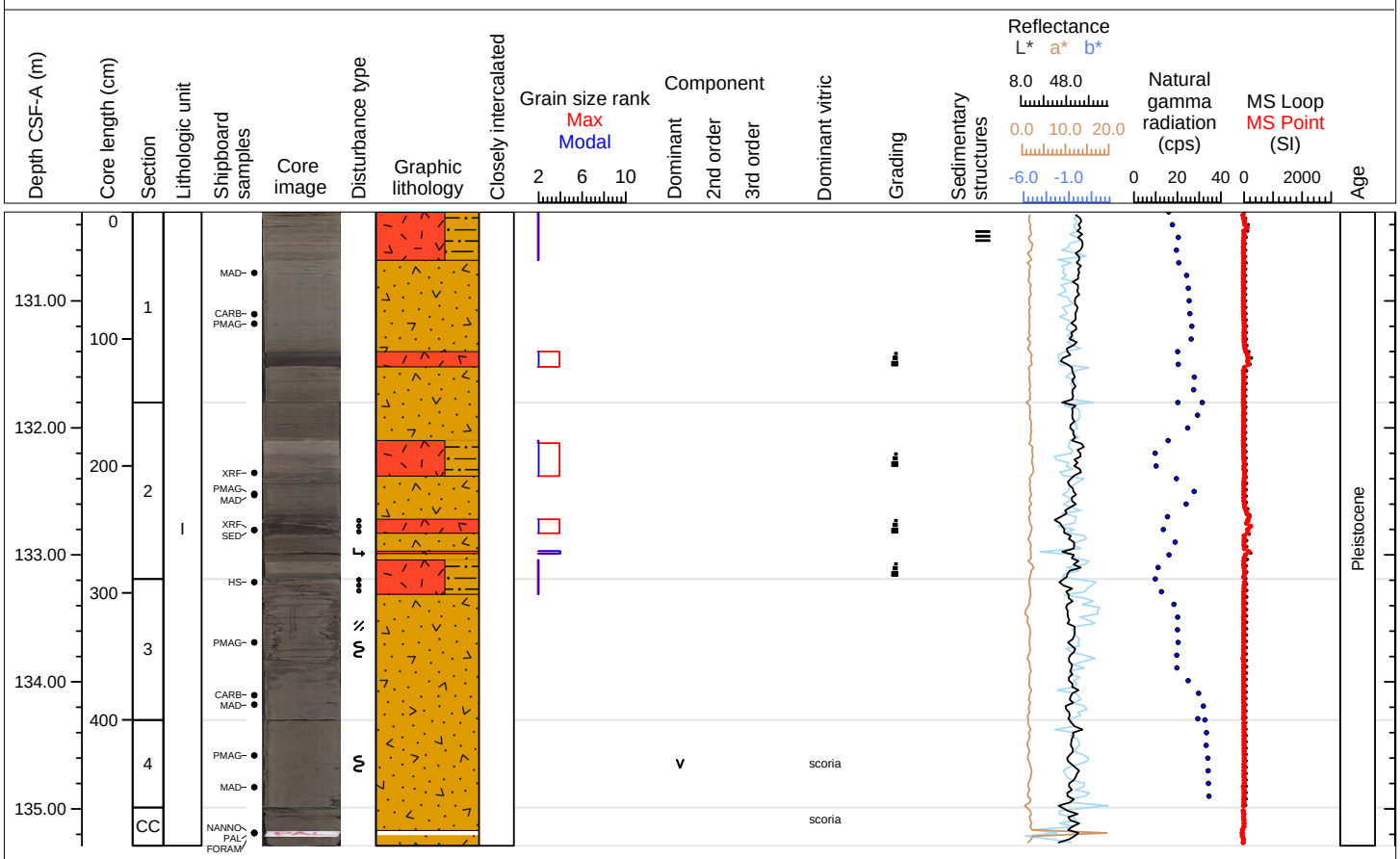
Hole 350-U1437B Core 19F, Interval 125.6-130.59 m (CSF-A)

monotonous tuffaceous mud with evolved ash layers



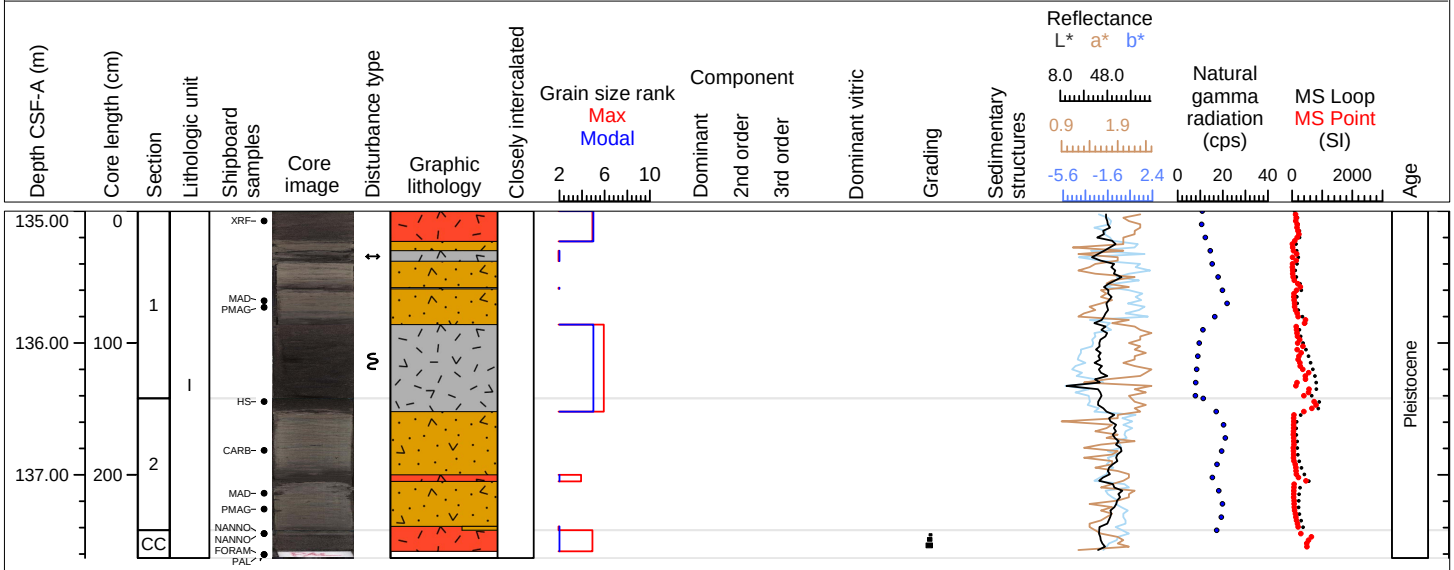
Hole 350-U1437B Core 20F, Interval 130.3-135.29 m (CSF-A)

monotonous tuffaceous mud with evolved ash layers



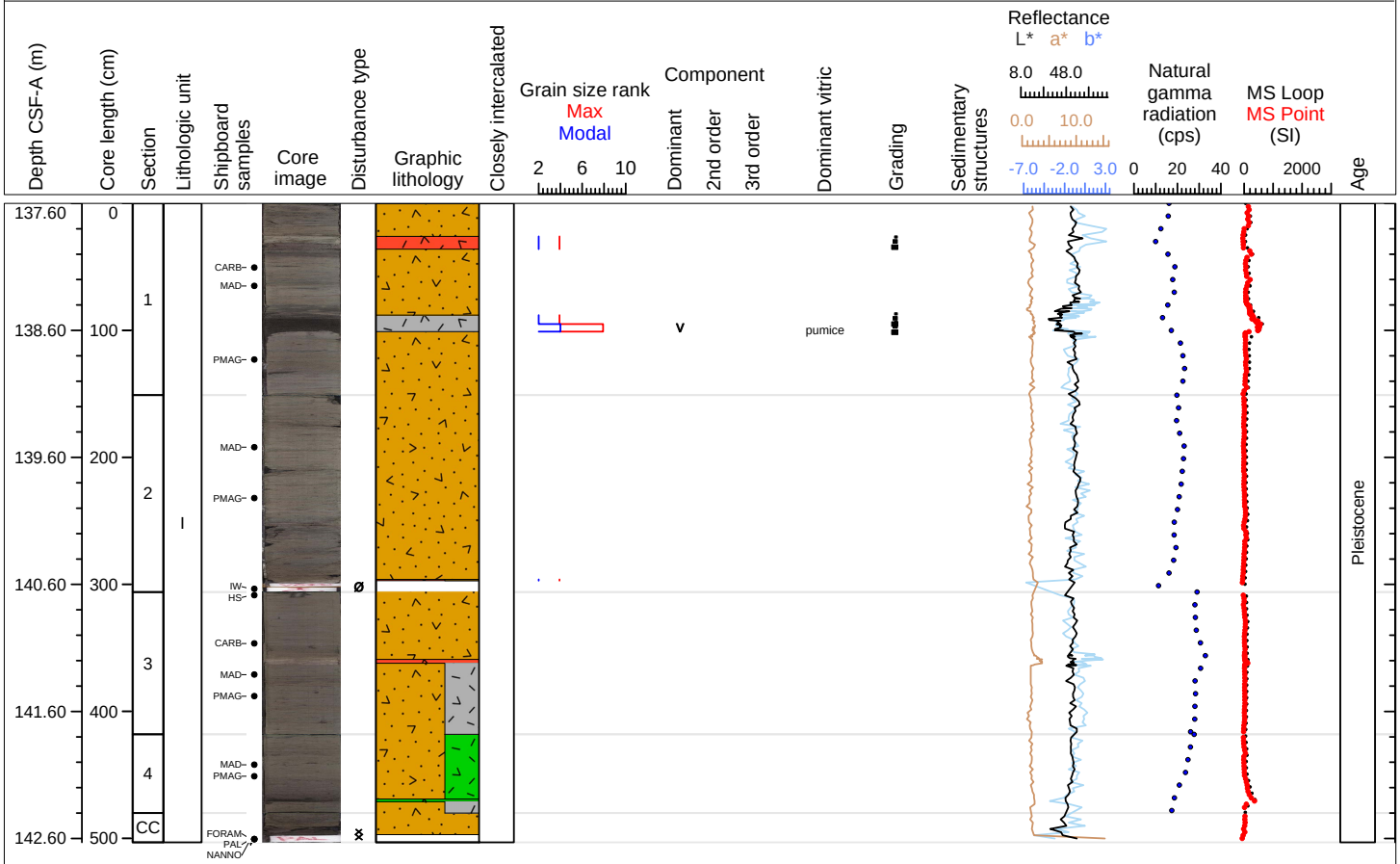
Hole 350-U1437B Core 21F, Interval 135.0-137.63 m (CSF-A)

tuffaceous mud with thick evolved and bimodal ash layers



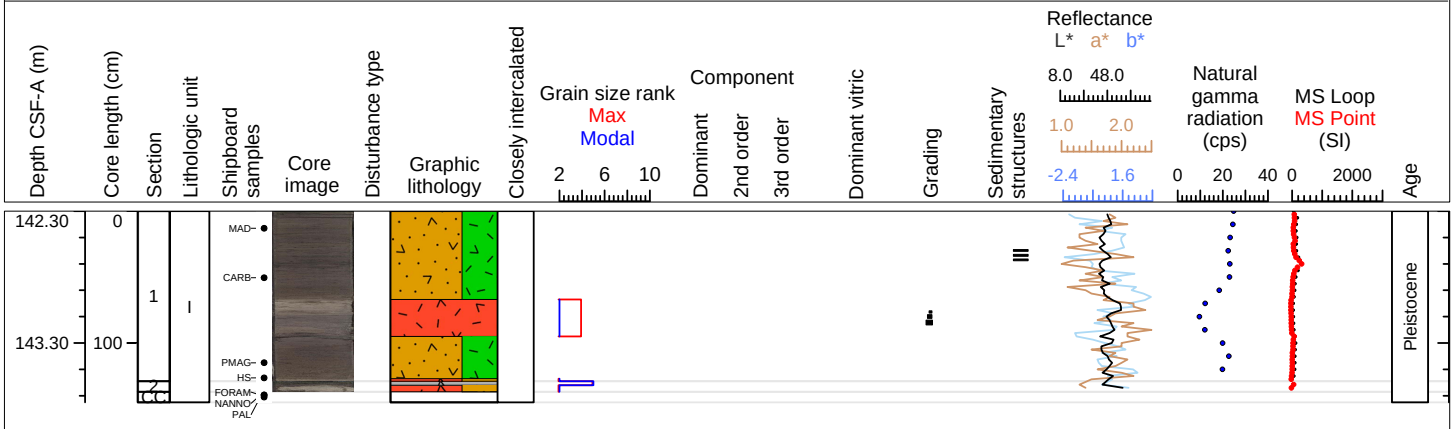
Hole 350-U1437B Core 22F, Interval 137.6-142.63 m (CSF-A)

tuffaceous mud with evolved ash layers



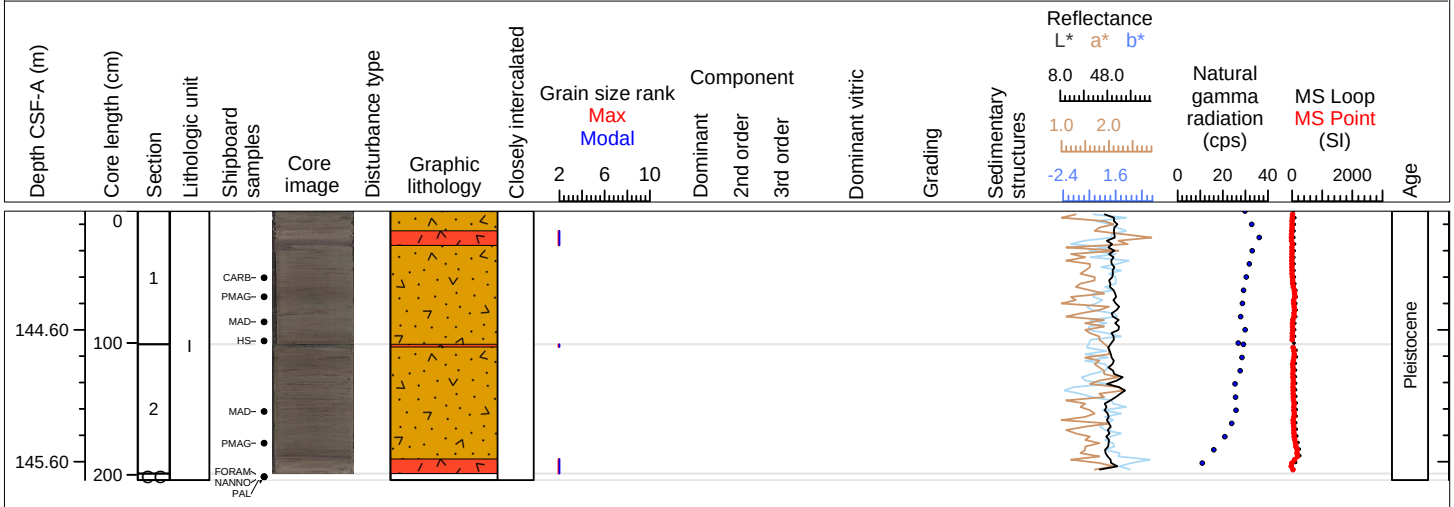
Hole 350-U1437B Core 23F, Interval 142.3-143.75 m (CSF-A)

monotonous tuffaceous mud with evolved ash layers



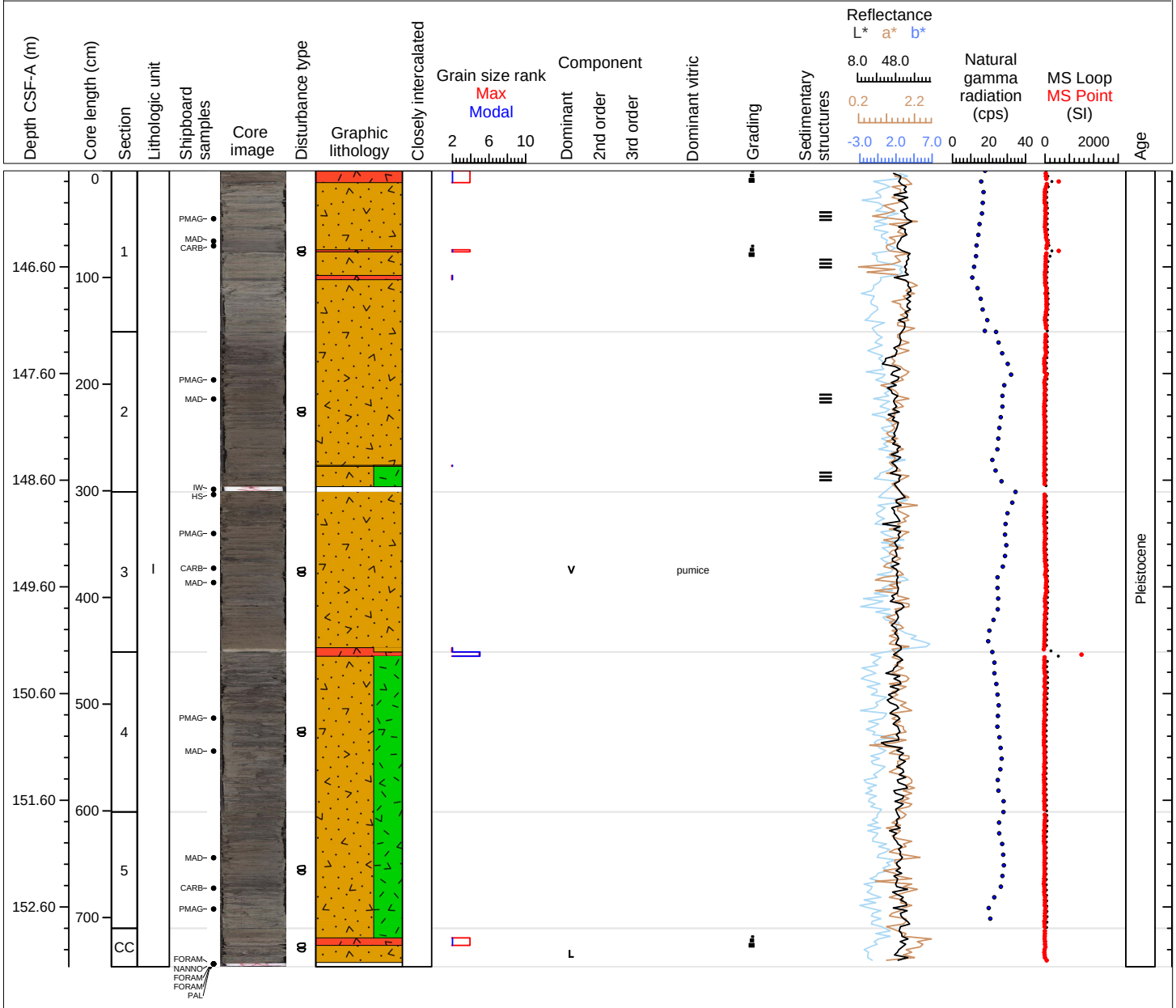
Hole 350-U1437B Core 24F, Interval 143.7-145.74 m (CSF-A)

monotonous tuffaceous mud with intercalated evolved ash layers



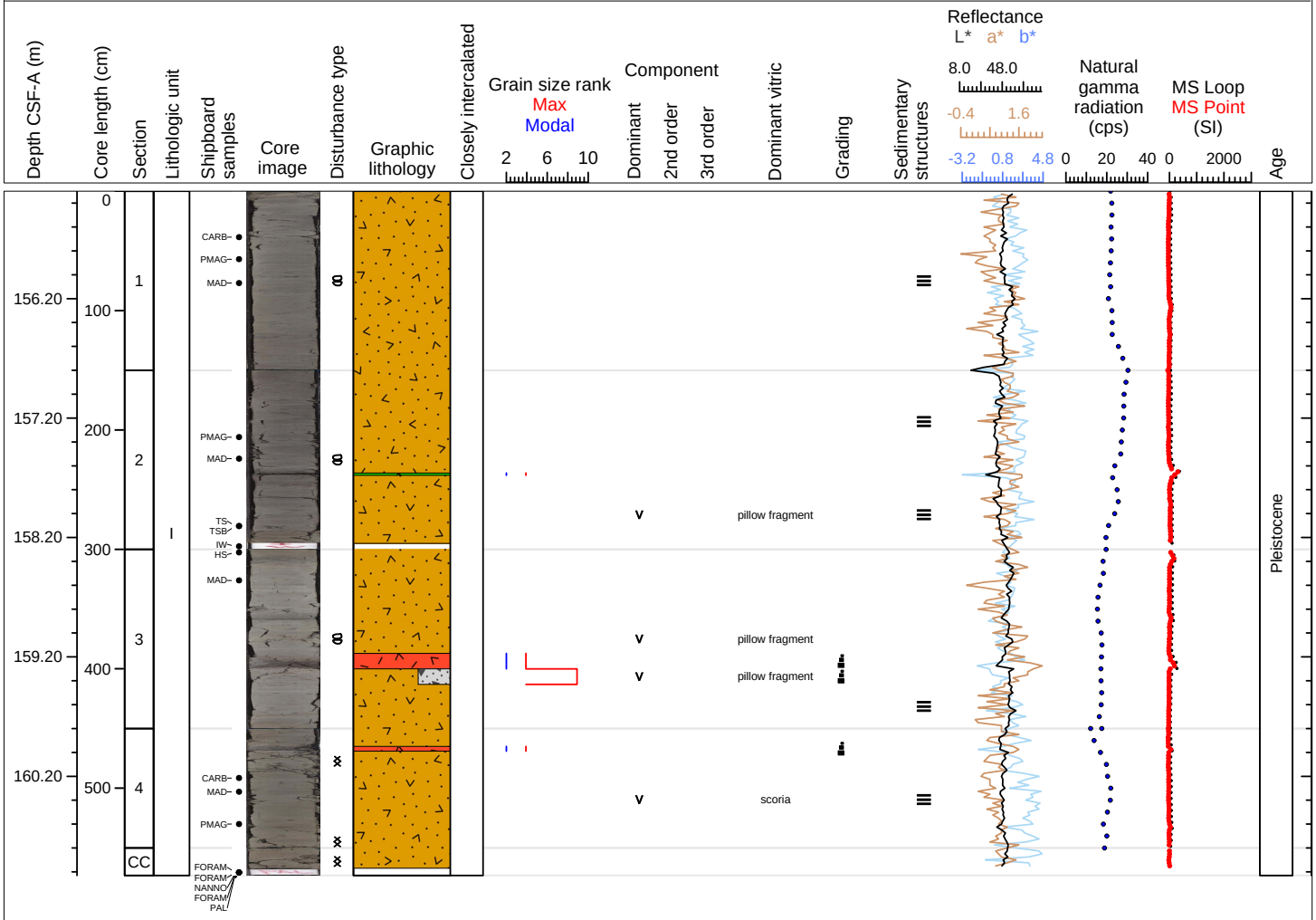
Hole 350-U1437B Core 25X, Interval 145.7-153.16 m (CSF-A)

monotonous tuffaceous mud with ash and evolved ash layers



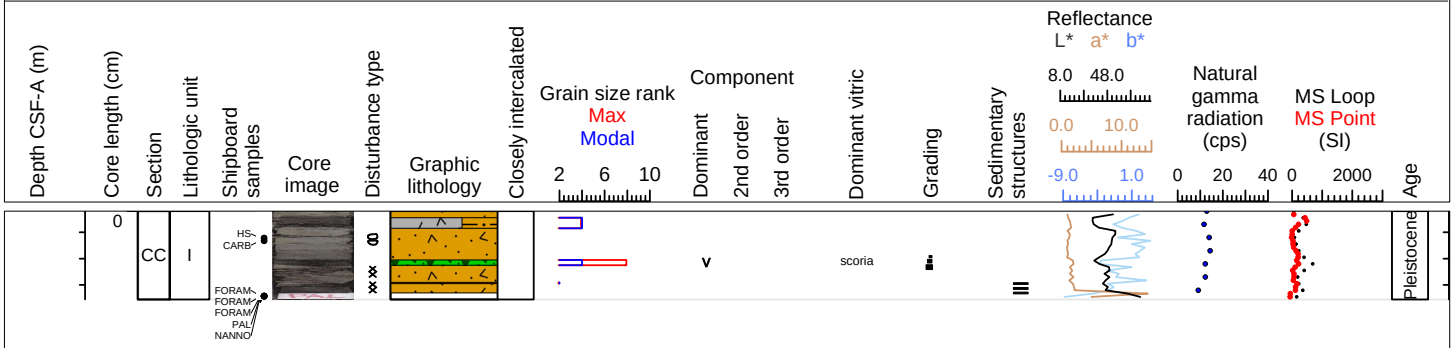
Hole 350-U1437B Core 26X, Interval 155.3-161.03 m (CSF-A)

strongly bioturbated tuffaceous mud, occasional evolved ash layers



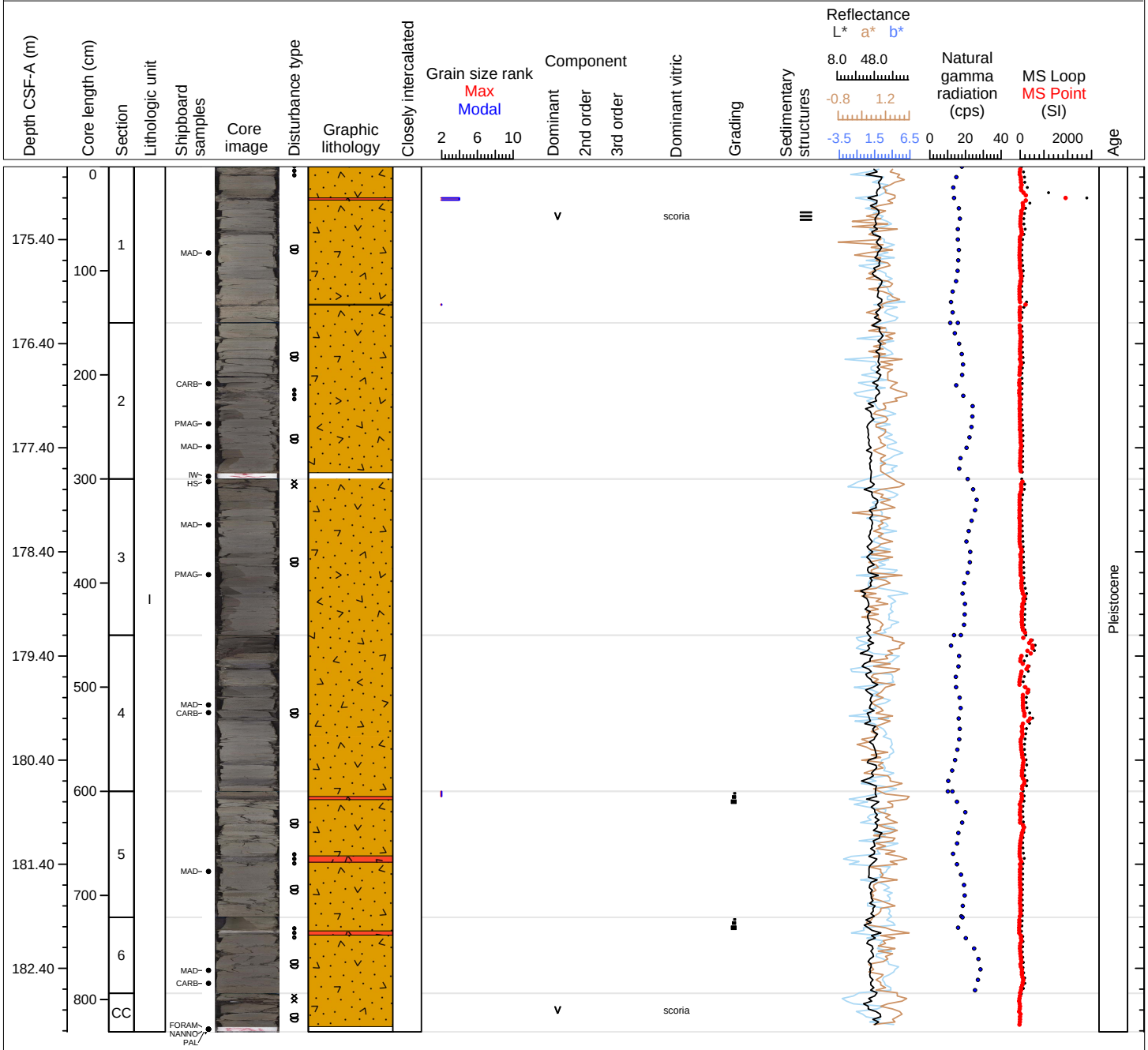
Hole 350-U1437B Core 27X, Interval 165.0-165.67 m (CSF-A)

tuffaceous mud and bimodal, mafic, and evolved ash layers



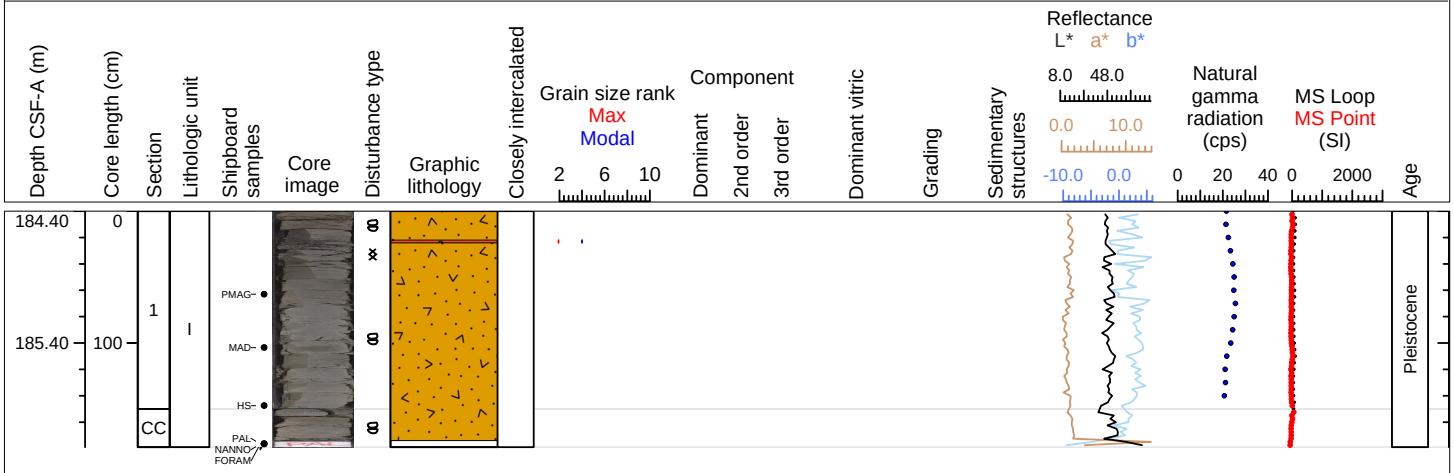
Hole 350-U1437B Core 28X, Interval 174.7-183.01 m (CSF-A)

heavily bioturbated tuffaceous mud, few evolved ash layers



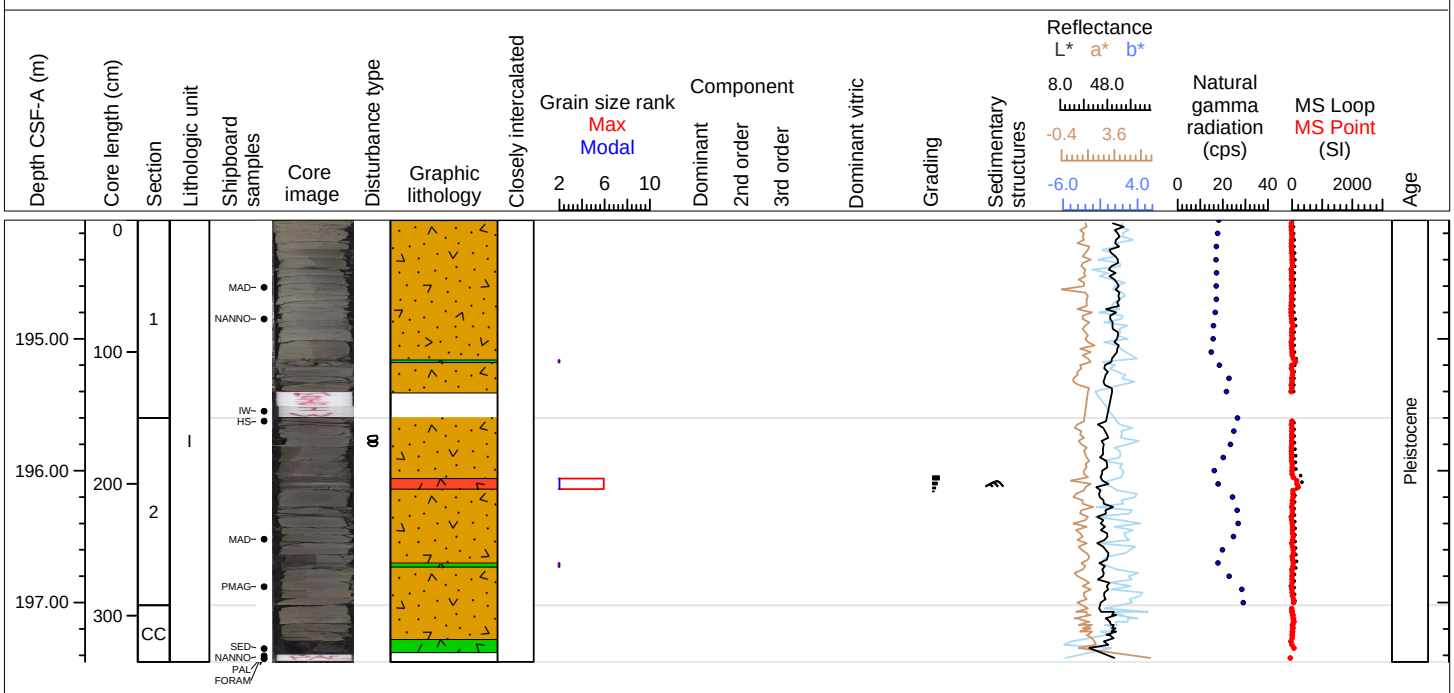
Hole 350-U1437B Core 29X, Interval 184.4-186.19 m (CSF-A)

bioturbated tuffaceous mud with single evolved ash layer



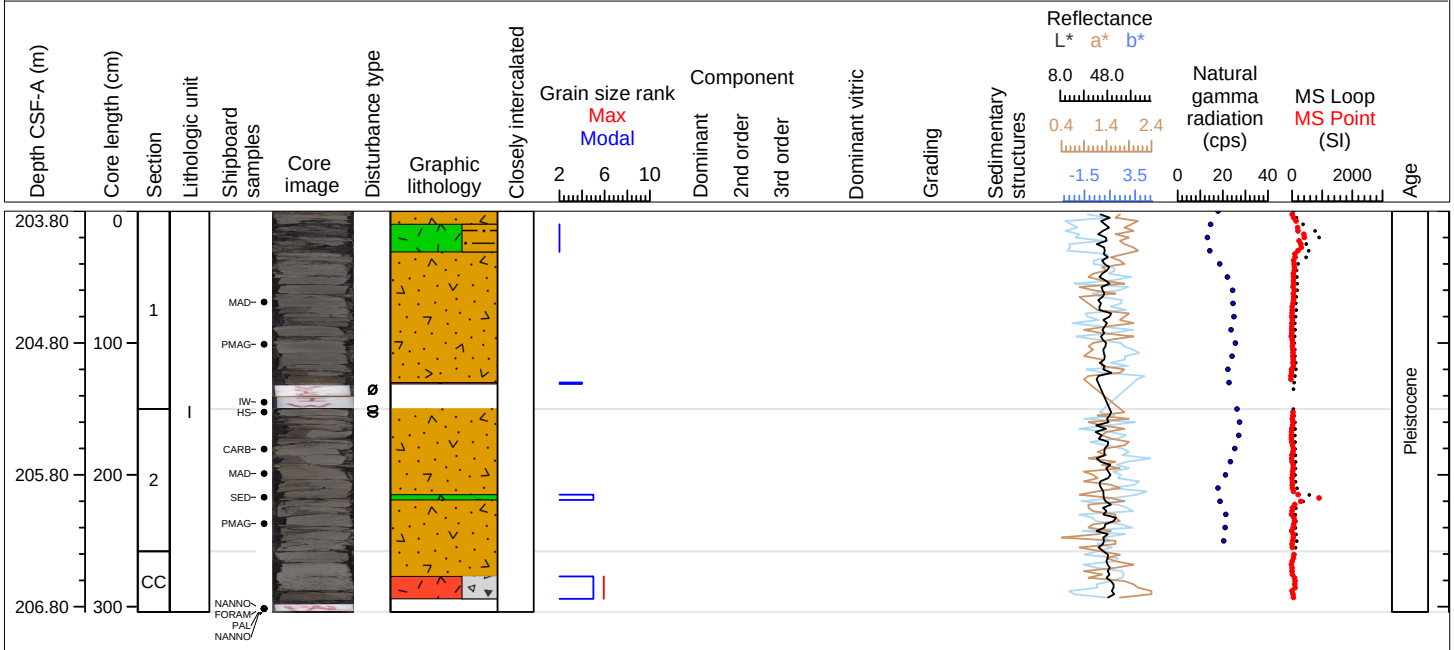
Hole 350-U1437B Core 30X, Interval 194.1-197.45 m (CSF-A)

tuffaceous mud and few mafic and evolved layers



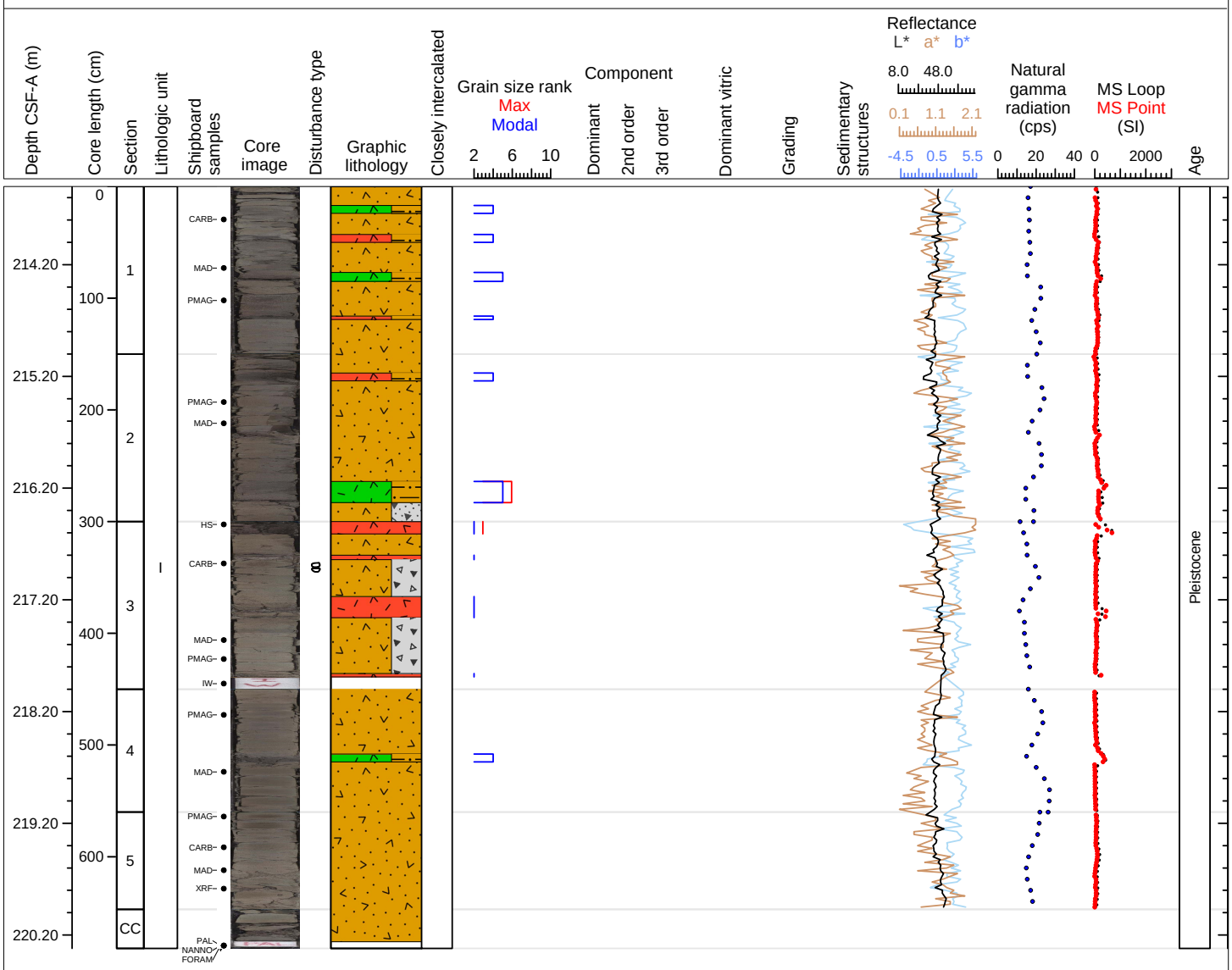
Hole 350-U1437B Core 31X, Interval 203.8-206.84 m (CSF-A)

tuffaceous mud and few evolved and mafic layers



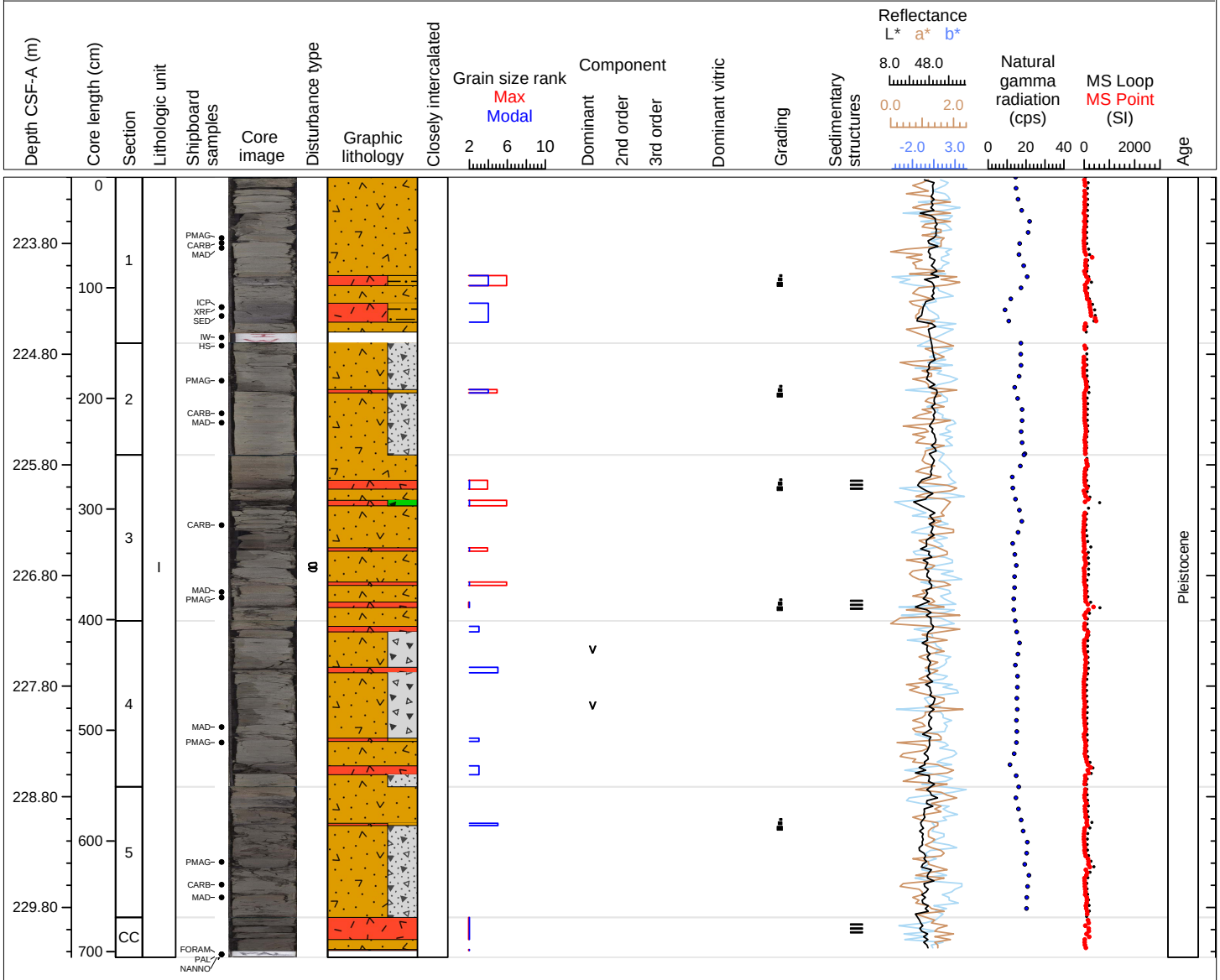
Hole 350-U1437B Core 32X, Interval 213.5-220.32 m (CSF-A)

tuffaceous mud and few evolved and mafic layers



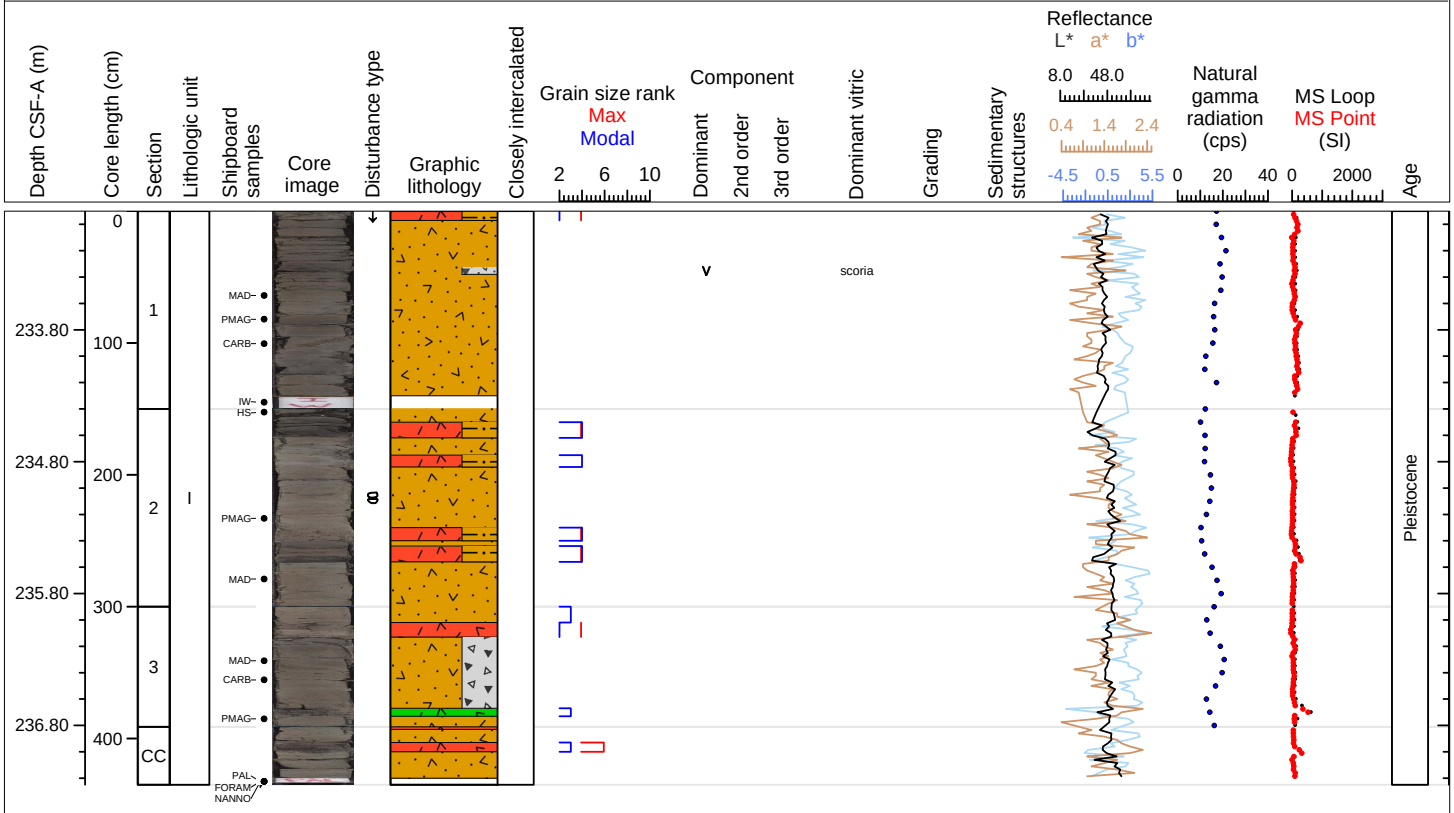
Hole 350-U1437B Core 33X, Interval 223.2-230.25 m (CSF-A)

tuffaceous mud with evolved ash layers



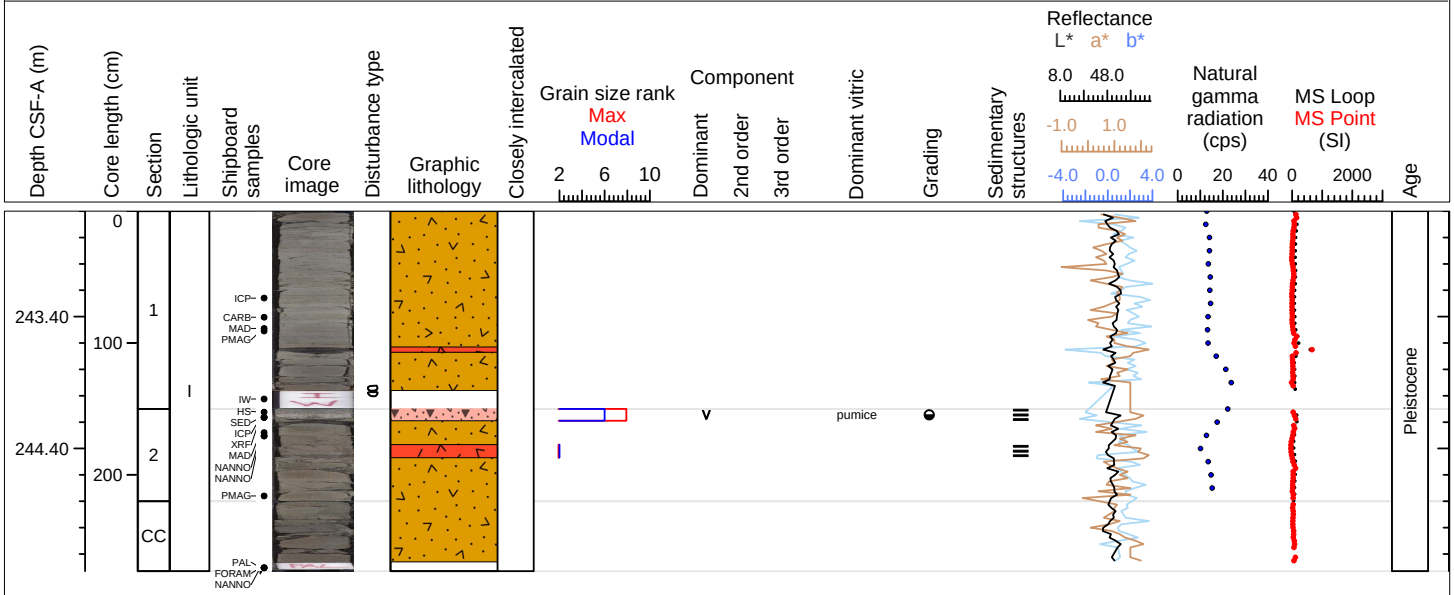
Hole 350-U1437B Core 34X, Interval 232.9-237.25 m (CSF-A)

tuffaceous mud with evolved ash layers



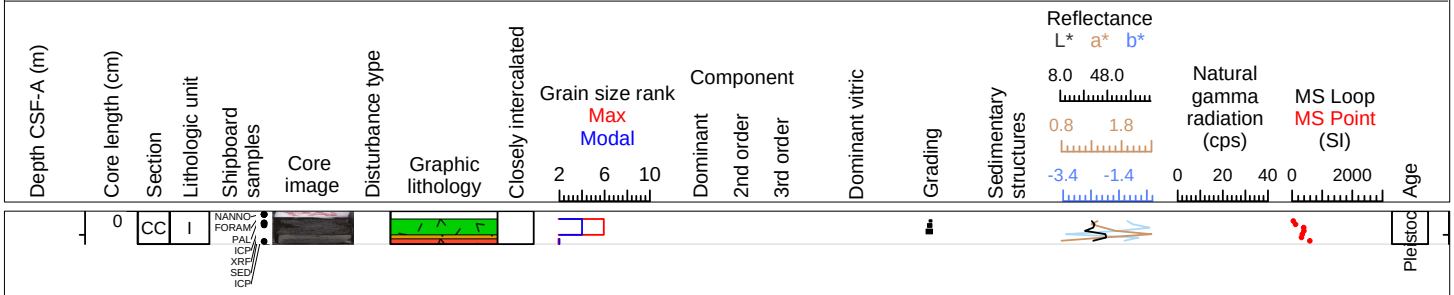
Hole 350-U1437B Core 35X, Interval 242.6-245.33 m (CSF-A)

tuffaceous mud with evolved ash layers



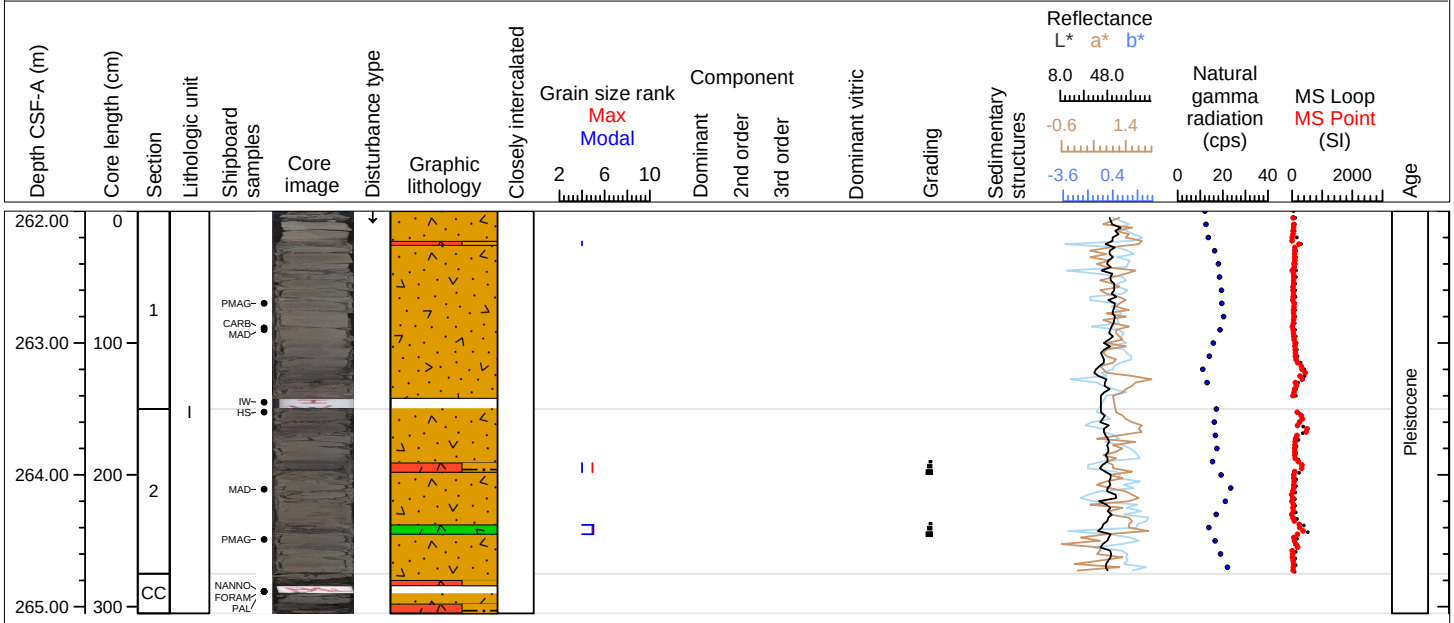
Hole 350-U1437B Core 36X, Interval 252.3-252.55 m (CSF-A)

mafic and evolved ash



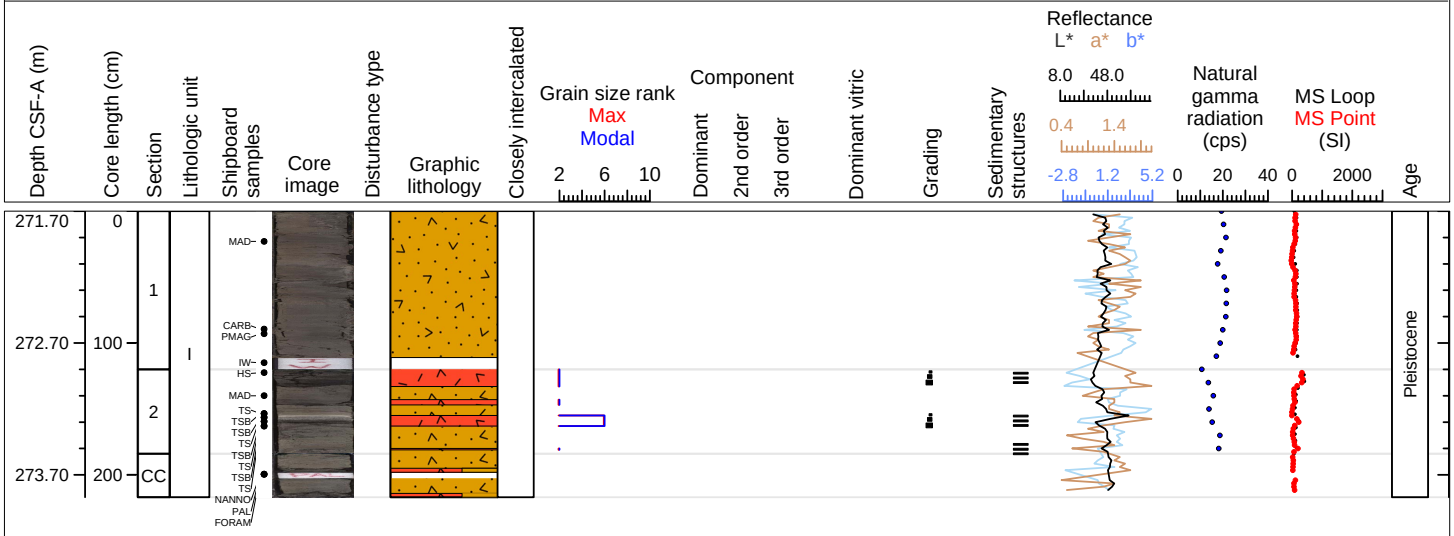
Hole 350-U1437B Core 37X, Interval 262.0-265.05 m (CSF-A)

tuffaceous mud with evolved ash layers



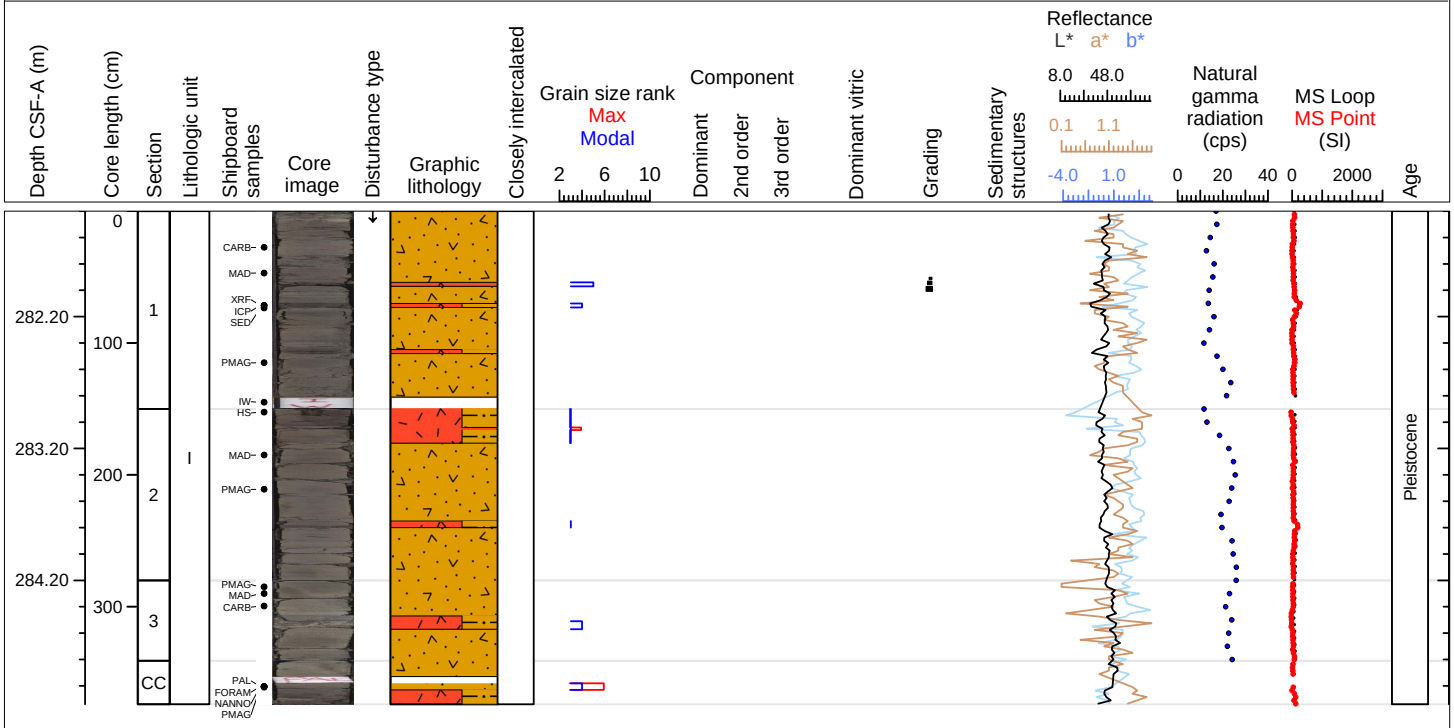
Hole 350-U1437B Core 38X, Interval 271.7-273.87 m (CSF-A)

tuffaceous mud with evolved ash layers



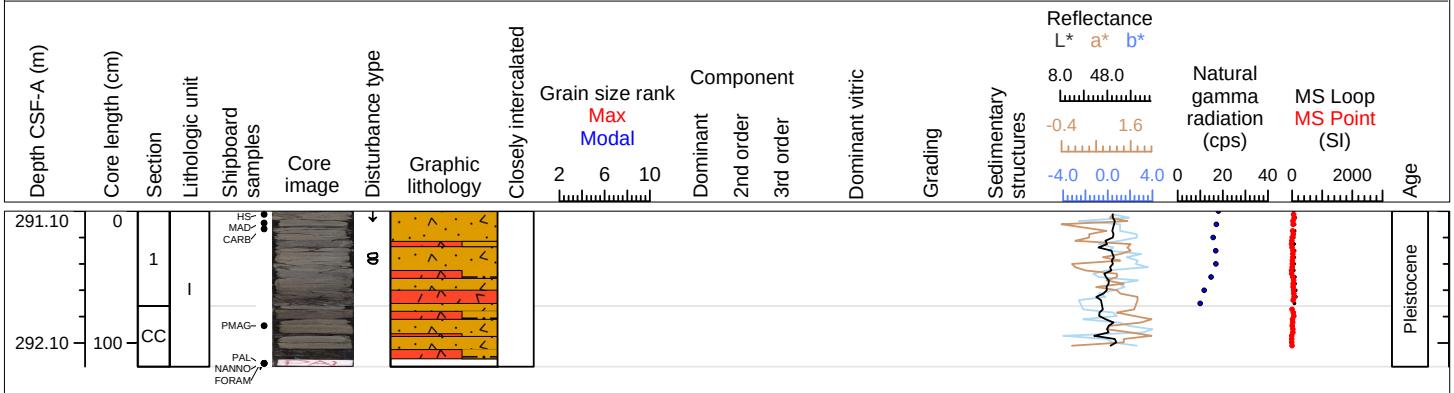
Hole 350-U1437B Core 39X, Interval 281.4-285.14 m (CSF-A)

tuffaceous mud with evolved ash layers



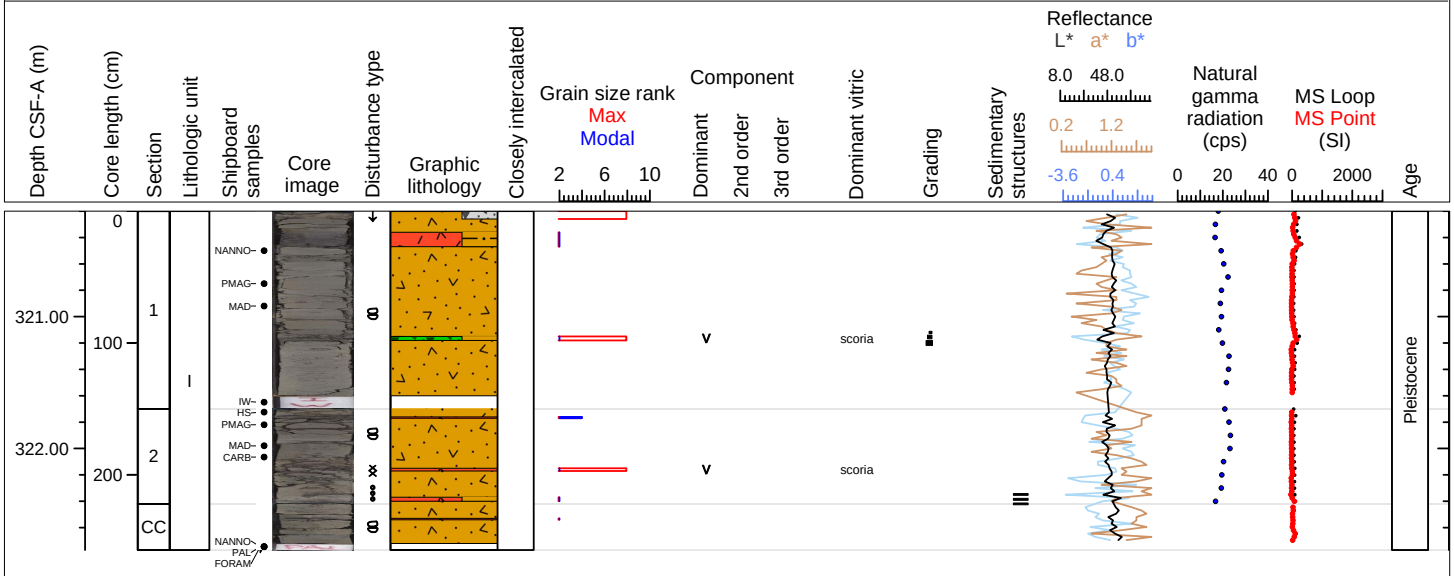
Hole 350-U1437B Core 40X, Interval 291.1-292.28 m (CSF-A)

tuffaceous mud with evolved ash layers



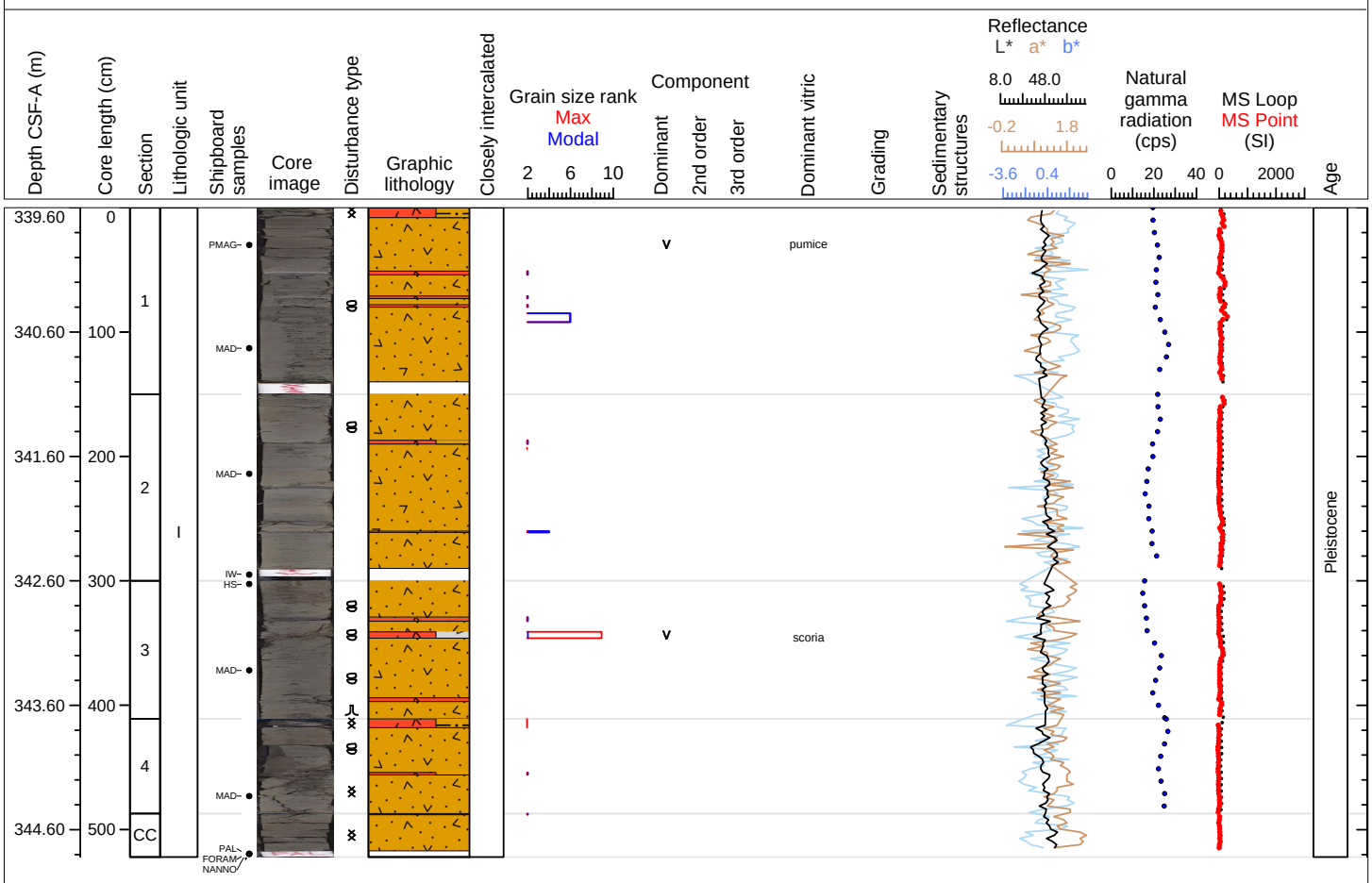
Hole 350-U1437B Core 43X, Interval 320.2-322.77 m (CSF-A)

bioturbated tuffaceous mud with intercalated evolved and mafic ash layers



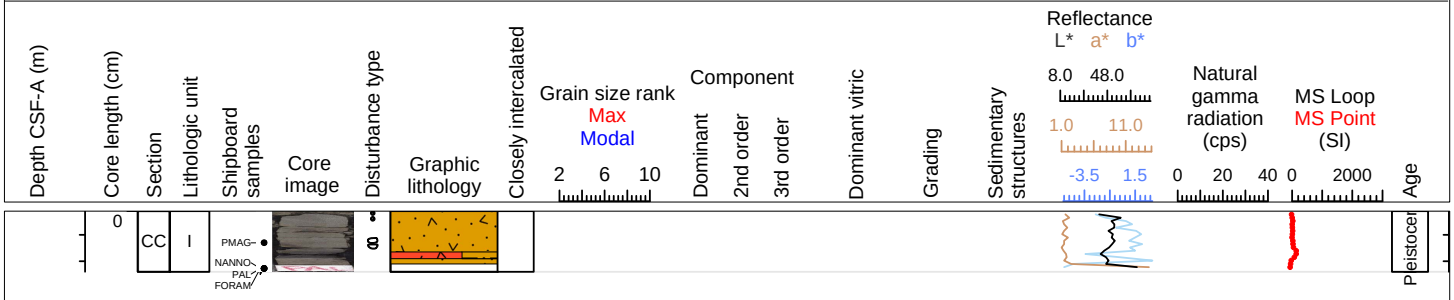
Hole 350-U1437B Core 45X, Interval 339.6-344.82 m (CSF-A)

bioturbated tuffaceous mud with evolved ash layers



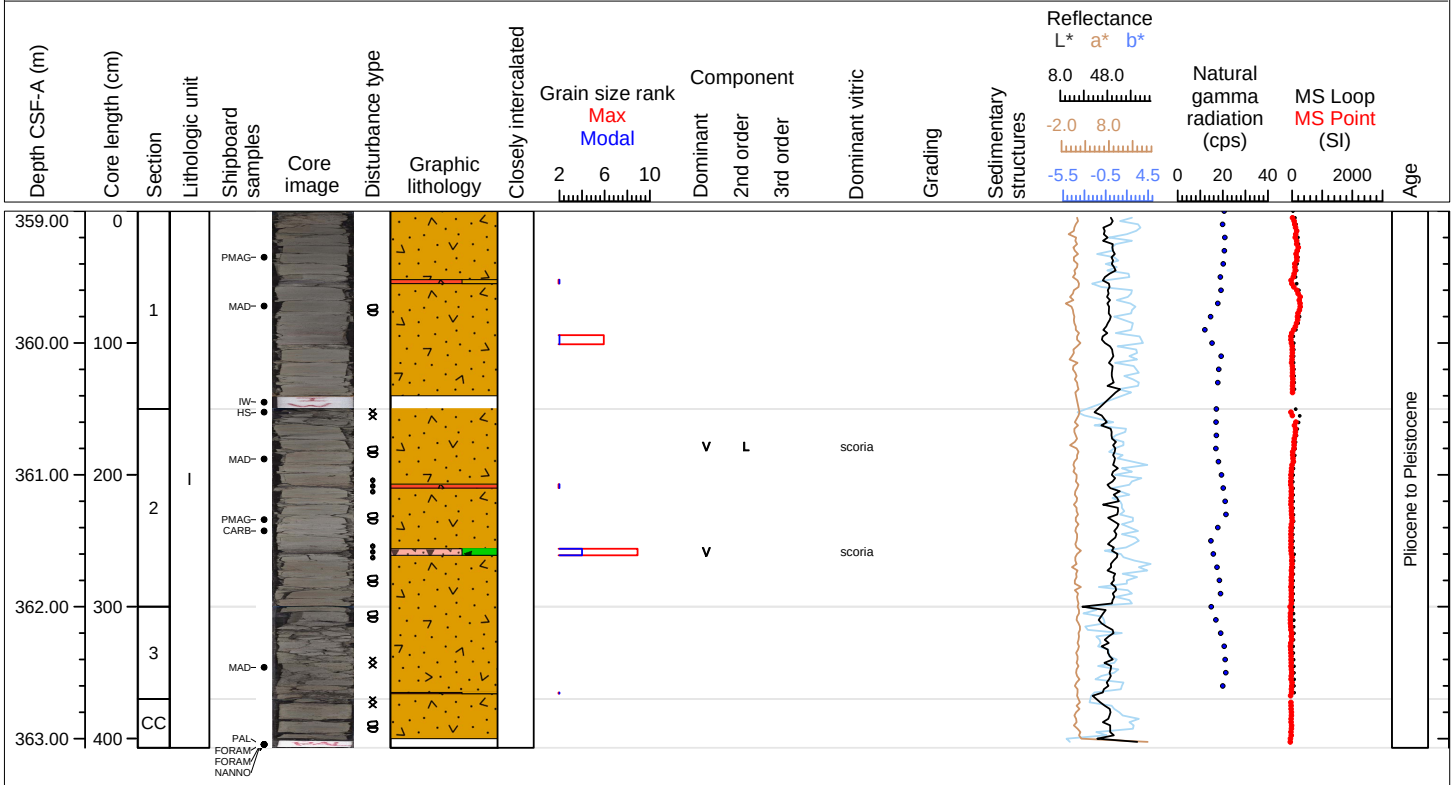
Hole 350-U1437B Core 46X, Interval 349.3-349.76 m (CSF-A)

tuffaceous mud



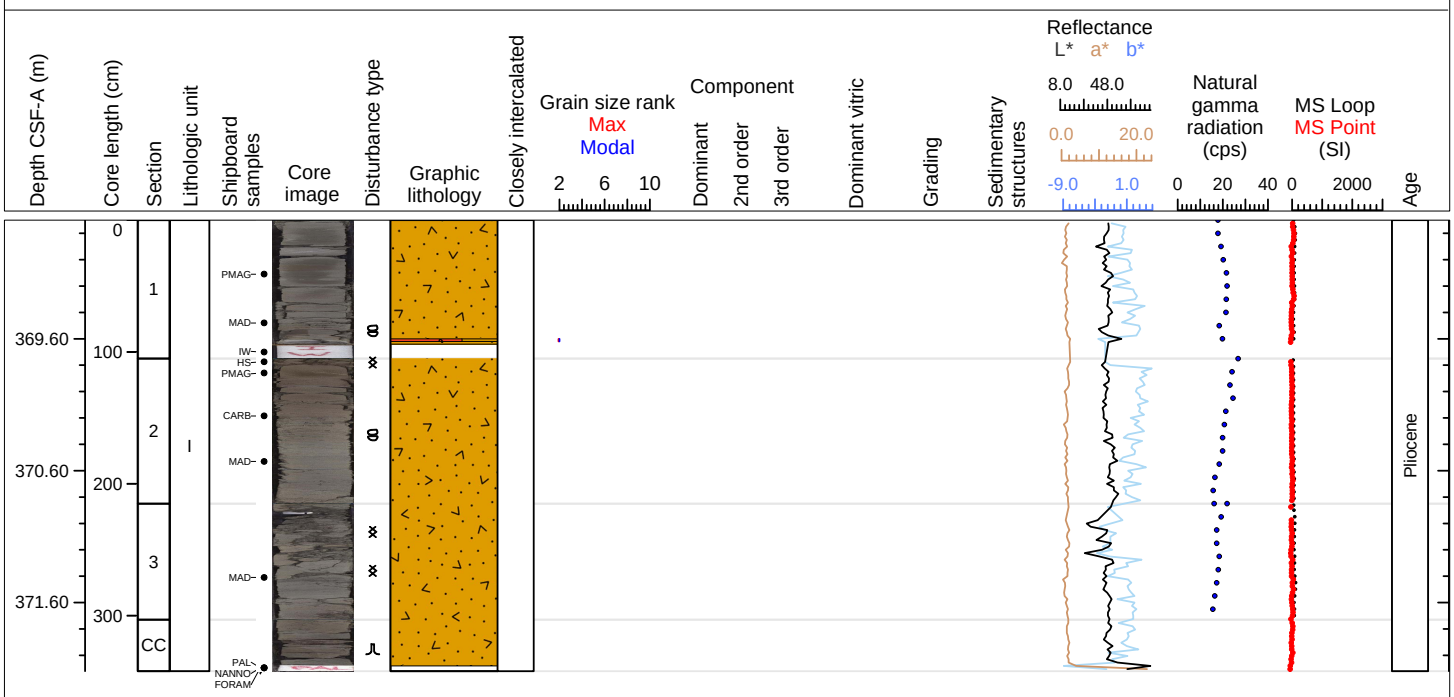
Hole 350-U1437B Core 47X, Interval 359.0-363.07 m (CSF-A)

bioturbated tuffaceous mud with evolved ash layers



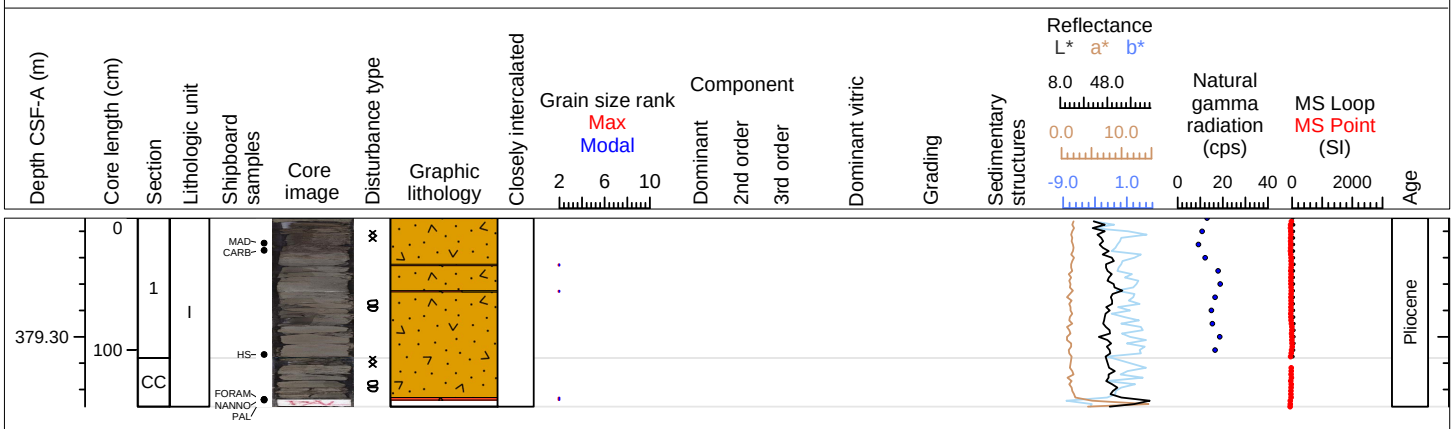
Hole 350-U1437B Core 48X, Interval 368.7-372.12 m (CSF-A)

bioturbated tuffaceous mud



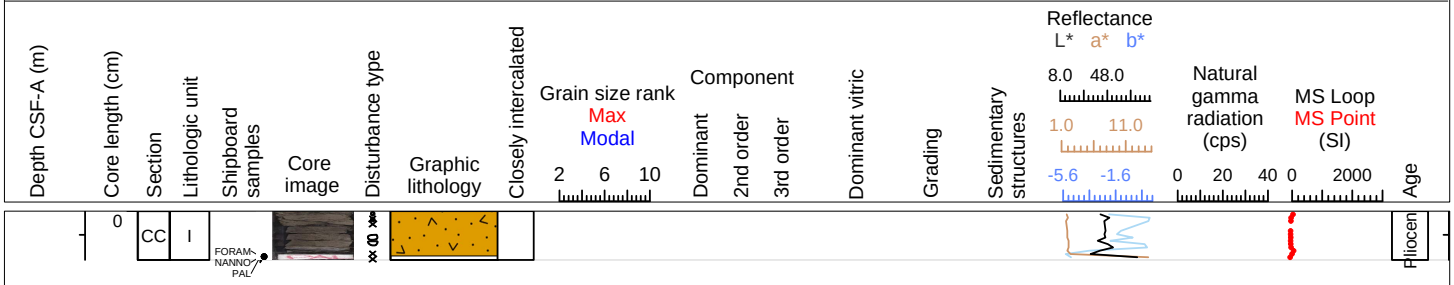
Hole 350-U1437B Core 49X, Interval 378.4-379.83 m (CSF-A)

bioturbated tuffaceous mud with evolved ash layers



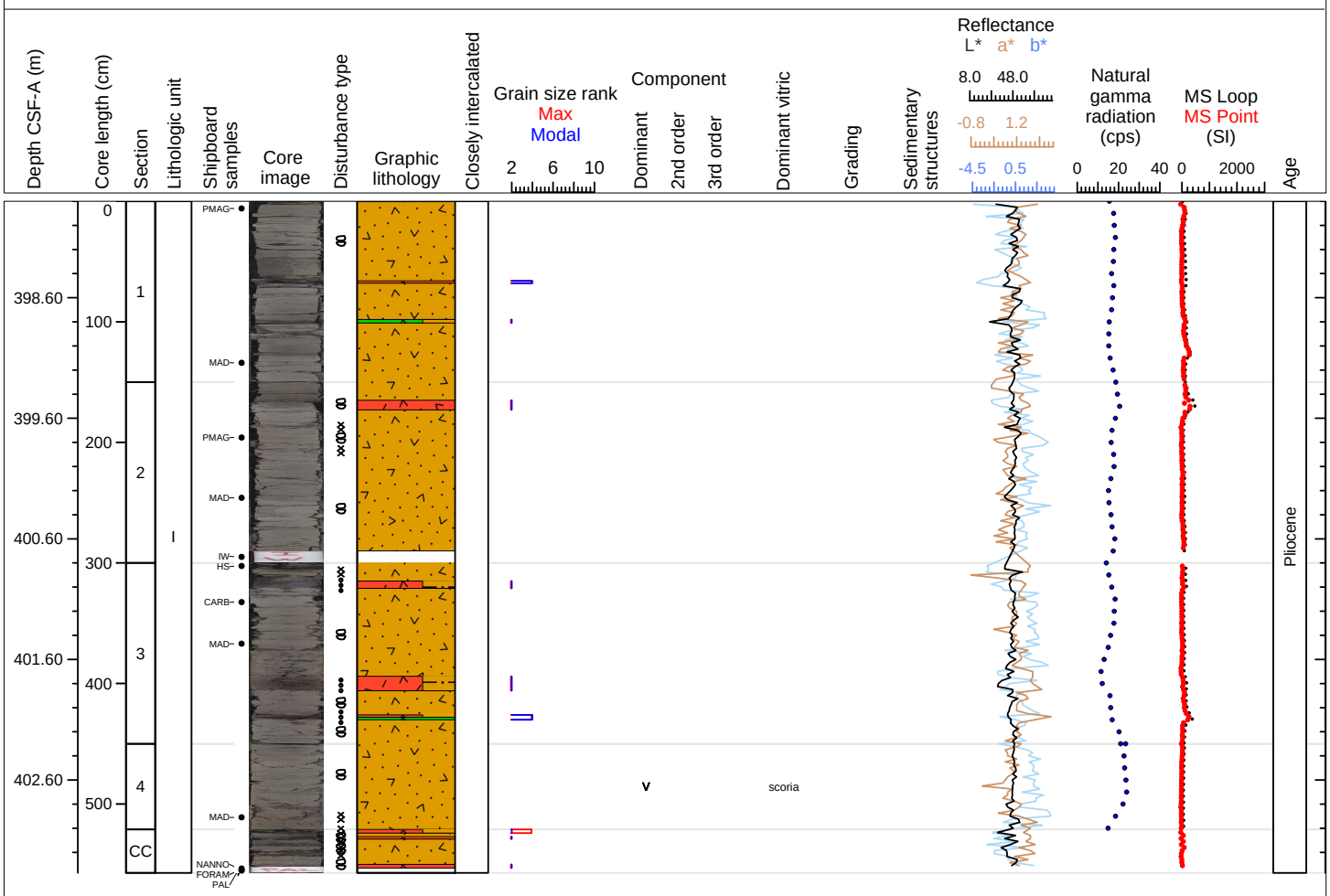
Hole 350-U1437B Core 50X, Interval 388.1-388.47 m (CSF-A)

tuffaceous mud



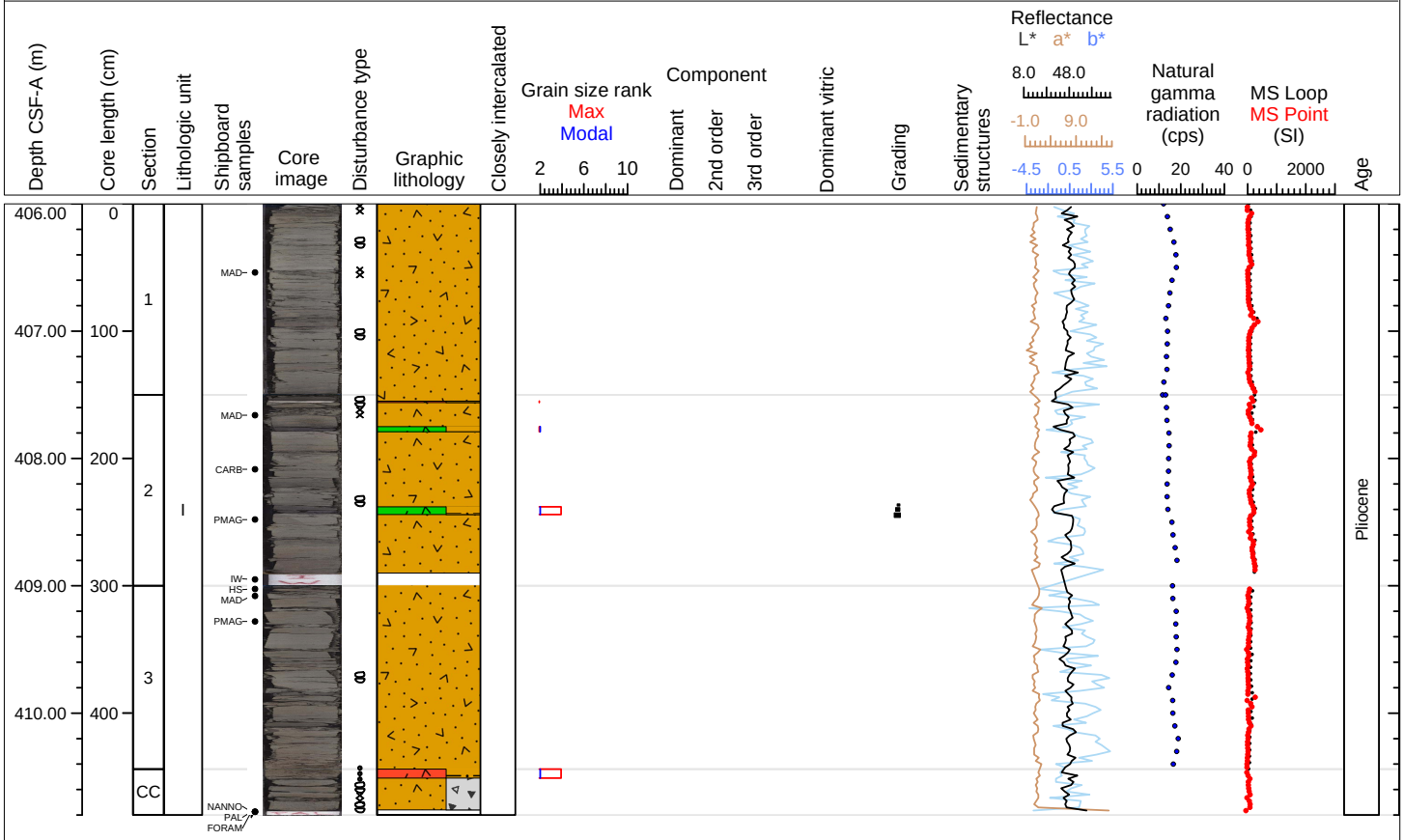
Hole 350-U1437B Core 51X, Interval 397.8-403.37 m (CSF-A)

bioturbated tuffaceous mud with many evolved ash and few mafic ash layers



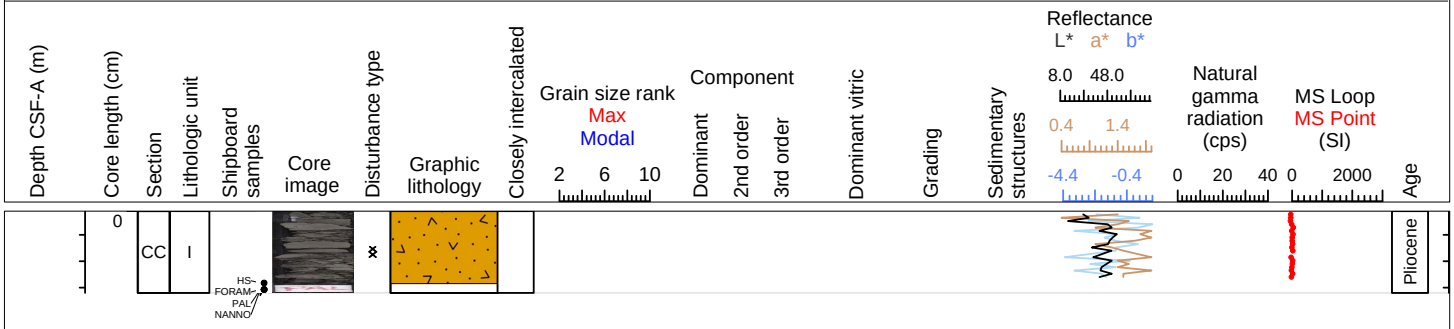
Hole 350-U1437B Core 52X, Interval 406.0-410.8 m (CSF-A)

tuffaceous mud with evolved and mafic ash layers



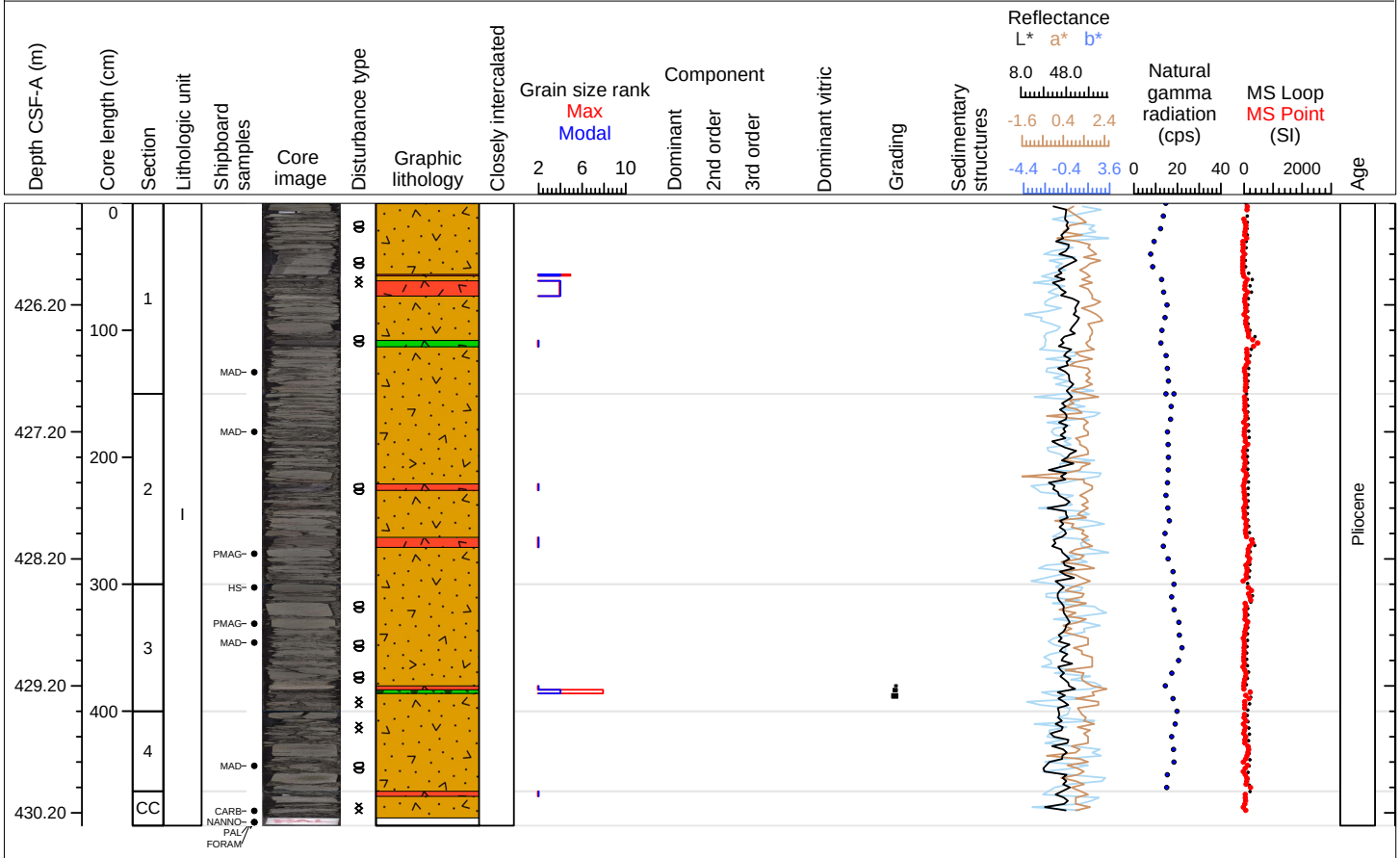
Hole 350-U1437B Core 53X, Interval 415.7-416.32 m (CSF-A)

tuffaceous mud



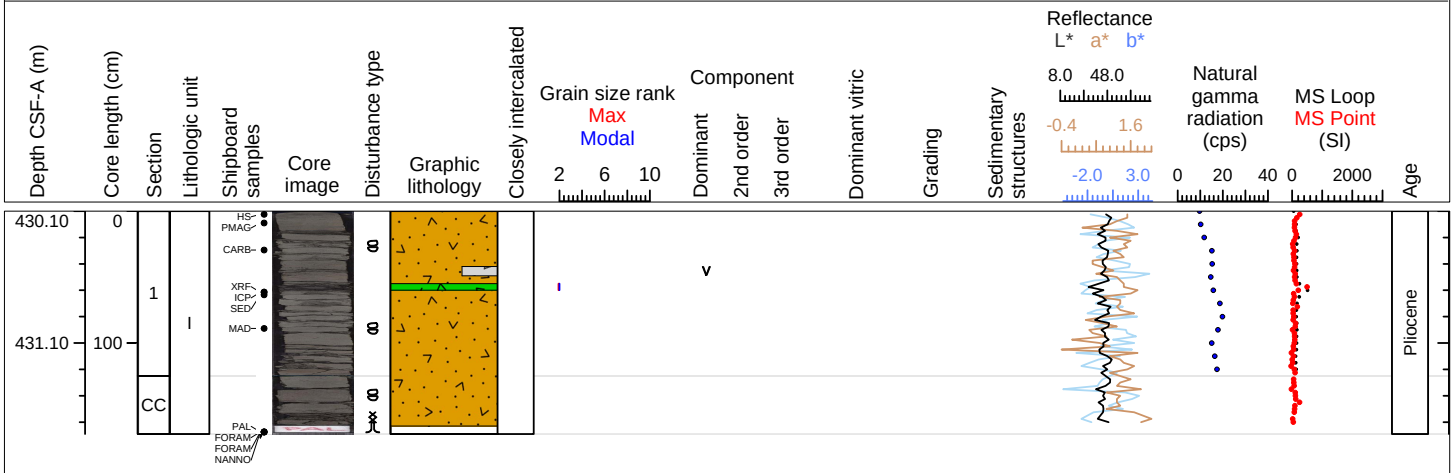
Hole 350-U1437B Core 54X, Interval 425.4-430.3 m (CSF-A)

tuffaceous mud with many evolved and mafic ash layers



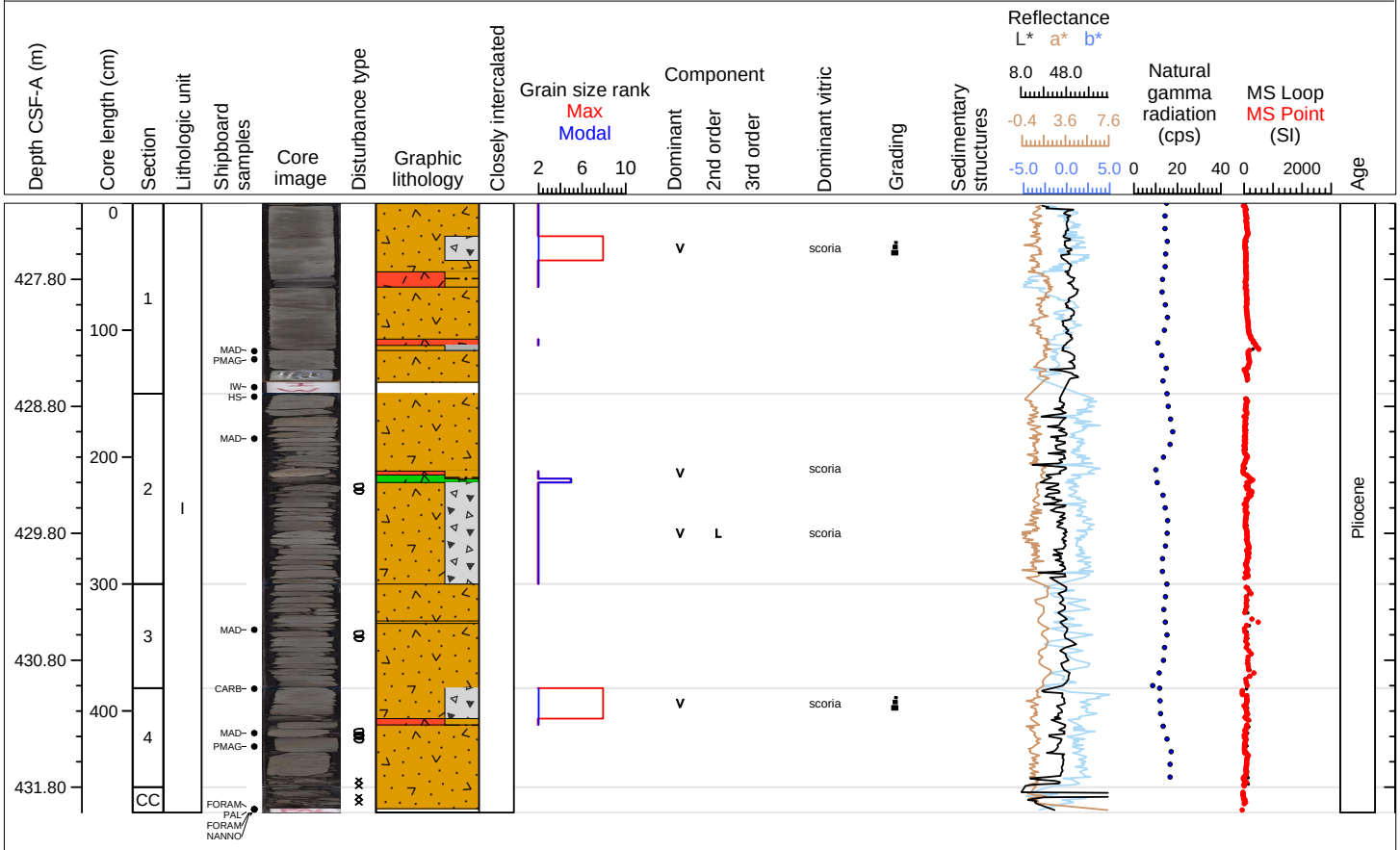
Hole 350-U1437B Core 55X, Interval 430.1-431.79 m (CSF-A)

tuffaceous mud with mafic ash layer



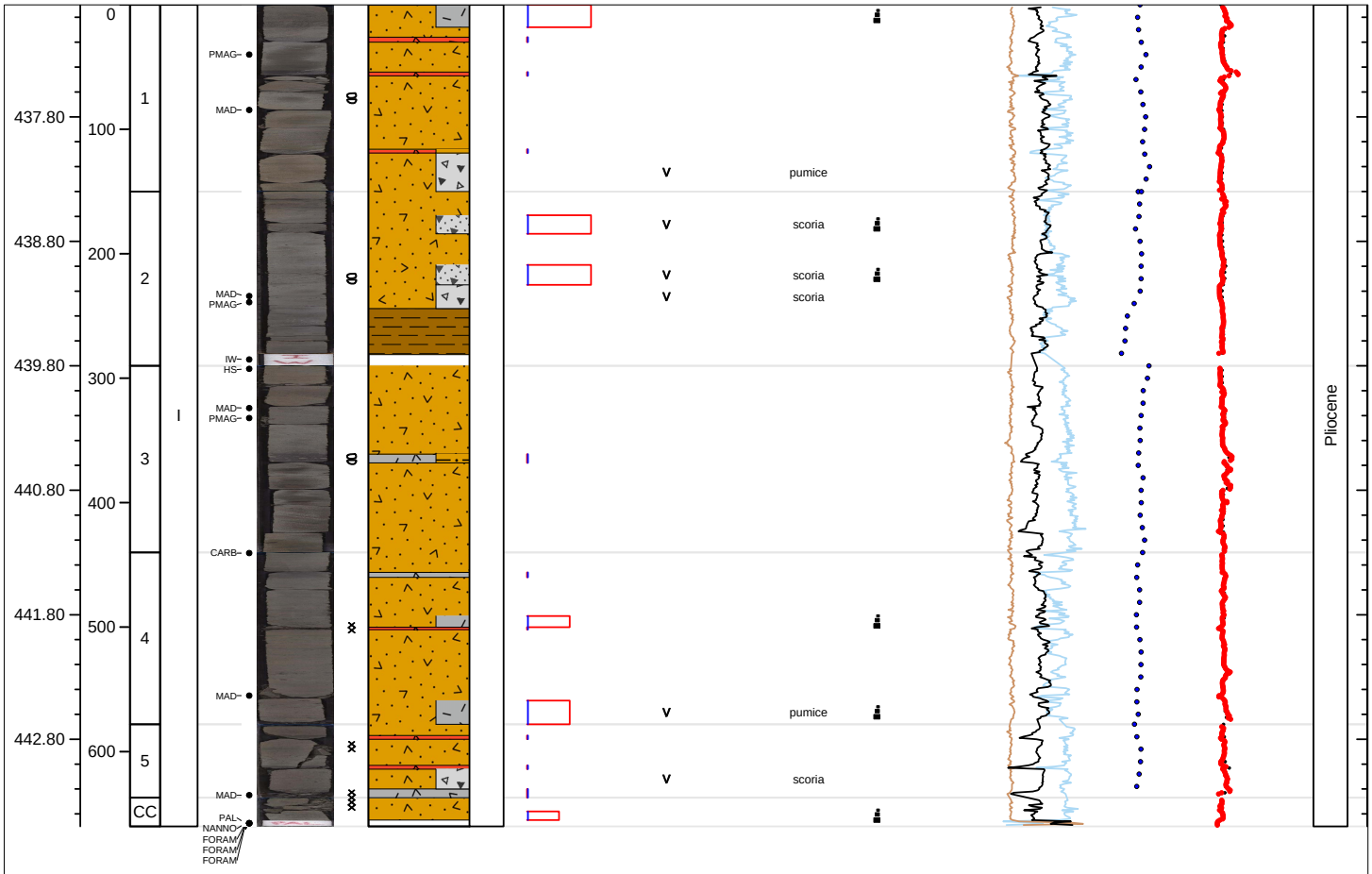
Hole 350-U1437D Core 2R, Interval 427.2-432.0 m (CSF-A)

bioturbated tuffaceous mudstone with several evolved ash/tuff layers and a single mafic tuff layer



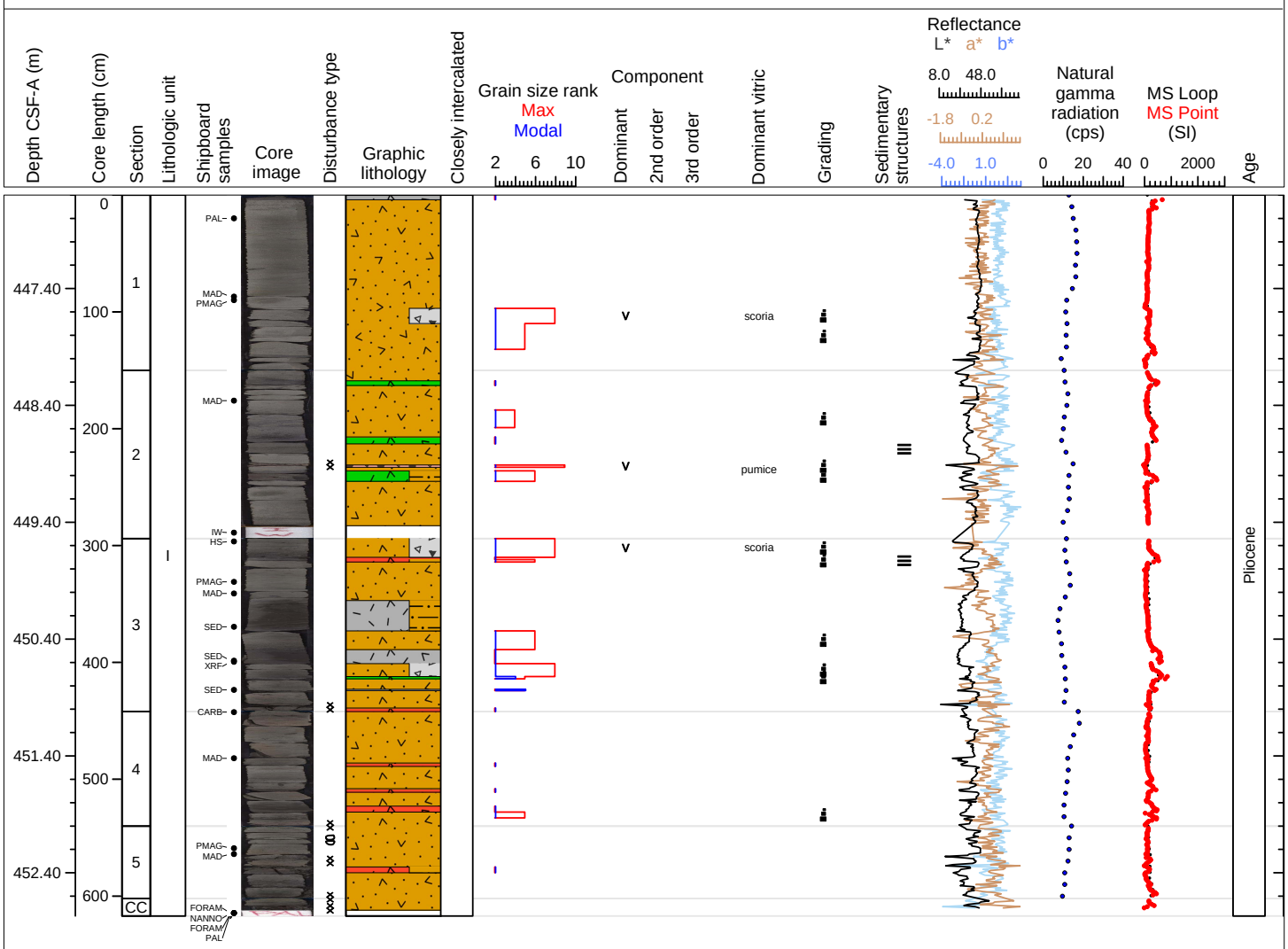
Hole 350-U1437D Core 3R, Interval 436.9-443.5 m (CSF-A)

bioturbated tuffaceous mudstone with many evolved and bimodal tuff layers; two mafic tuffaceous mudstones turbidity current deposits



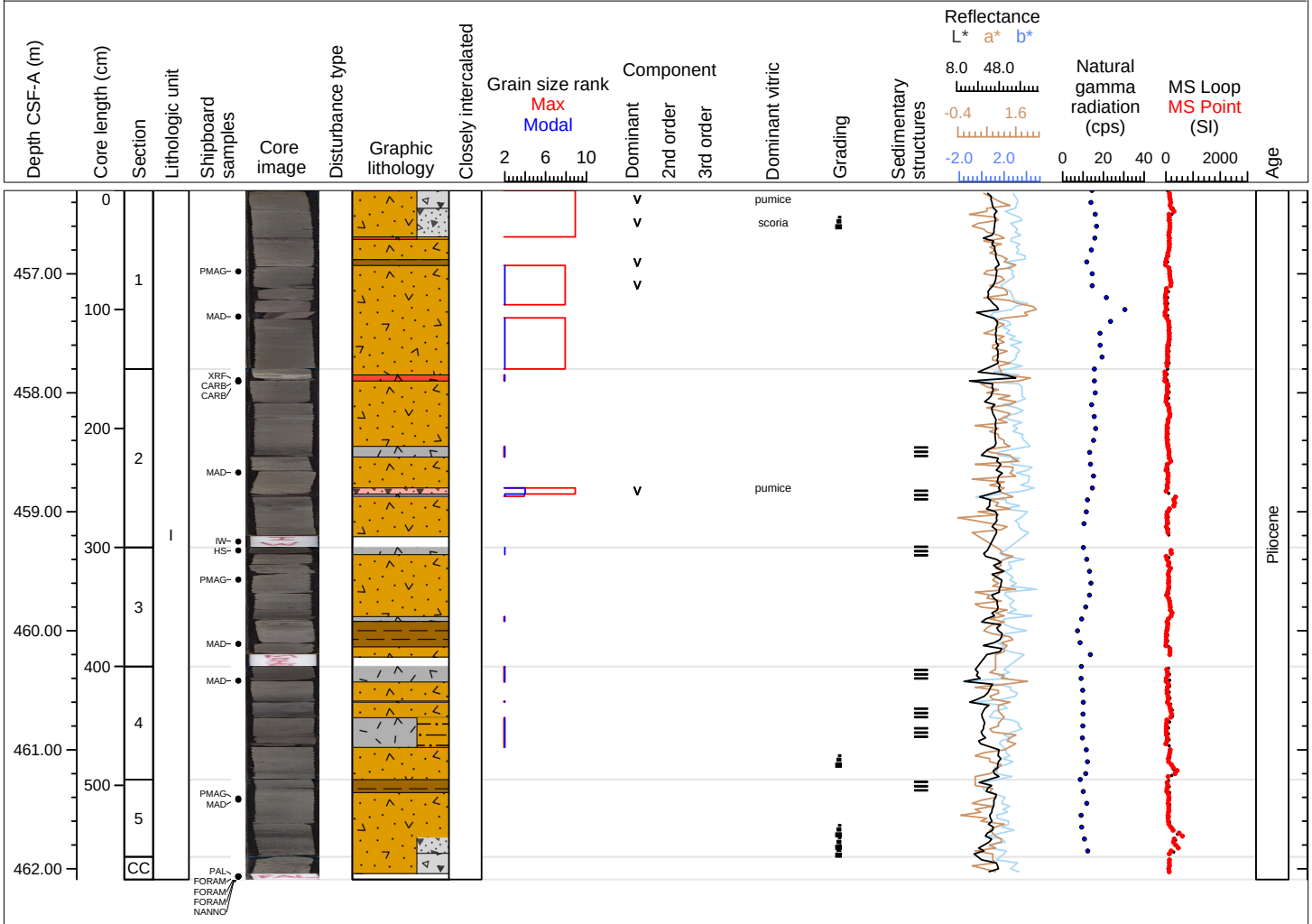
Hole 350-U1437D Core 4R, Interval 446.6-452.77 m (CSF-A)

bioturbated tuffaceous mudstone with abundant mafic, evolved and bimodal tuff layers



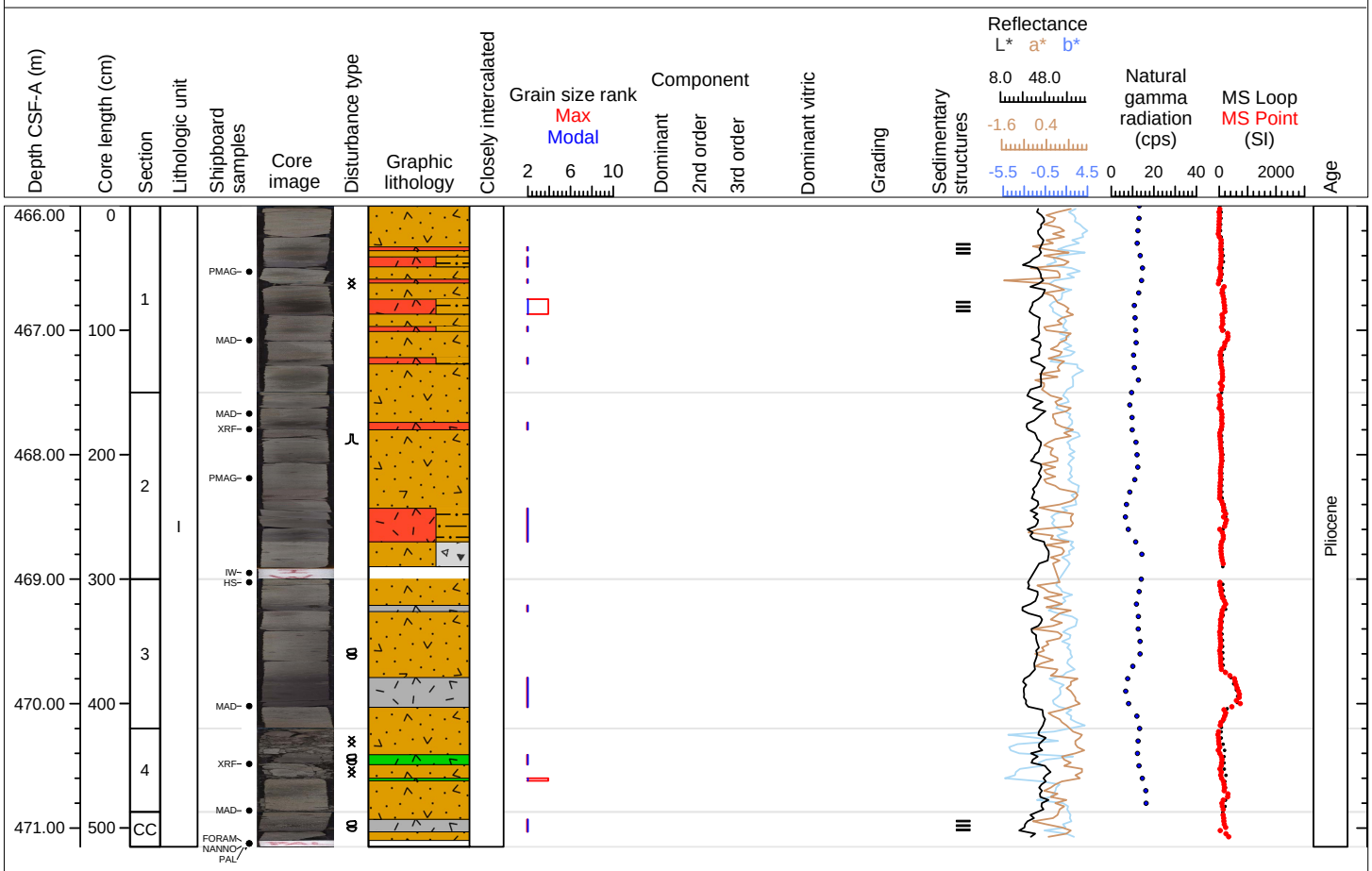
Hole 350-U1437D Core 5R, Interval 456.3-462.09 m (CSF-A)

bioturbated tuffaceous mudstone with abundant bimodal tuff layers, few evolved and mafic tuff layers



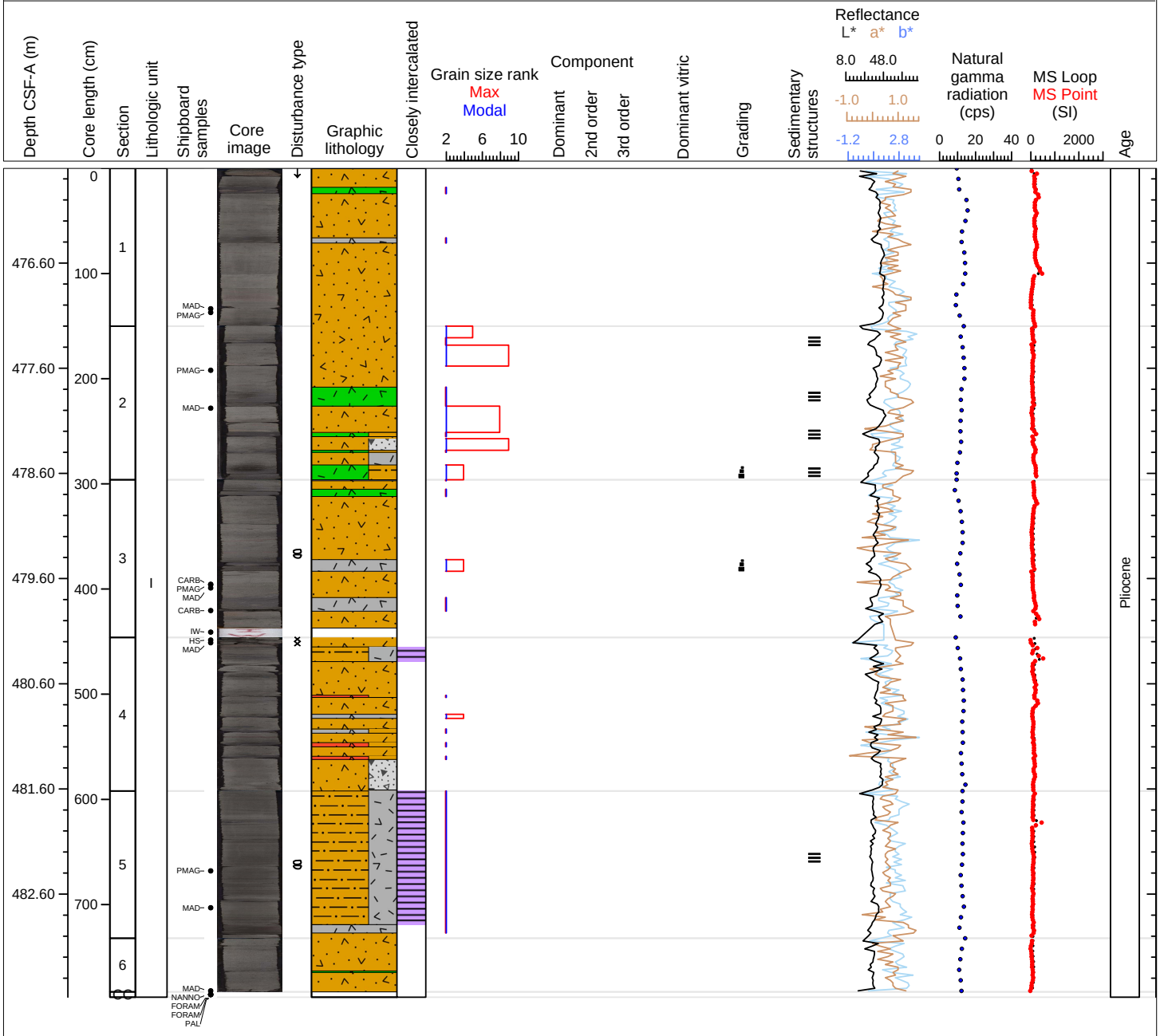
Hole 350-U1437D Core 6R, Interval 466.0-471.15 m (CSF-A)

bioturbated tuffaceous mudstone with abundant evolved tuff layers and several mafic and bimodal tuff layers



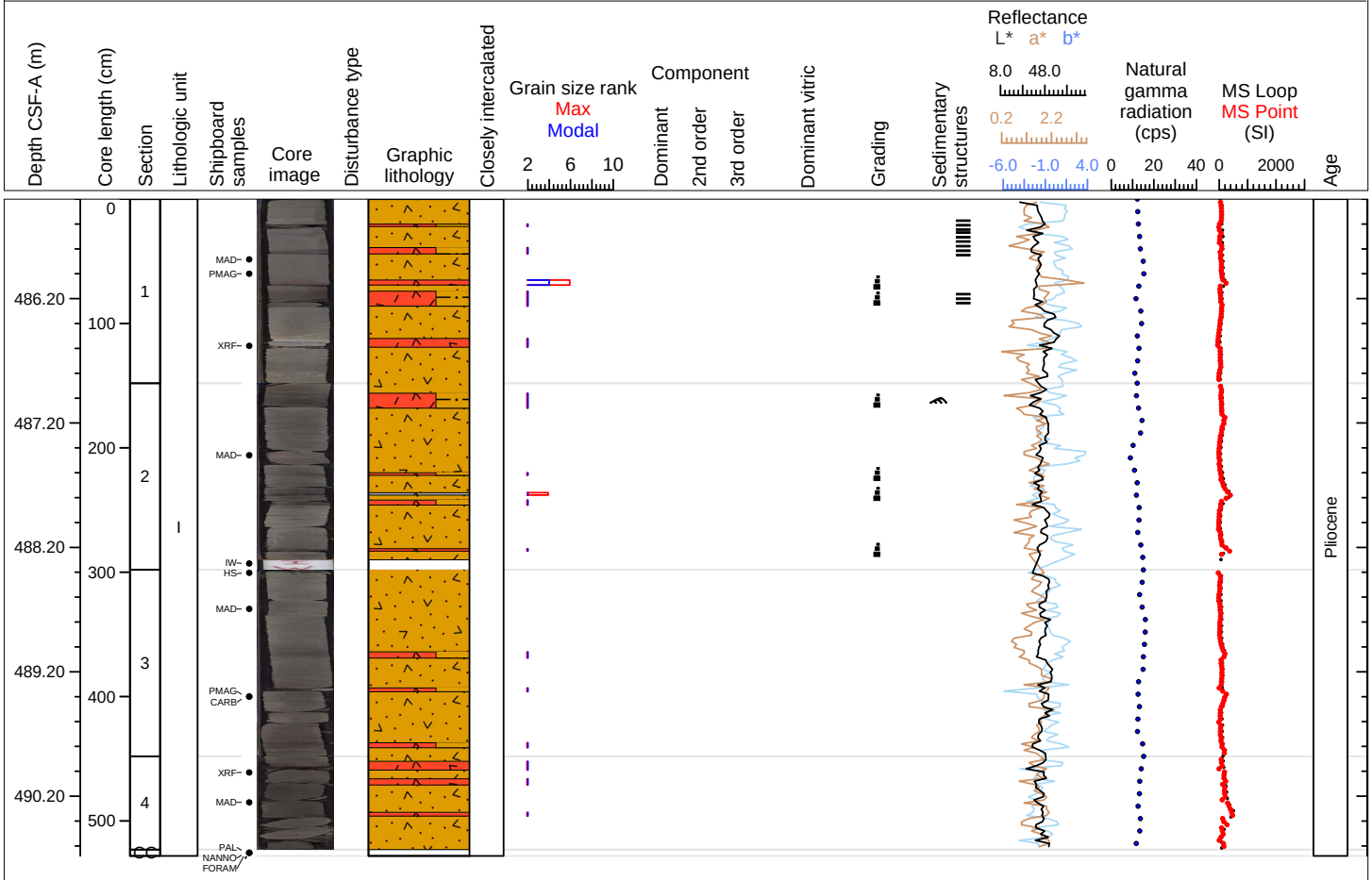
Hole 350-U1437D Core 7R, Interval 475.7-483.58 m (CSF-A)

bioturbated tuffaceous mudstone with abundant mafic, evolved, and bimodal tuff layers



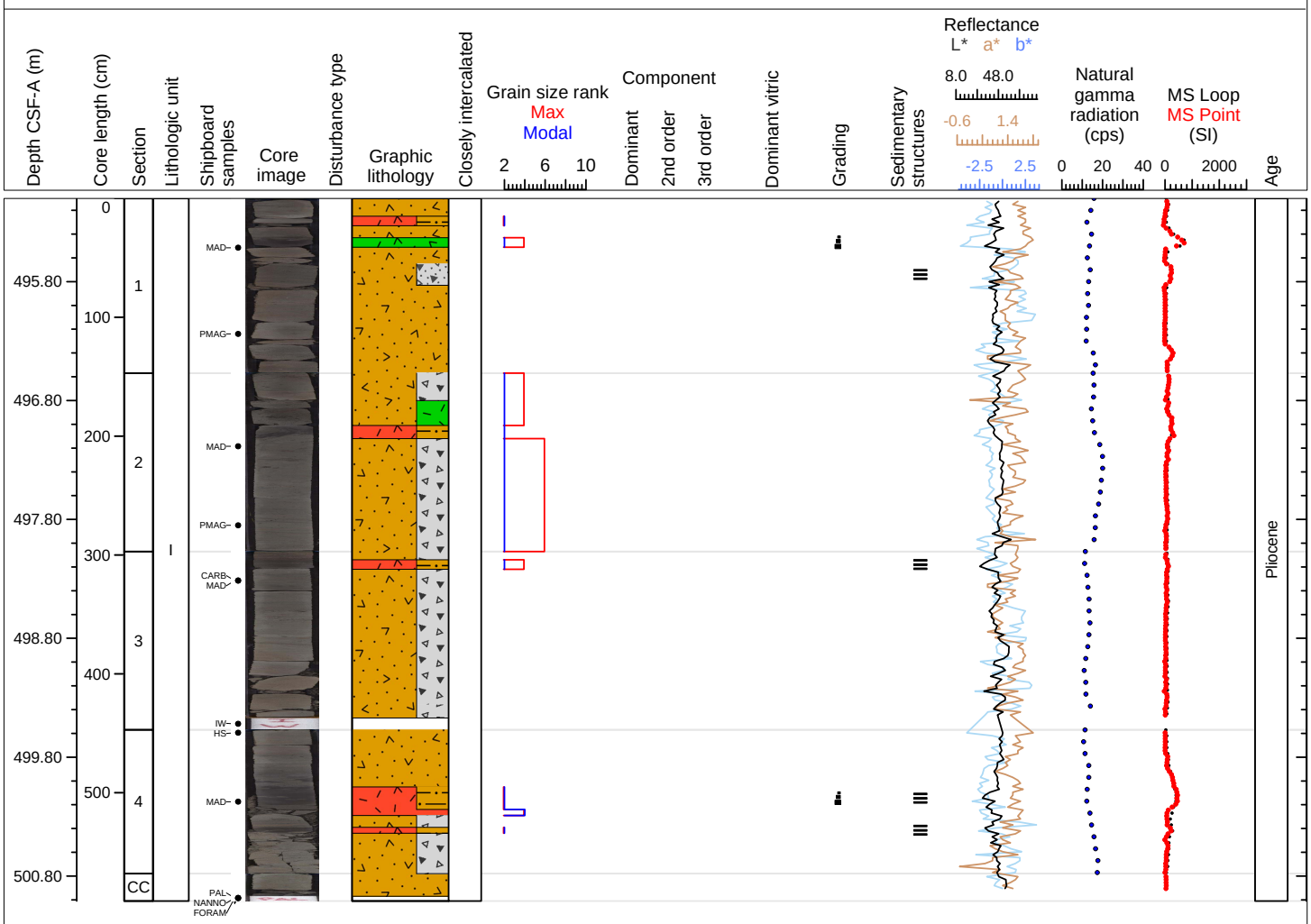
Hole 350-U1437D Core 8R, Interval 485.4-490.68 m (CSF-A)

bioturbated tuffaceous mudstone with evolved tuff layers



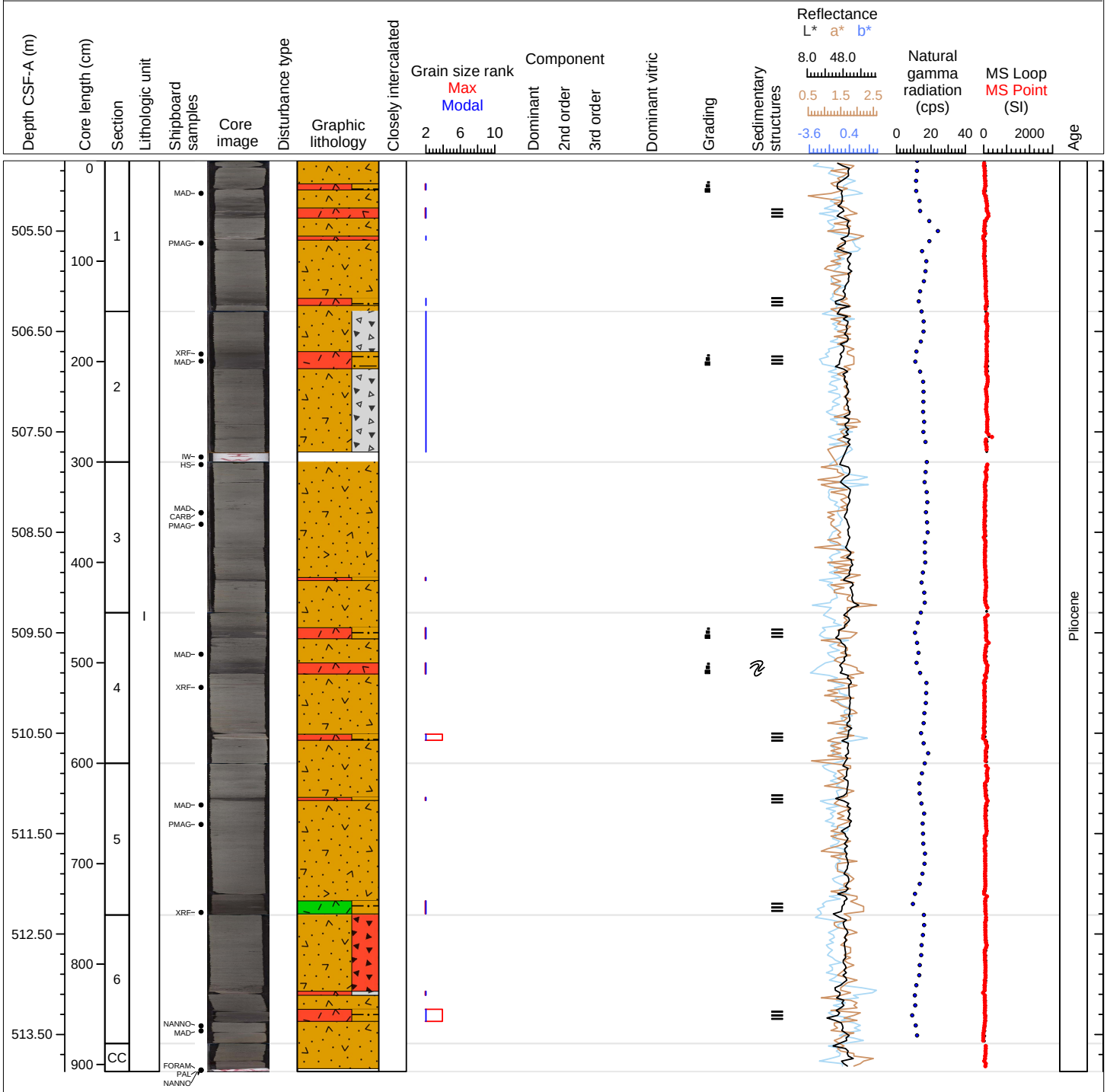
Hole 350-U1437D Core 9R, Interval 495.1-501.01 m (CSF-A)

bioturbated tuffaceous mudstone with layers of evolved tuff



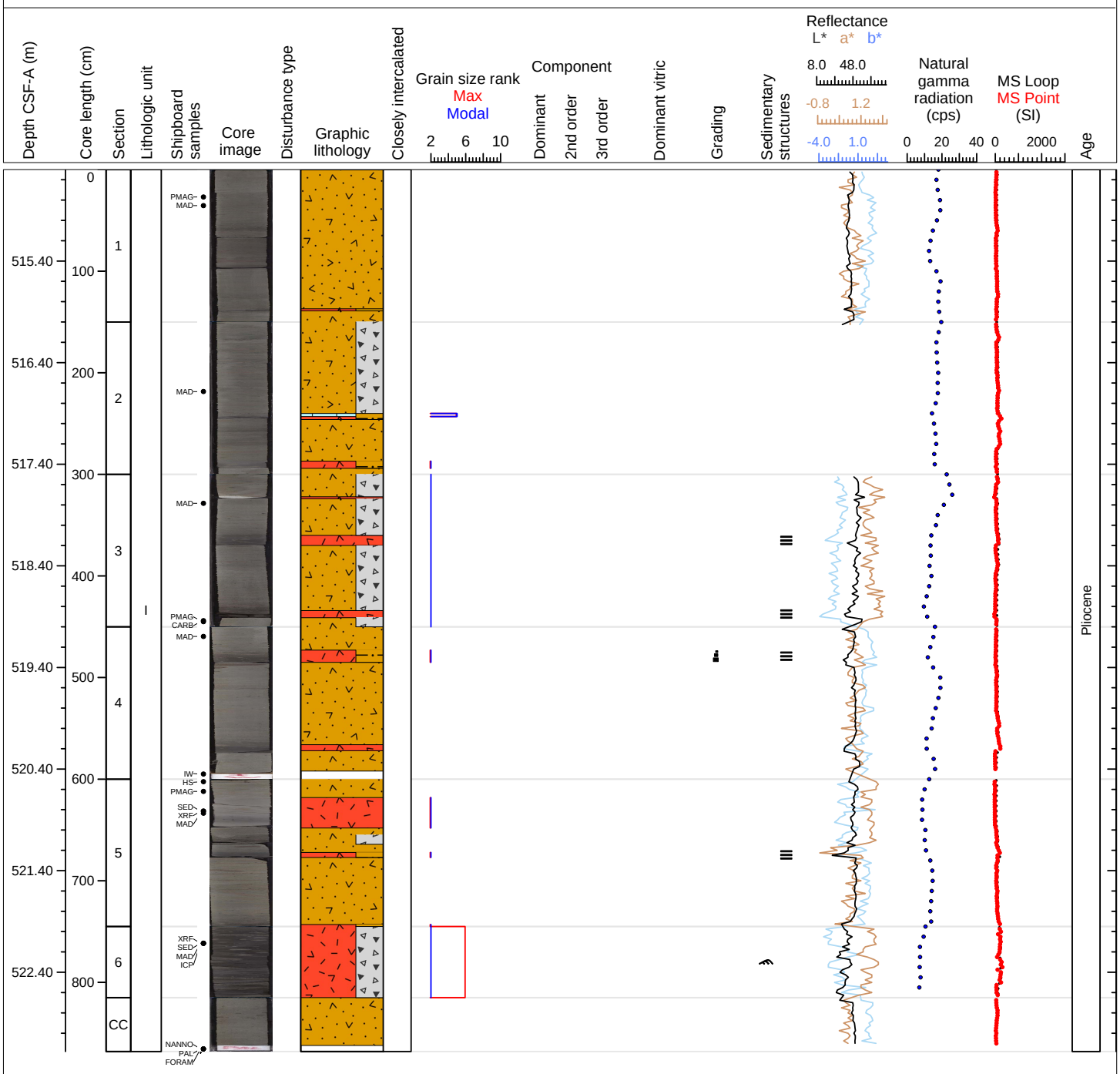
Hole 350-U1437D Core 10R, Interval 504.8-513.87 m (CSF-A)

bioturbated tuffaceous mudstone with adundant evolved tuff layers and scarce mafic layers



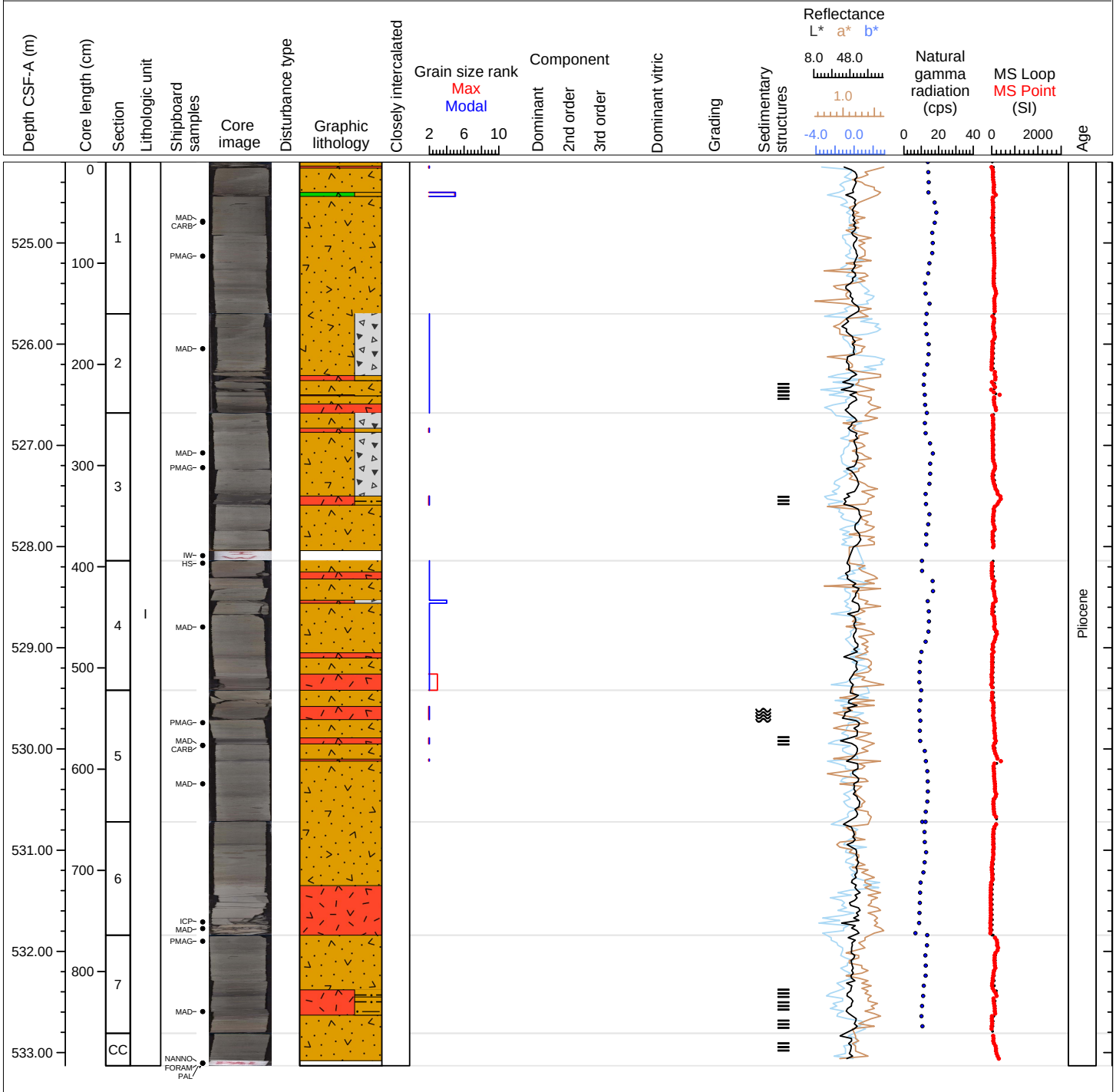
Hole 350-U1437D Core 11R, Interval 514.5-523.18 m (CSF-A)

bioturbated tuffaceous mudstone with adundant evolved tuff and scarce mafic layers



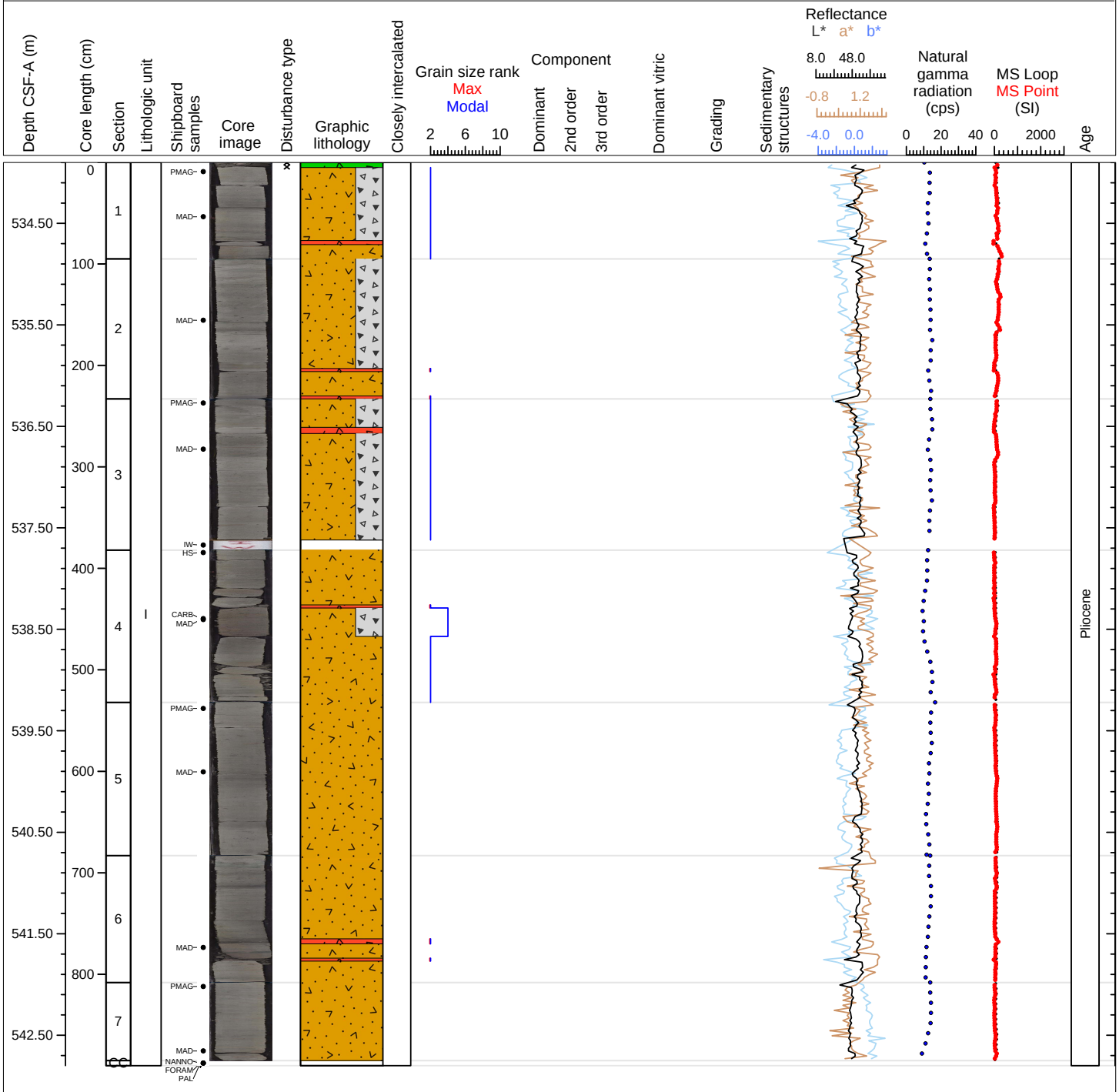
Hole 350-U1437D Core 12R, Interval 524.2-533.13 m (CSF-A)

bioturbated tuffaceous mudstone with adundant evolved tuff and scarce mafic layers



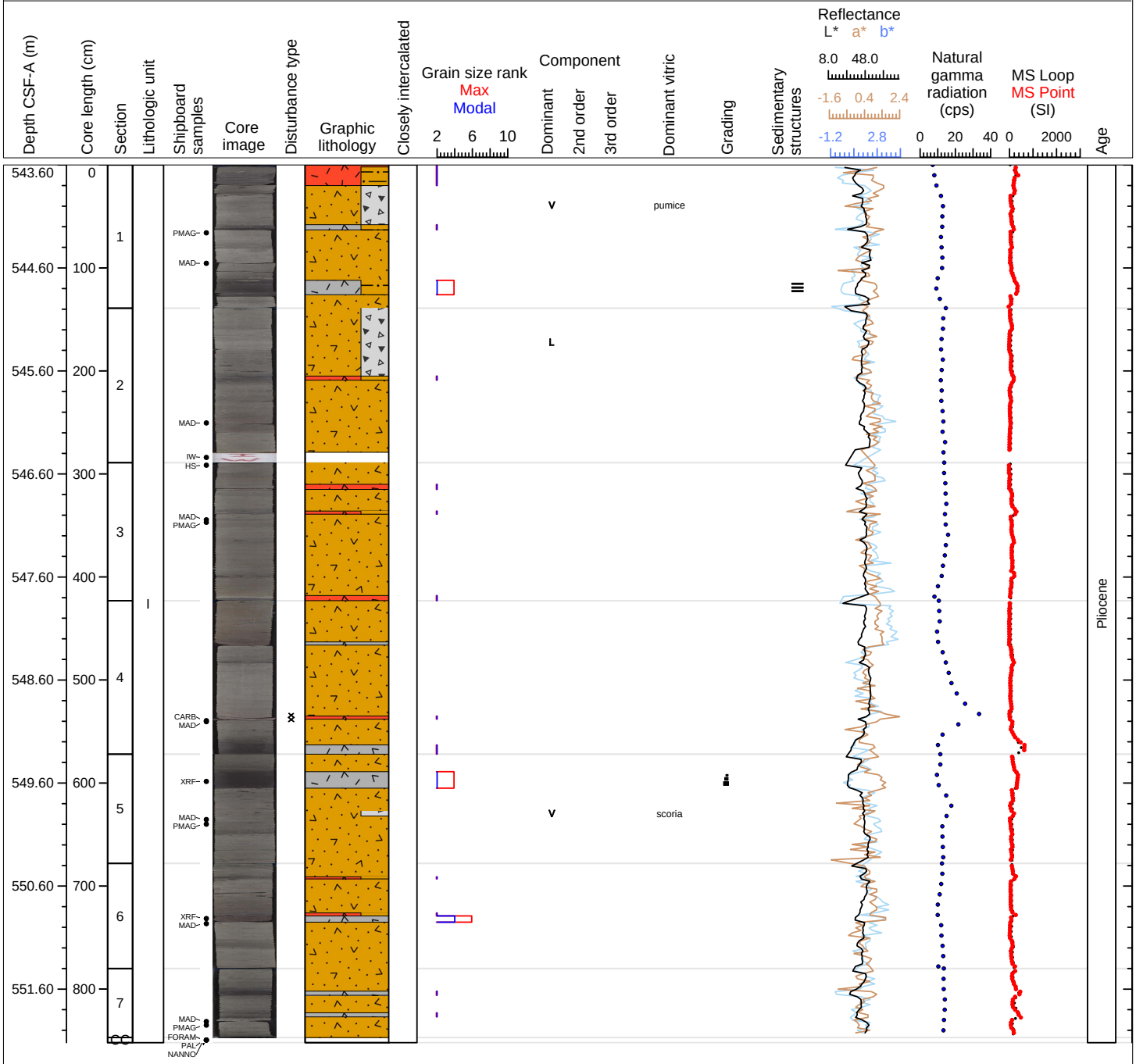
Hole 350-U1437D Core 13R, Interval 533.9-542.8 m (CSF-A)

tuffaceous mudstone with evolved tuff layers



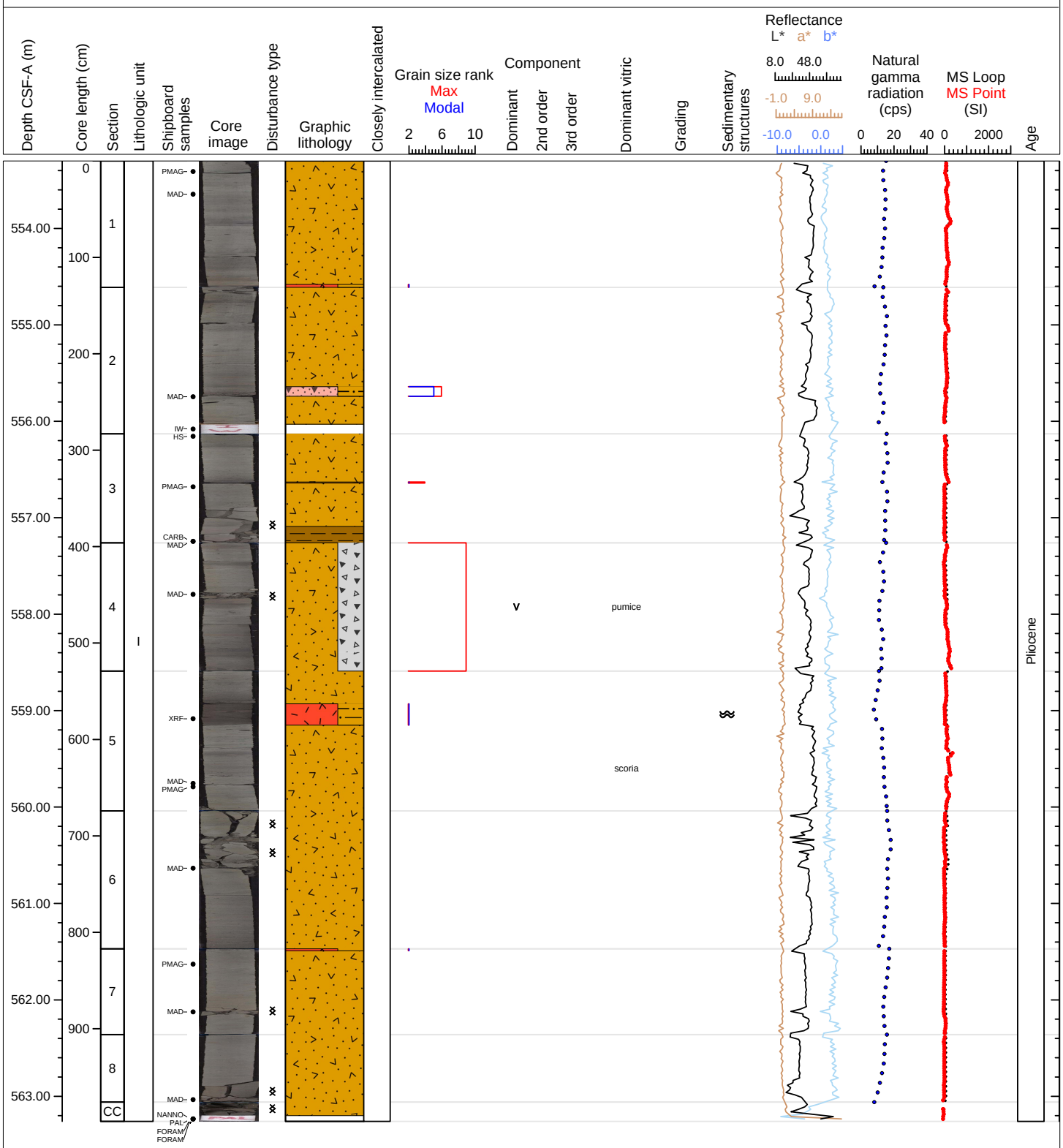
Hole 350-U1437D Core 14R, Interval 543.6-552.12 m (CSF-A)

bioturbated tuffaceous mudstone with layers of evolved and bimodal tuff



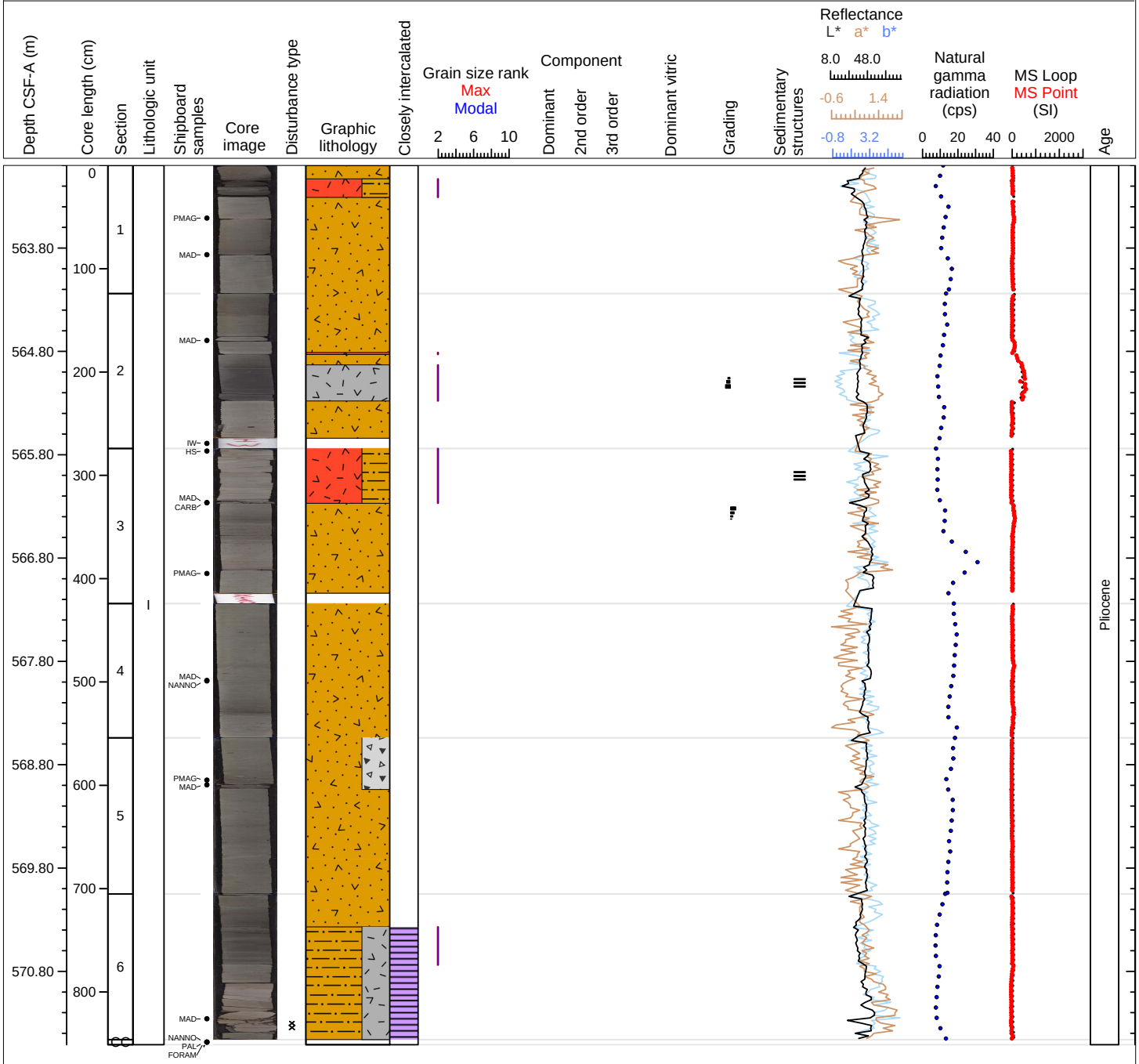
Hole 350-U1437D Core 15R, Interval 553.3-563.26 m (CSF-A)

Bioturbated tuffaceous mudstone with layers of evolved tuff



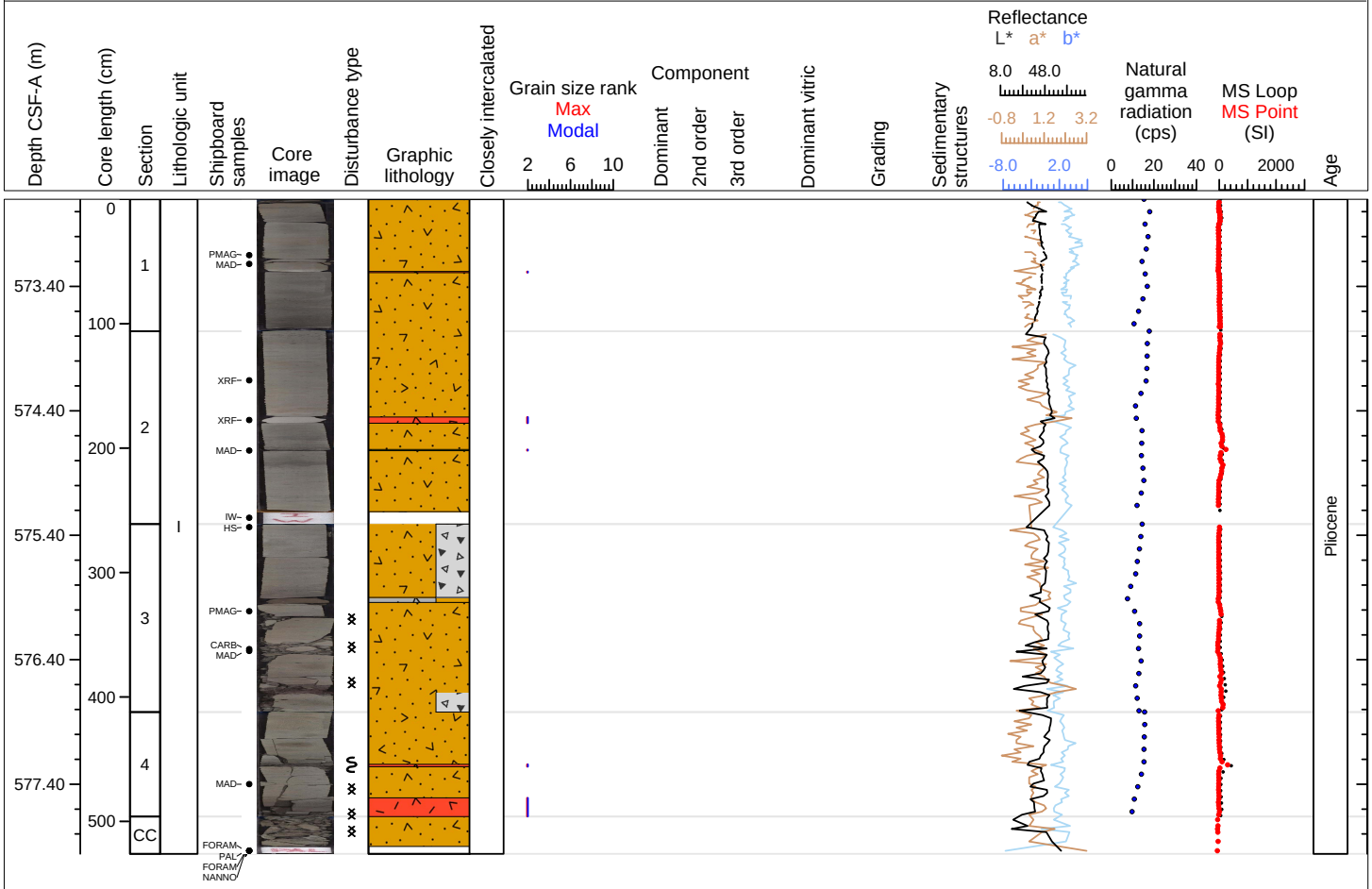
Hole 350-U1437D Core 16R, Interval 563.0-571.51 m (CSF-A)

bioturbated tuffaceous mudstone with few evolved tuff layers



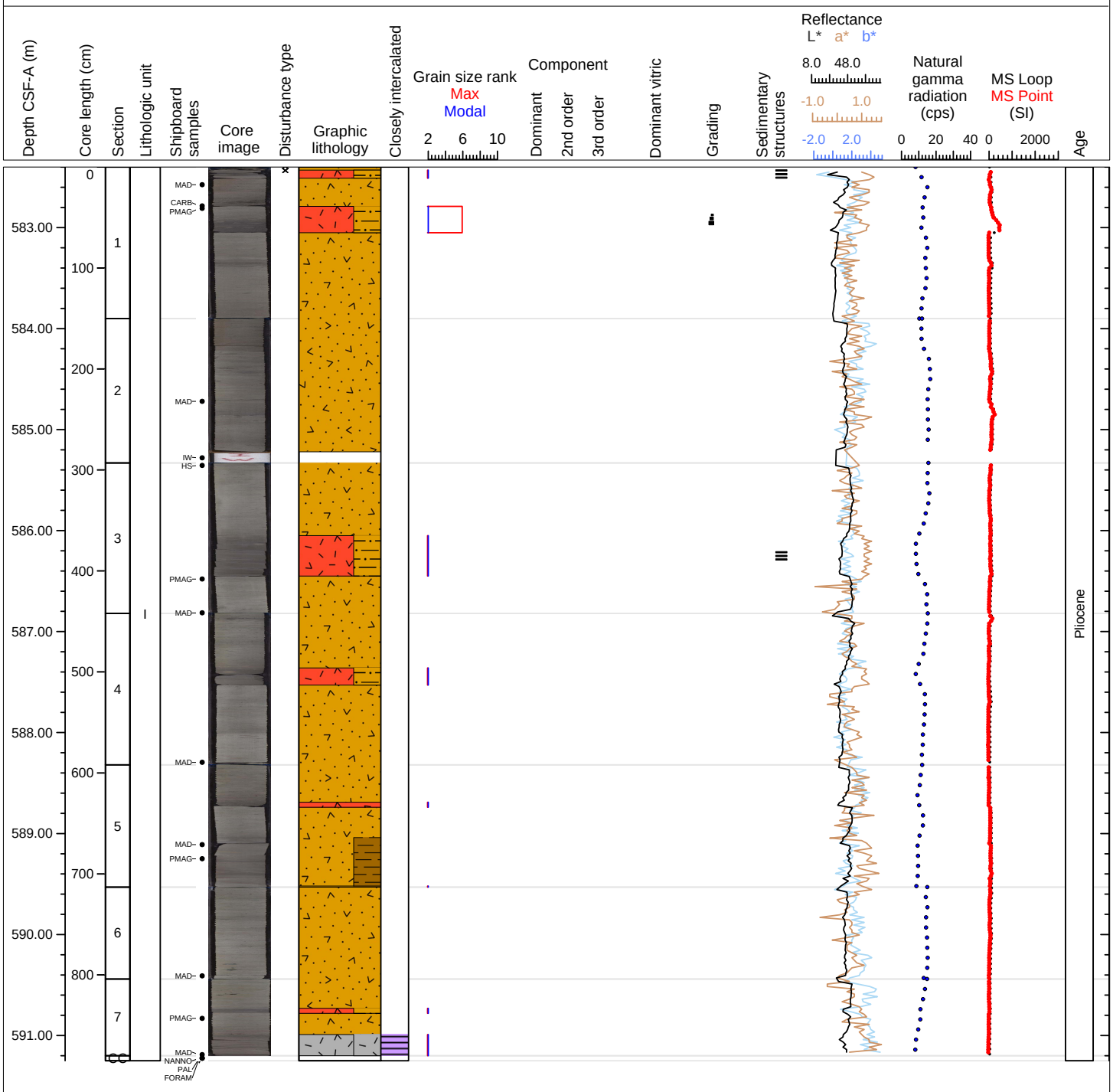
Hole 350-U1437D Core 17R, Interval 572.7-577.96 m (CSF-A)

bioturbated tuffaceous mudstone with mafic and evolved tuffs



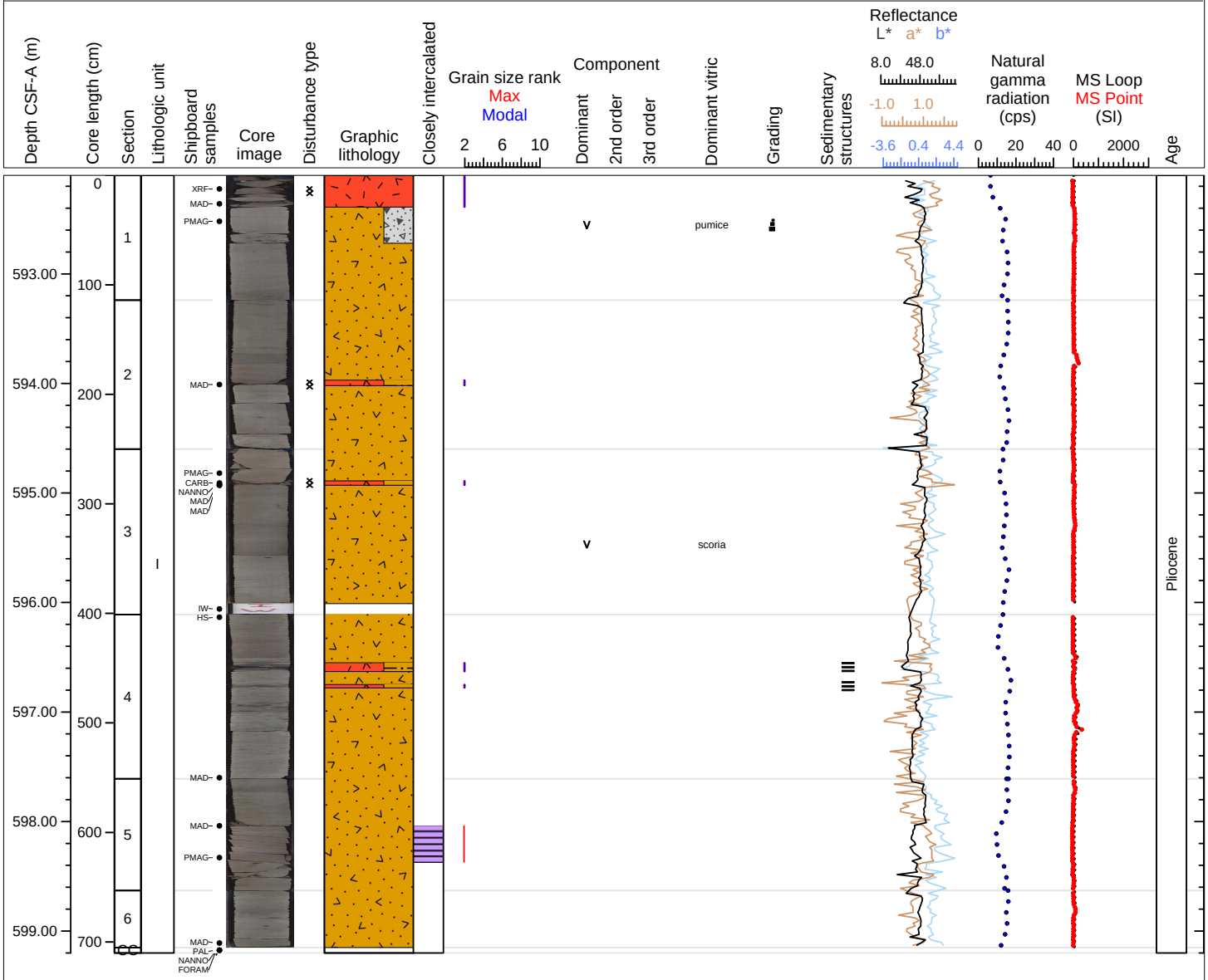
Hole 350-U1437D Core 18R, Interval 582.4-591.25 m (CSF-A)

tuffaceous mudstone with many evolved tuff layers



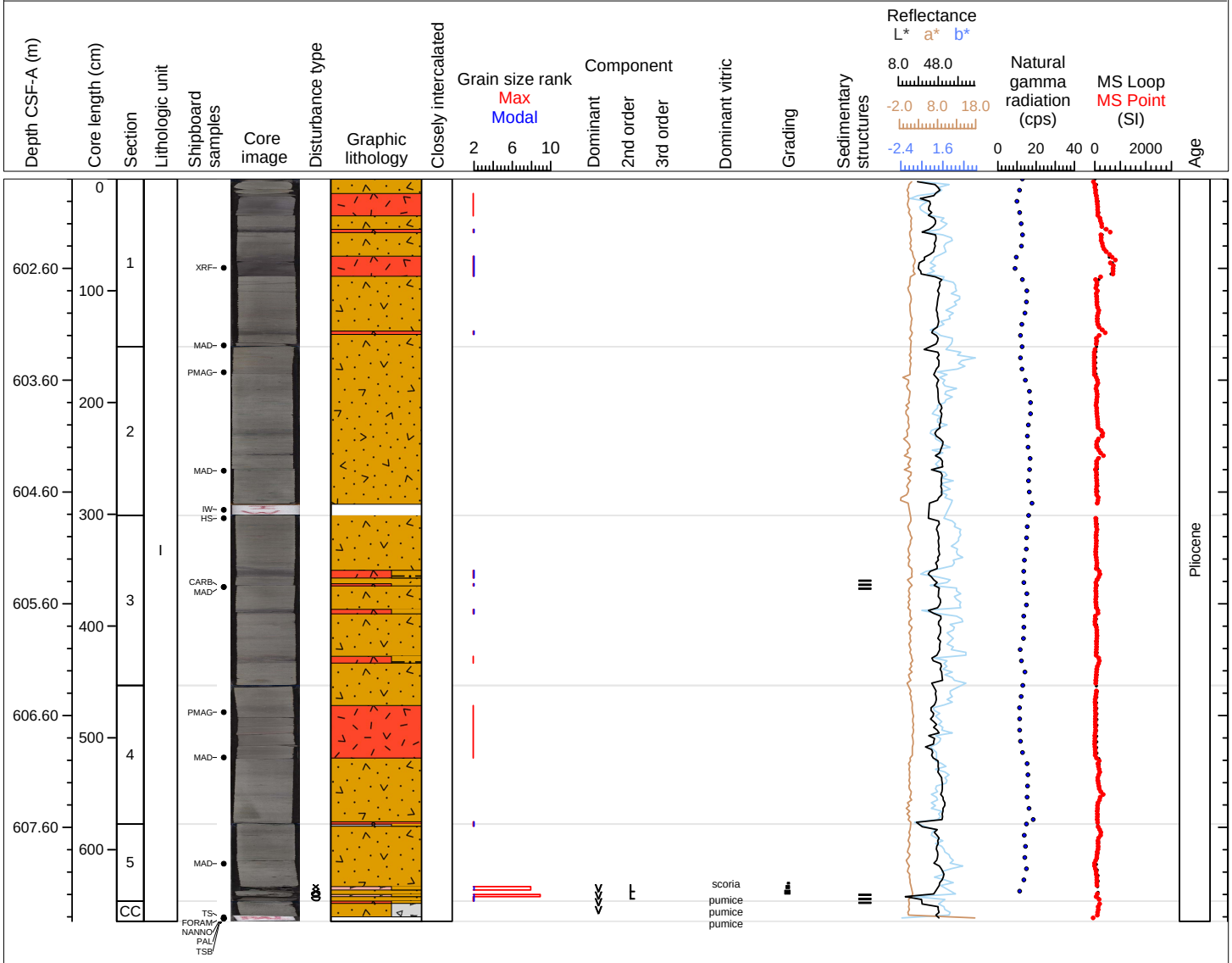
Hole 350-U1437D Core 19R, Interval 592.1-599.2 m (CSF-A)

tuffaceous mudstone and evolved ash layers



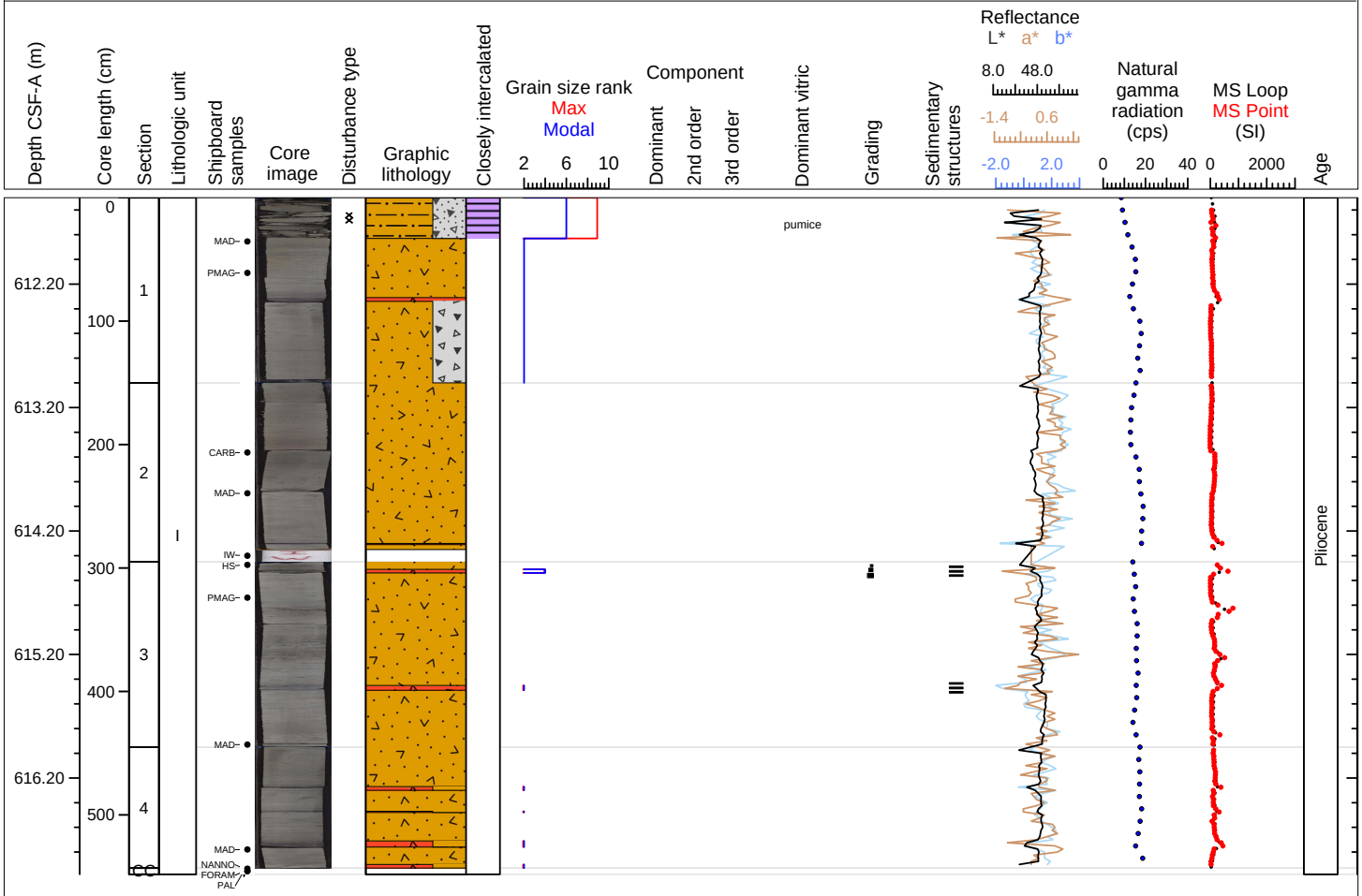
Hole 350-U1437D Core 20R, Interval 601.8-608.44 m (CSF-A)

Evolved tuff with tuffaceous mudstone AND matrix supported polymictic lapilllistone with mudstone.



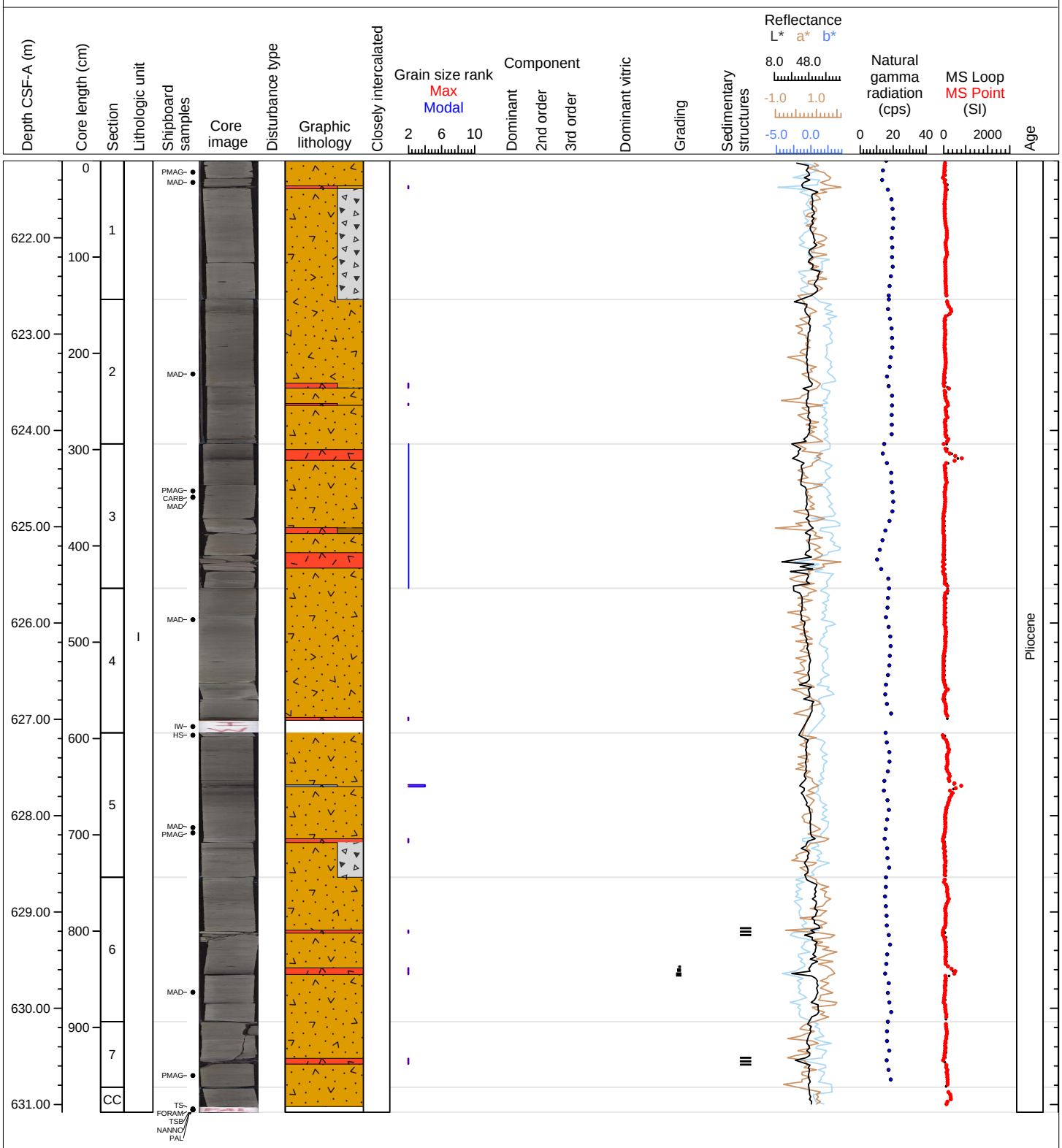
Hole 350-U1437D Core 21R, Interval 611.5-616.98 m (CSF-A)

tuffaceous mudstone with evolved tuff layers



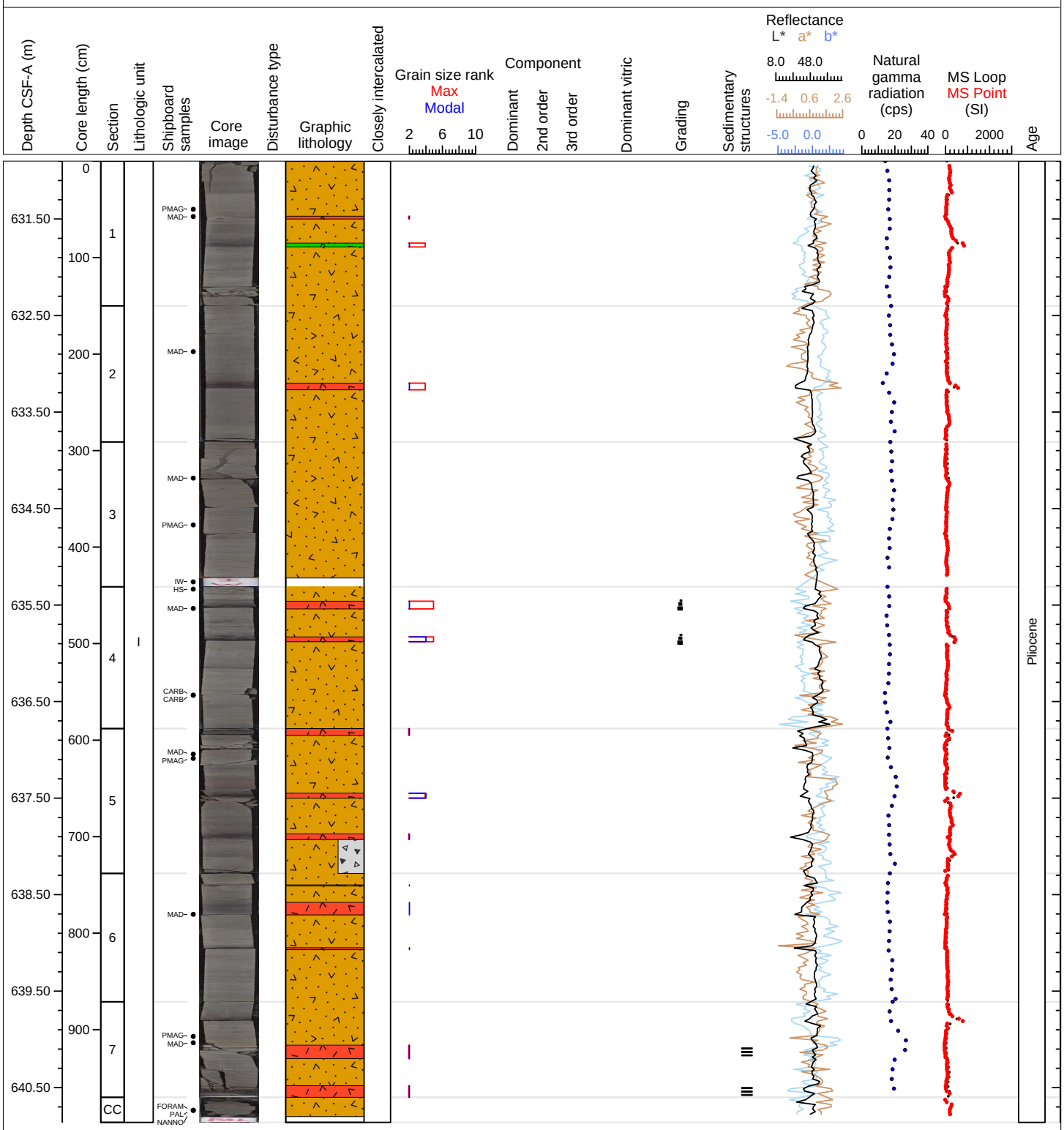
Hole 350-U1437D Core 22R, Interval 621.2-631.08 m (CSF-A)

tuffaceous mudstone with evolved tuff layers



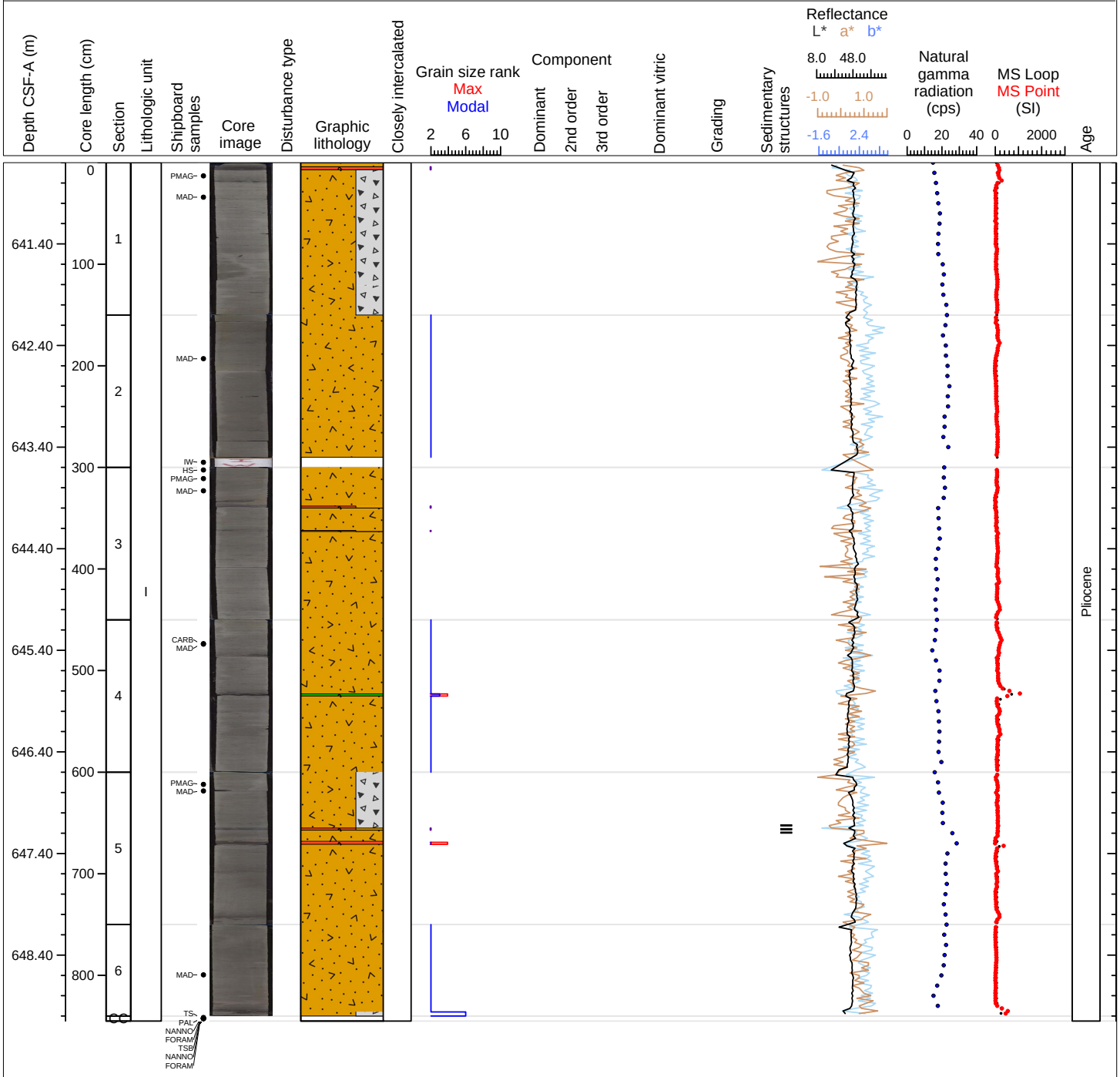
Hole 350-U1437D Core 23R, Interval 630.9-640.86 m (CSF-A)

tuffaceous mudstone with abundant evolved and one mafic tuff



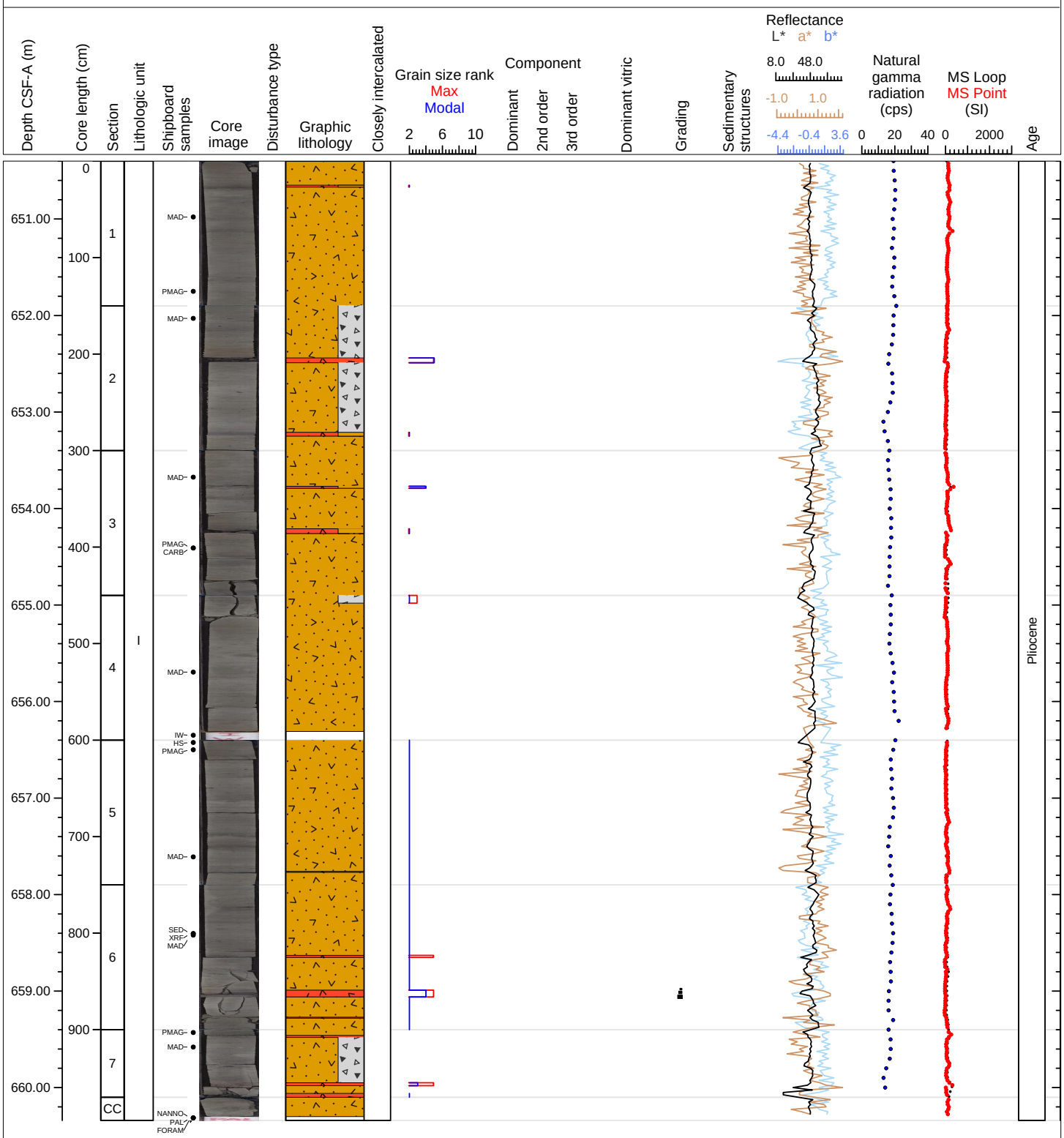
Hole 350-U1437D Core 24R, Interval 640.6-649.05 m (CSF-A)

tuffaceous mudstone with few evolved and one mafic tuff



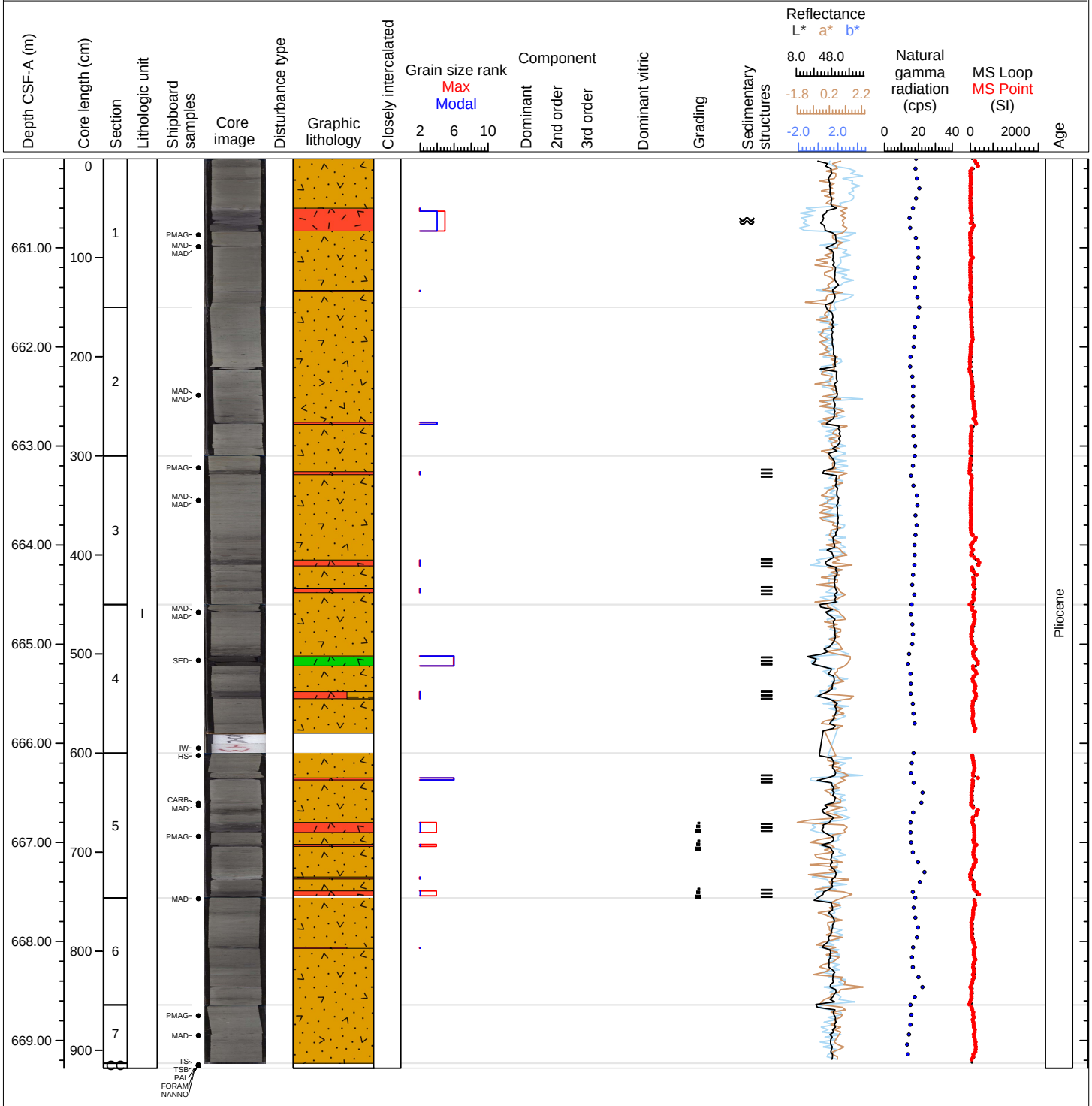
Hole 350-U1437D Core 25R, Interval 650.4-660.34 m (CSF-A)

tuffaceous mudstone with few evolved tuff layers



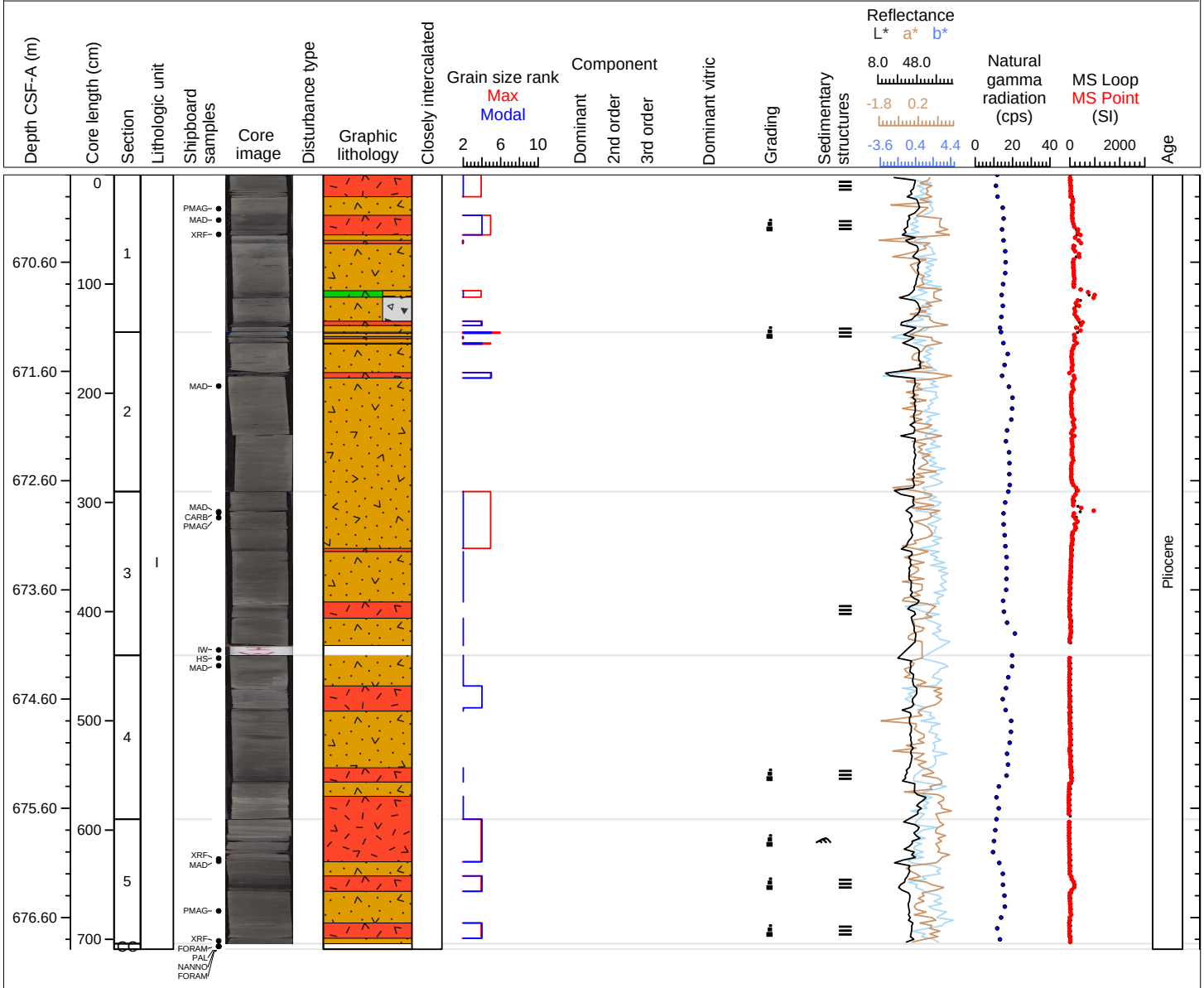
Hole 350-U1437D Core 26R, Interval 660.1-669.28 m (CSF-A)

tuffaceous mudstone with abundant evolved tuff and one mafic tuff layers



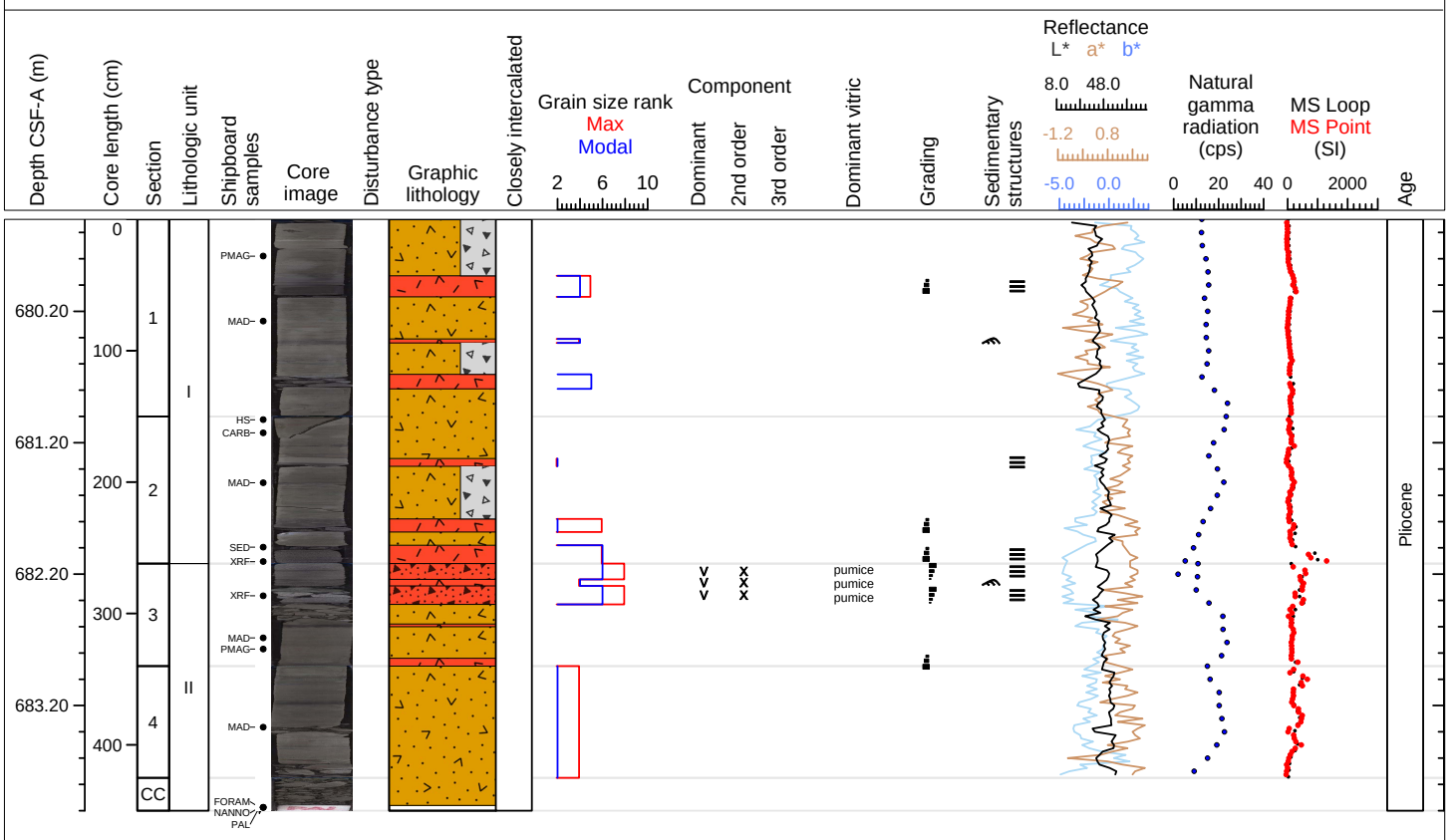
Hole 350-U1437D Core 27R, Interval 669.8-676.89 m (CSF-A)

tuffaceous mudstone with abundant stratified and graded evolved and mafic tuff layers



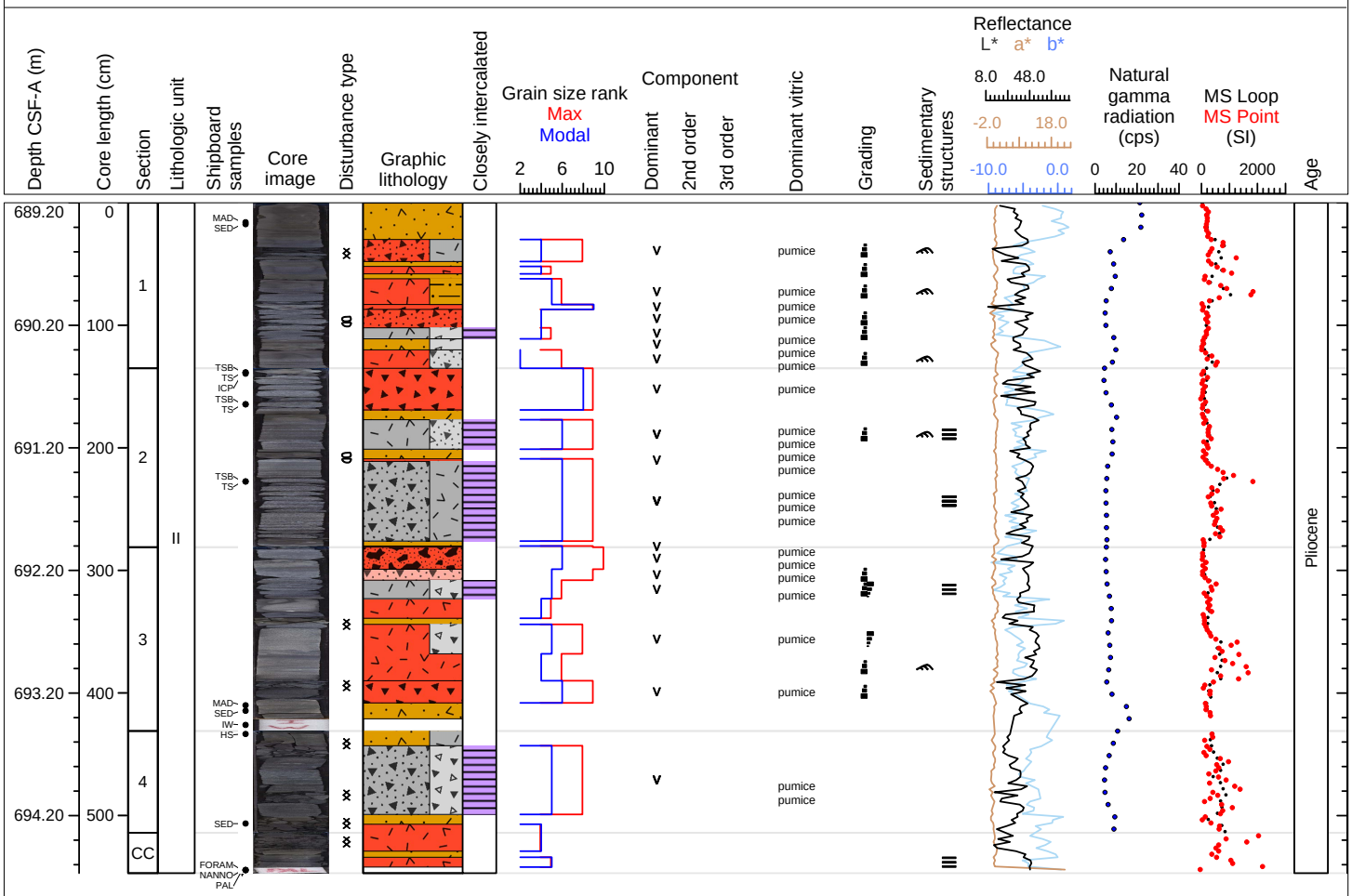
Hole 350-U1437D Core 28R, Interval 679.5-684.0 m (CSF-A)

tuffaceous mudstone with abundant evolved tuff and lapilli-tuff layers



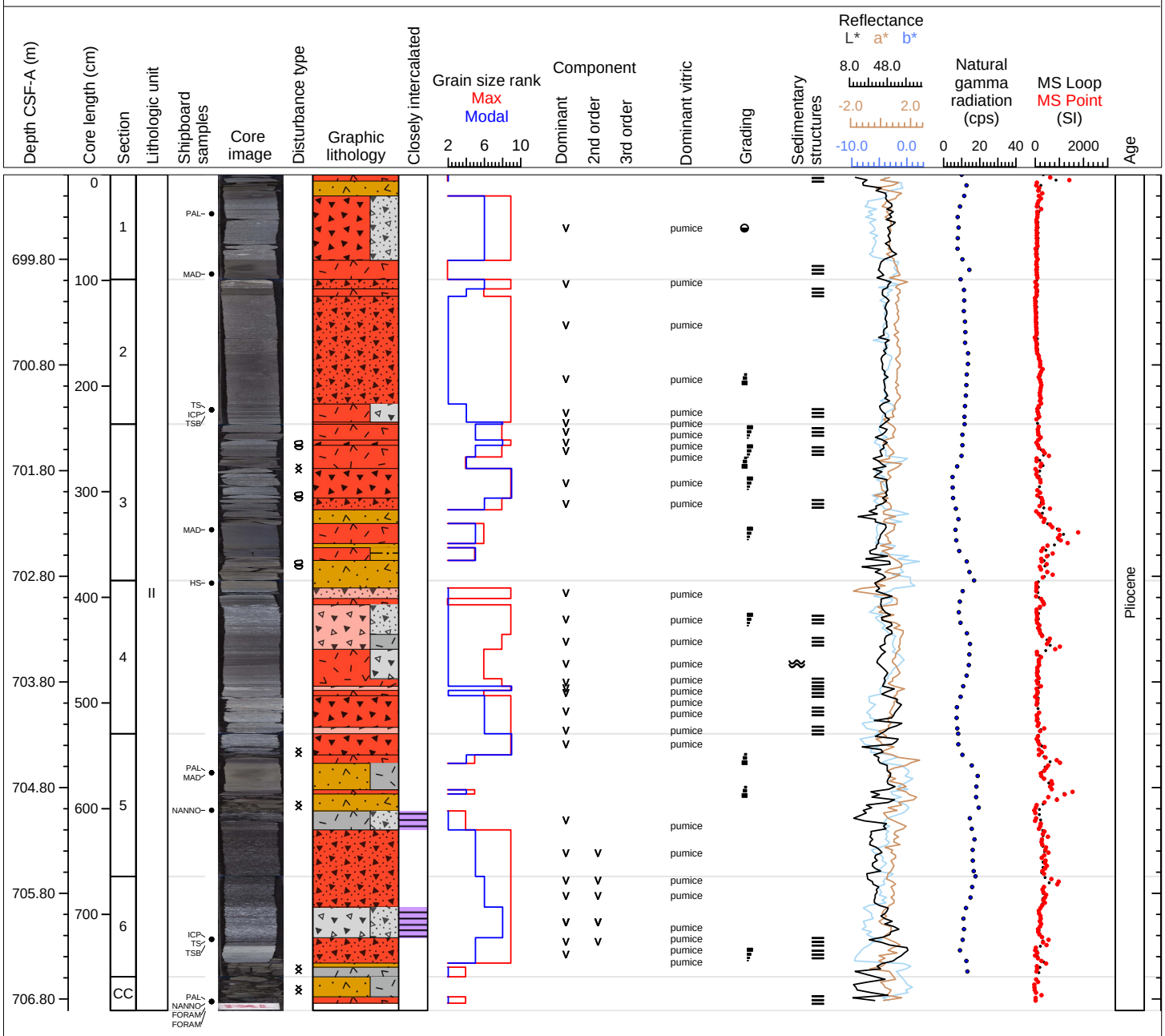
Hole 350-U1437D Core 29R, Interval 689.2-694.67 m (CSF-A)

evolved tuff, lapilli-tuff, and lapillistone with intercalated tuffaceous mudstone



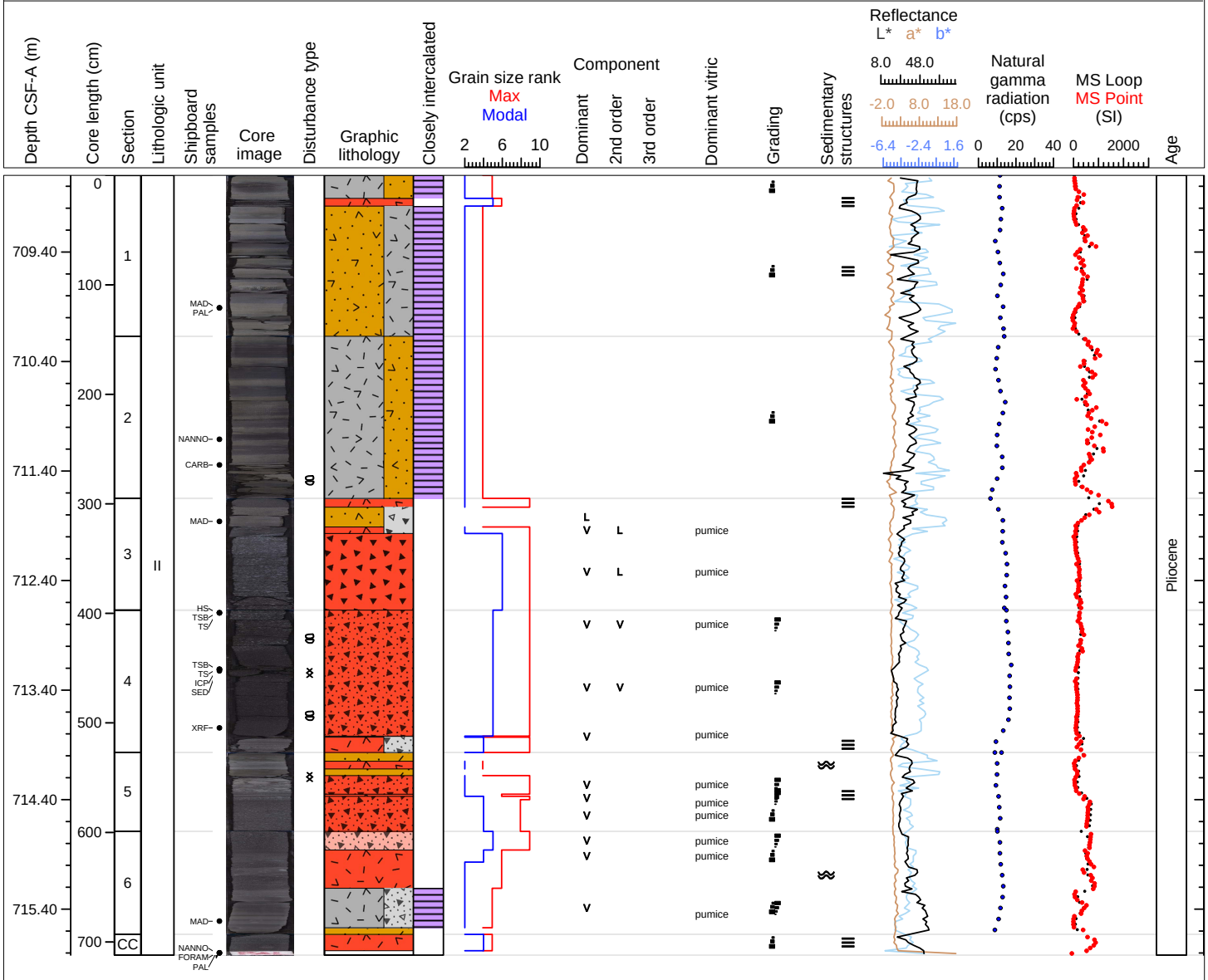
Hole 350-U1437D Core 30R, Interval 699.0-706.91 m (CSF-A)

abundant evolved tuff, lapilli-tuff, and lapilli-stone with intercalated tuffaceous mudstone



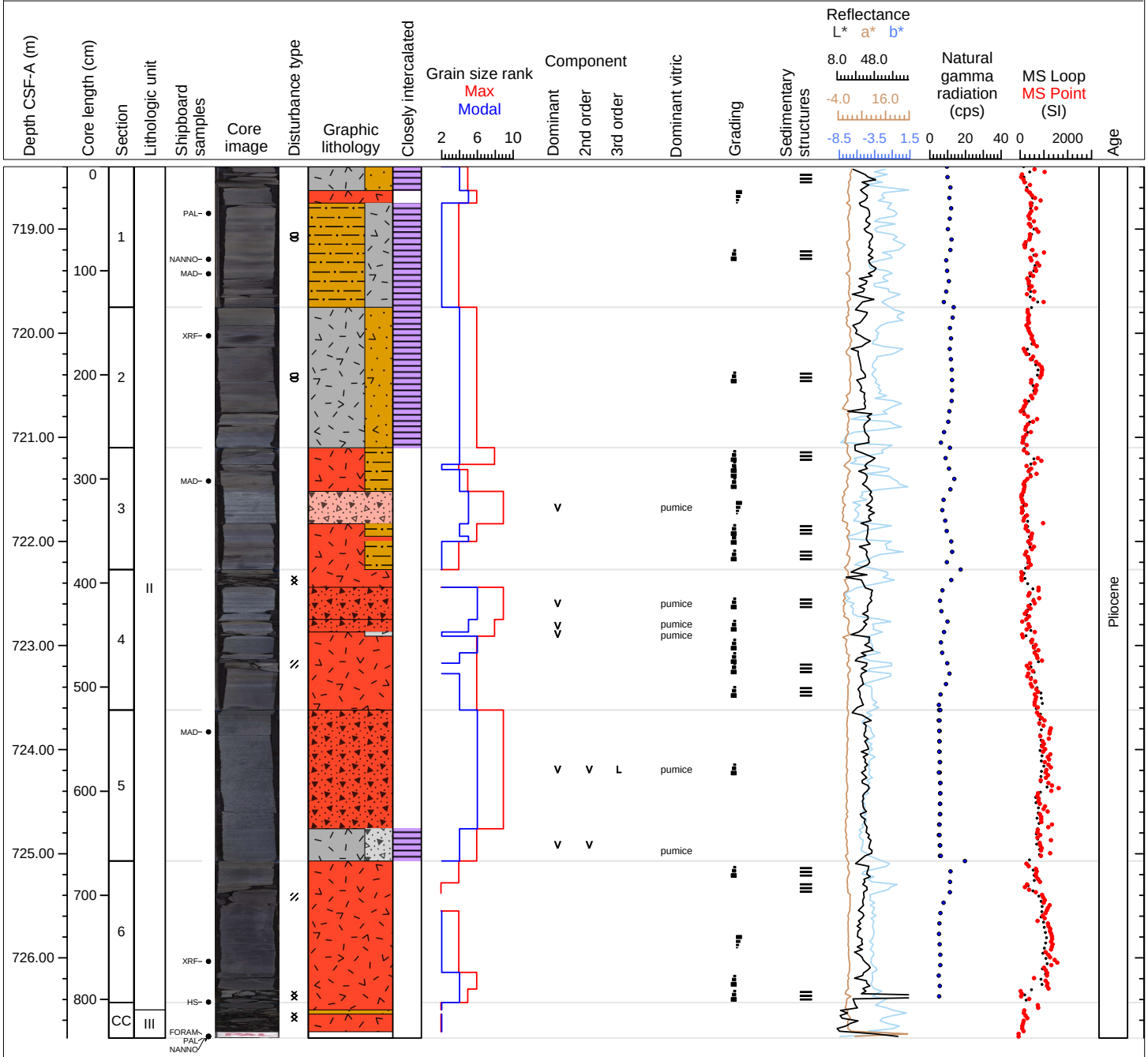
Hole 350-U1437D Core 31R, Interval 708.7-715.82 m (CSF-A)

abundant evolved tuff and lapilli-tuff with intercalated tuffaceous mudstone



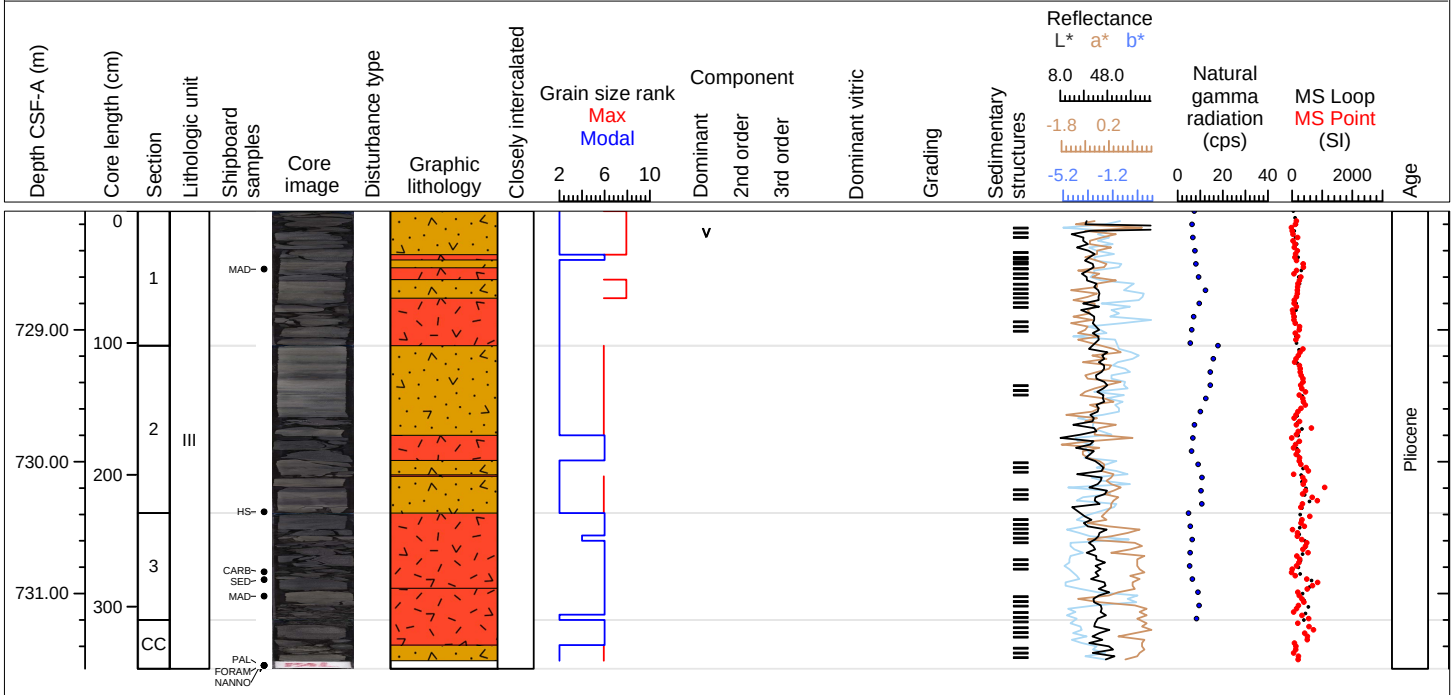
Hole 350-U1437D Core 32R, Interval 718.4-726.77 m (CSF-A)

evolved tuff and lapilli-tuff layers with intercalated tuffaceous mudstone



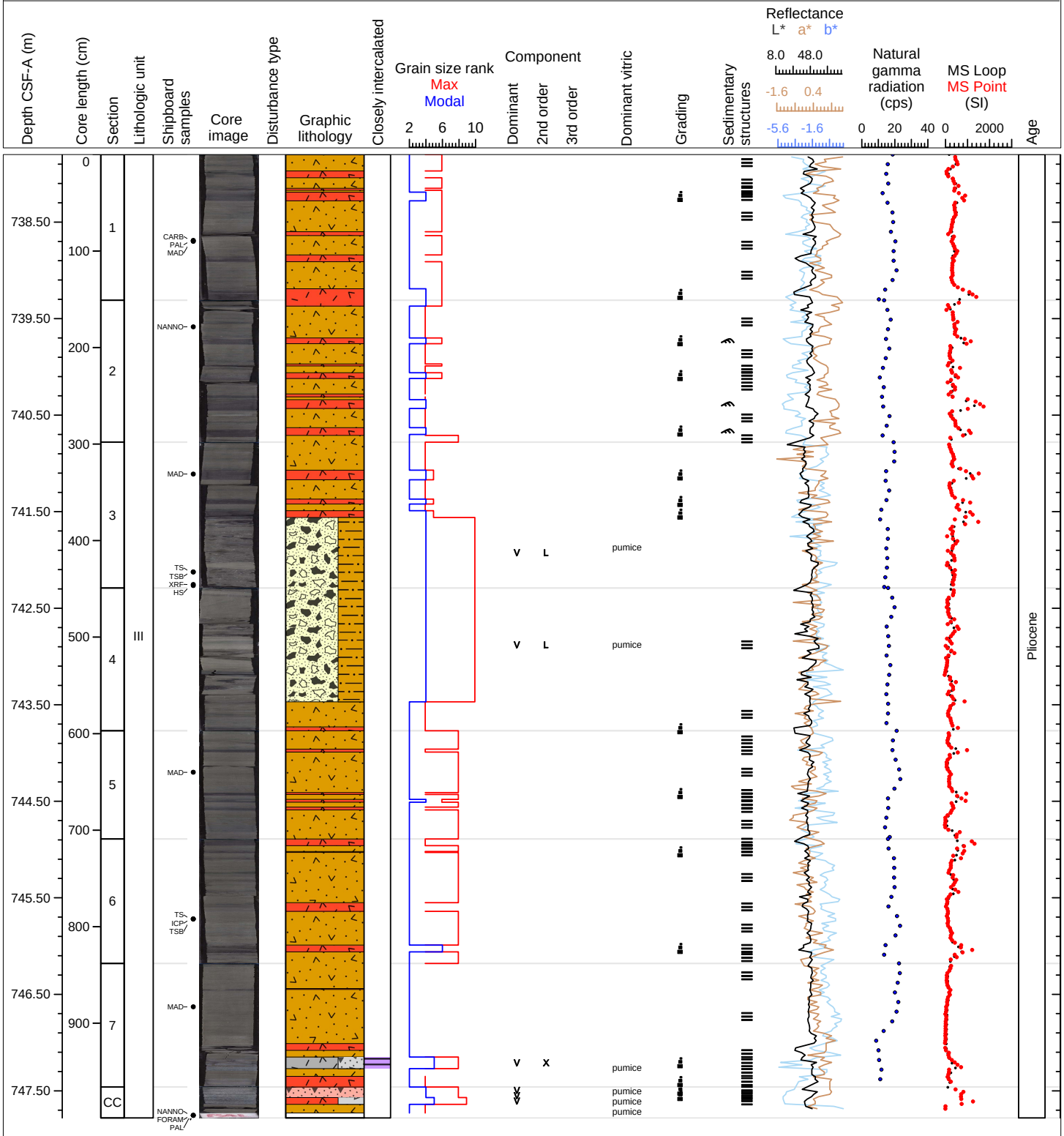
Hole 350-U1437D Core 33R, Interval 728.1-731.57 m (CSF-A)

tuffaceous mudstone with numerous evolved and mafic tuff layers



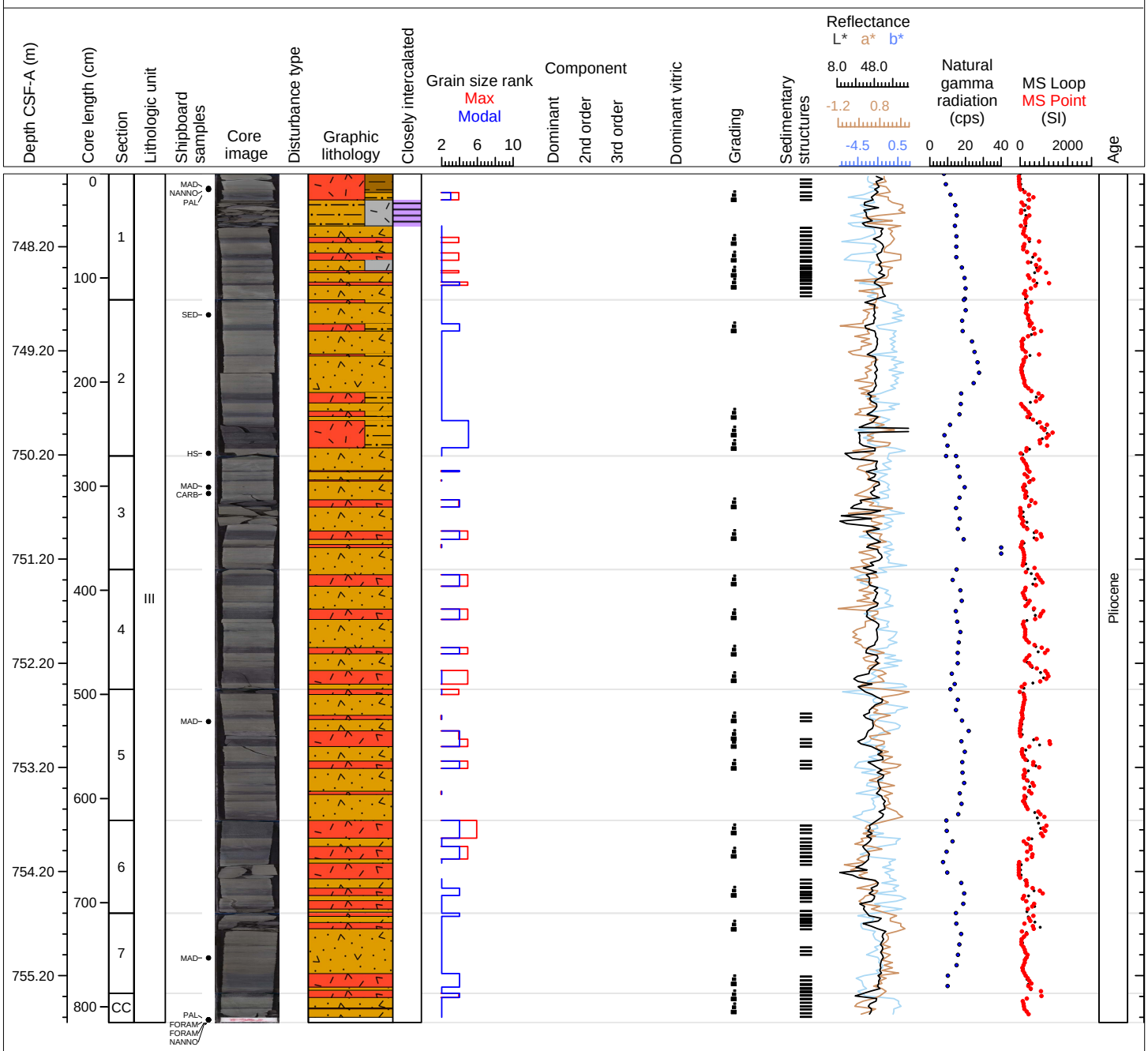
Hole 350-U1437D Core 34R, Interval 737.8-747.78 m (CSF-A)

tuffaceous mudstone and evolved tuff; single thick matrix-supprted tuff-breccia (debris flow deposit)



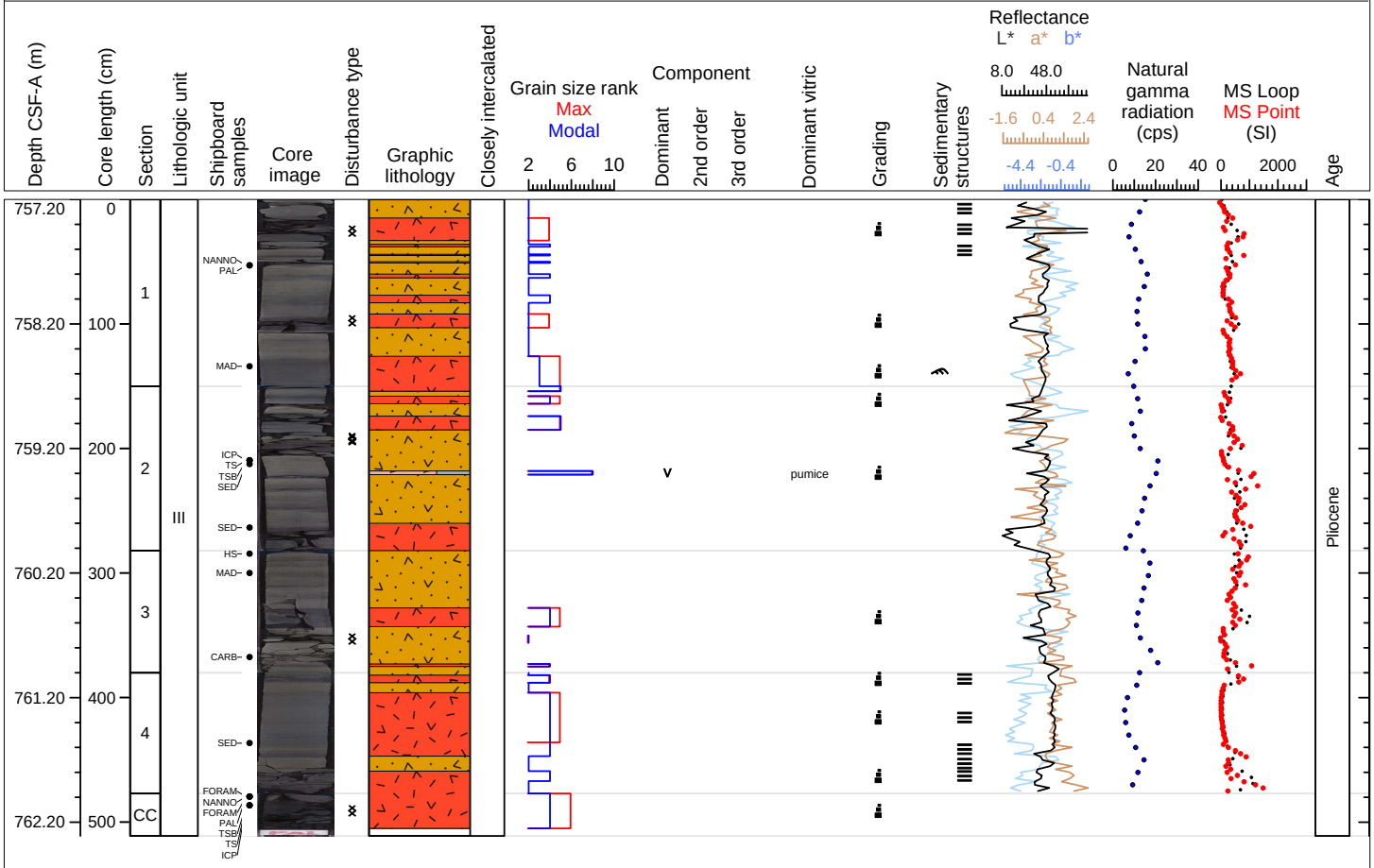
Hole 350-U1437D Core 35R, Interval 747.5-755.65 m (CSF-A)

tuffaceous mudstone with abundant evolved tuff layers



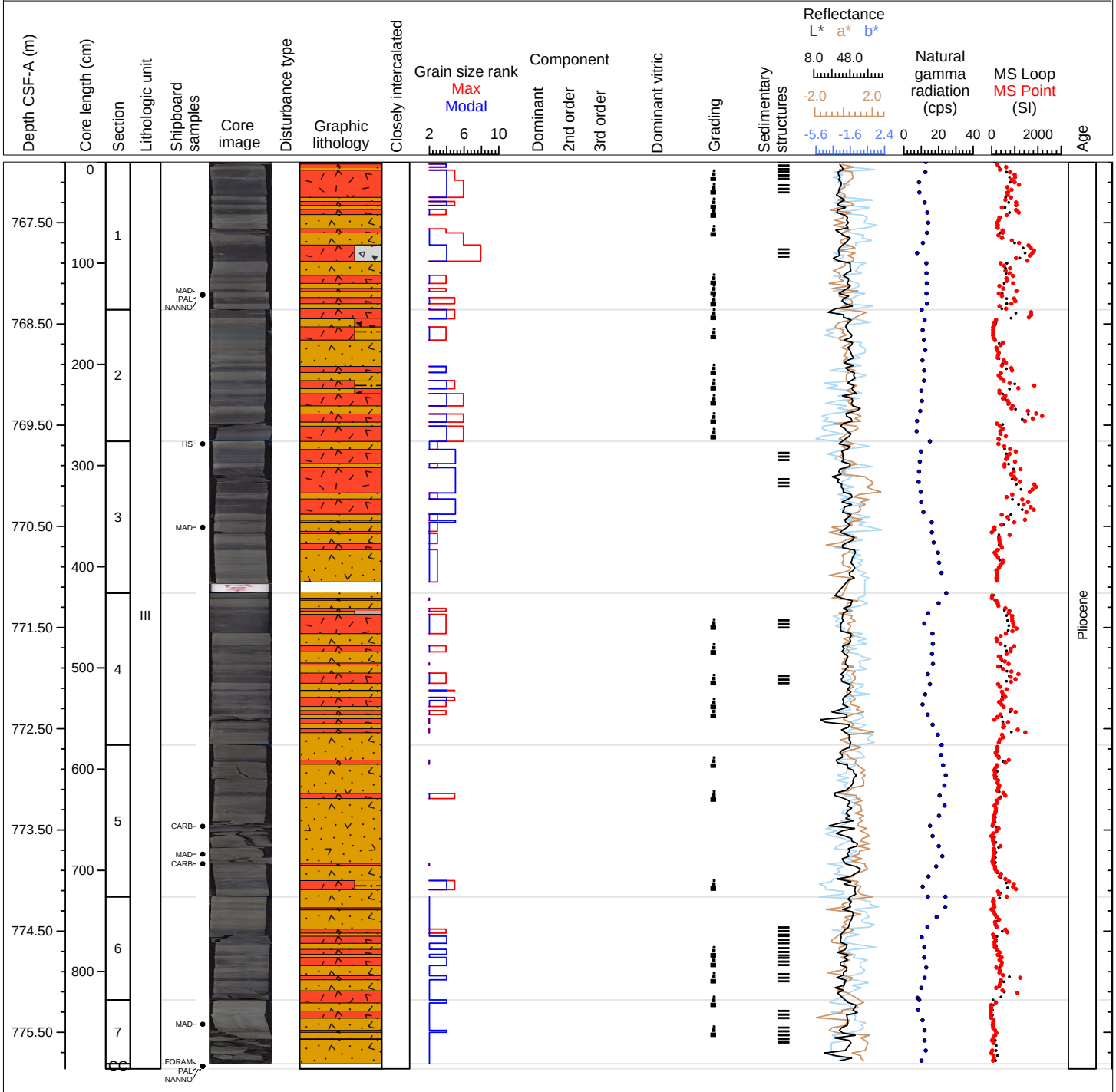
Hole 350-U1437D Core 36R, Interval 757.2-762.31 m (CSF-A)

monotonous tuffaceous mudstone with evolved tuff layers



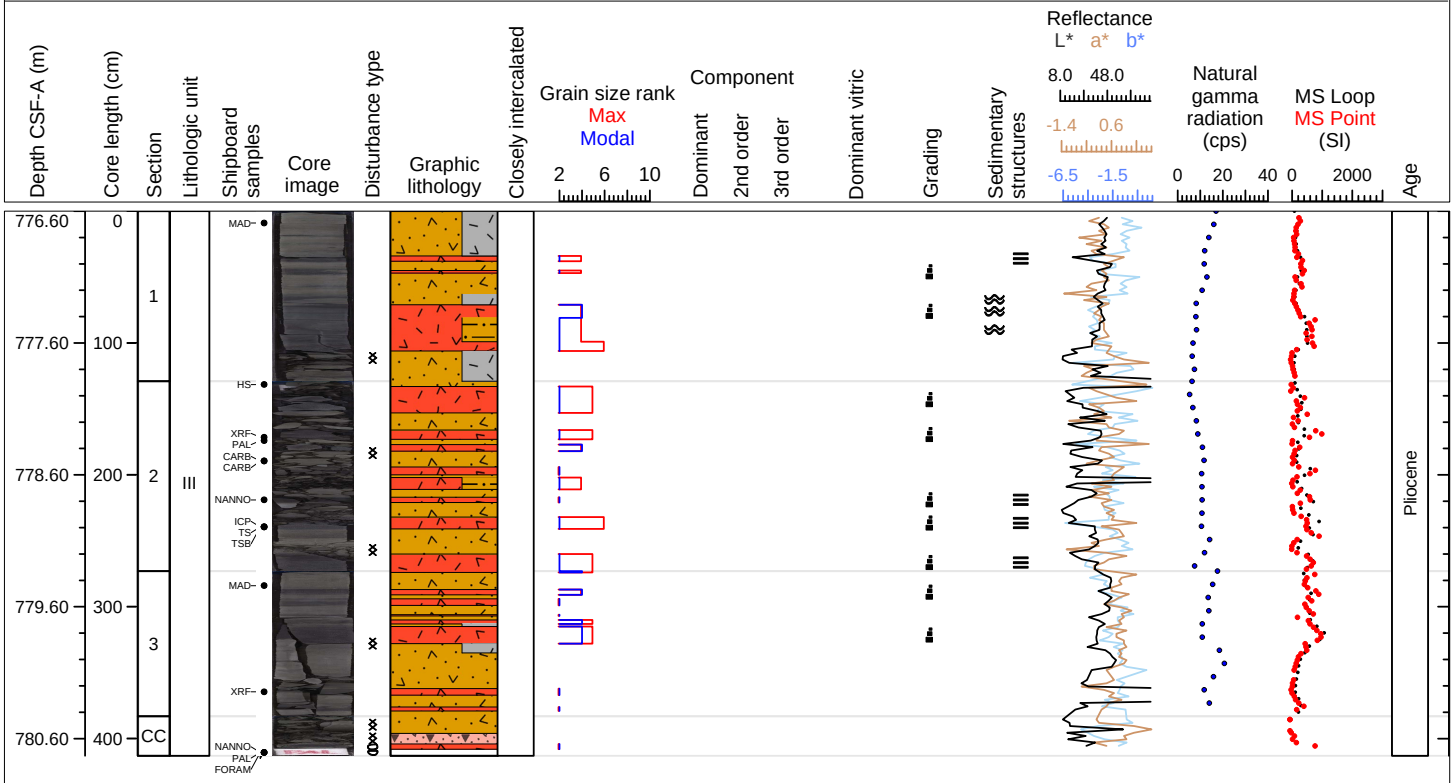
Hole 350-U1437D Core 37R, Interval 766.9-775.86 m (CSF-A)

monotonous intercalated fine-grained evolved tuff and tuffaceous mudstone



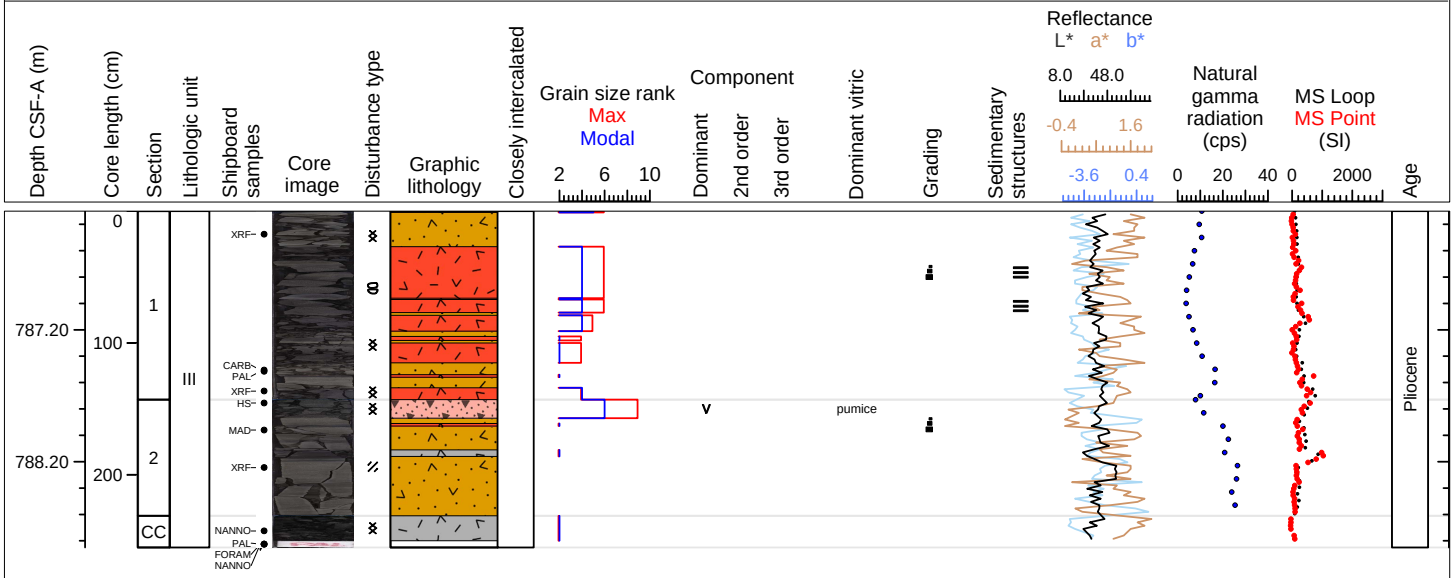
Hole 350-U1437D Core 38R, Interval 776.6-780.73 m (CSF-A)

tuffaceous mudstone with layers of evolved ash



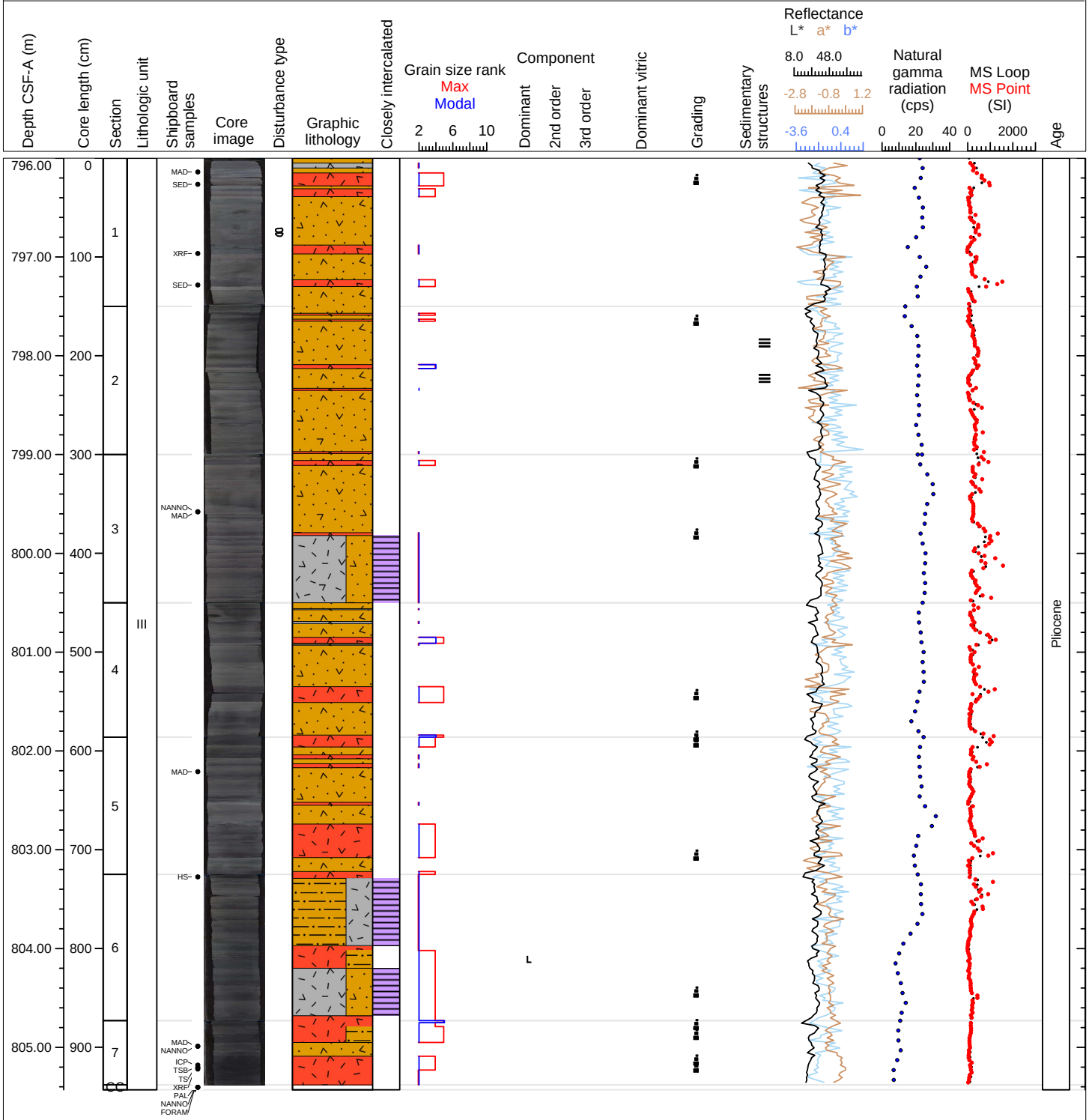
Hole 350-U1437D Core 39R, Interval 786.3-788.85 m (CSF-A)

tuffaceous mudstone intercalated with evolved tuff



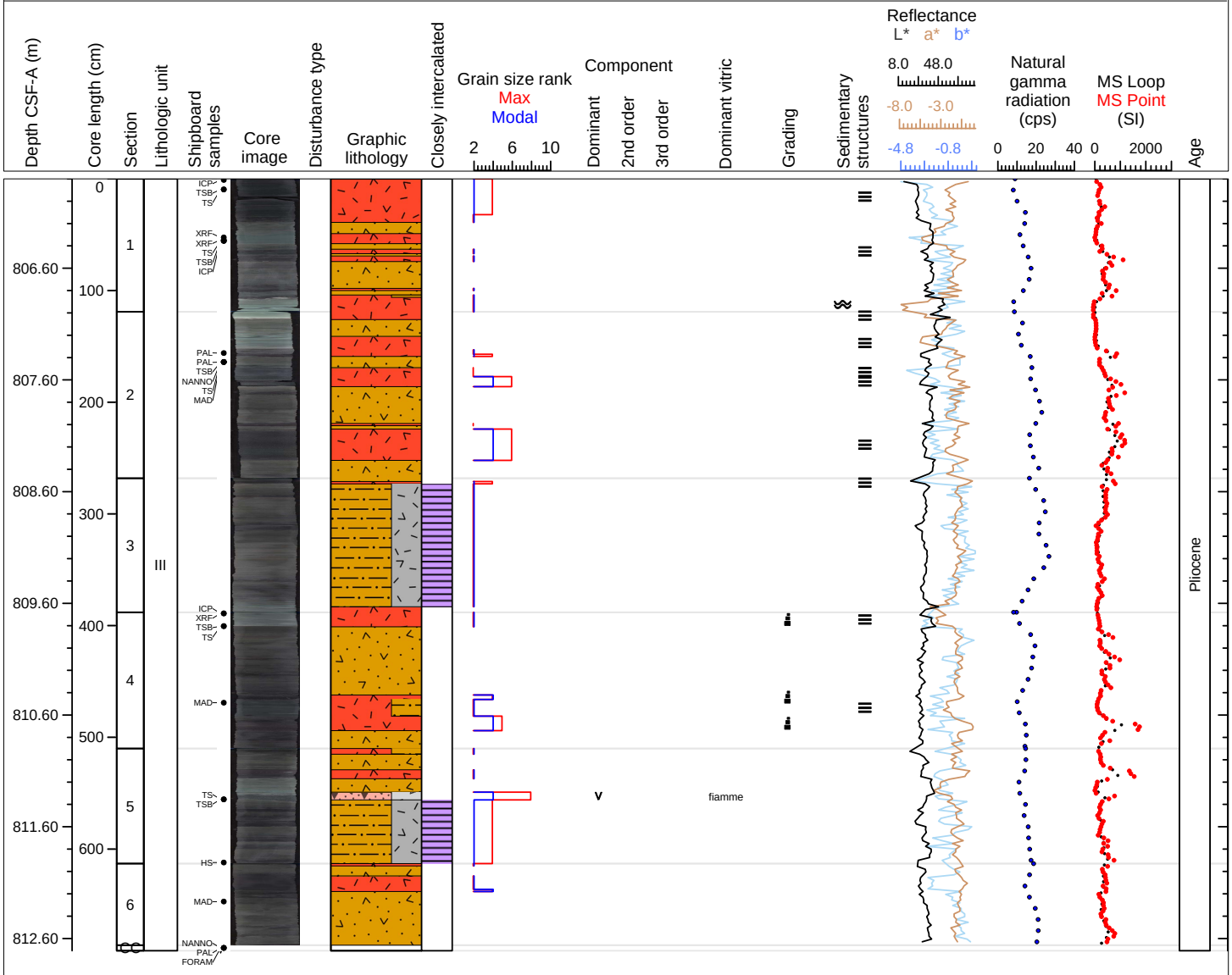
Hole 350-U1437D Core 40R, Interval 796.0-805.43 m (CSF-A)

thin evolved crystal-rich tuffs with tuffaceous mudstone layers



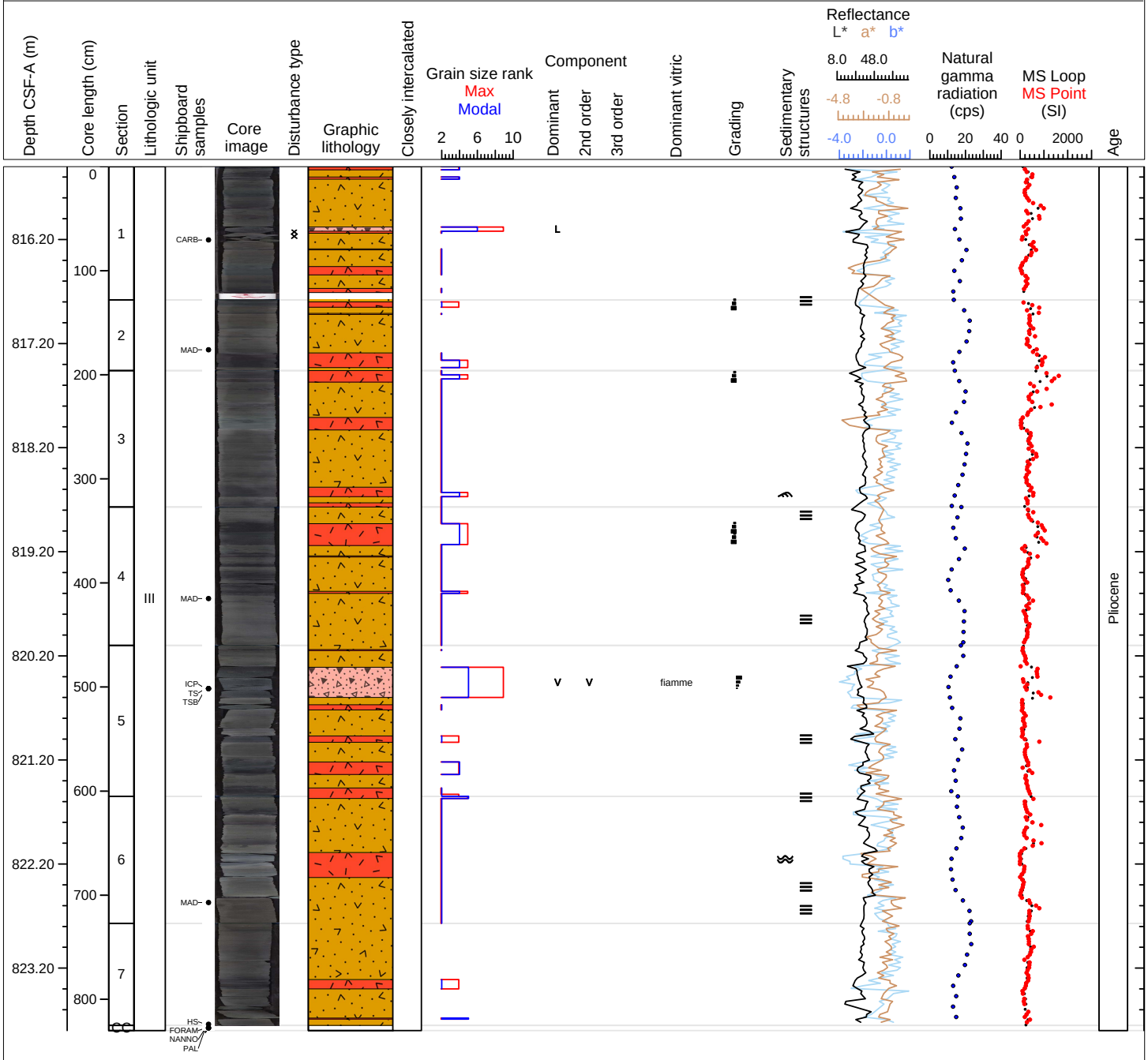
Hole 350-U1437D Core 41R, Interval 805.8-812.71 m (CSF-A)

tuffaceous mudstone with abundant evolved tuff layers; pervasive green glauconite alteration



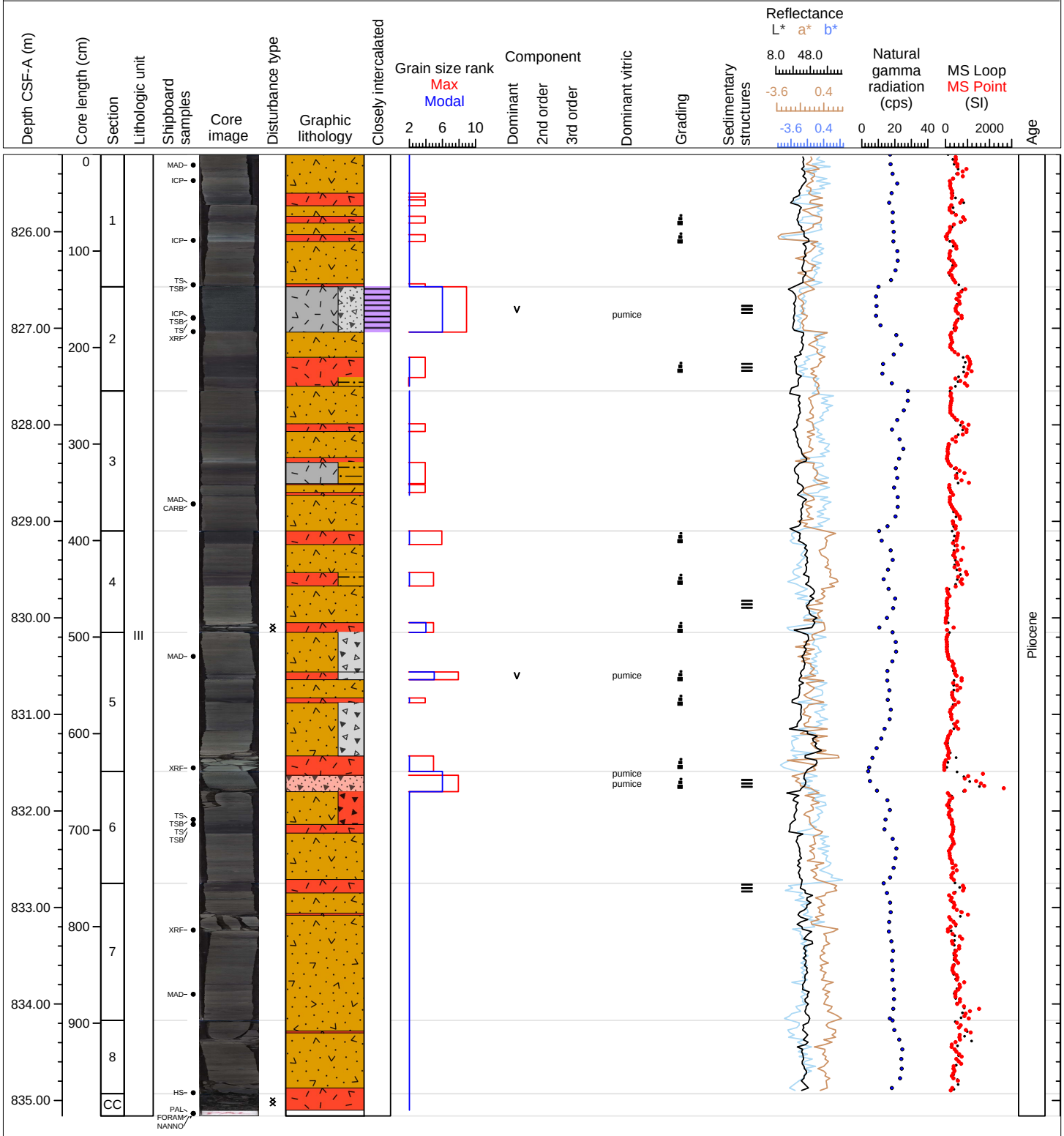
Hole 350-U1437D Core 42R, Interval 815.5-823.8 m (CSF-A)

tuffaceous mudstone and evolved tuff layers



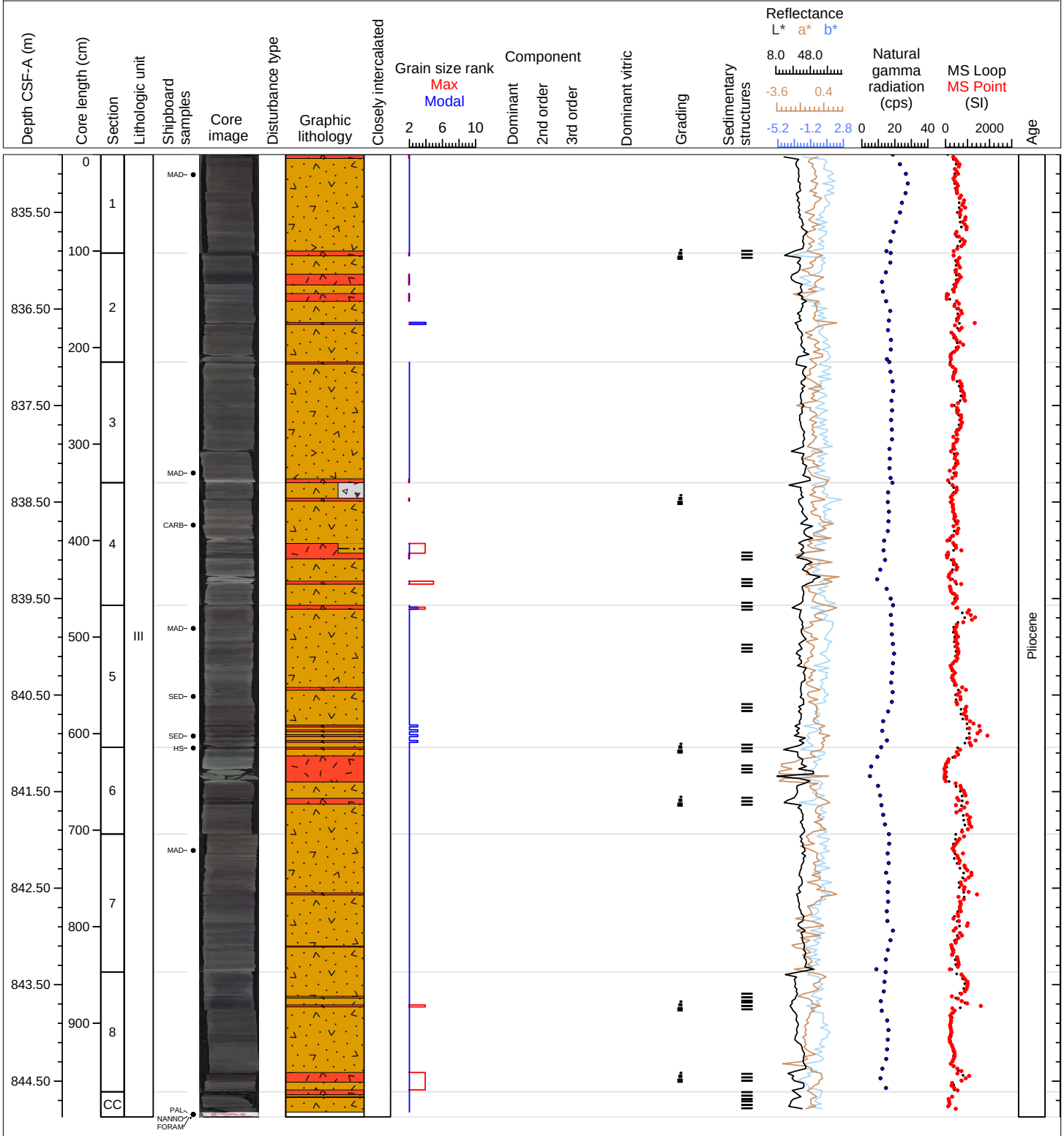
Hole 350-U1437D Core 43R, Interval 825.2-835.16 m (CSF-A)

tuffaceous mudstone and evolved tuff layers



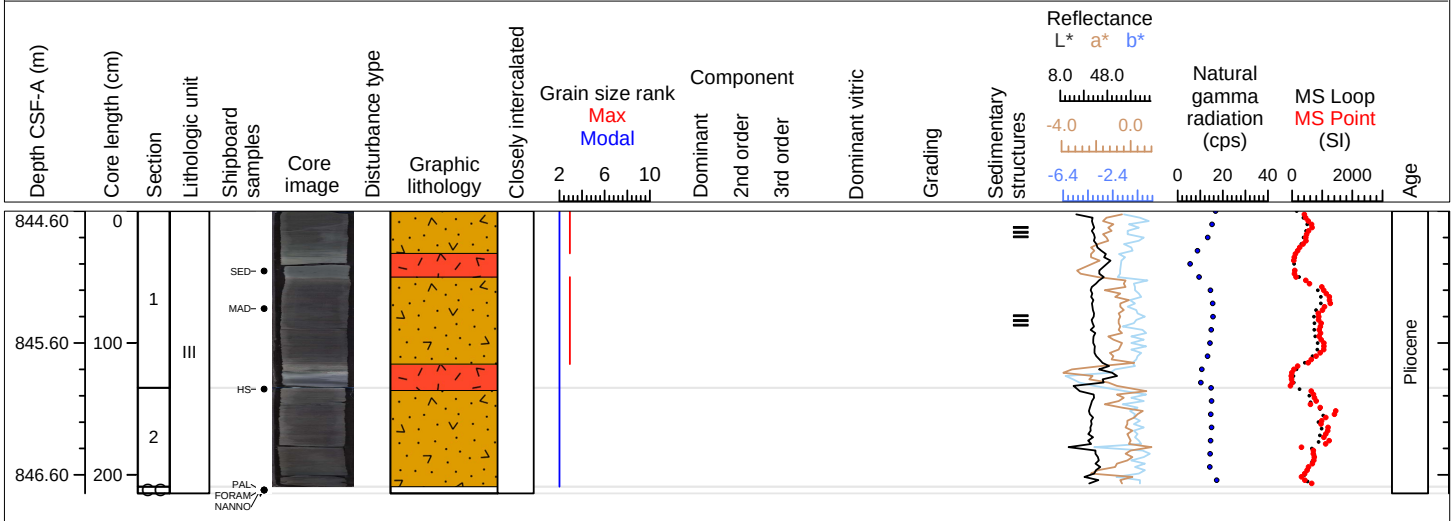
Hole 350-U1437D Core 44R, Interval 834.9-844.87 m (CSF-A)

tuffaceous mudstone and evolved tuff layers



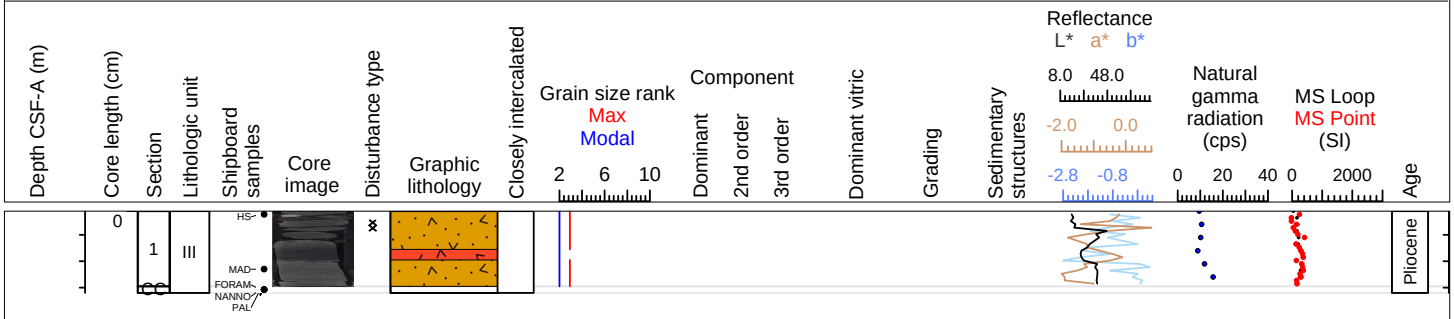
Hole 350-U1437D Core 45R, Interval 844.6-846.74 m (CSF-A)

tuffaceous mudstone and evolved tuff layers



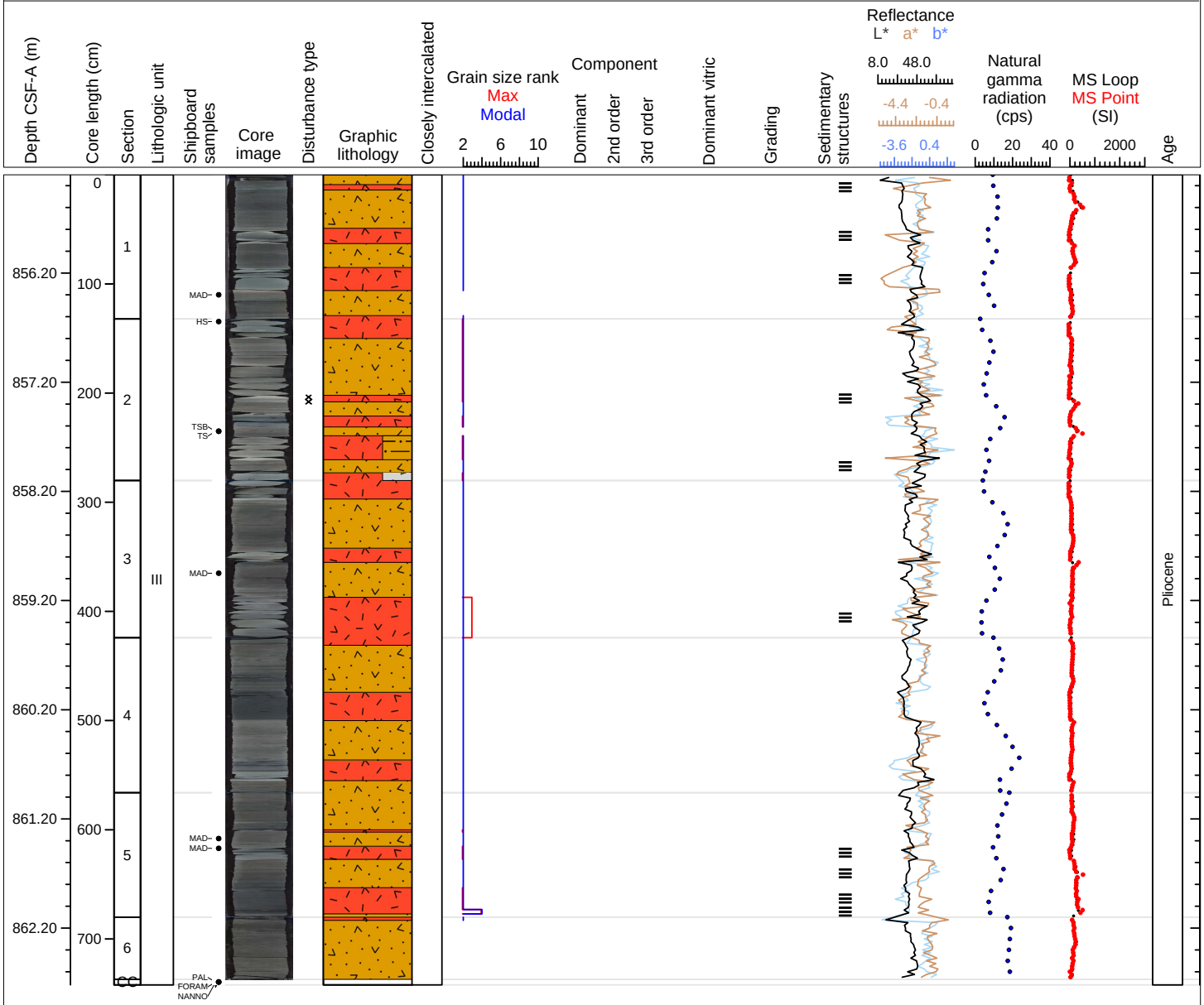
Hole 350-U1437D Core 46R, Interval 854.3-854.92 m (CSF-A)

tuffaceous mudstone and evolved tuff layers



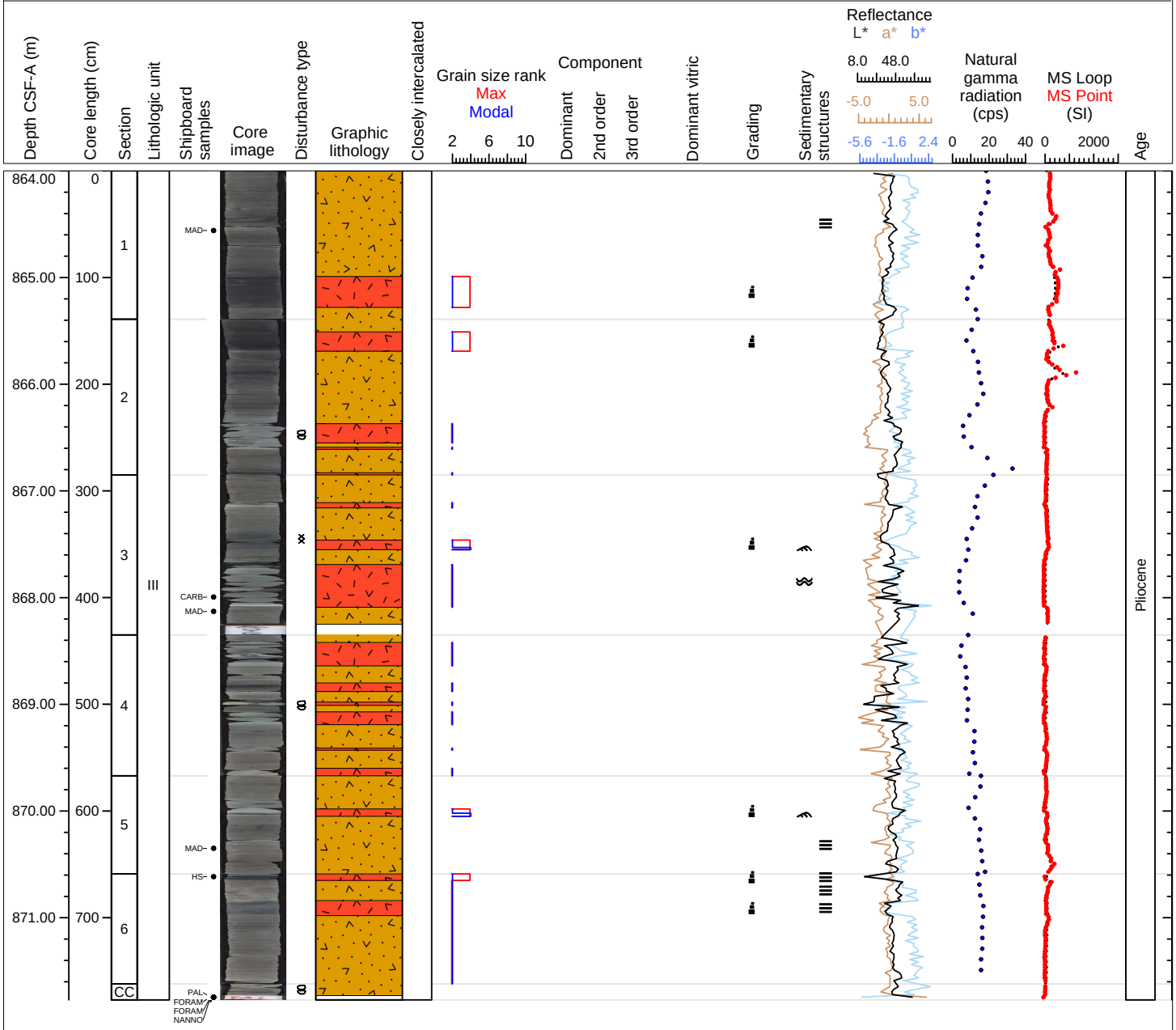
Hole 350-U1437D Core 47R, Interval 855.3-862.72 m (CSF-A)

tuffaceous mudstone with evolved tuff layers



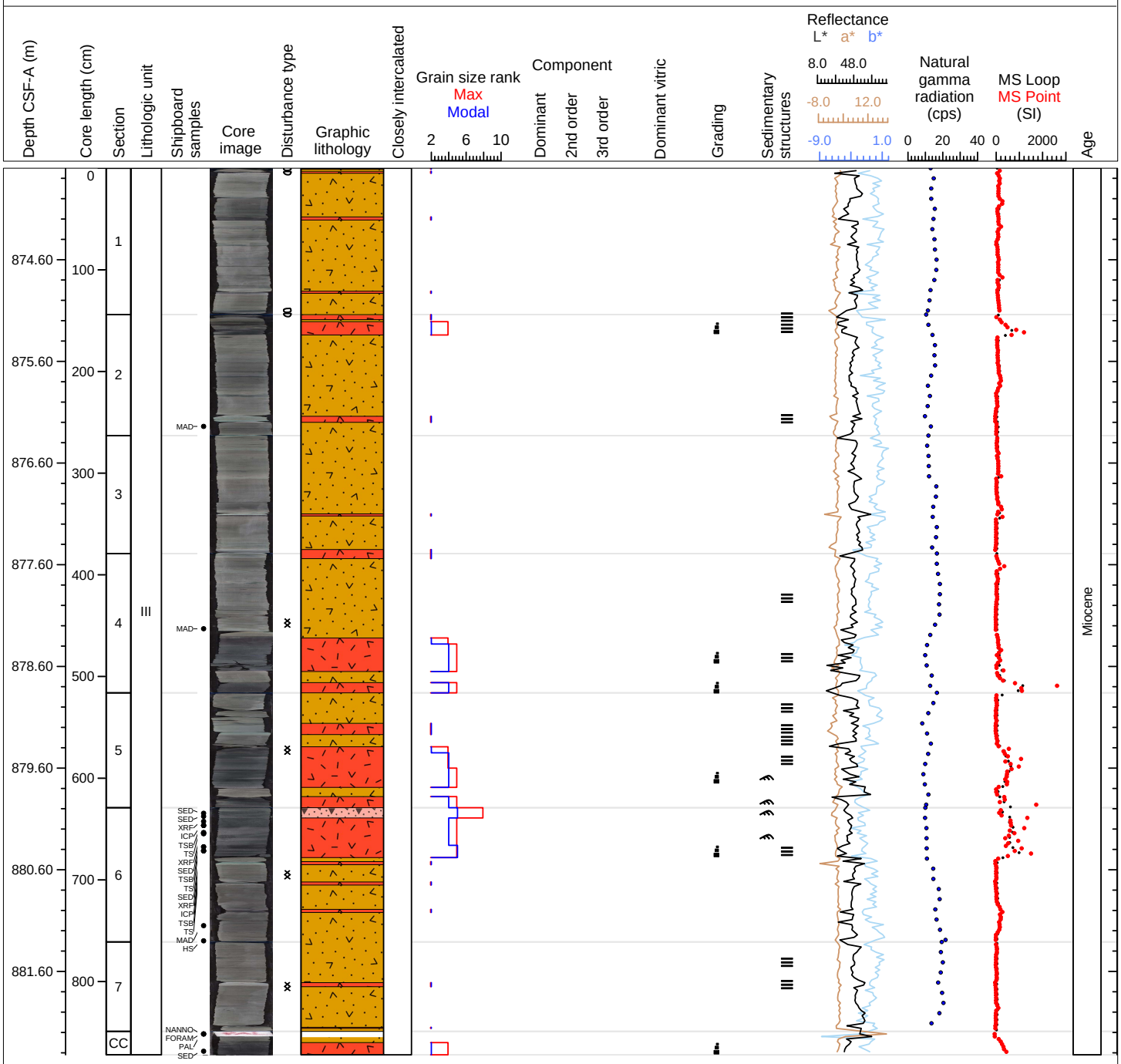
Hole 350-U1437D Core 48R, Interval 864.0-871.77 m (CSF-A)

intercalated tuffaceous mudstone and evolved tuff



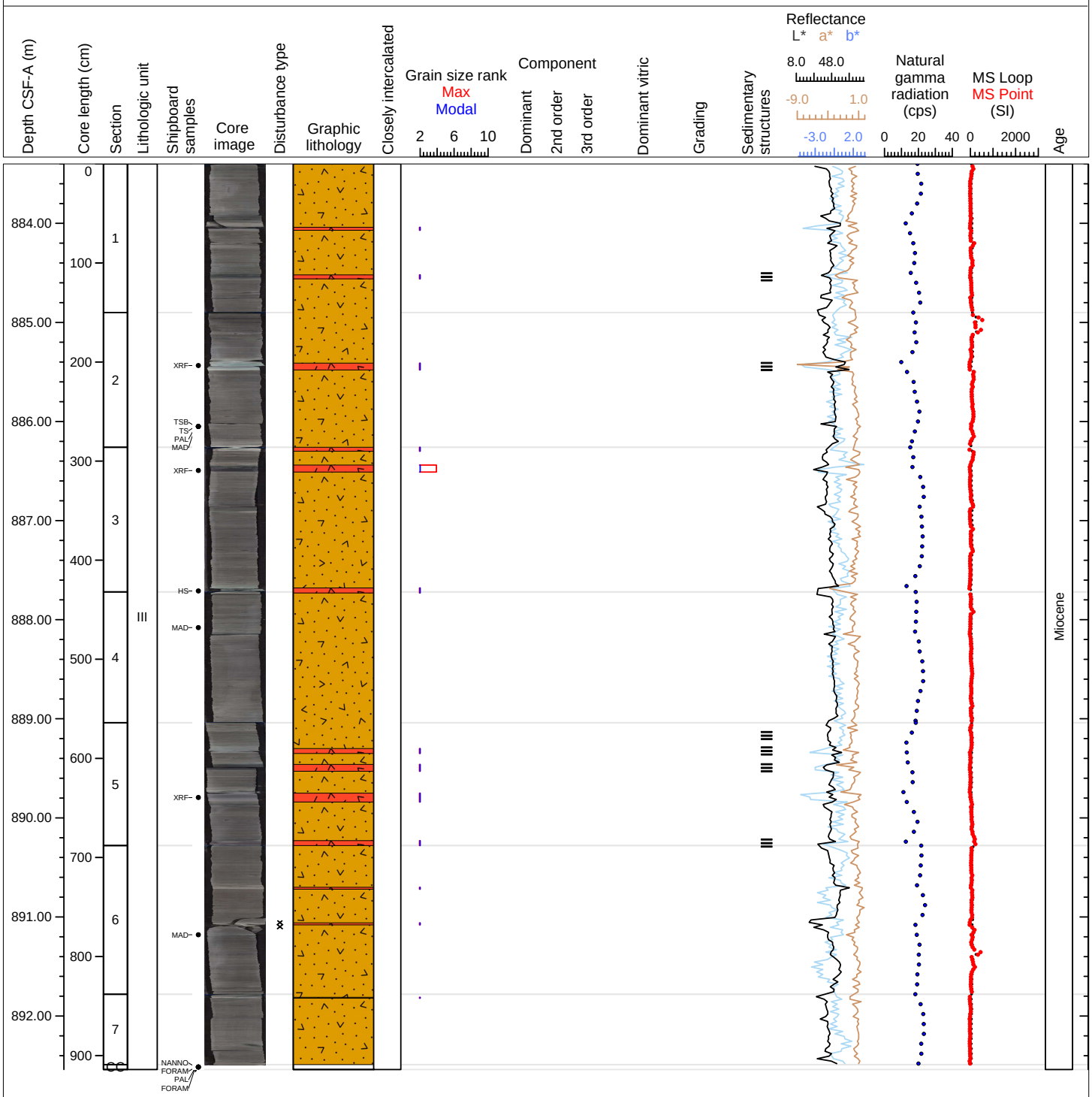
Hole 350-U1437D Core 49R, Interval 873.7-882.42 m (CSF-A)

alternating tuffaceous mudstone and evolved tuff



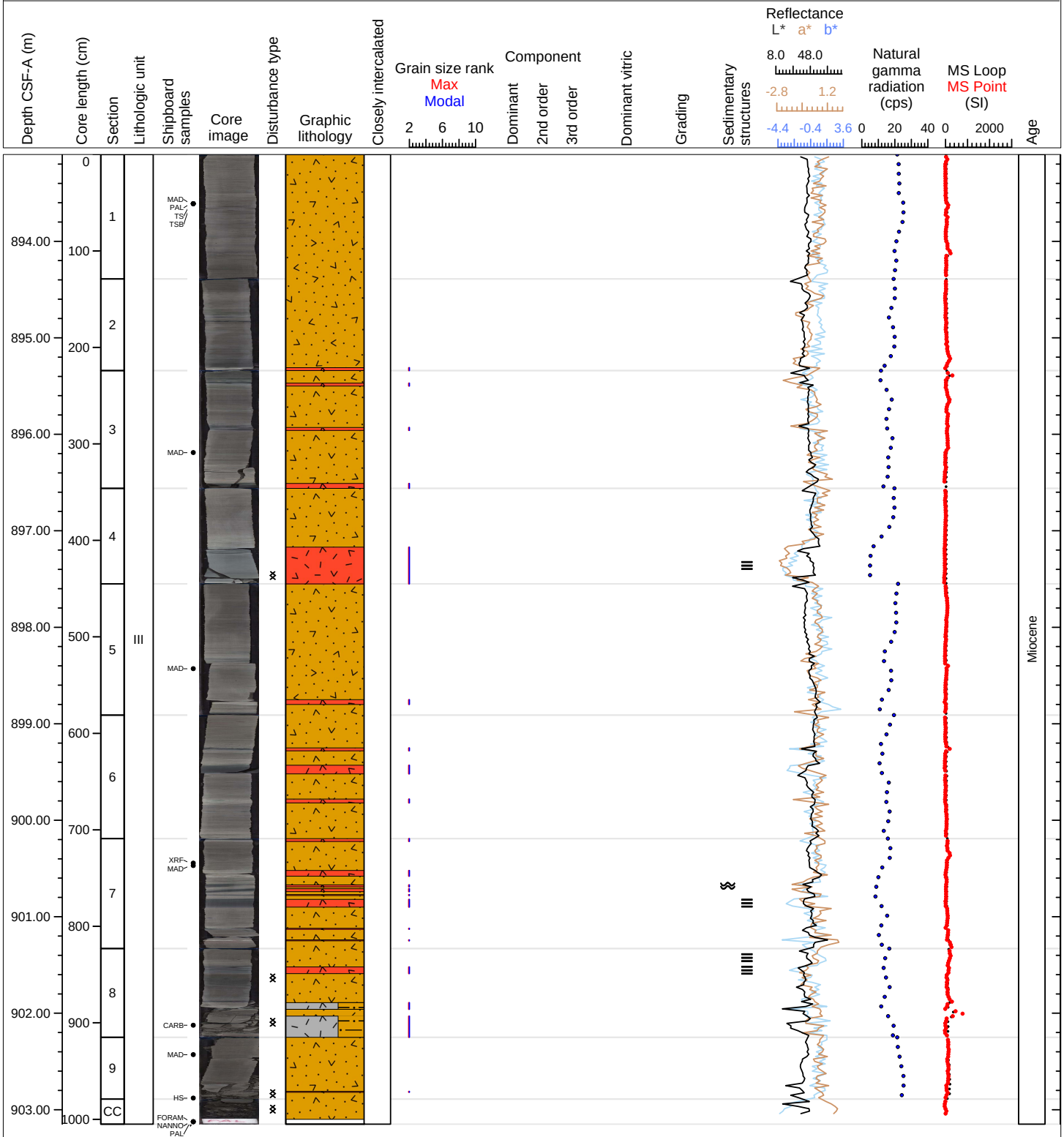
Hole 350-U1437D Core 50R, Interval 883.4-892.54 m (CSF-A)

alternating tuffaceous mudstone and evolved tuff



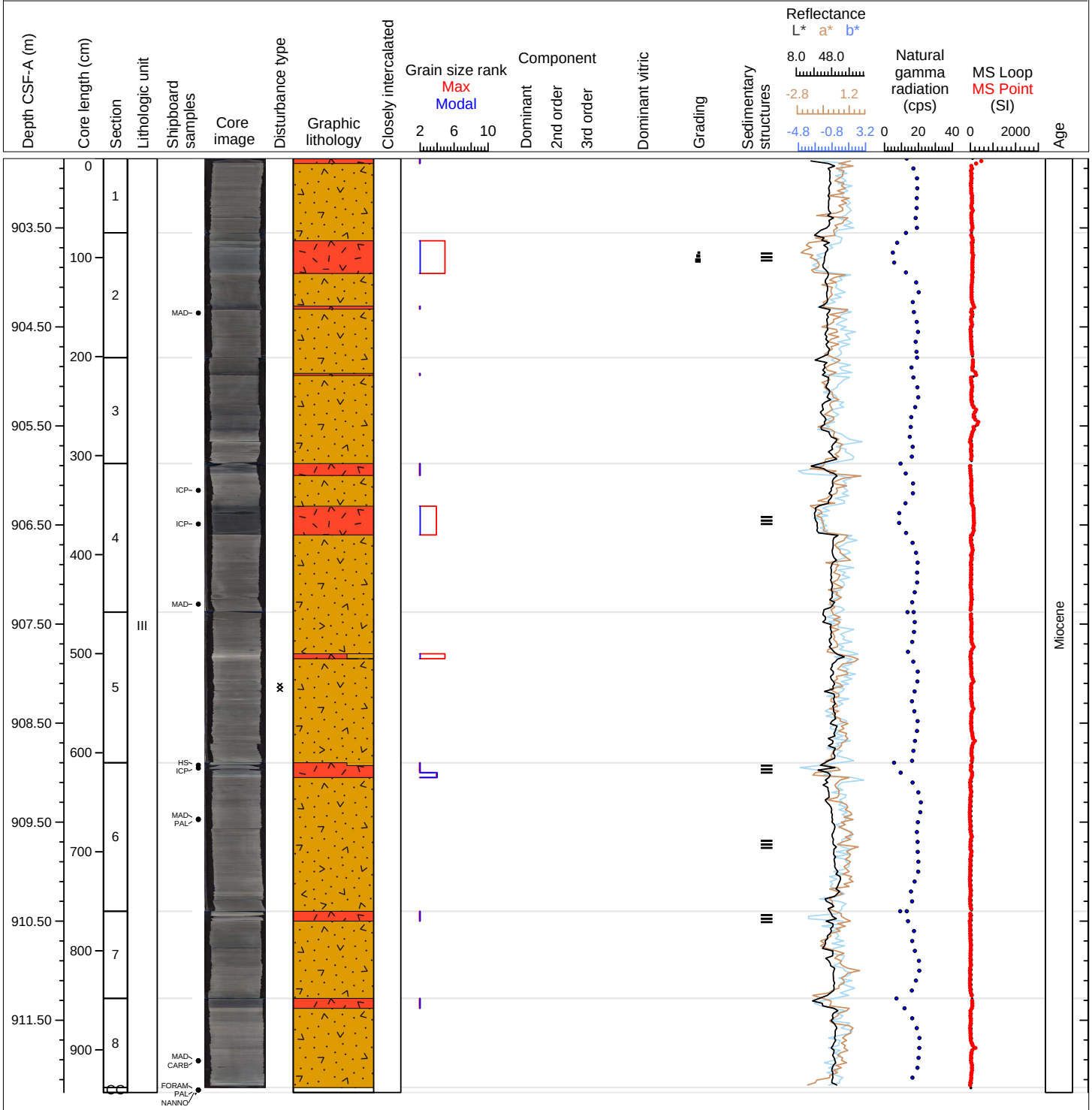
Hole 350-U1437D Core 51R, Interval 893.1-903.15 m (CSF-A)

tuffaceous mudstone with evolved tuff layers intercalated



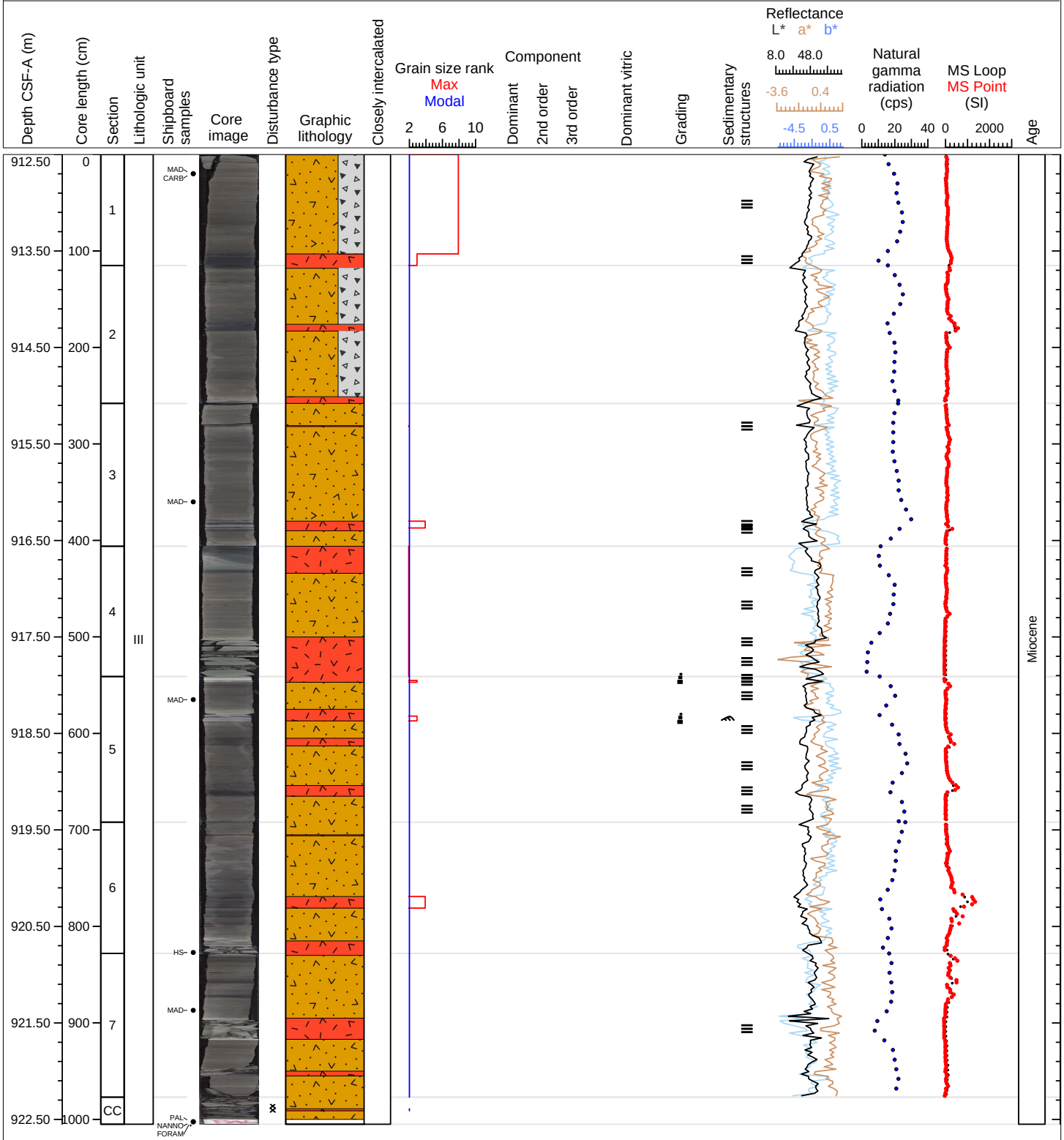
Hole 350-U1437D Core 52R, Interval 902.8-912.23 m (CSF-A)

monotonous tuffaceous mudstone with evolved tuff layers



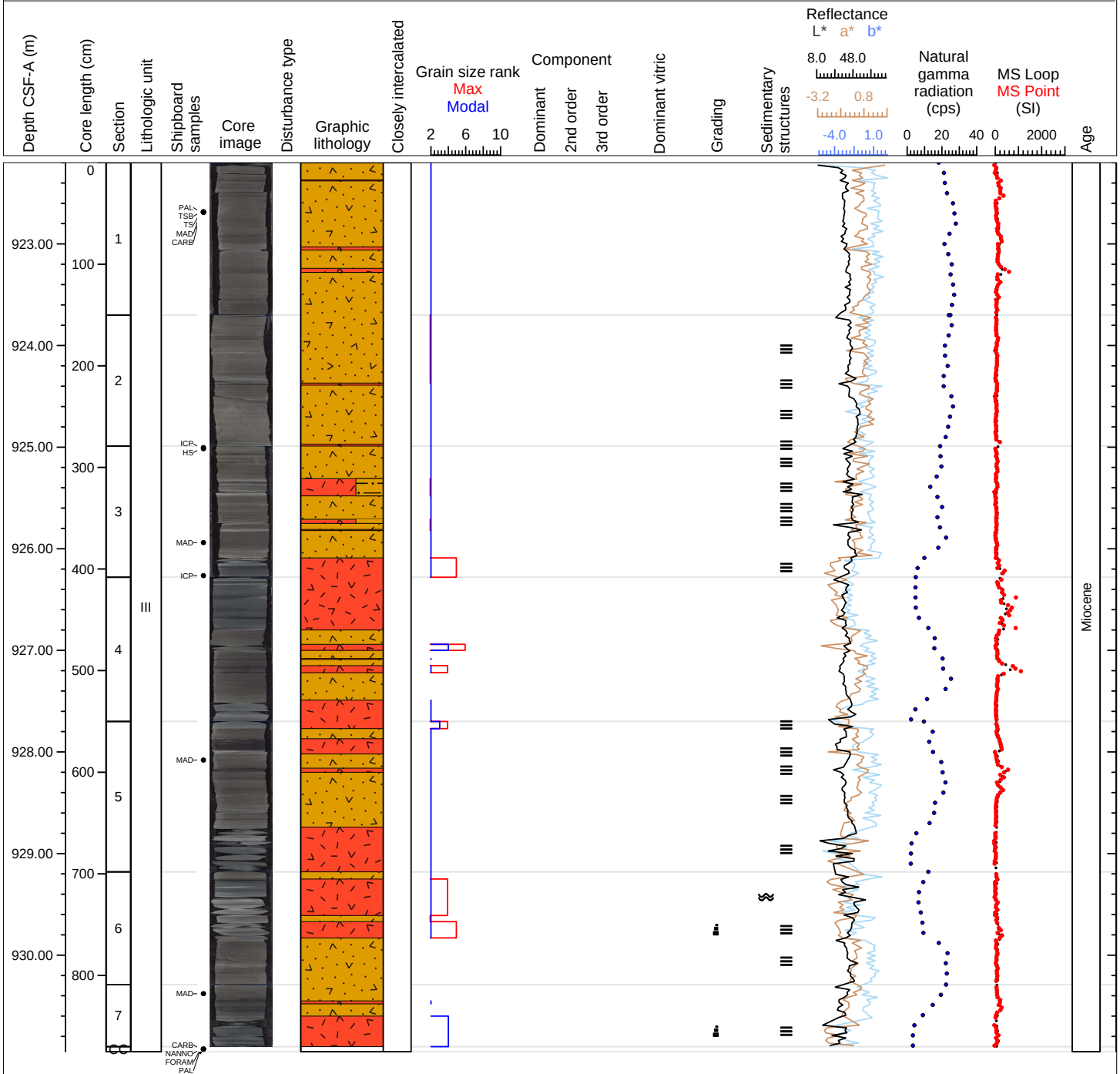
Hole 350-U1437D Core 53R, Interval 912.5-922.55 m (CSF-A)

monotonous tuffaceous mudstone with evolved tuff layers



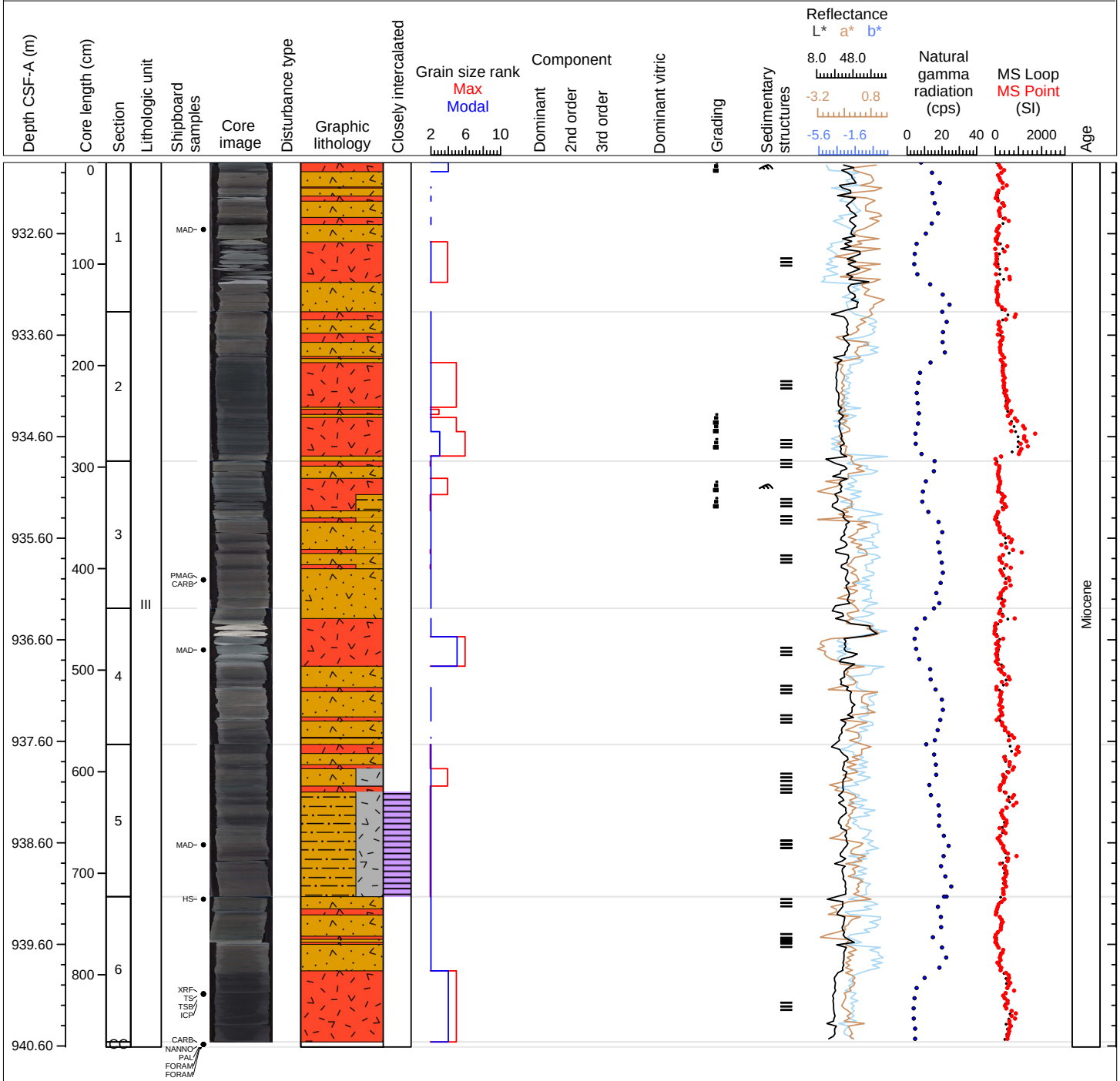
Hole 350-U1437D Core 54R, Interval 922.2-930.95 m (CSF-A)

monotonous tuffaceous mudstone with evolved tuff layers



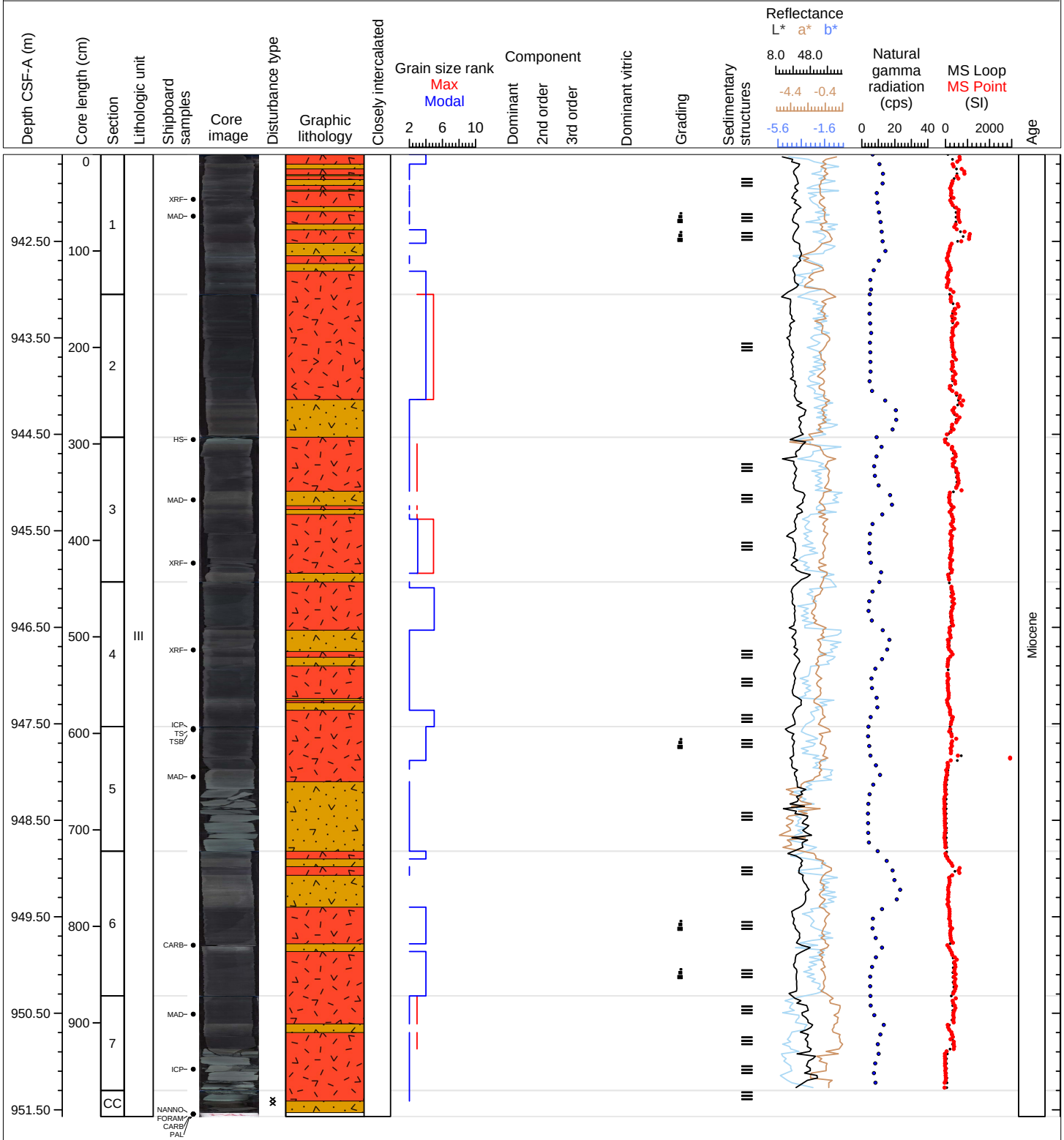
Hole 350-U1437D Core 55R, Interval 931.9-940.61 m (CSF-A)

monotonous tuffaceous mudstone with evolved and gradded tuff layers



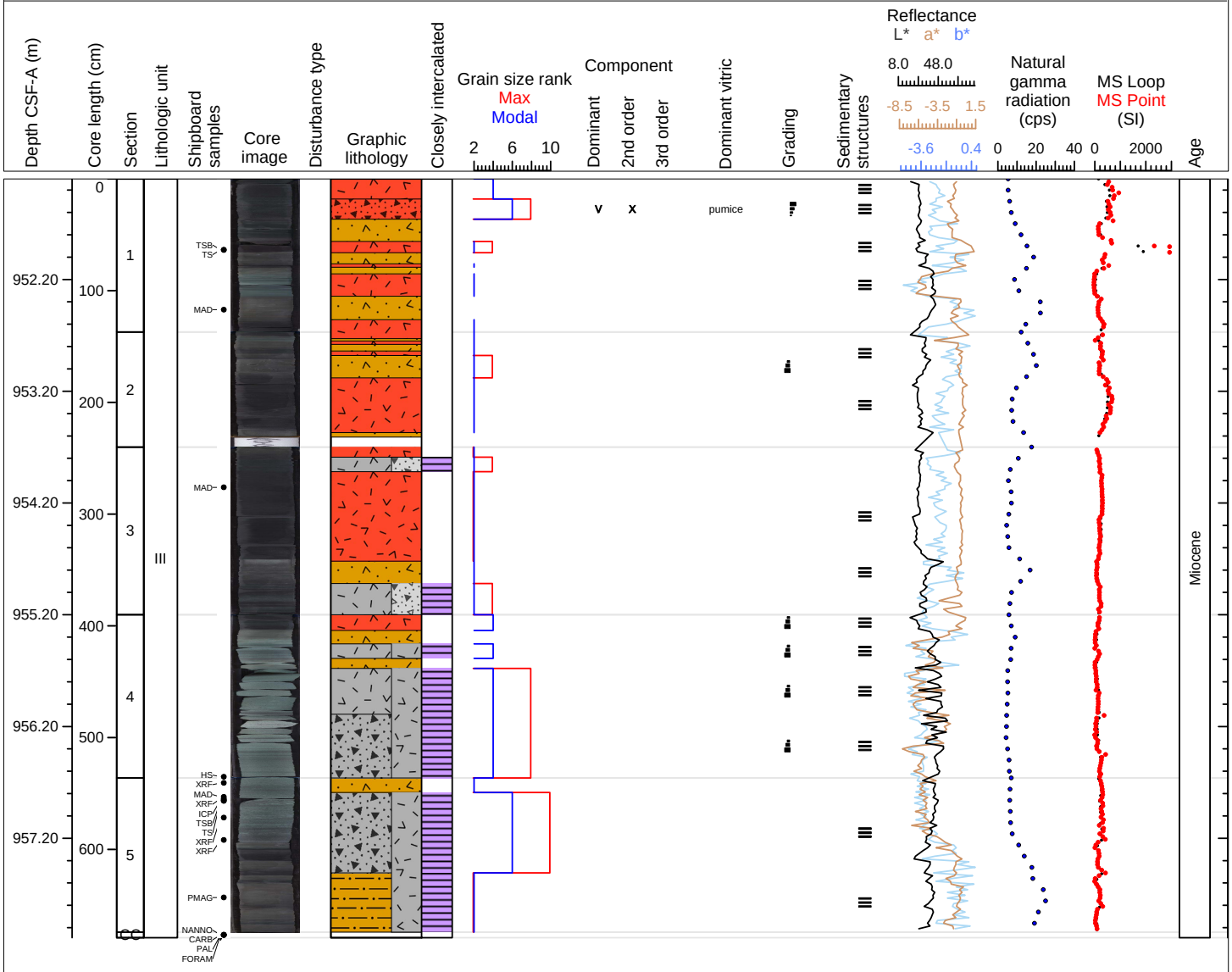
Hole 350-U1437D Core 56R, Interval 941.6-951.57 m (CSF-A)

Thick black evolved tuff layers alternating with tuffaceous mudstone



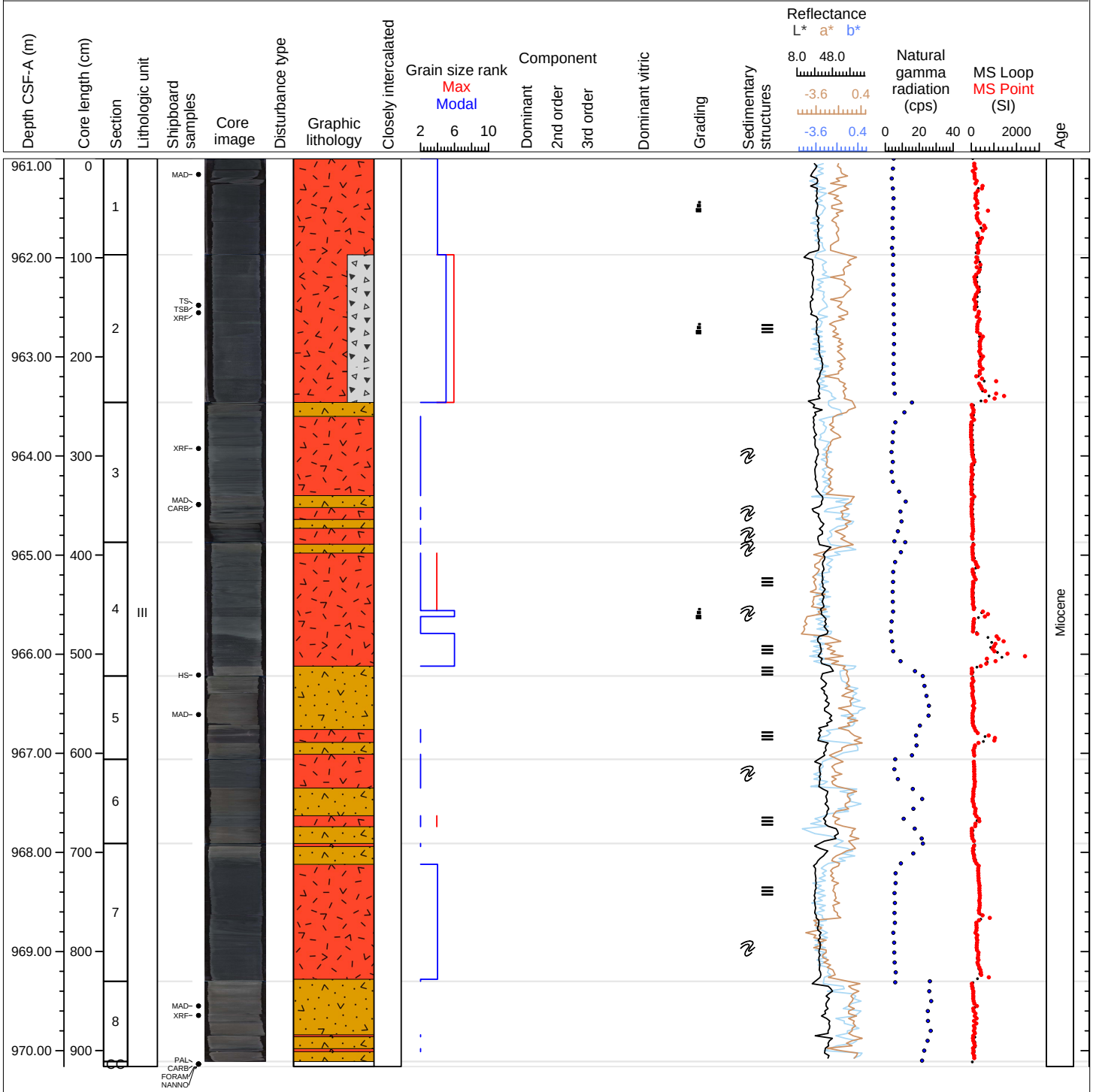
Hole 350-U1437D Core 57R, Interval 951.3-958.09 m (CSF-A)

Thick black and green evolved tuff layers alternating with tuffaceous mudstone



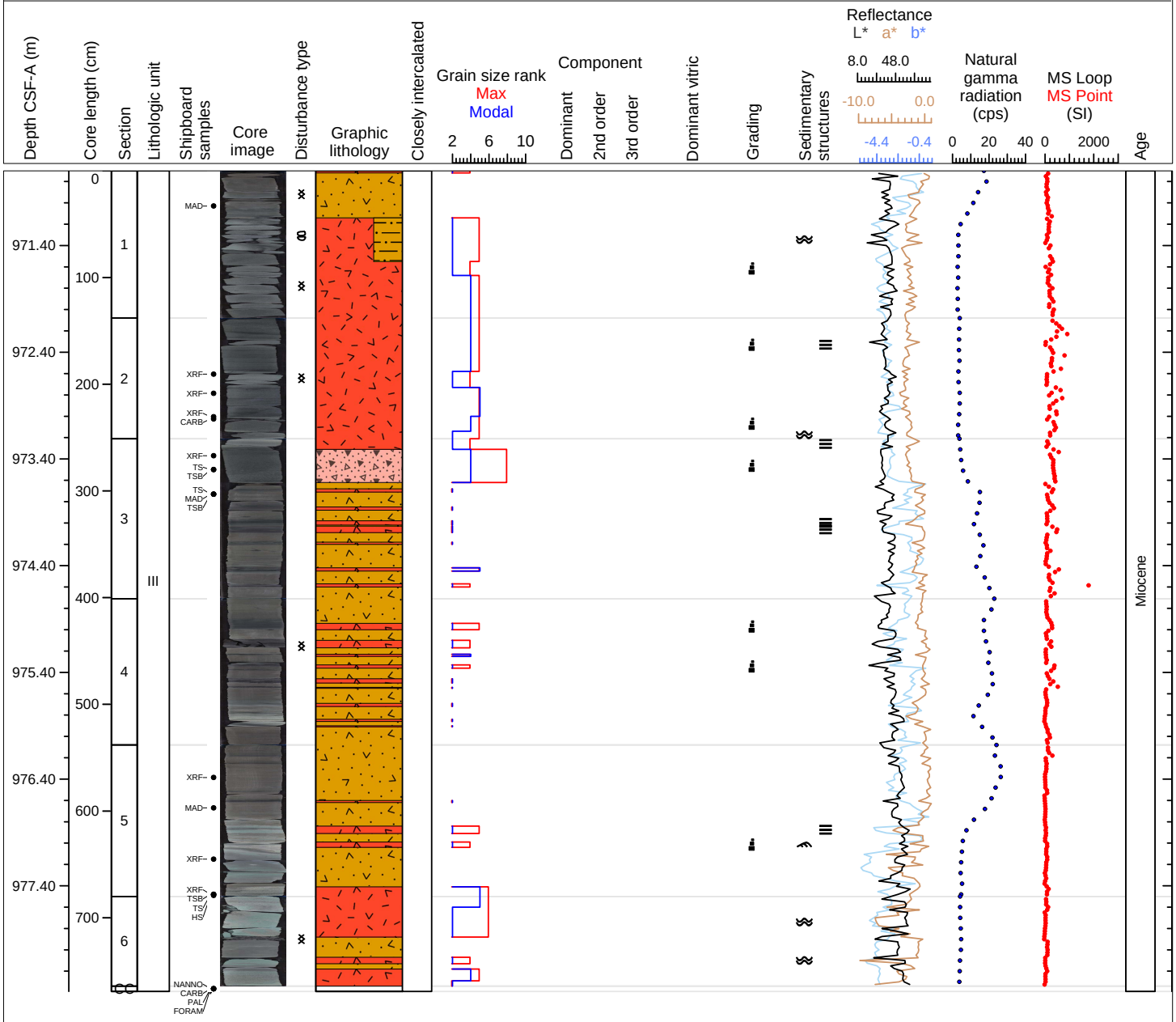
Hole 350-U1437D Core 58R, Interval 961.0-970.16 m (CSF-A)

Thick black and green evolved tuff layers alternating with tuffaceous mudstone



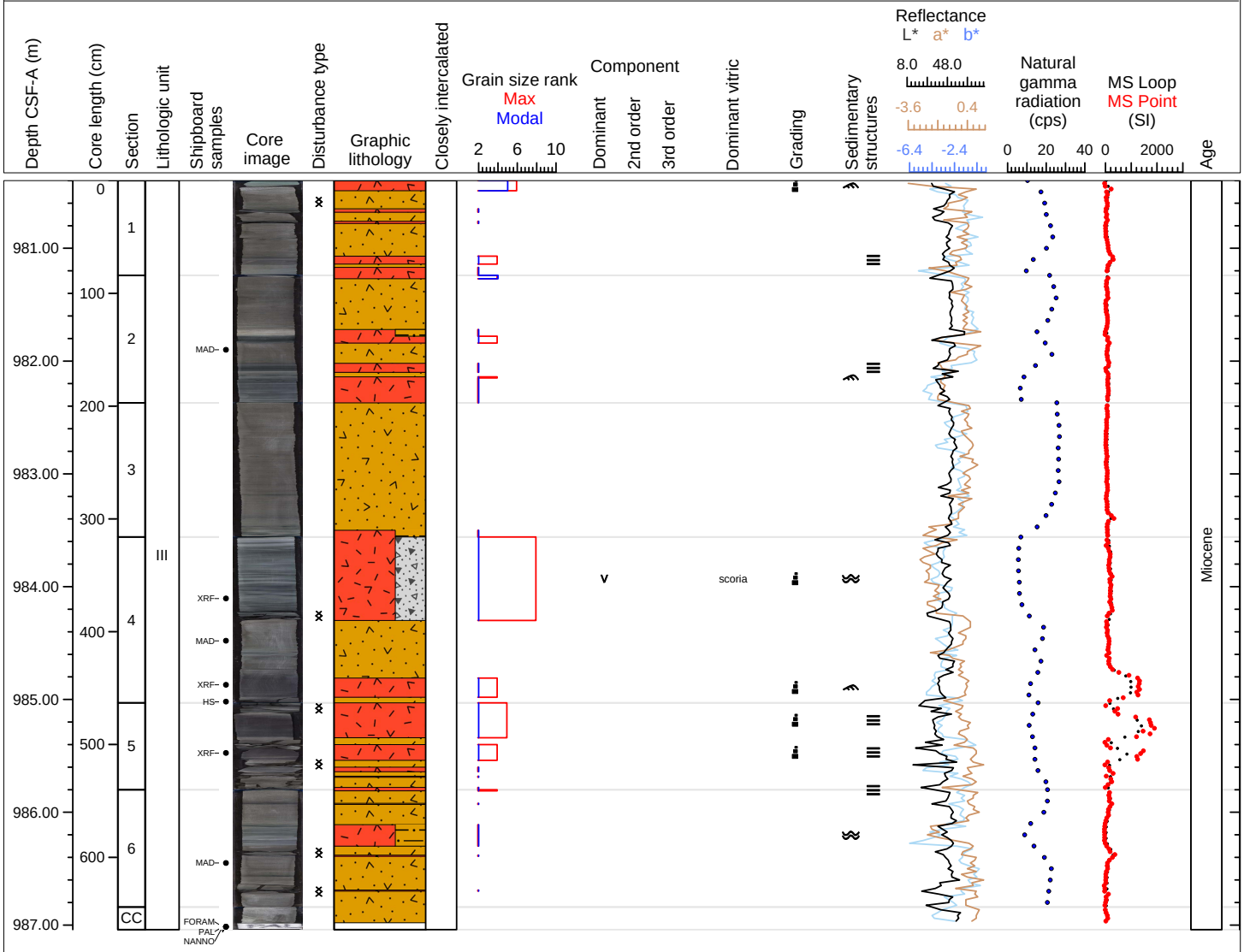
Hole 350-U1437D Core 59R, Interval 970.7-978.39 m (CSF-A)

evolved tuff layers seperated by tuffaceous mudstones



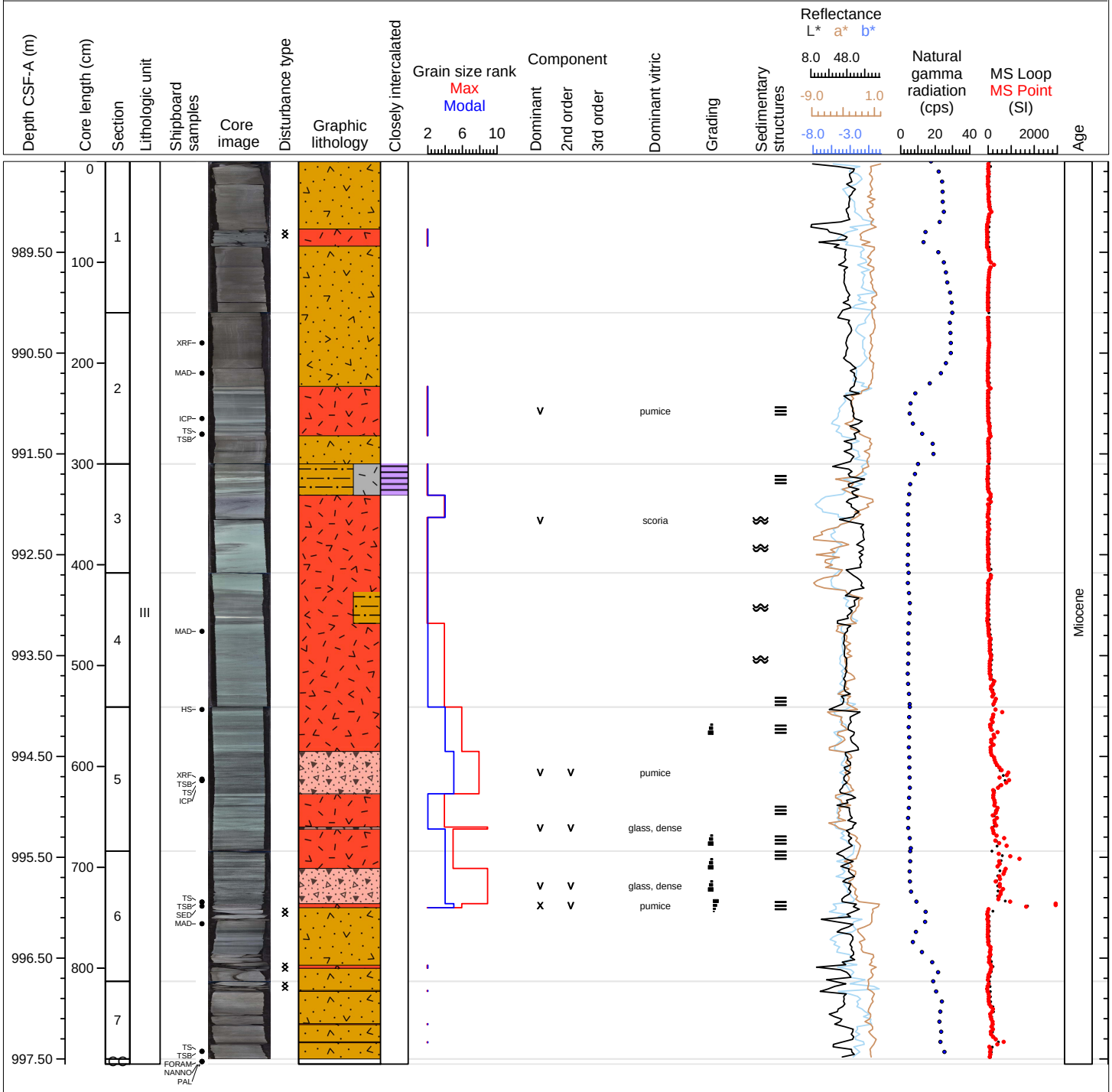
Hole 350-U1437D Core 60R, Interval 980.4-987.04 m (CSF-A)

tuffaceous mudstone intercalated with evolved tuff layers



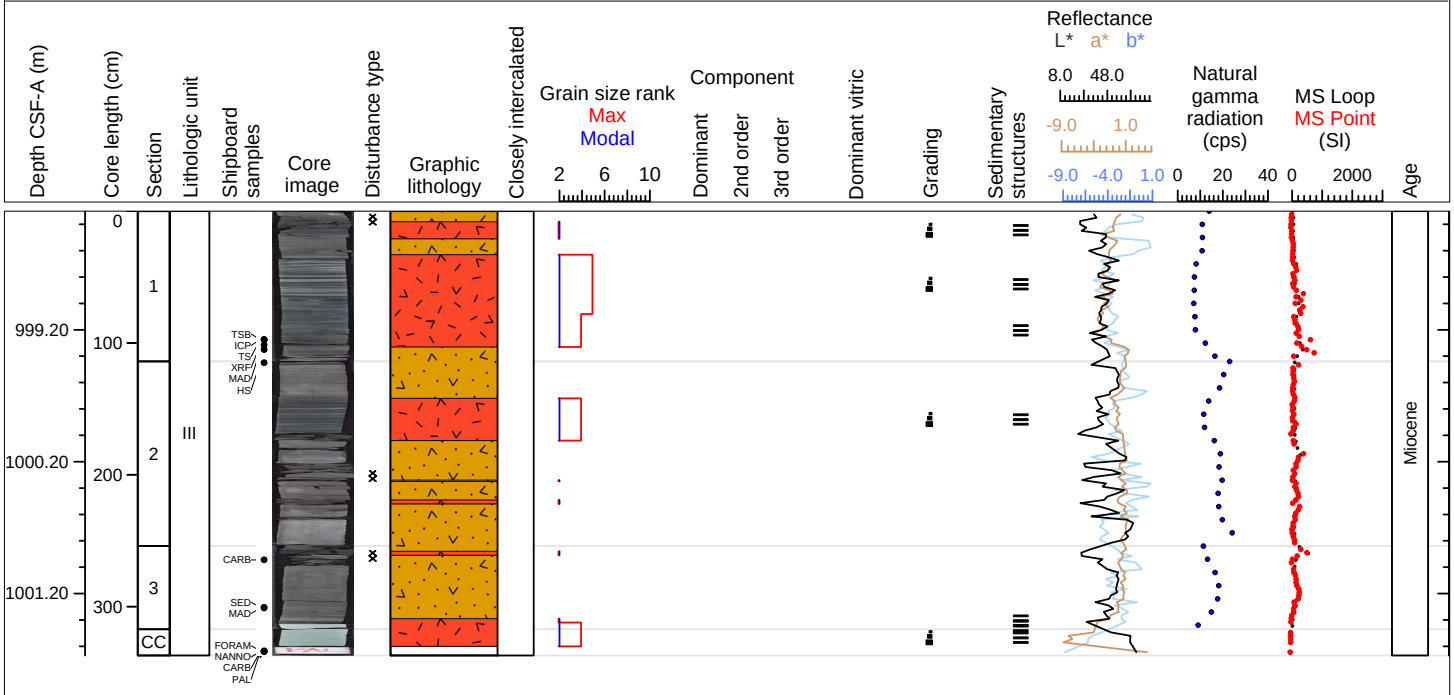
Hole 350-U1437D Core 61R, Interval 988.6-997.55 m (CSF-A)

abundant evolved tuff, including 4.5 m continuous section, intercalated with tuffaceous mudstone



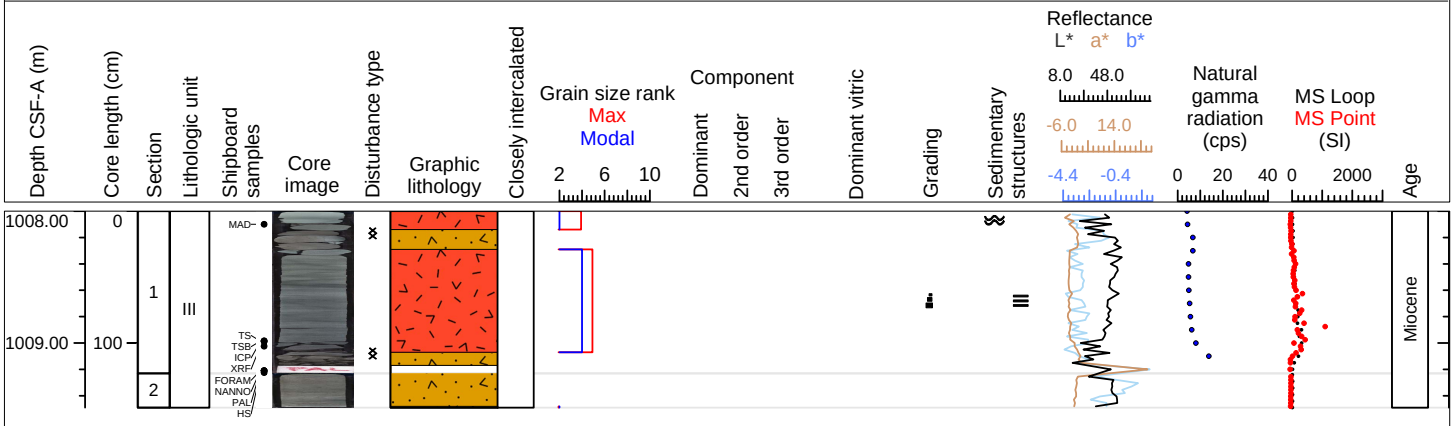
Hole 350-U1437D Core 62R, Interval 998.3-1001.67 m (CSF-A)

tuffaceous mudstone with intercalated evolved tuff layers



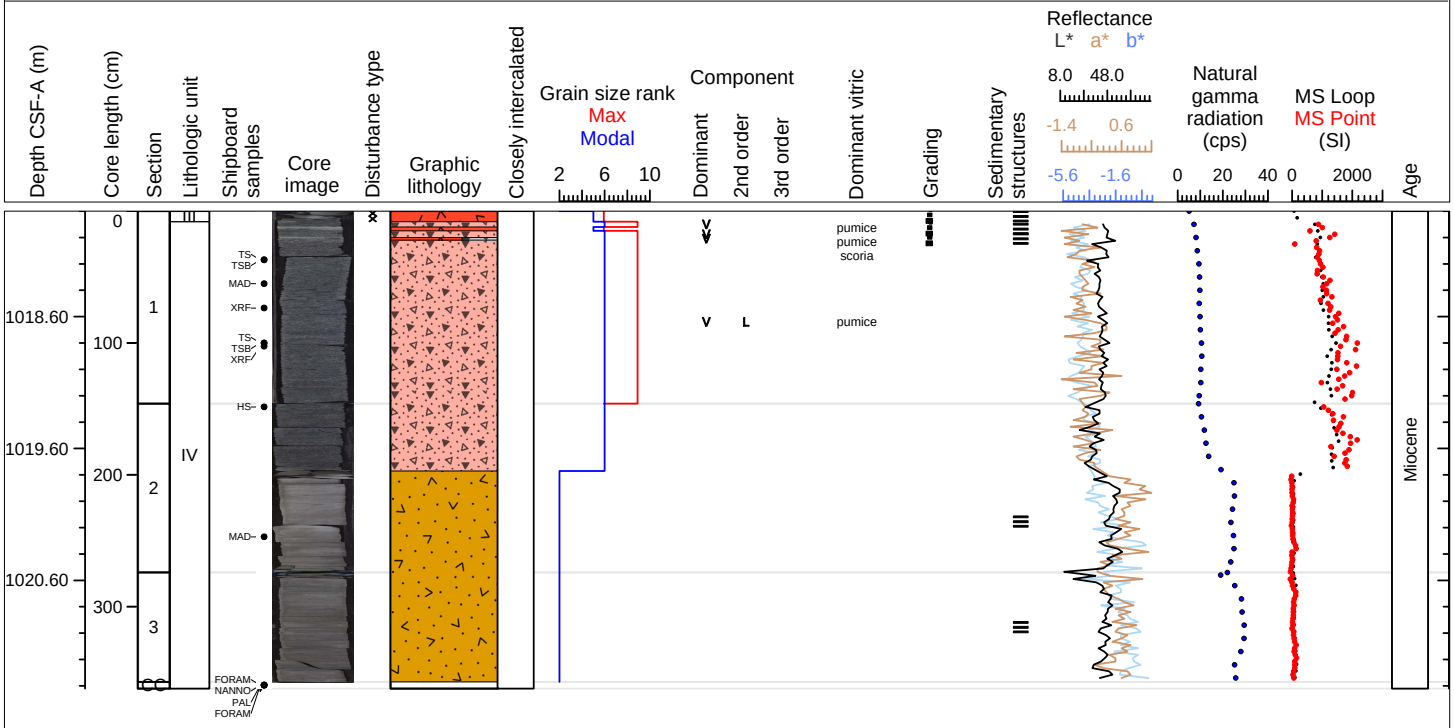
Hole 350-U1437D Core 63R, Interval 1008.0-1009.49 m (CSF-A)

tuffaceous mudstone with intercalated evolved tuff. Section 2 is not well located due to core catcher failure



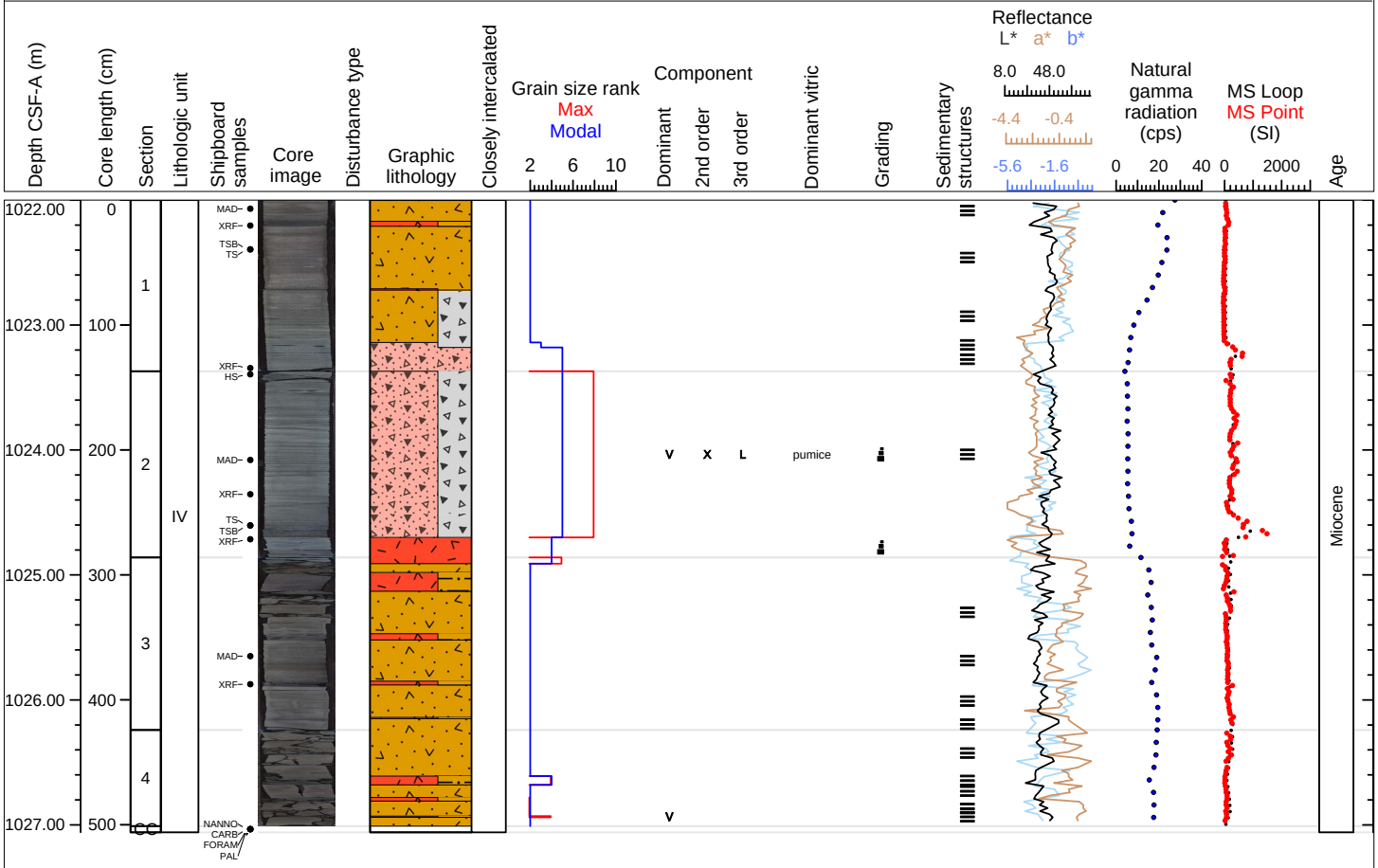
Hole 350-U1437D Core 64R, Interval 1017.8-1021.42 m (CSF-A)

evolved polymictic lapilli-tuff with tuffaceous mudstone



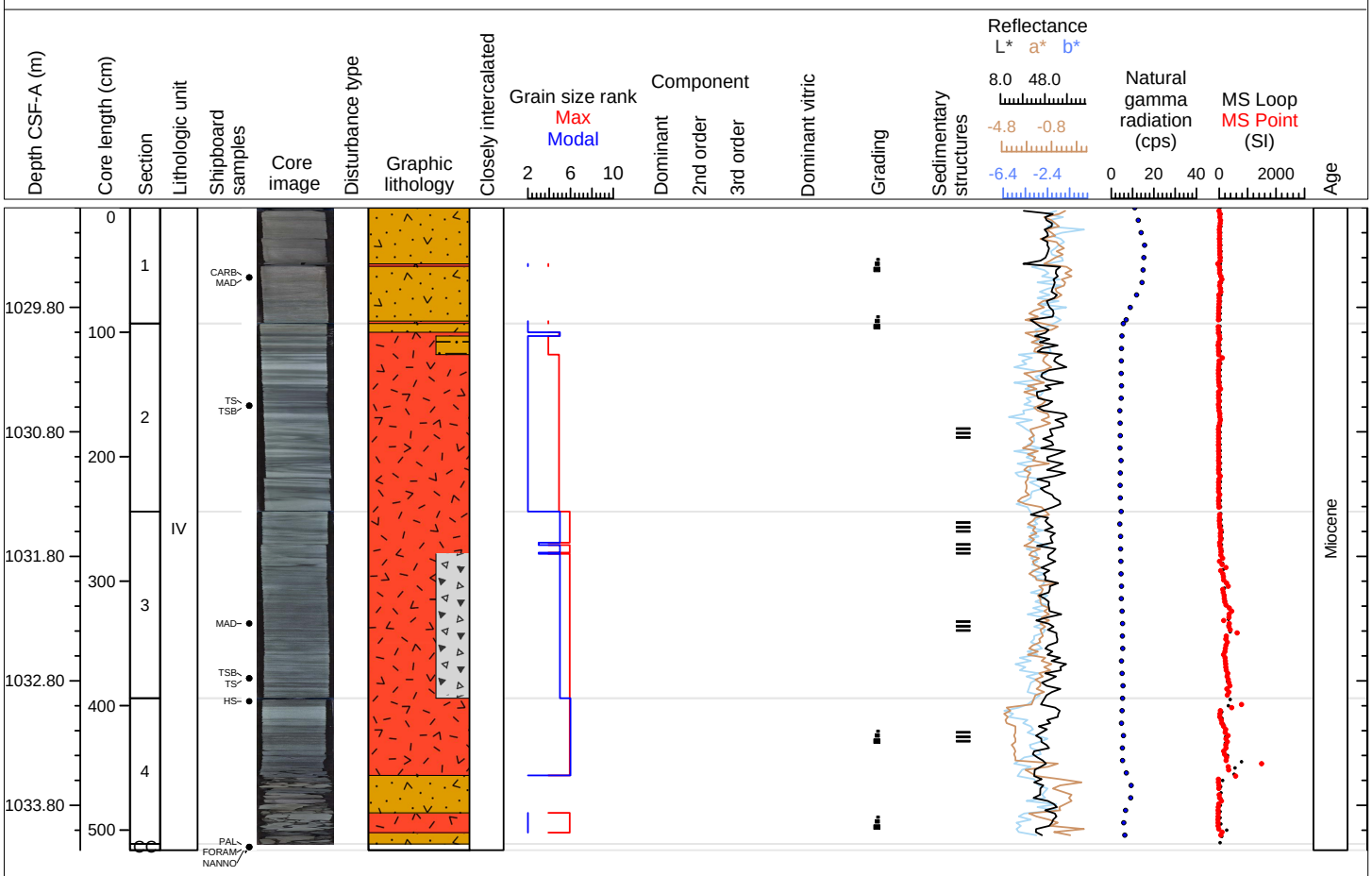
Hole 350-U1437D Core 65R, Interval 1022.0-1027.06 m (CSF-A)

evolved tuff intercalated with tuffaceous mudstone



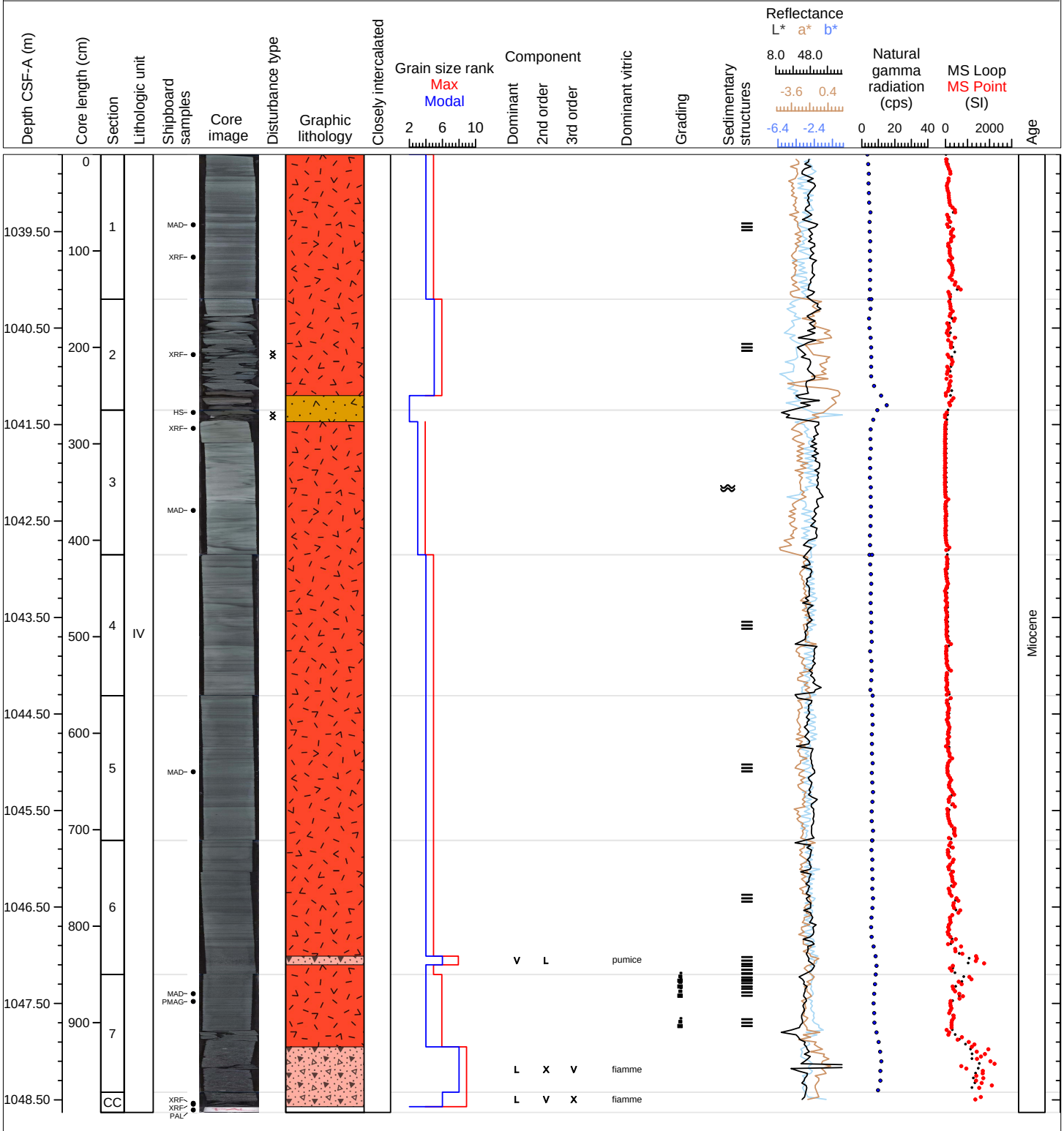
Hole 350-U1437D Core 66R, Interval 1029.0-1034.16 m (CSF-A)

evolved tuff with tuffaceous mudstone



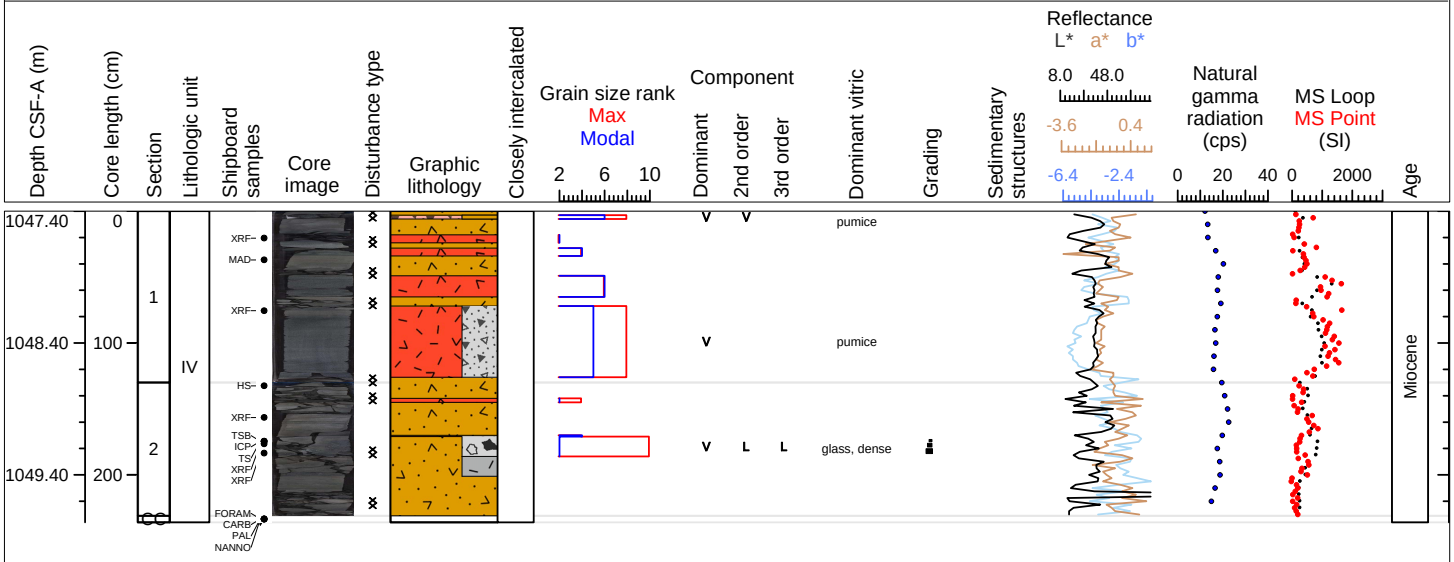
Hole 350-U1437D Core 67R, Interval 1038.7-1048.63 m (CSF-A)

evolved tuff and polymictic evolved lapilli-tuff



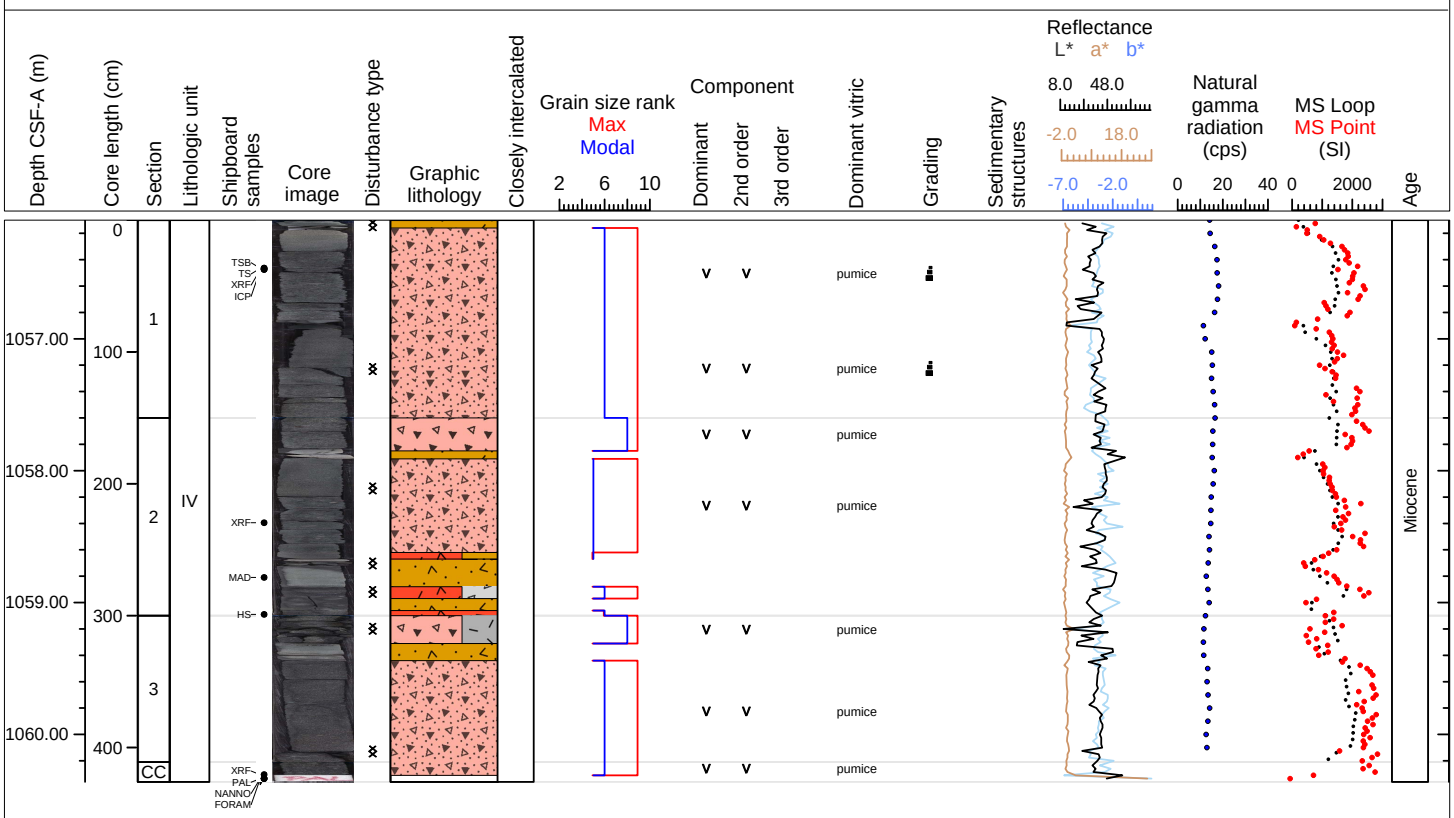
Hole 350-U1437D Core 68R, Interval 1047.4-1049.76 m (CSF-A)

tuffaceous mudstone intercalated with evolved tuff



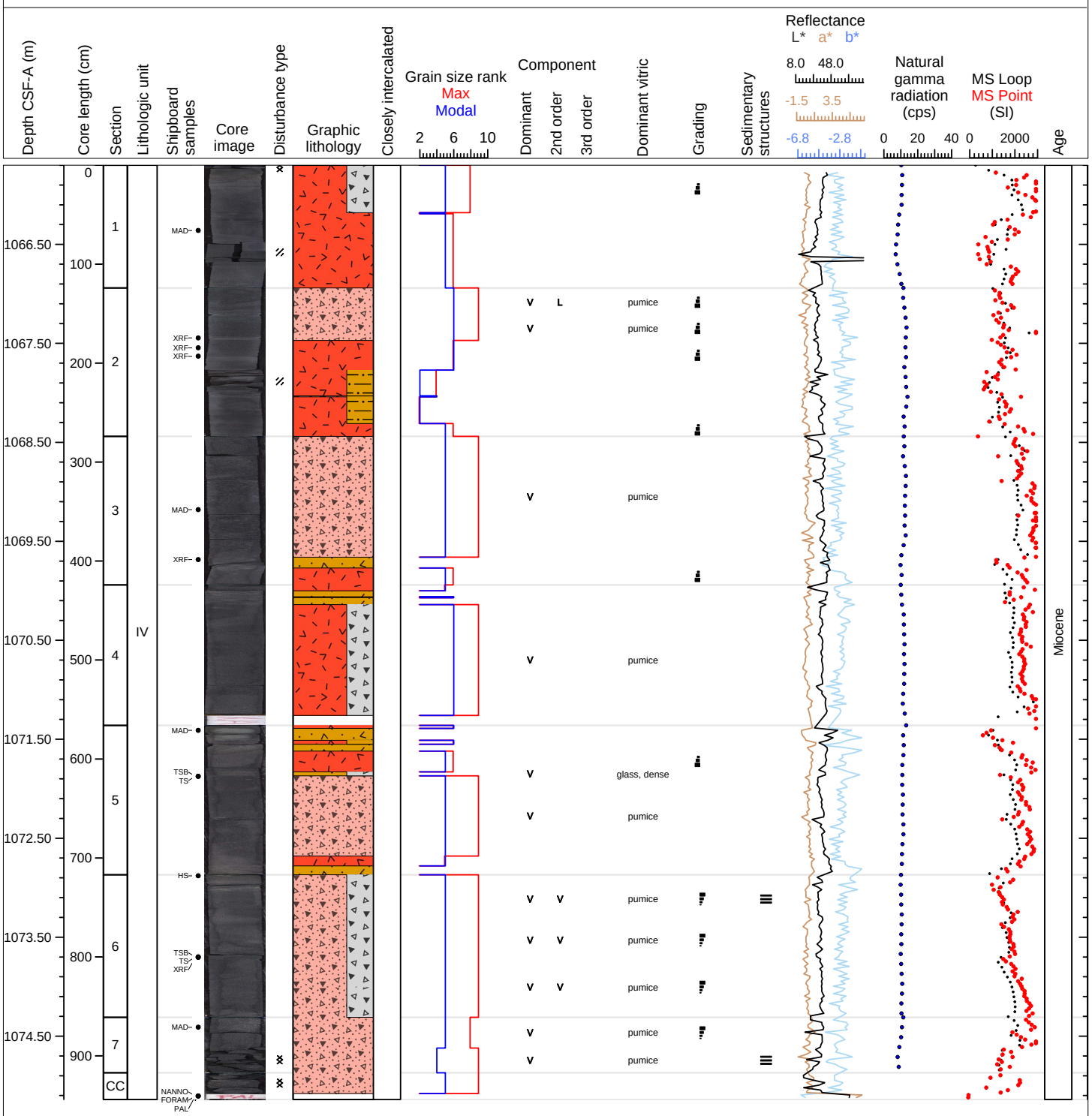
Hole 350-U1437D Core 69R, Interval 1056.1-1060.36 m (CSF-A)

evolved tuff, lapilli-tuff, and lapillistone intercalated with tuffaceous mudstone



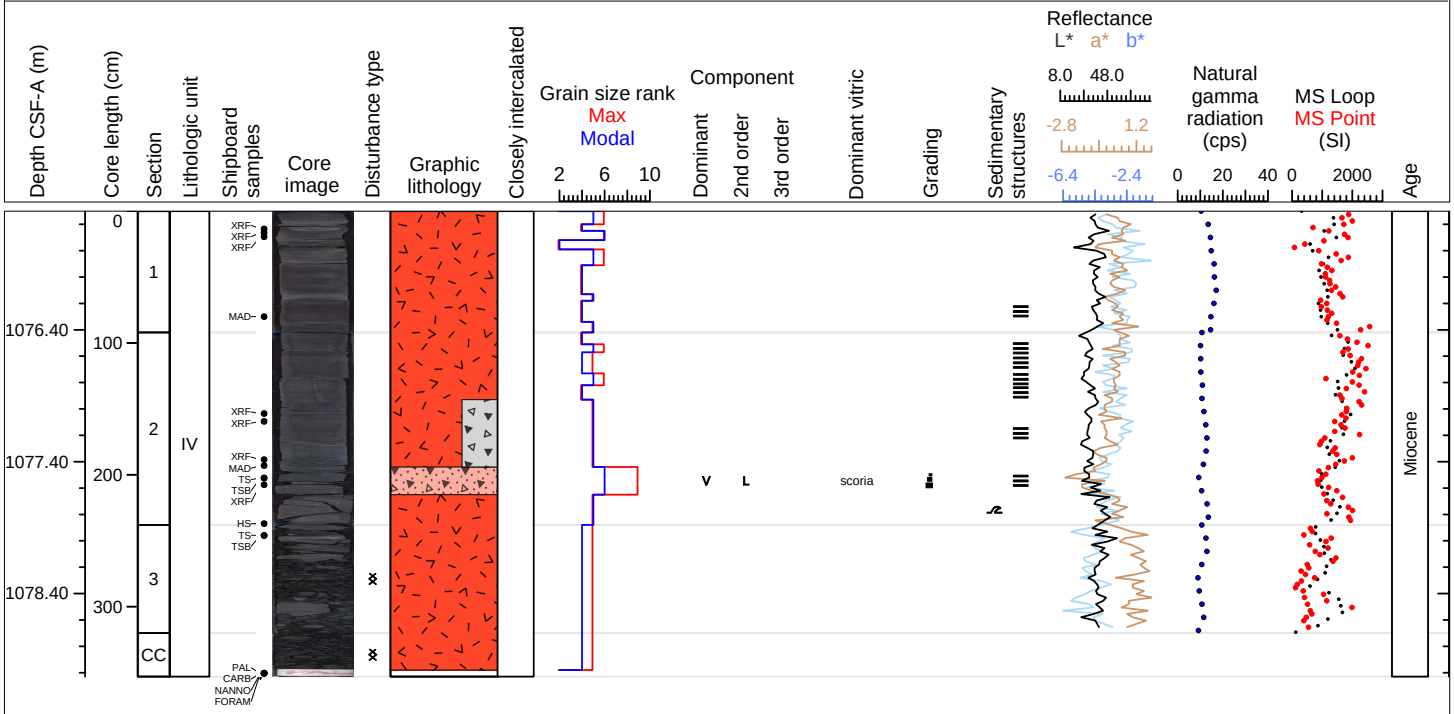
Hole 350-U1437D Core 70R, Interval 1065.7-1075.14 m (CSF-A)

evolved tuff and lapilli-tuff with minor intercalated tuff



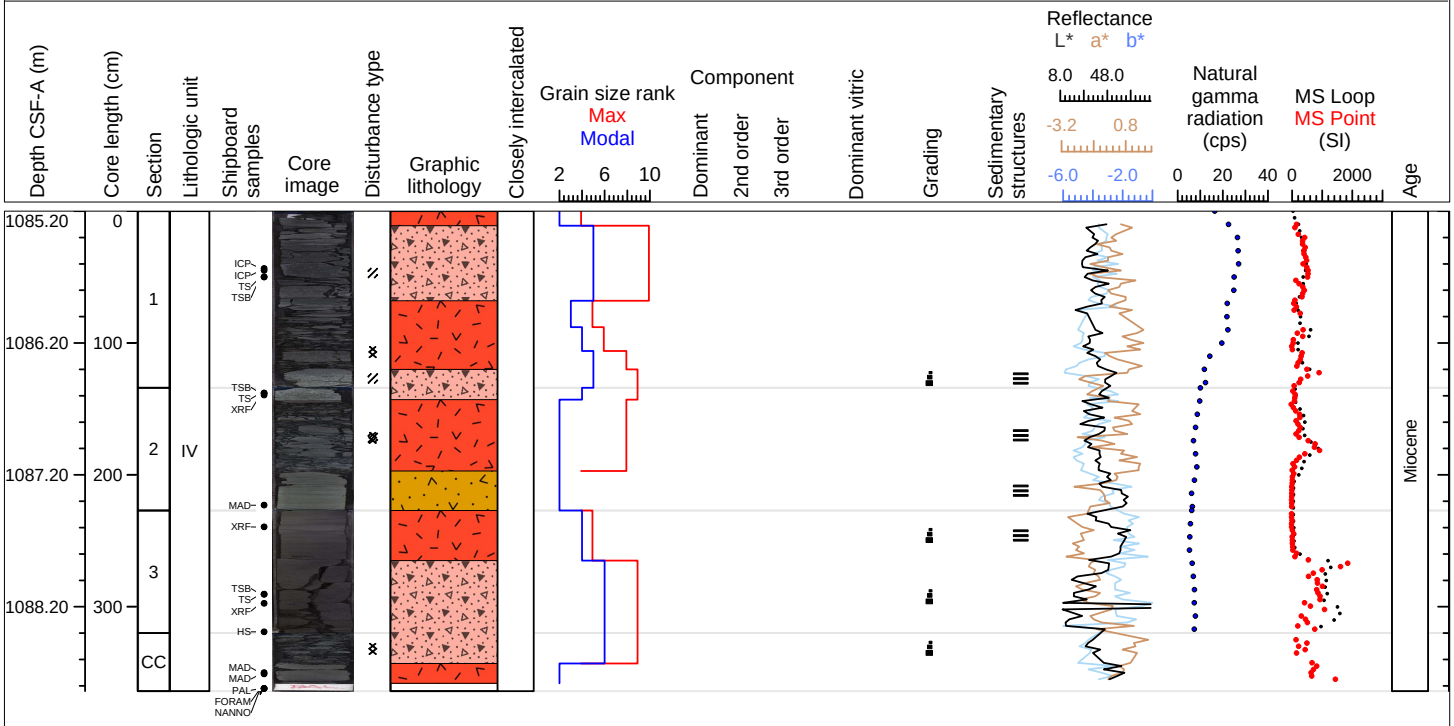
Hole 350-U1437D Core 71R, Interval 1075.5-1079.03 m (CSF-A)

evolved tuff



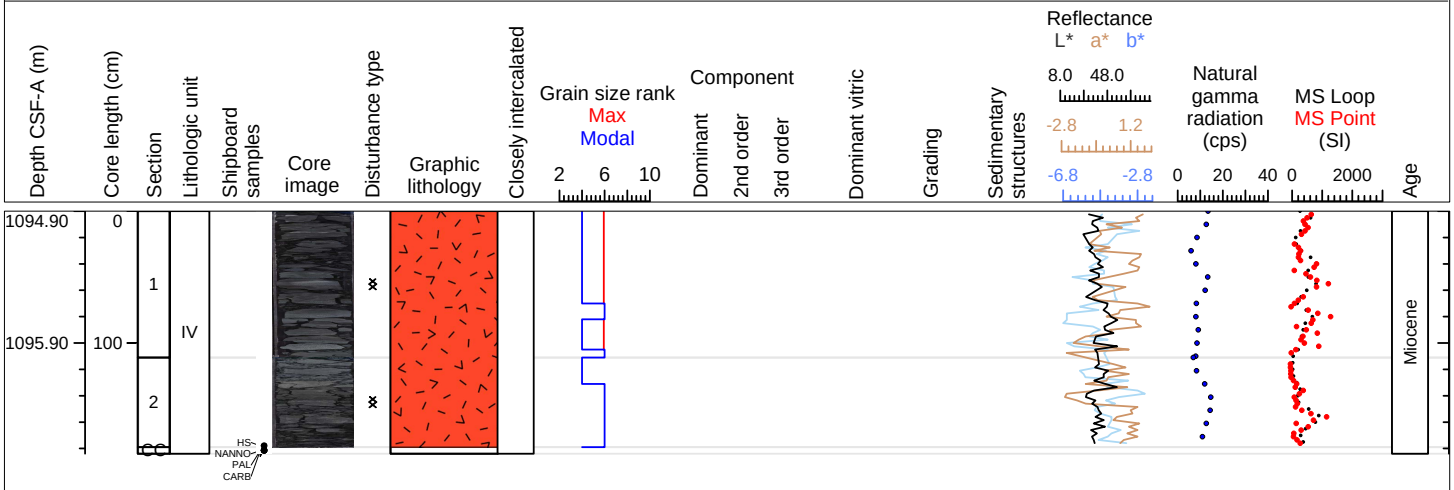
Hole 350-U1437D Core 72R, Interval 1085.2-1088.84 m (CSF-A)

evolved tuff and lapilli-tuff



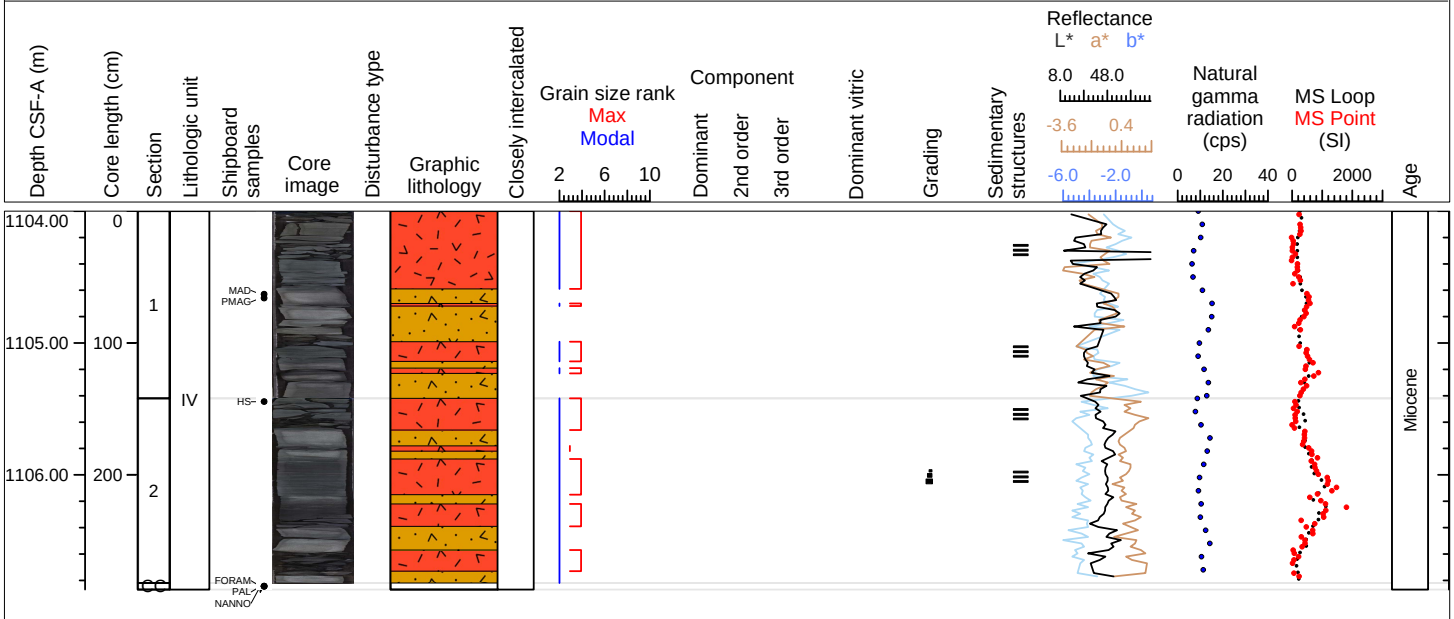
Hole 350-U1437D Core 73R, Interval 1094.9-1096.74 m (CSF-A)

evolved tuff



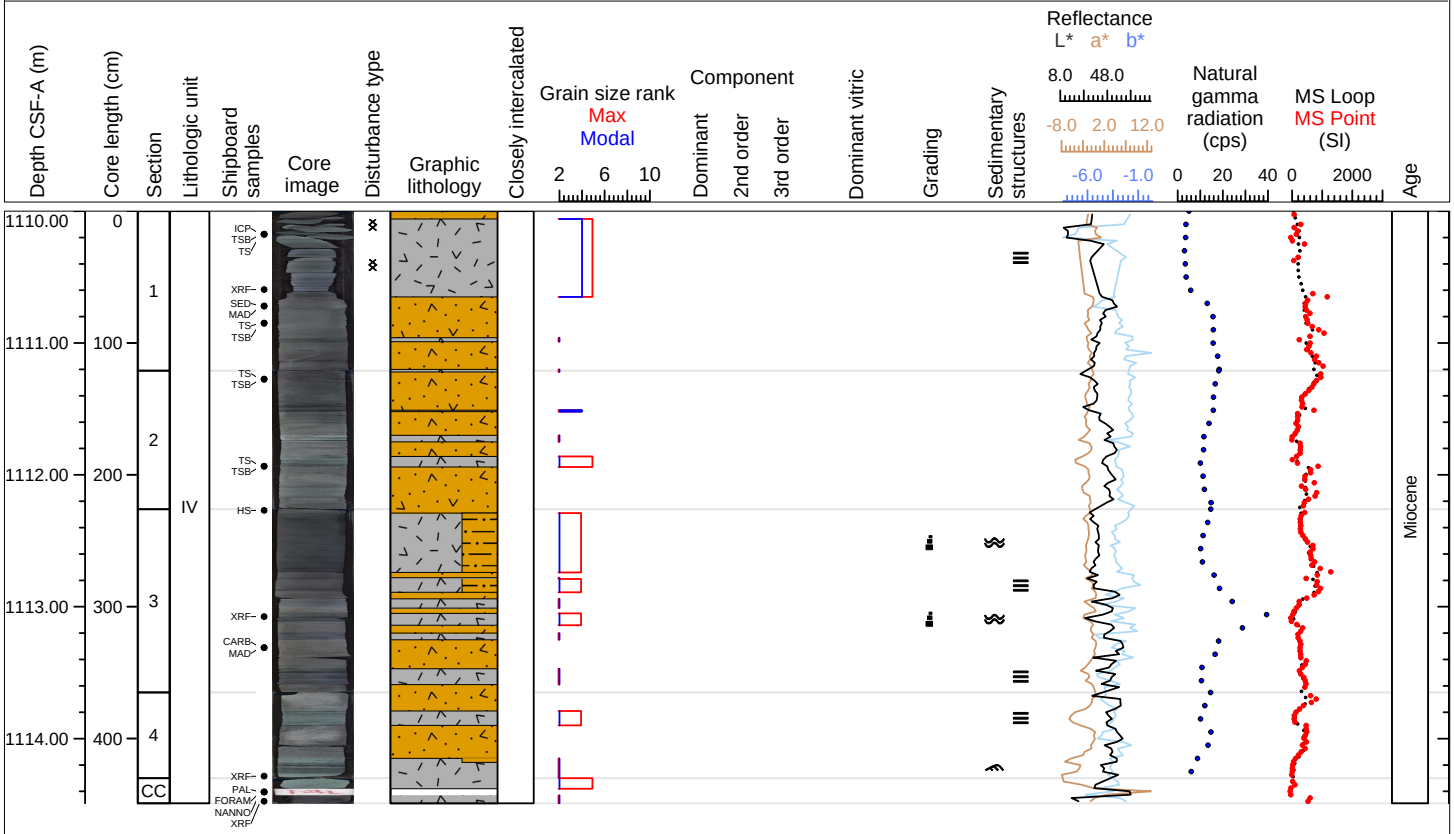
Hole 350-U1437E Core 4R, Interval 1104.0-1106.87 m (CSF-A)

intercalated tuffaceous mudstone and tuff



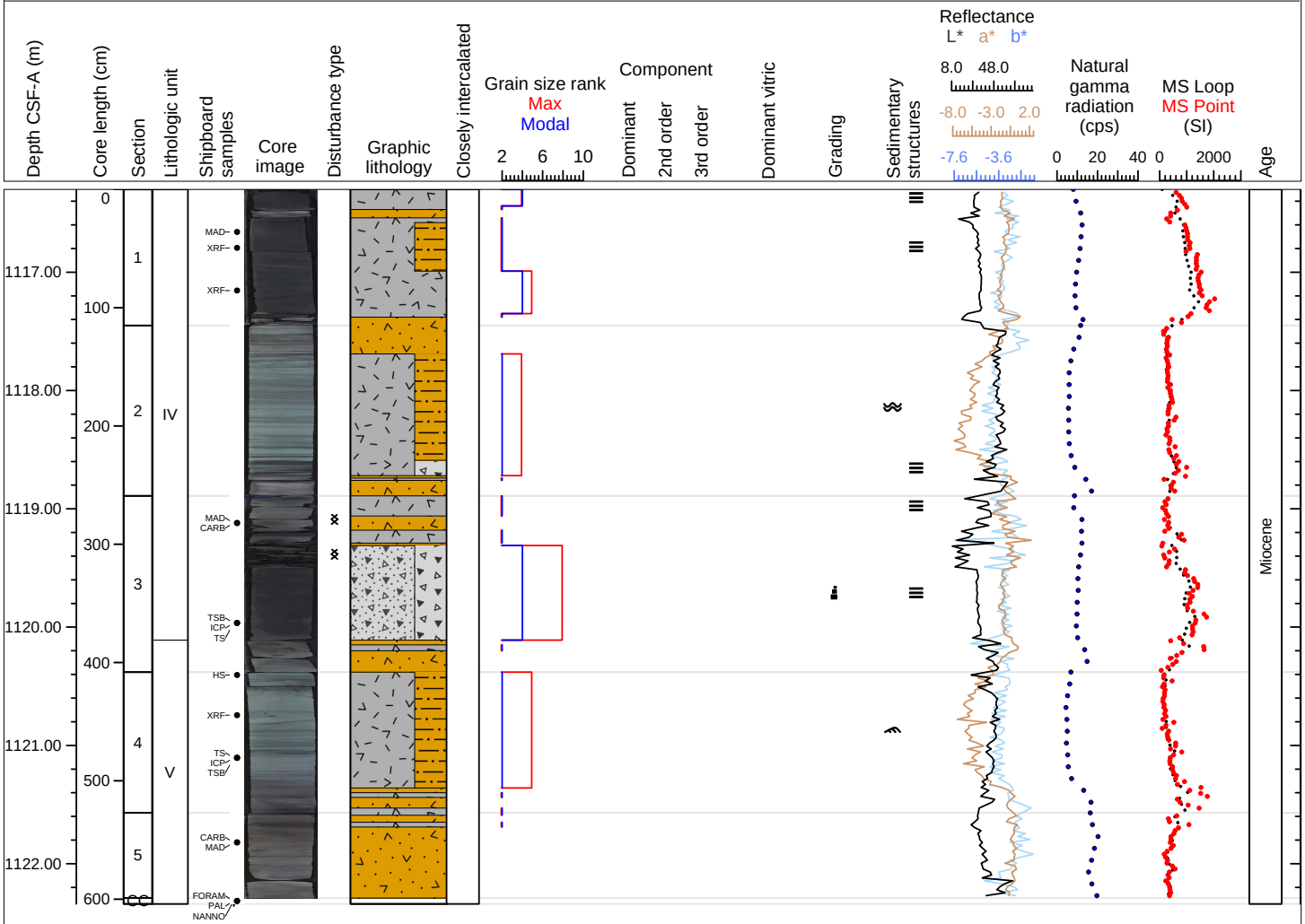
Hole 350-U1437E Core 5R, Interval 1110.0-1114.49 m (CSF-A)

tuffaceous mudstone with intercalated tuff



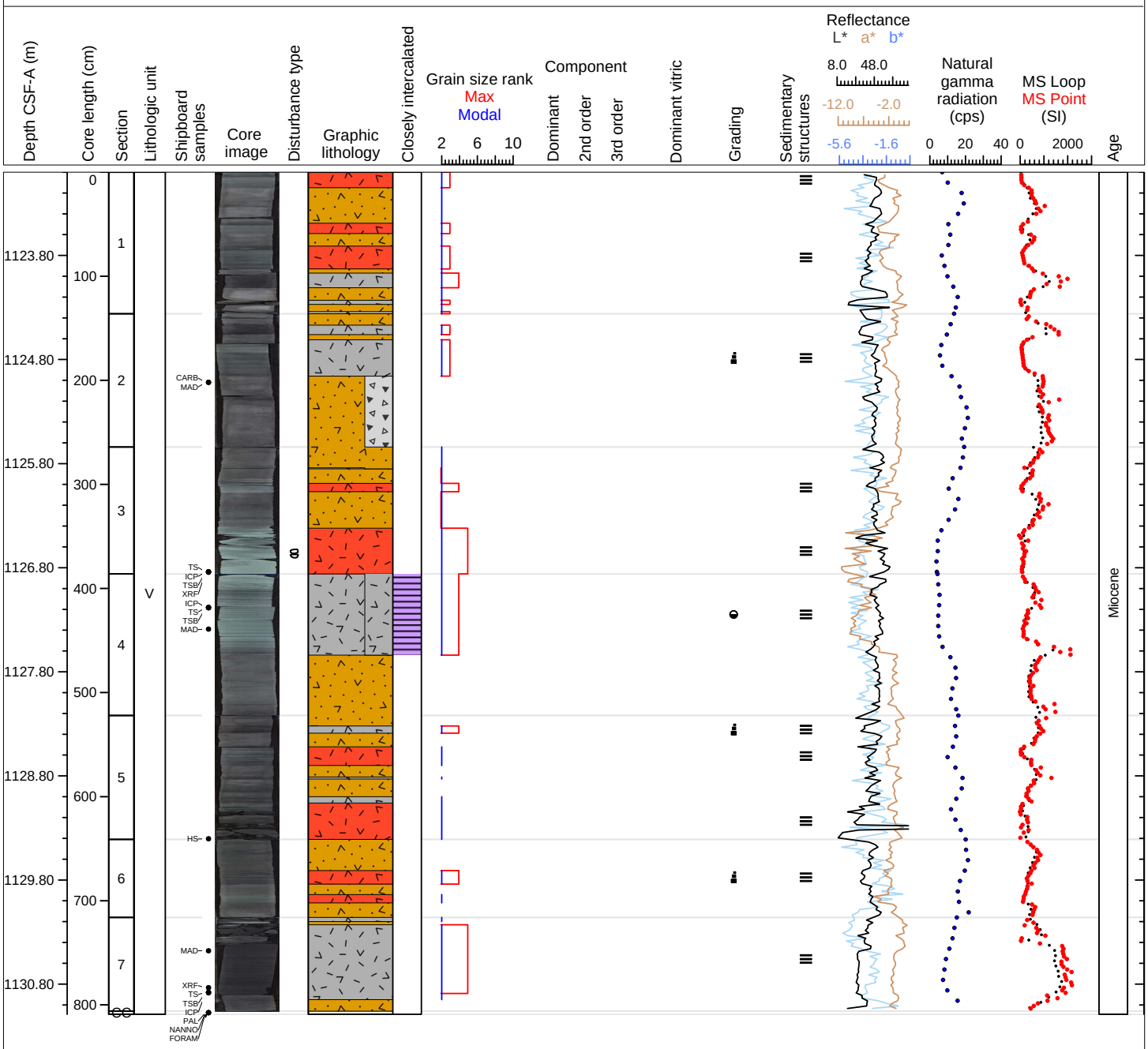
Hole 350-U1437E Core 6R, Interval 1116.3-1122.34 m (CSF-A)

tuff with tuffaceous mudstone, high bioturbation



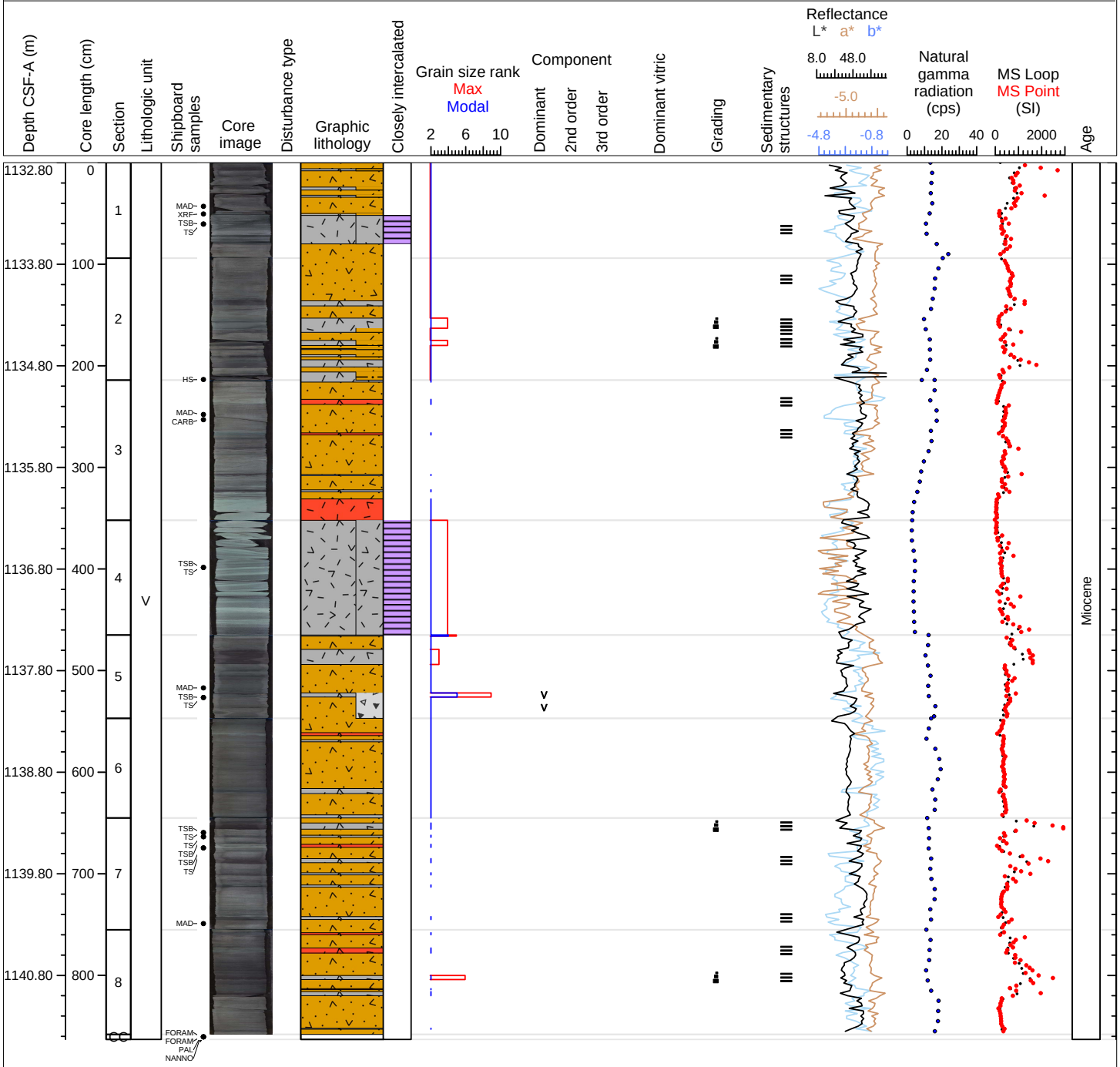
Hole 350-U1437E Core 7R, Interval 1123.0-1131.09 m (CSF-A)

intercalated tuffaceous mudstone and tuff



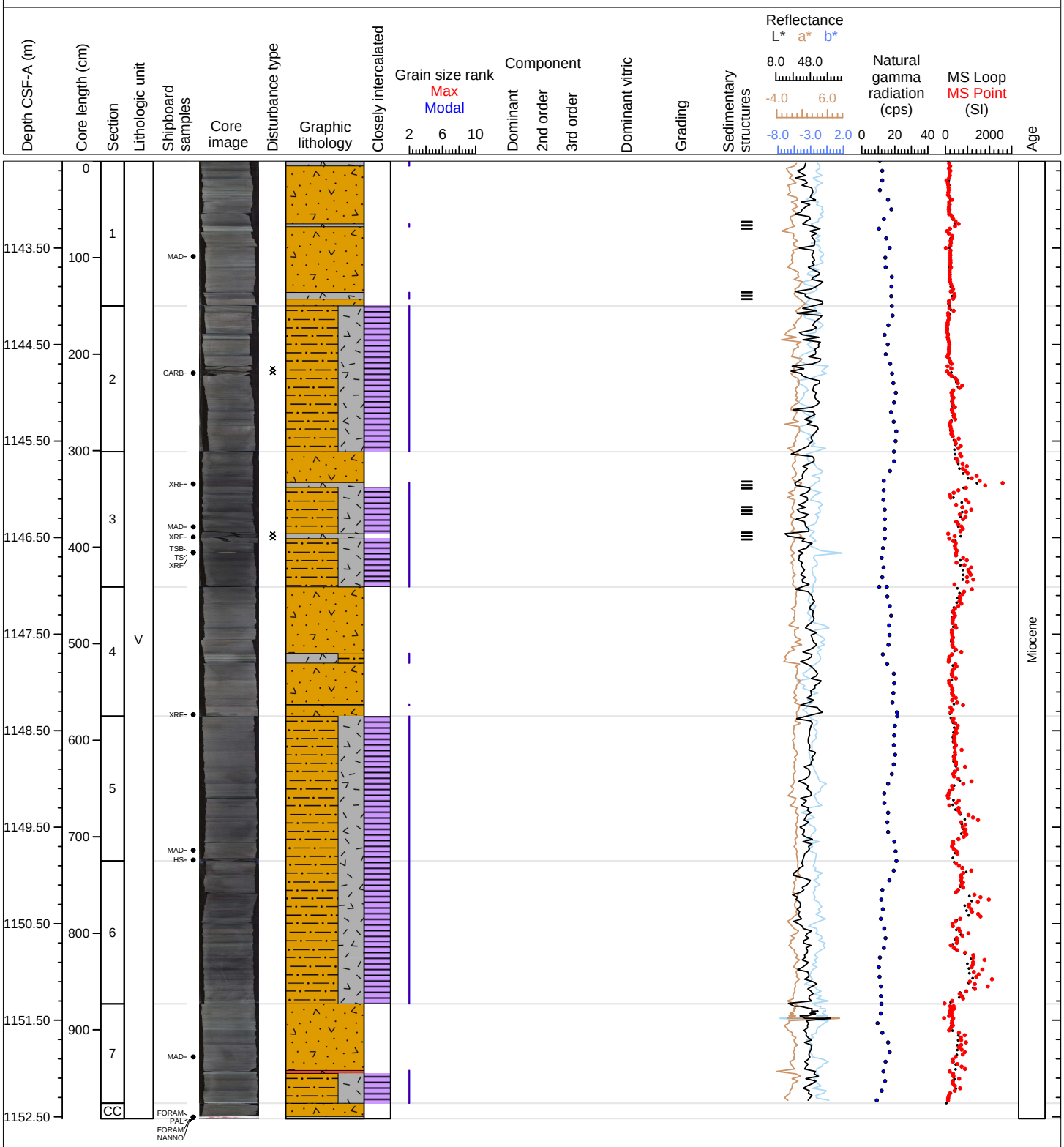
Hole 350-U1437E Core 8R, Interval 1132.8-1141.43 m (CSF-A)

intercalated tuff and tuffaceous mudstone



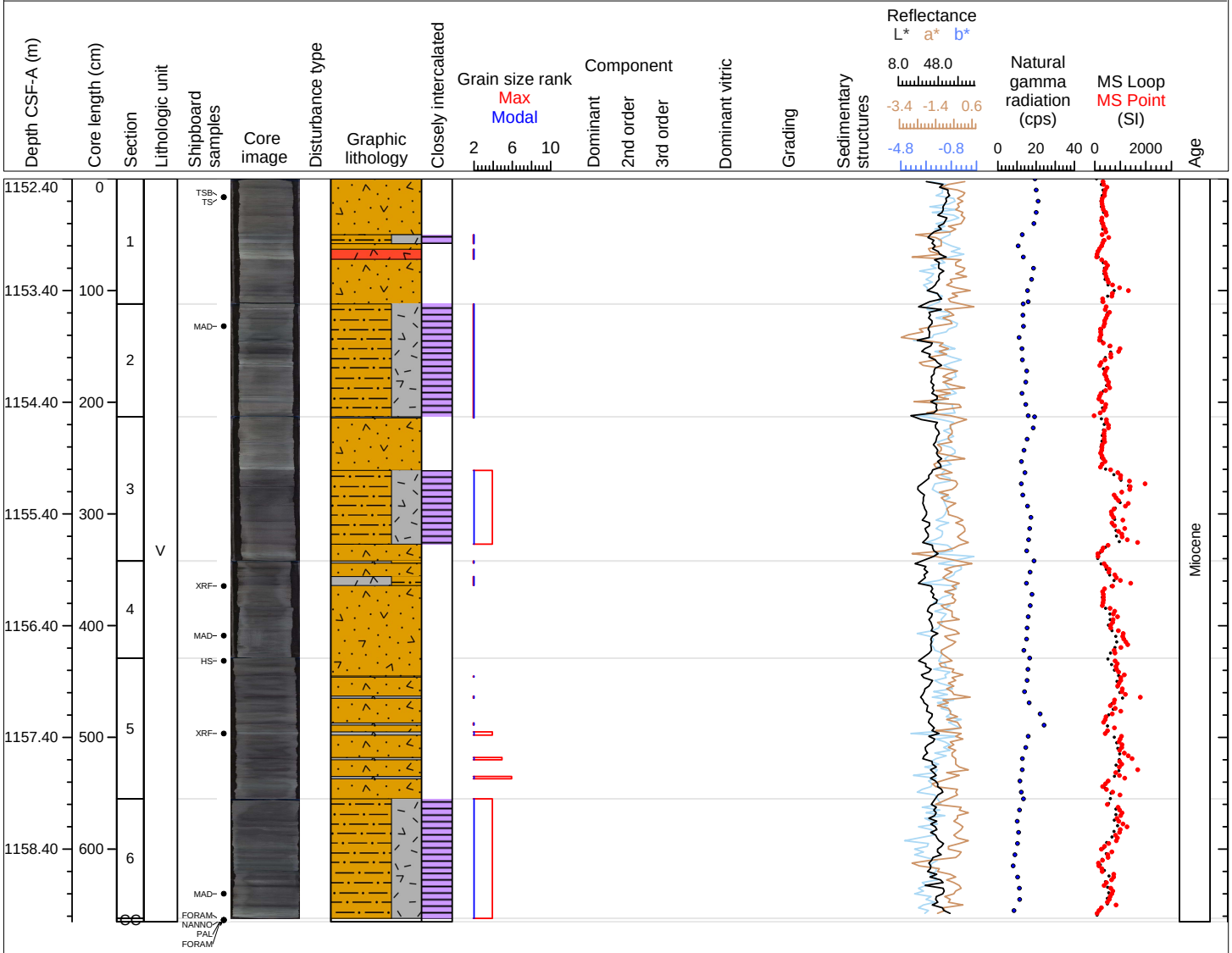
Hole 350-U1437E Core 9R, Interval 1142.6-1152.52 m (CSF-A)

tuffaceous mudstone intercalated with tuff



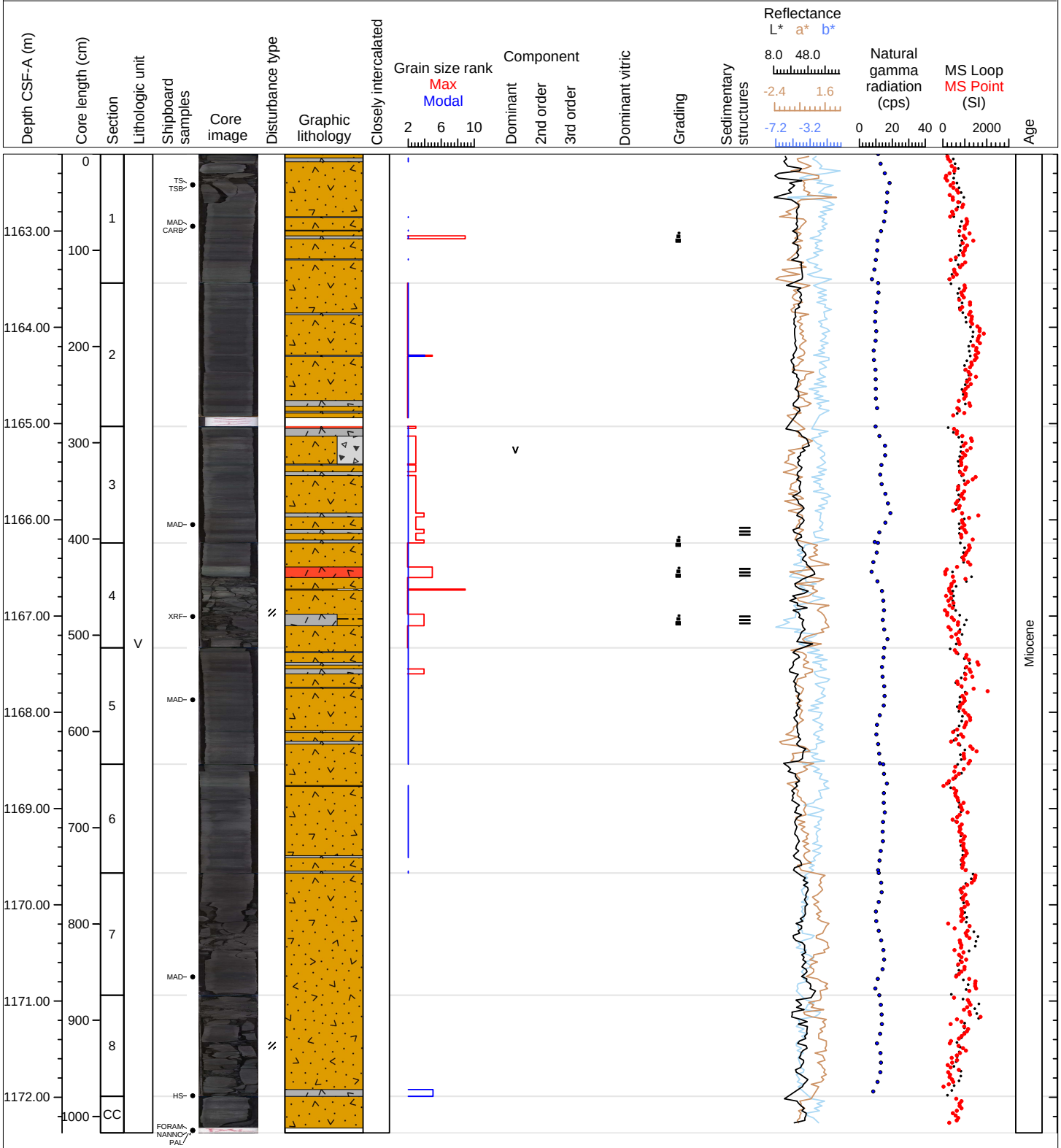
Hole 350-U1437E Core 10R, Interval 1152.4-1159.05 m (CSF-A)

tuffaceous mudstone with tuff



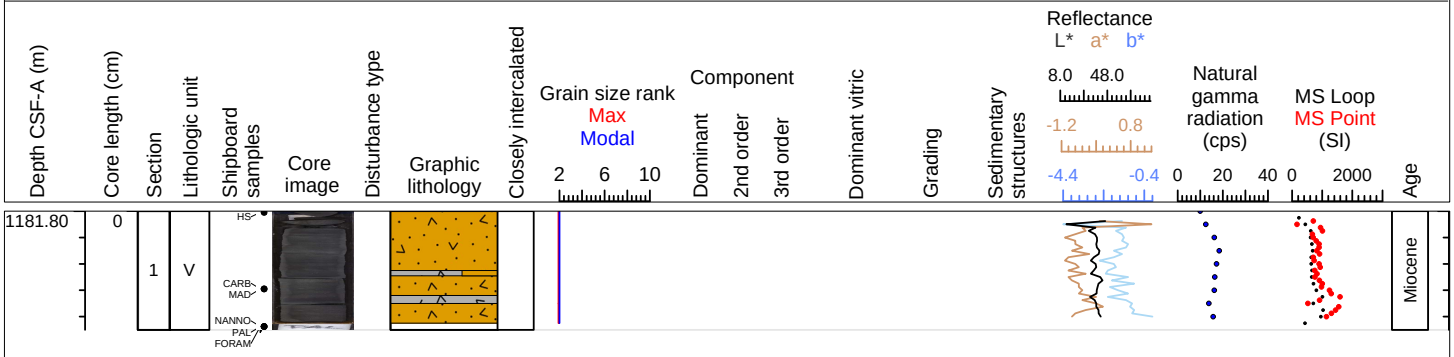
Hole 350-U1437E Core 11R, Interval 1162.2-1172.37 m (CSF-A)

tuffaceous mudstone with tuff layers



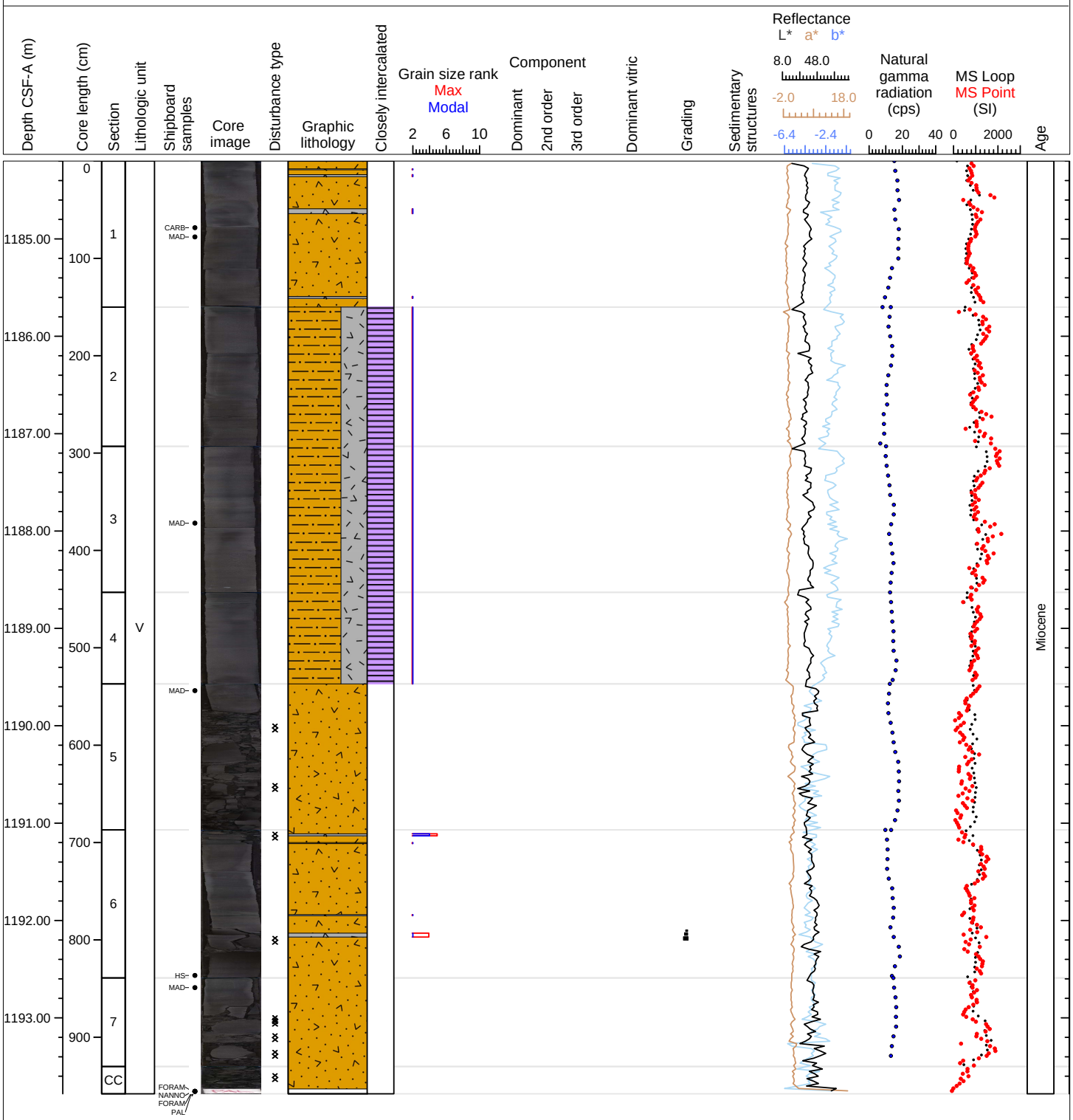
Hole 350-U1437E Core 13R, Interval 1181.8-1182.7 m (CSF-A)

tuffaceous mudstone intercalated with tuff



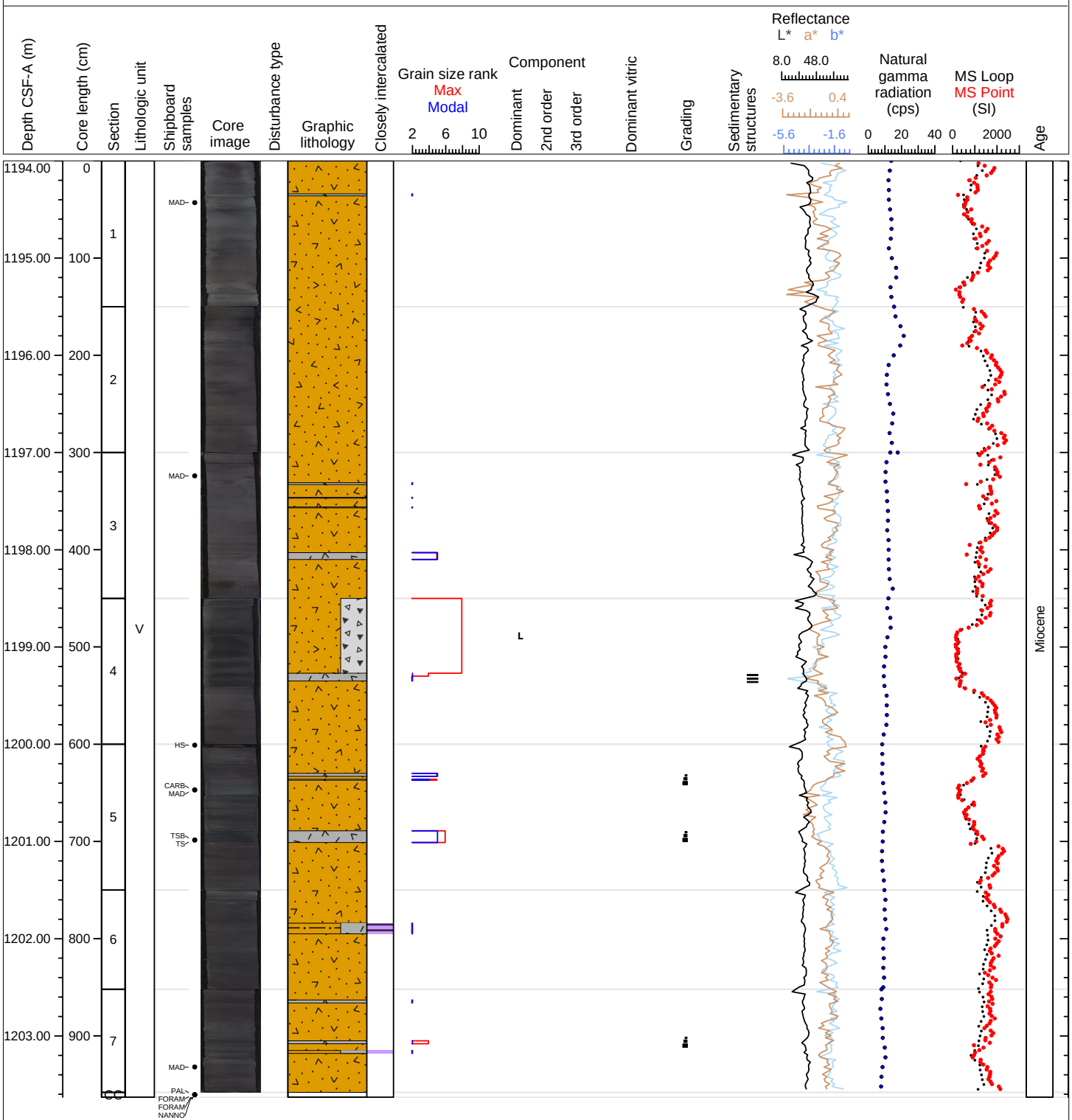
Hole 350-U1437E Core 14R, Interval 1184.2-1193.78 m (CSF-A)

tuffaceous mudstone and intercalated tuff



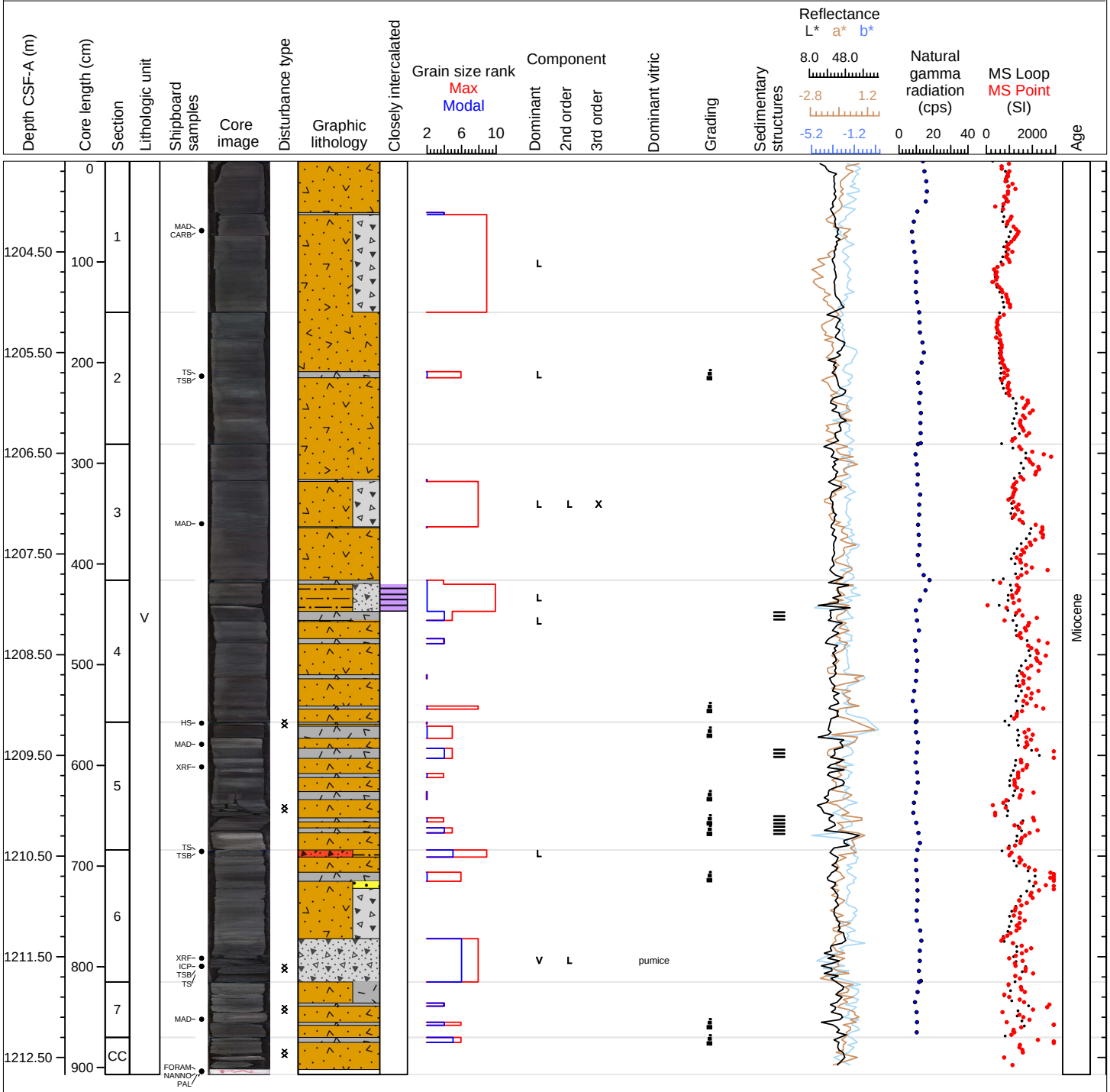
Hole 350-U1437E Core 15R, Interval 1194.0-1203.63 m (CSF-A)

tuffaceous mudstone intercalated with tuff



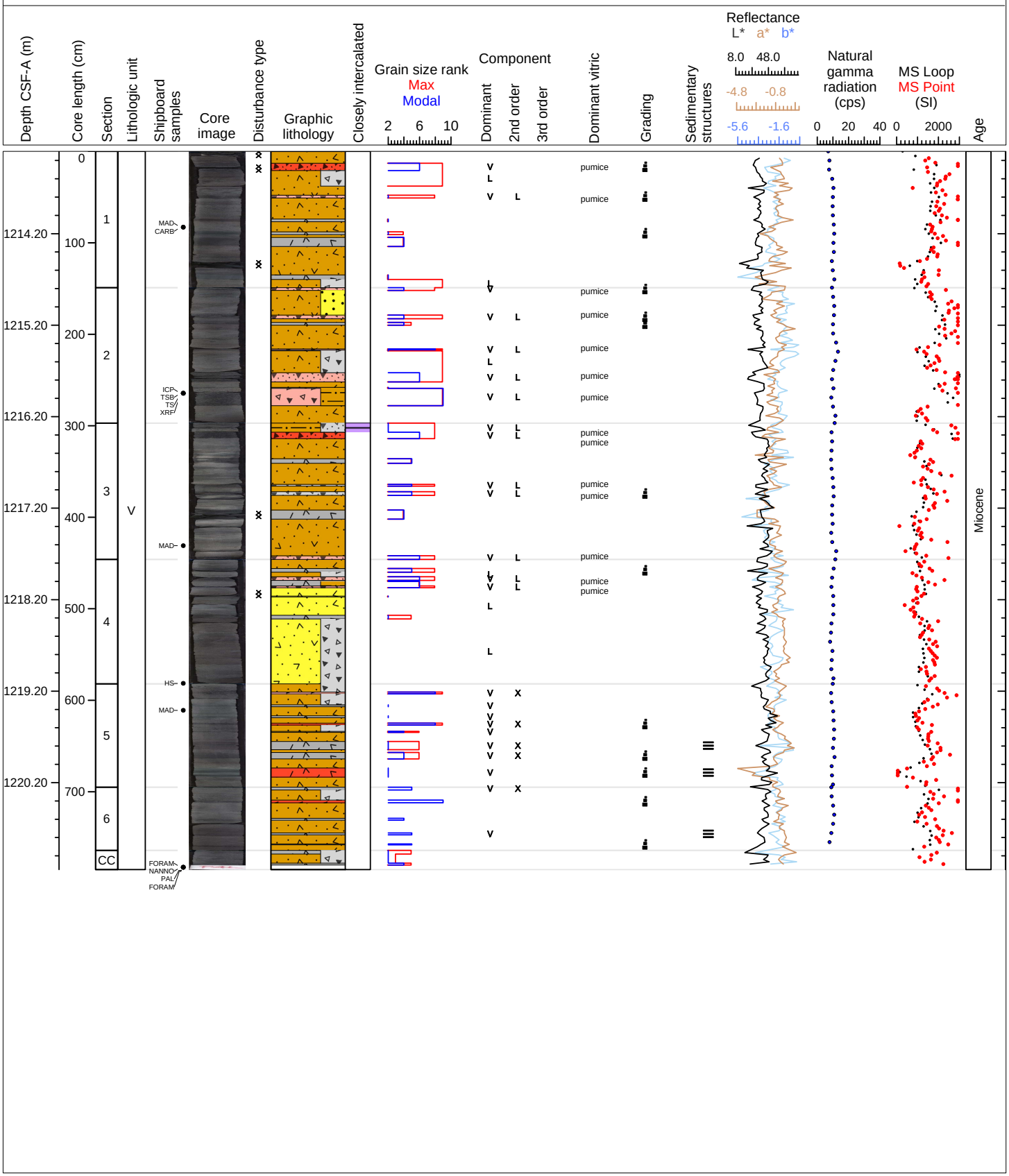
Hole 350-U1437E Core 16R, Interval 1203.6-1212.67 m (CSF-A)

tuffaceous mudstone with intercalated tuff layers and tuffaceous consolidated breccia with mudstone



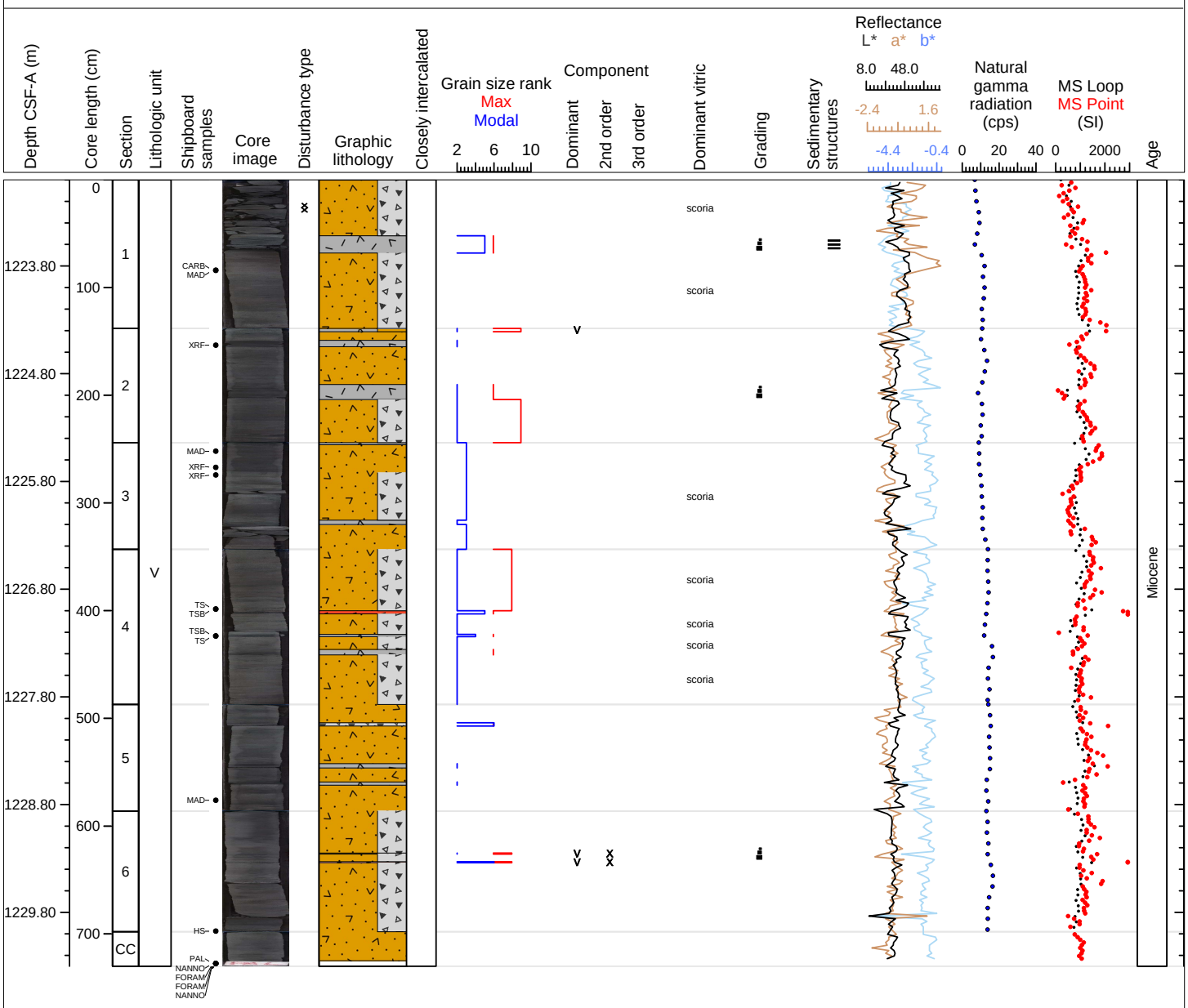
Hole 350-U1437E Core 17R, Interval 1213.3-1221.15 m (CSF-A)

tuffaceous mudstone intercalated with tuff and lapilli-tuff



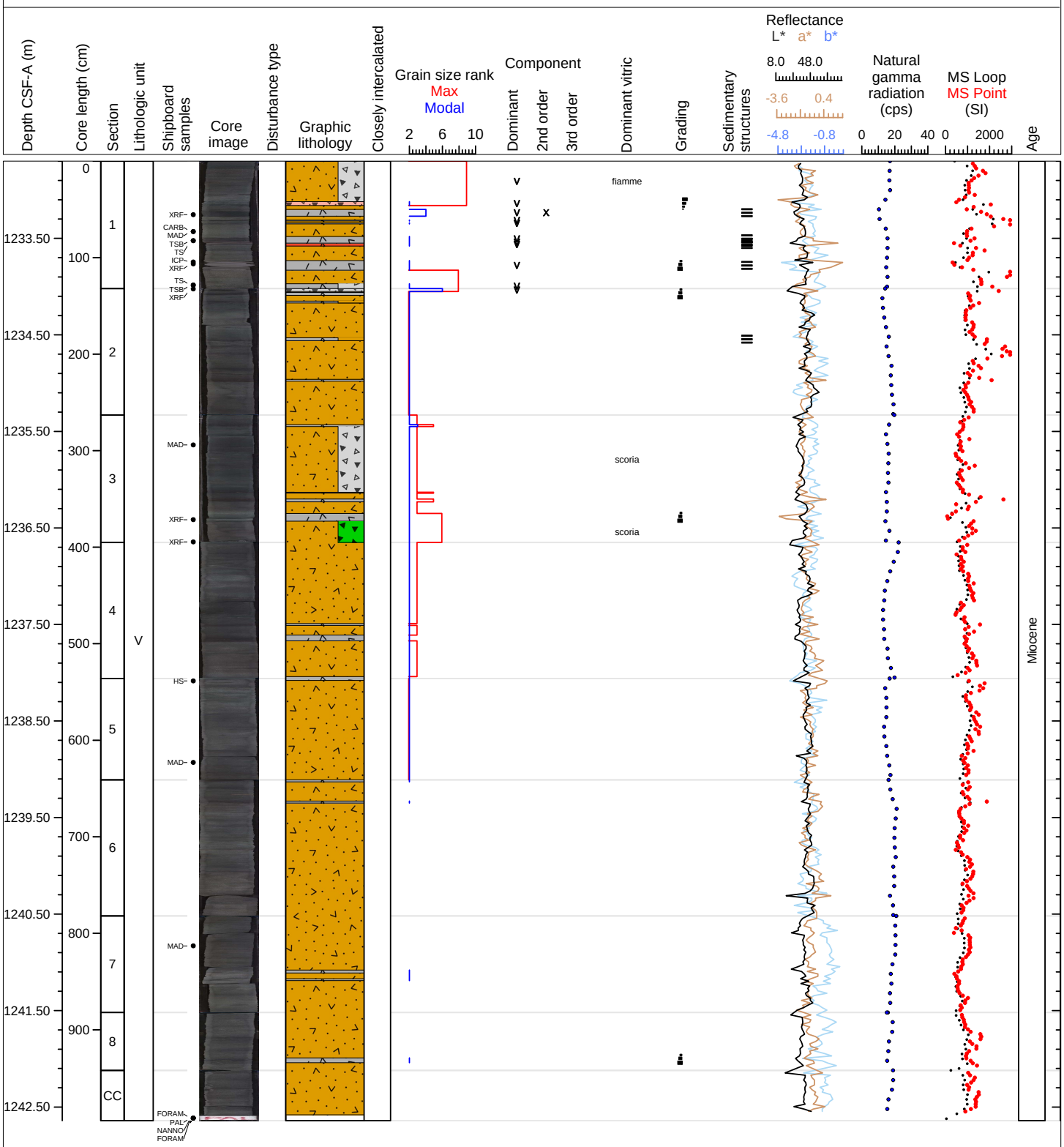
Hole 350-U1437E Core 18R, Interval 1223.0-1230.3 m (CSF-A)

tuffaceous mudstone intercalated with tuff



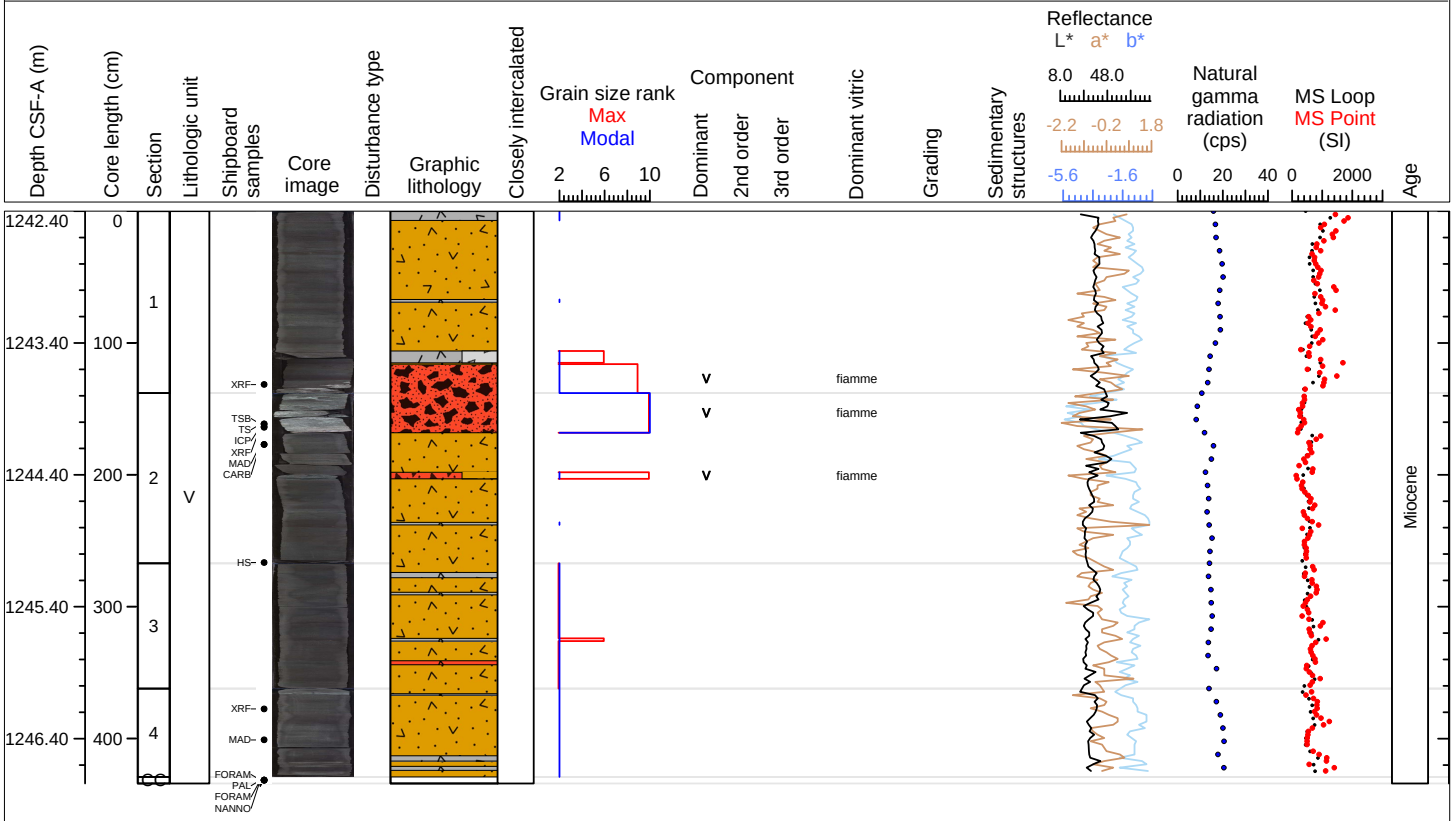
Hole 350-U1437E Core 19R, Interval 1232.7-1242.64 m (CSF-A)

tuffaceous mudstone intercalated with tuff and lapilli-tuff



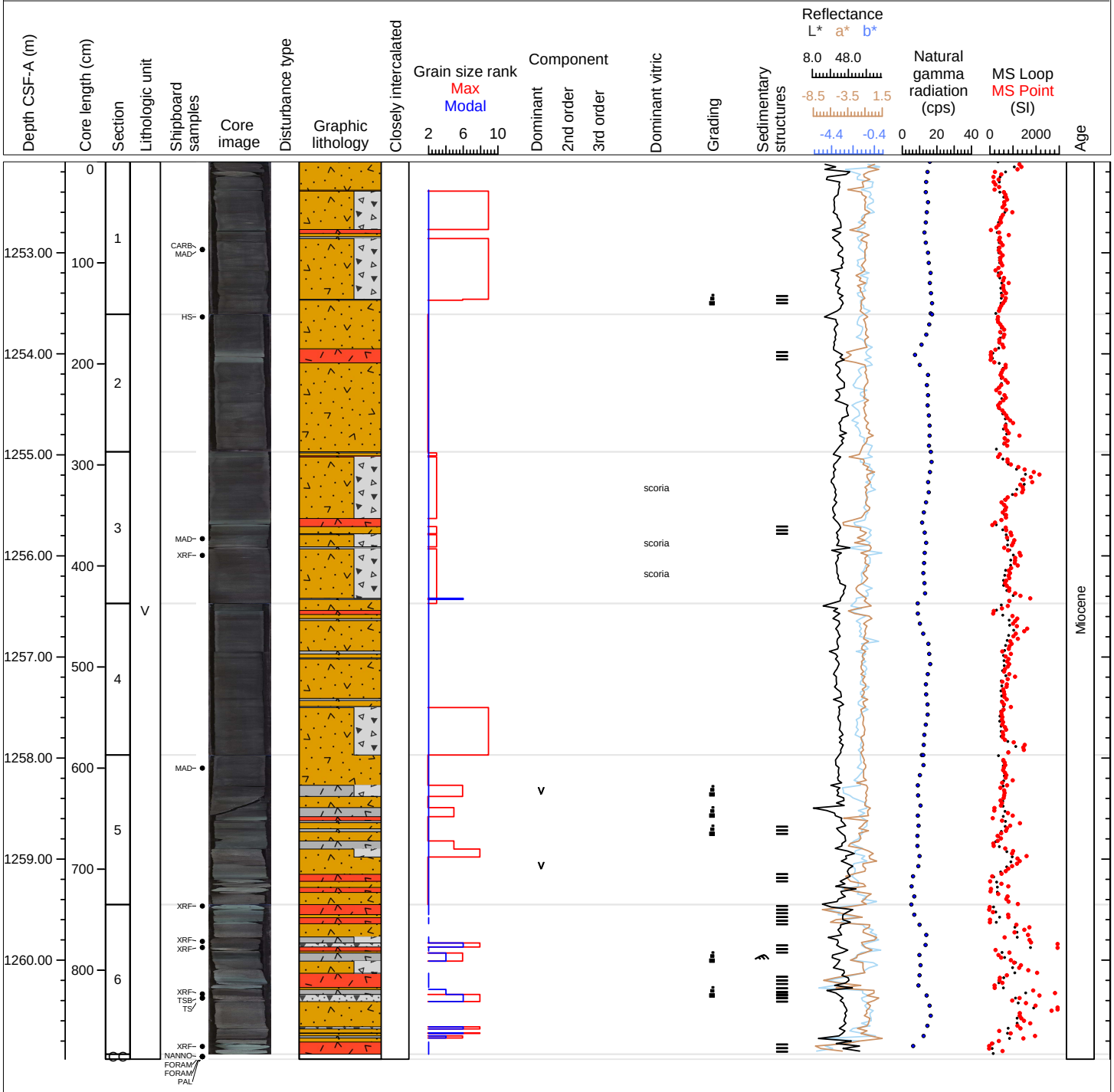
Hole 350-U1437E Core 20R, Interval 1242.4-1246.74 m (CSF-A)

tuffaceous mudstone intercalated with tuff and lapilli-tuff



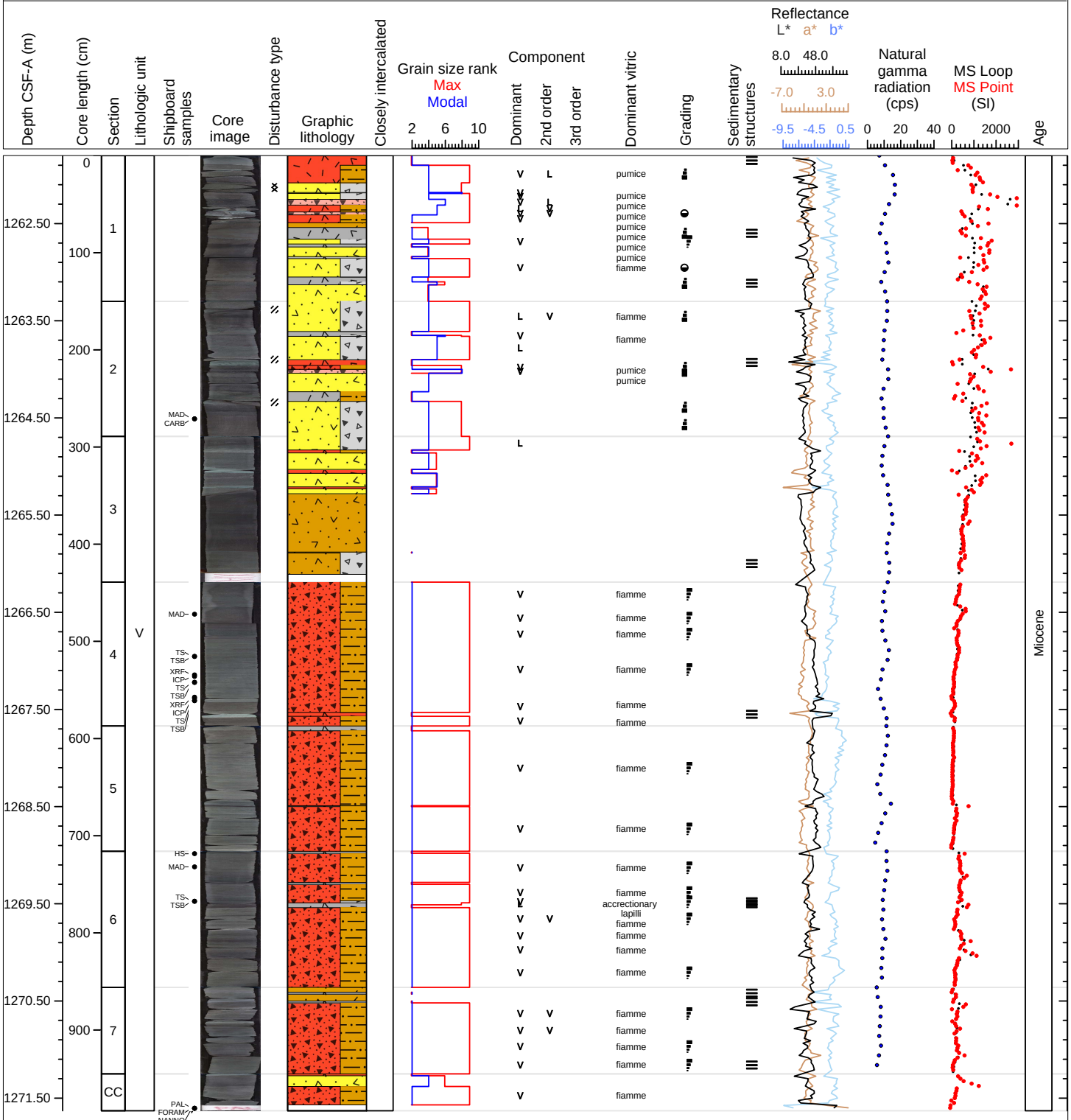
Hole 350-U1437E Core 21R, Interval 1252.1-1260.98 m (CSF-A)

tuffaceous mudstone intercalated with tuff, brown tuff, and lapilli-tuff



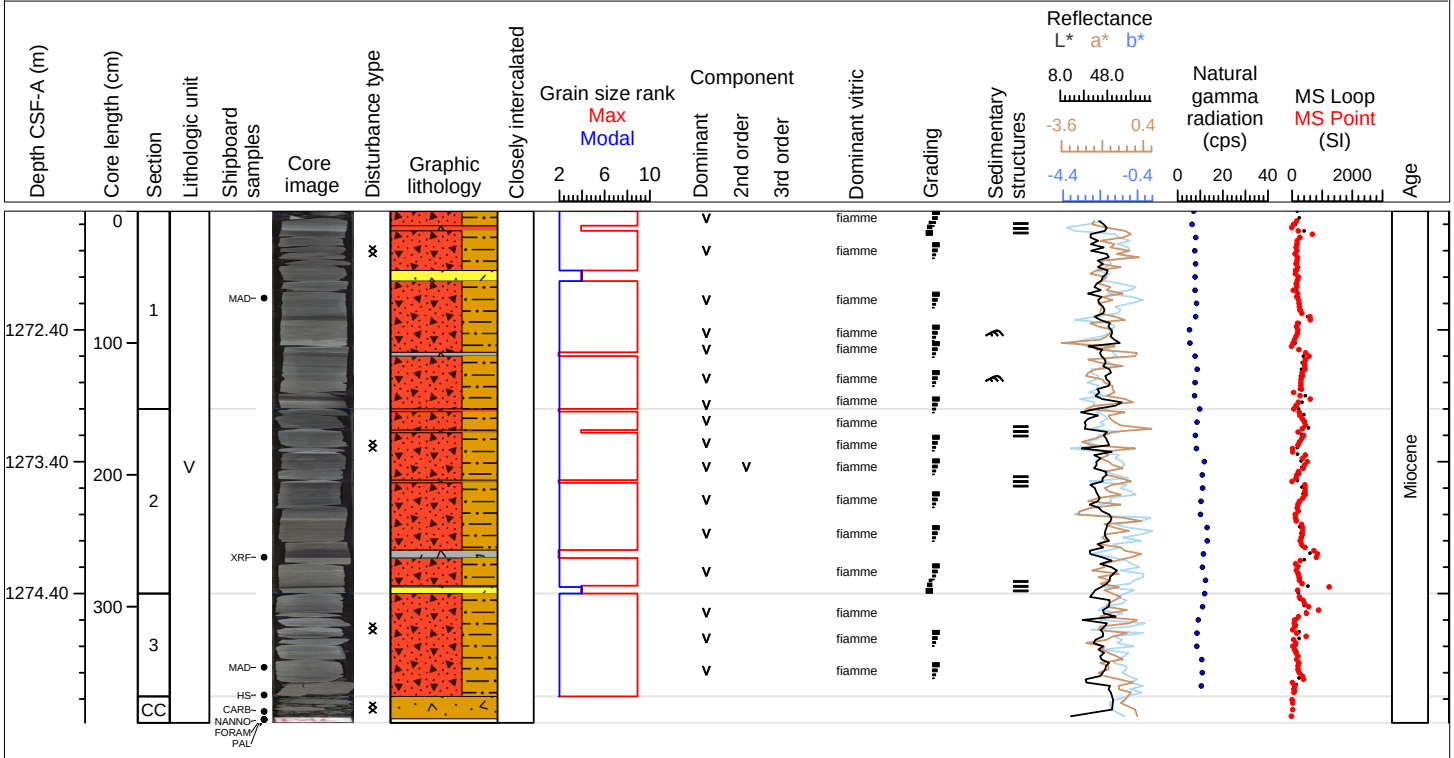
Hole 350-U1437E Core 22R, Interval 1261.8-1271.63 m (CSF-A)

lapilli-tuff and tuff intercalated with tuffaceous sandstone



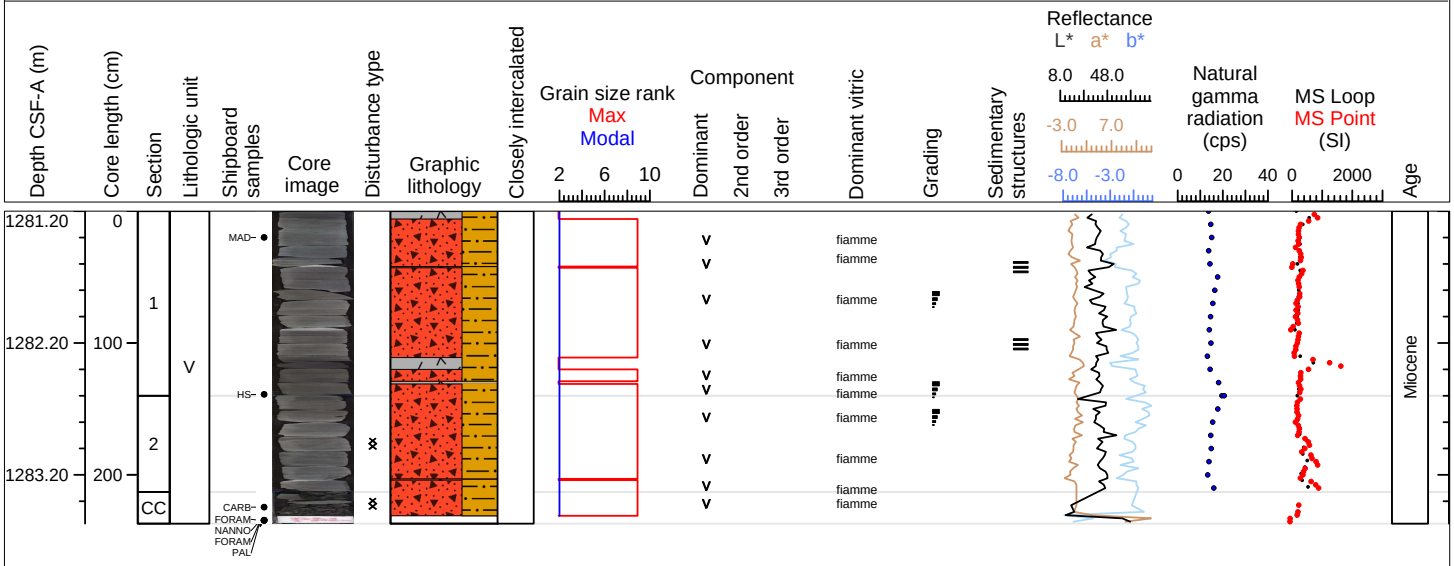
Hole 350-U1437E Core 23R, Interval 1271.5-1275.38 m (CSF-A)

fiamme lapilli-tuffs (PDC deposits) intercalated with evolved tuff and tuffaceous sandstone



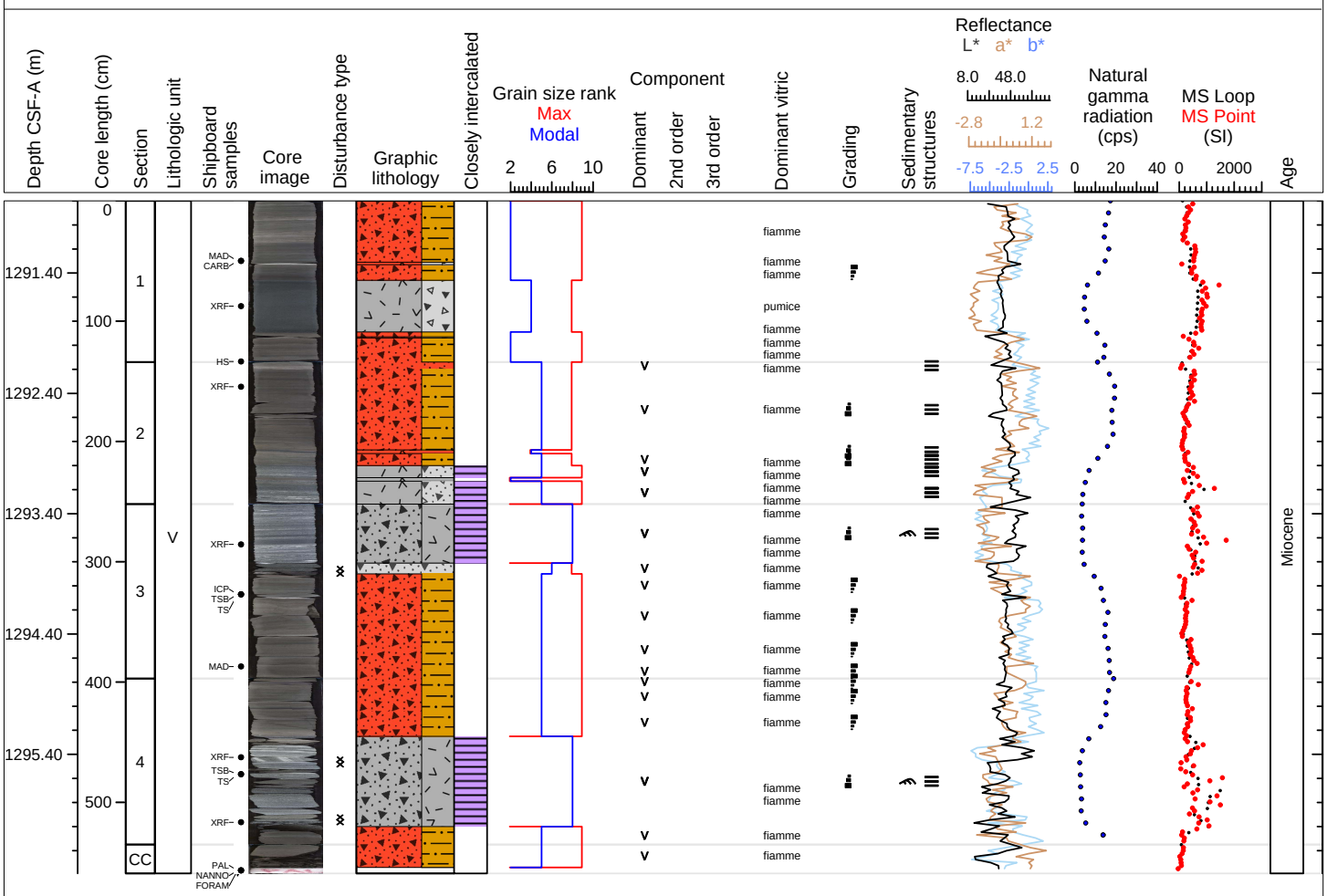
Hole 350-U1437E Core 24R, Interval 1281.2-1283.57 m (CSF-A)

fiamme lapilli-tuff (PDC deposits) with intercalated tuff



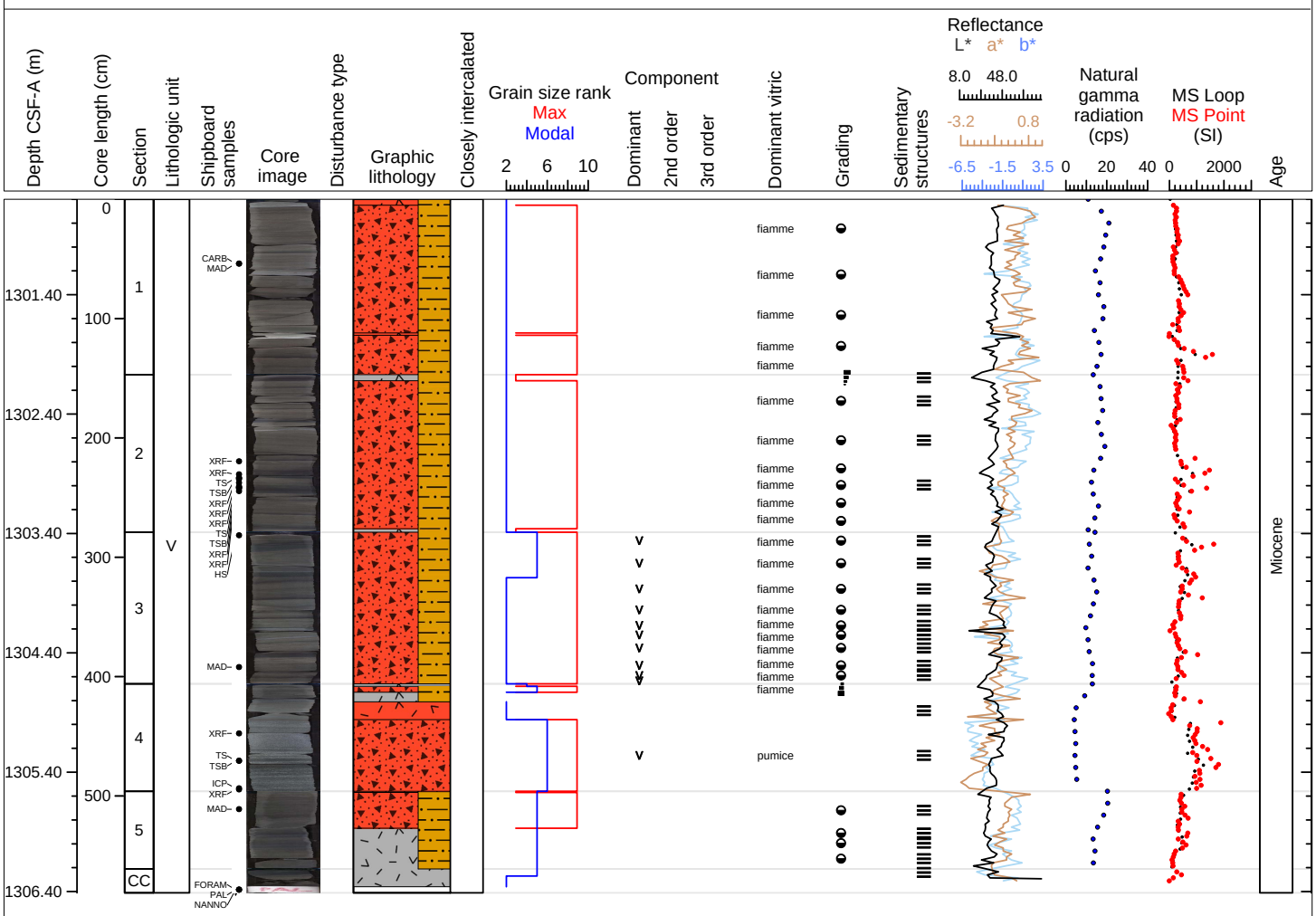
Hole 350-U1437E Core 25R, Interval 1290.8-1296.39 m (CSF-A)

monomictic evolved lapilli-tuff intercalated with tuff



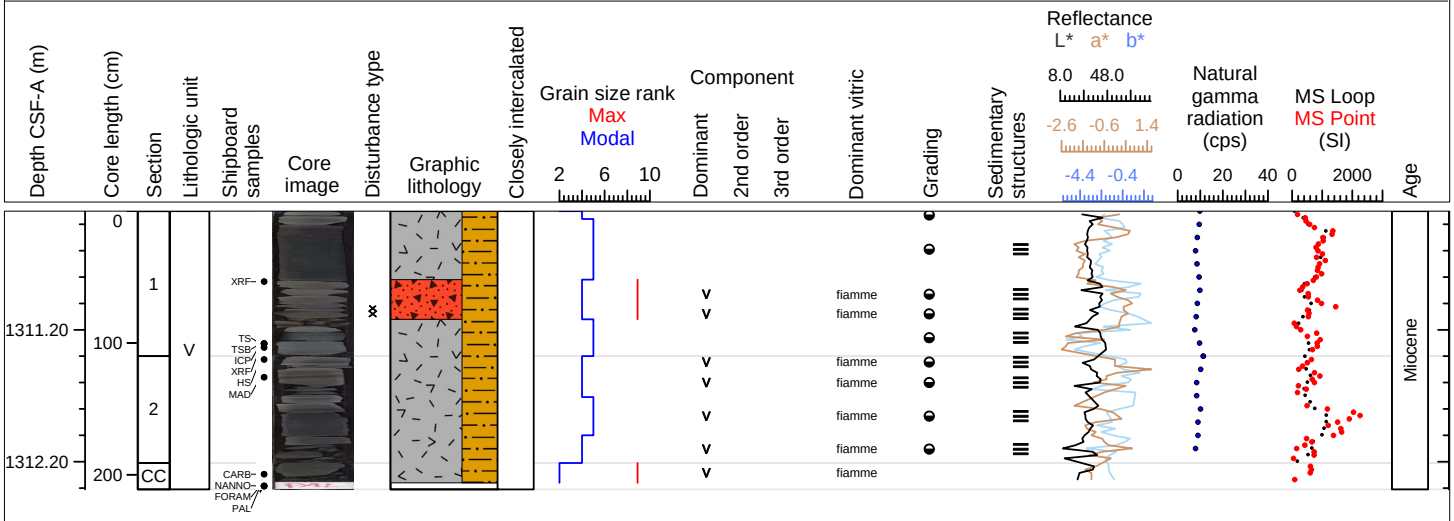
Hole 350-U1437E Core 26R, Interval 1300.6-1306.41 m (CSF-A)

monomictic evolved lapilli-tuff intercalated with tuff



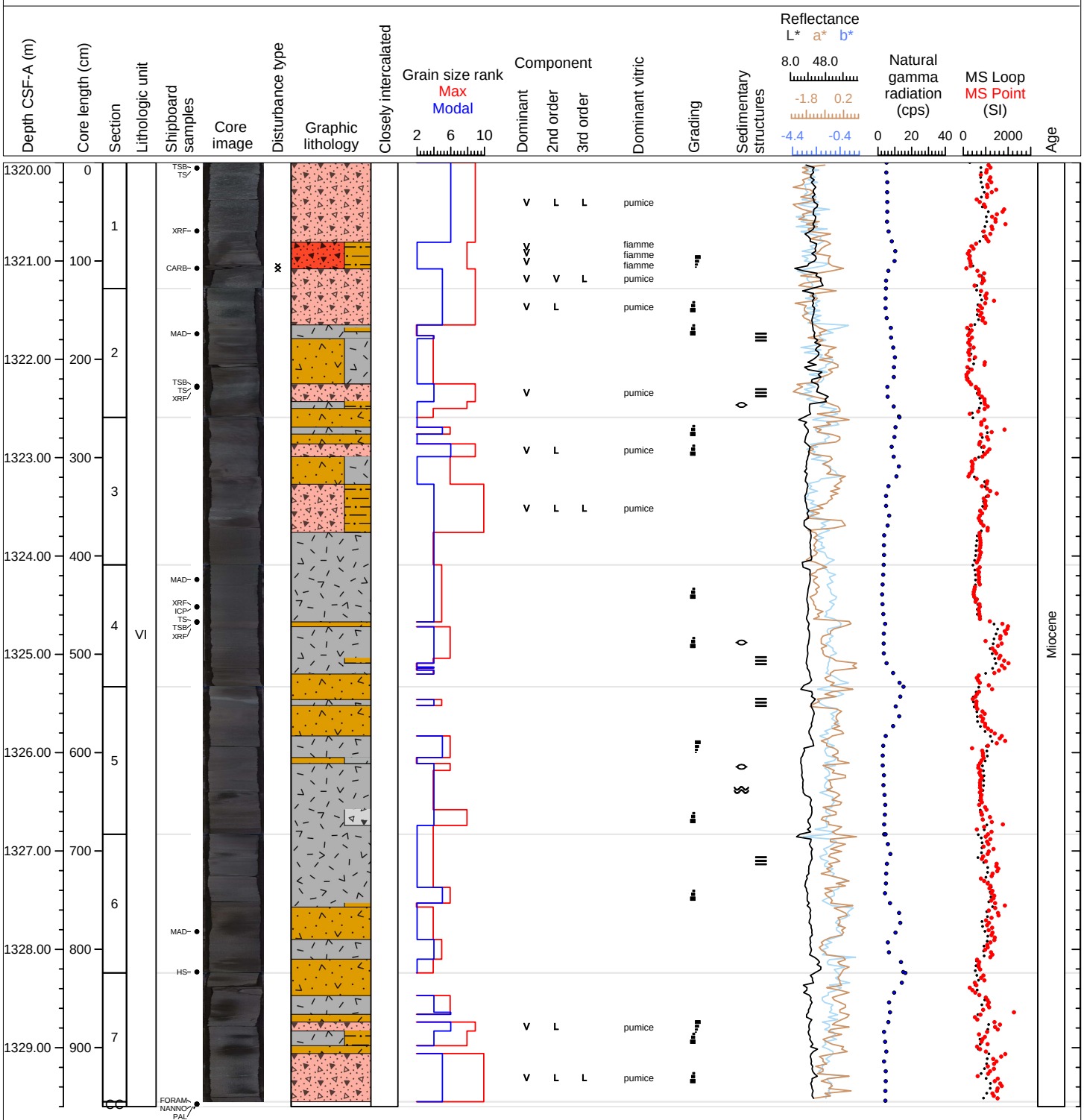
Hole 350-U1437E Core 27R, Interval 1310.3-1312.41 m (CSF-A)

tuff intercalated with lapilli-tuff



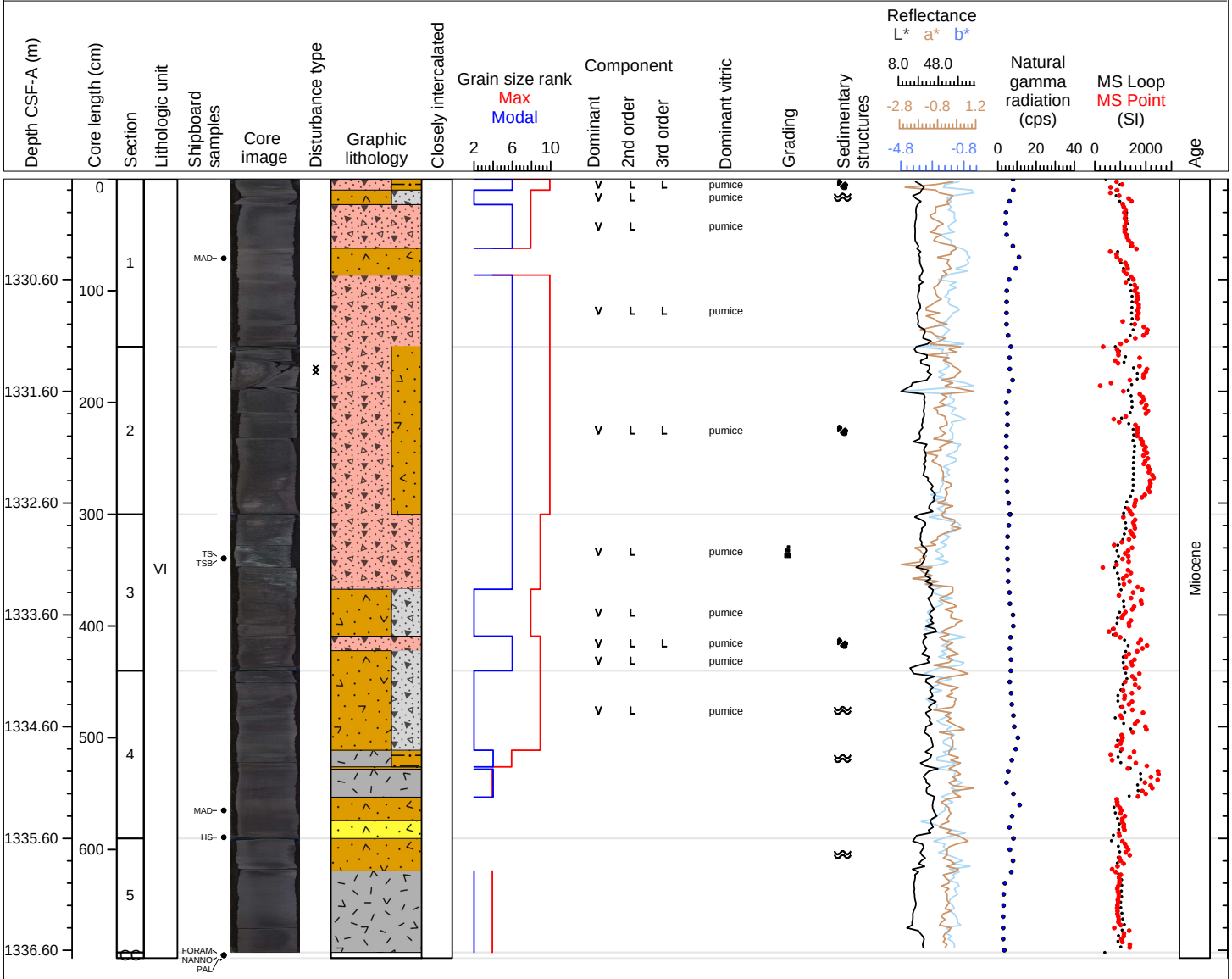
Hole 350-U1437E Core 28R, Interval 1320.0-1329.6 m (CSF-A)

domintaed by tuff and matrix-supported monomictic and polymictic lapilli-tuff intrevals, minor tuffaceous mudstone



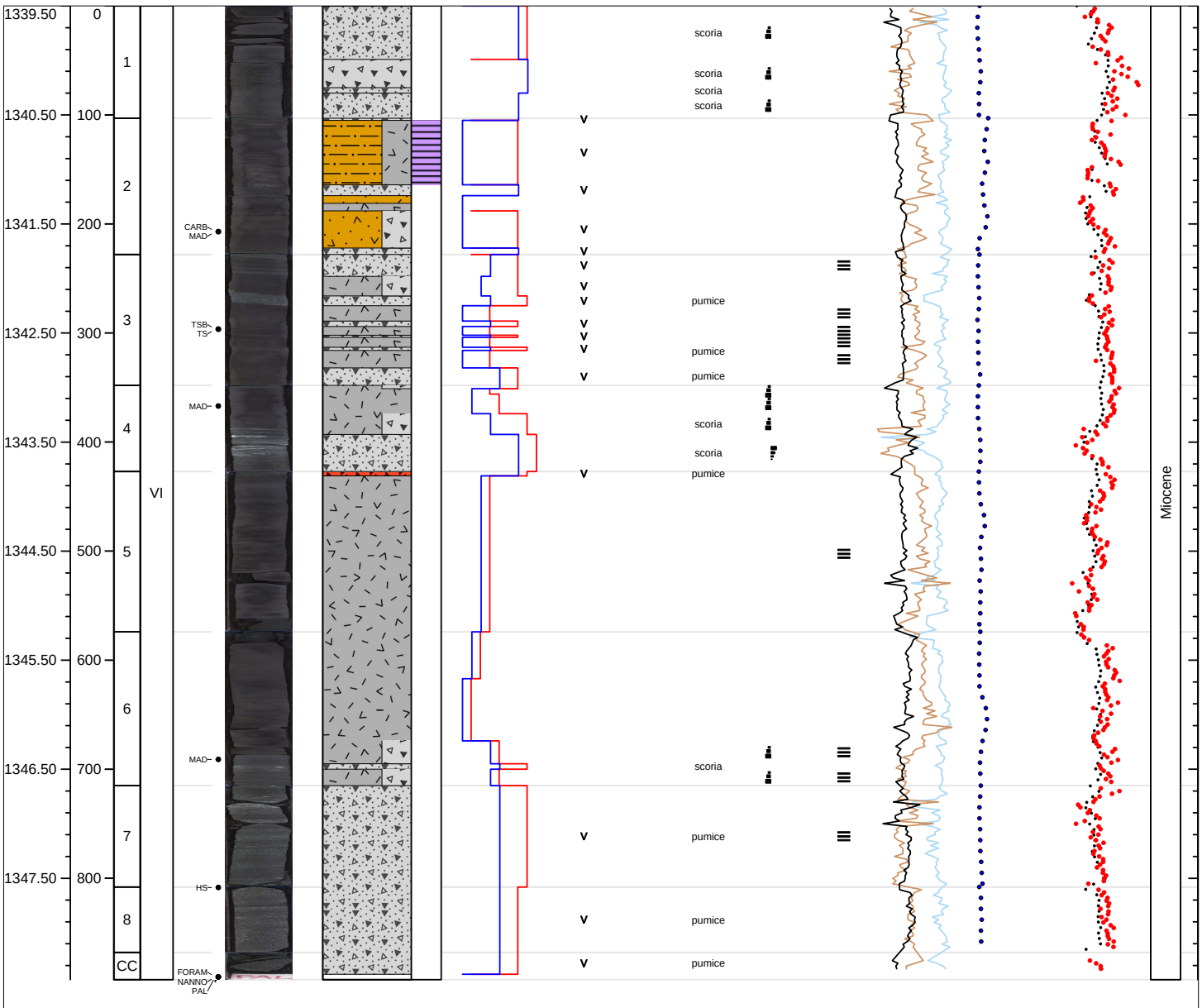
Hole 350-U1437E Core 29R, Interval 1329.7-1336.67 m (CSF-A)

matrix-supported polymictic lapilli-tuff and tuff intervals with minor mudstone layers and intraclasts



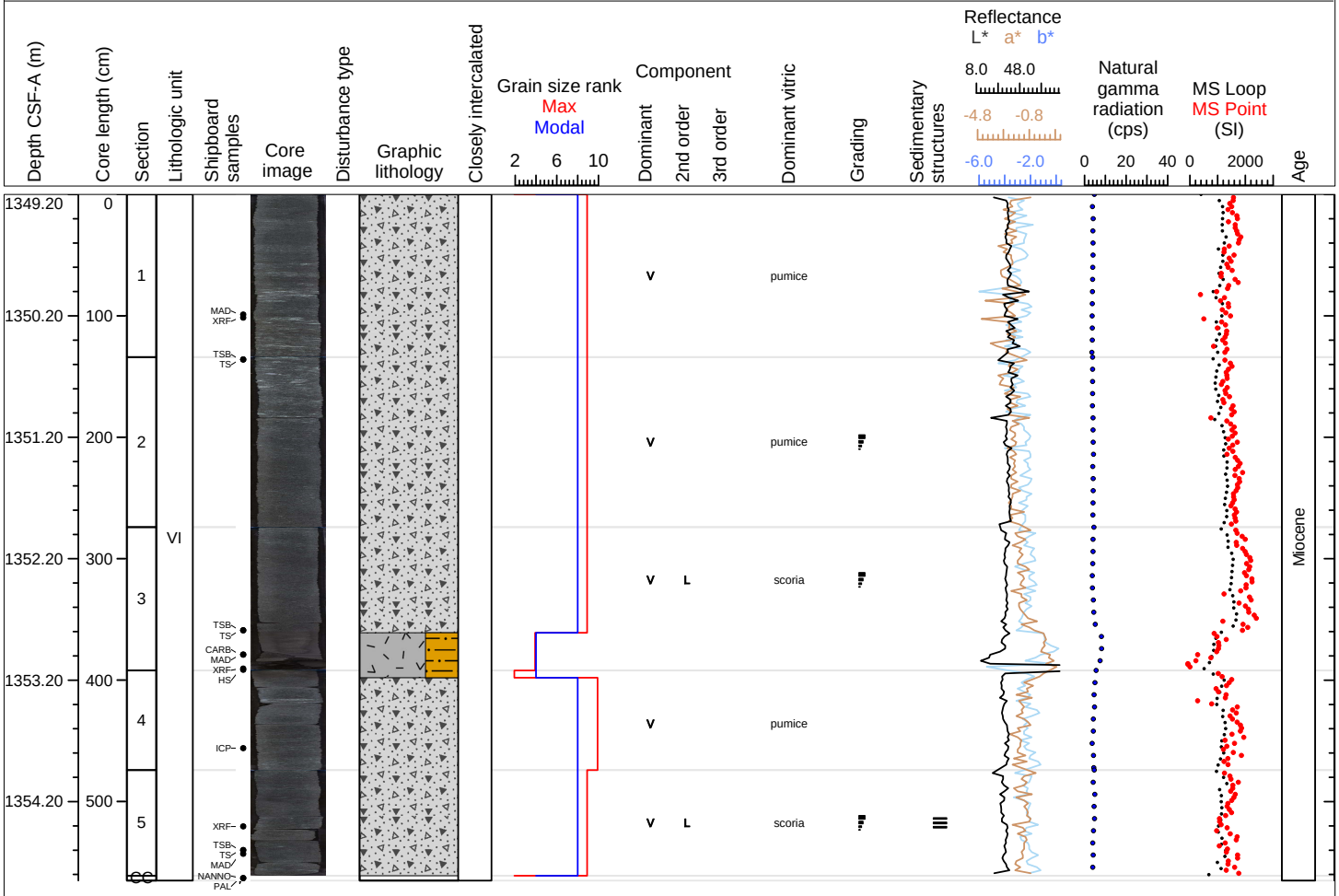
Hole 350-U1437E Core 30R, Interval 1339.5-1348.43 m (CSF-A)

tuff intercalated with lapilli-tuff and tuffaceous mudstone



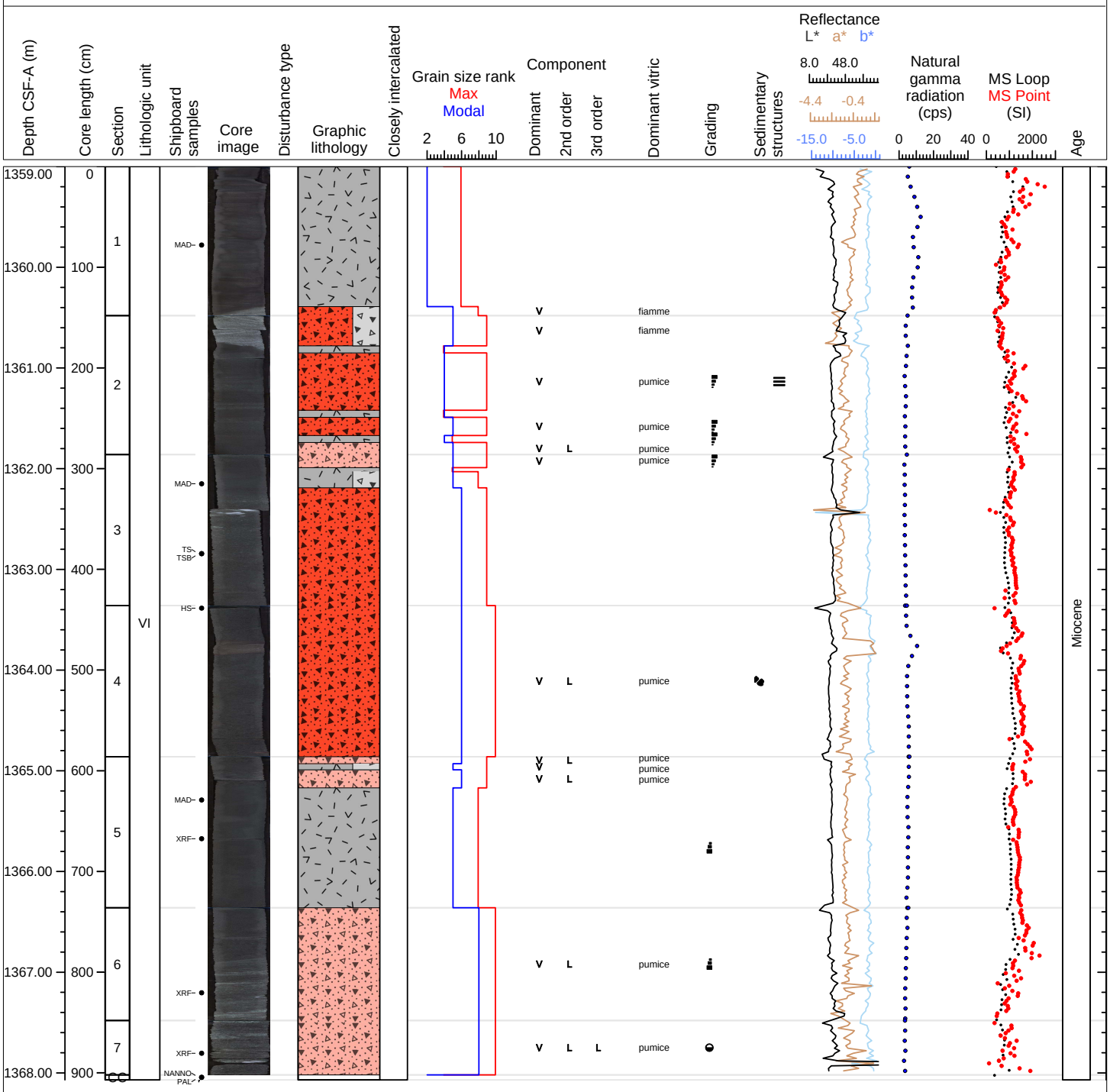
Hole 350-U1437E Core 31R, Interval 1349.2-1354.85 m (CSF-A)

lapilli-tuff and tuff



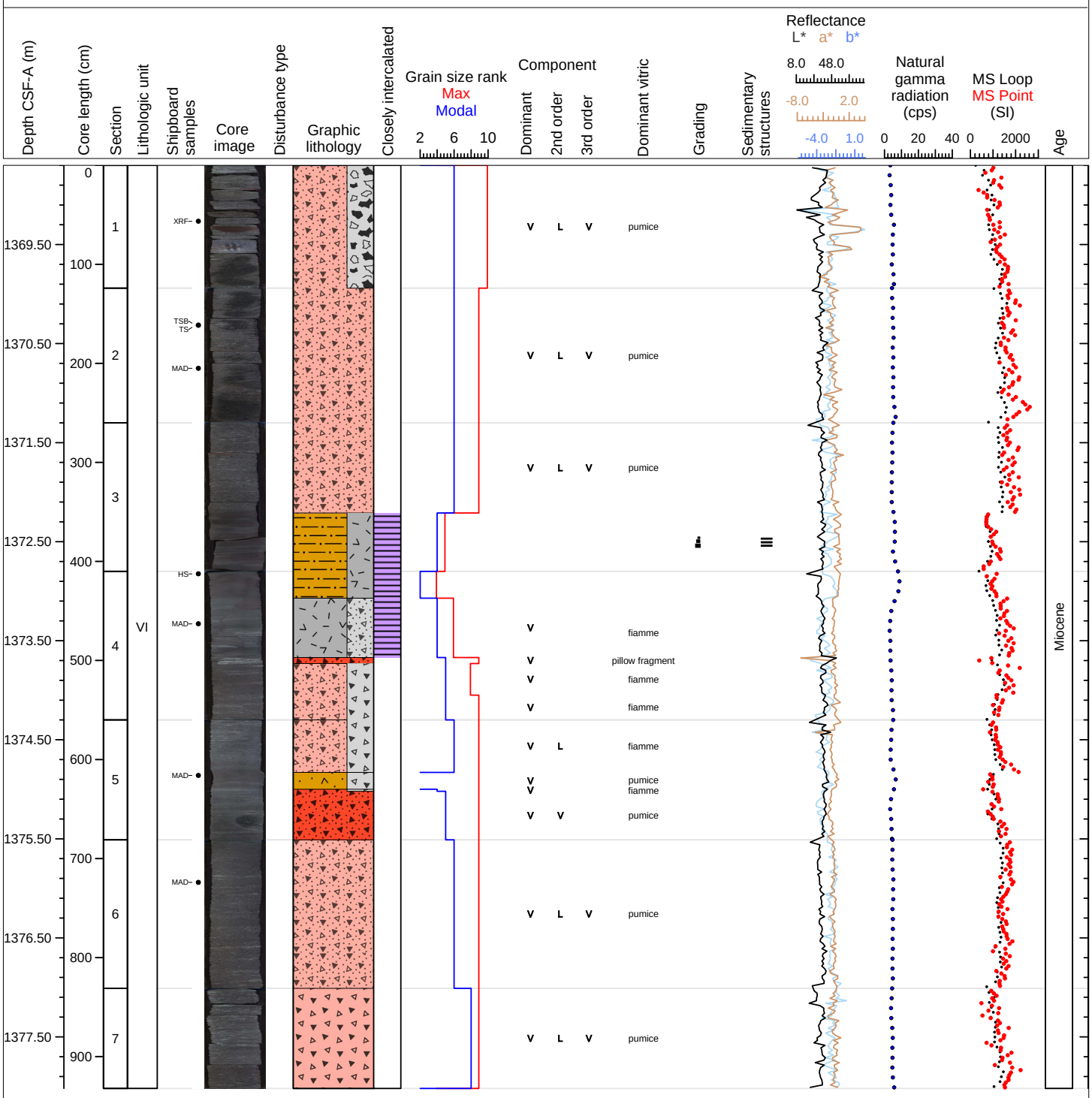
Hole 350-U1437E Core 32R, Interval 1359.0-1368.07 m (CSF-A)

evolved lapilli-tuff intercalated with tuff



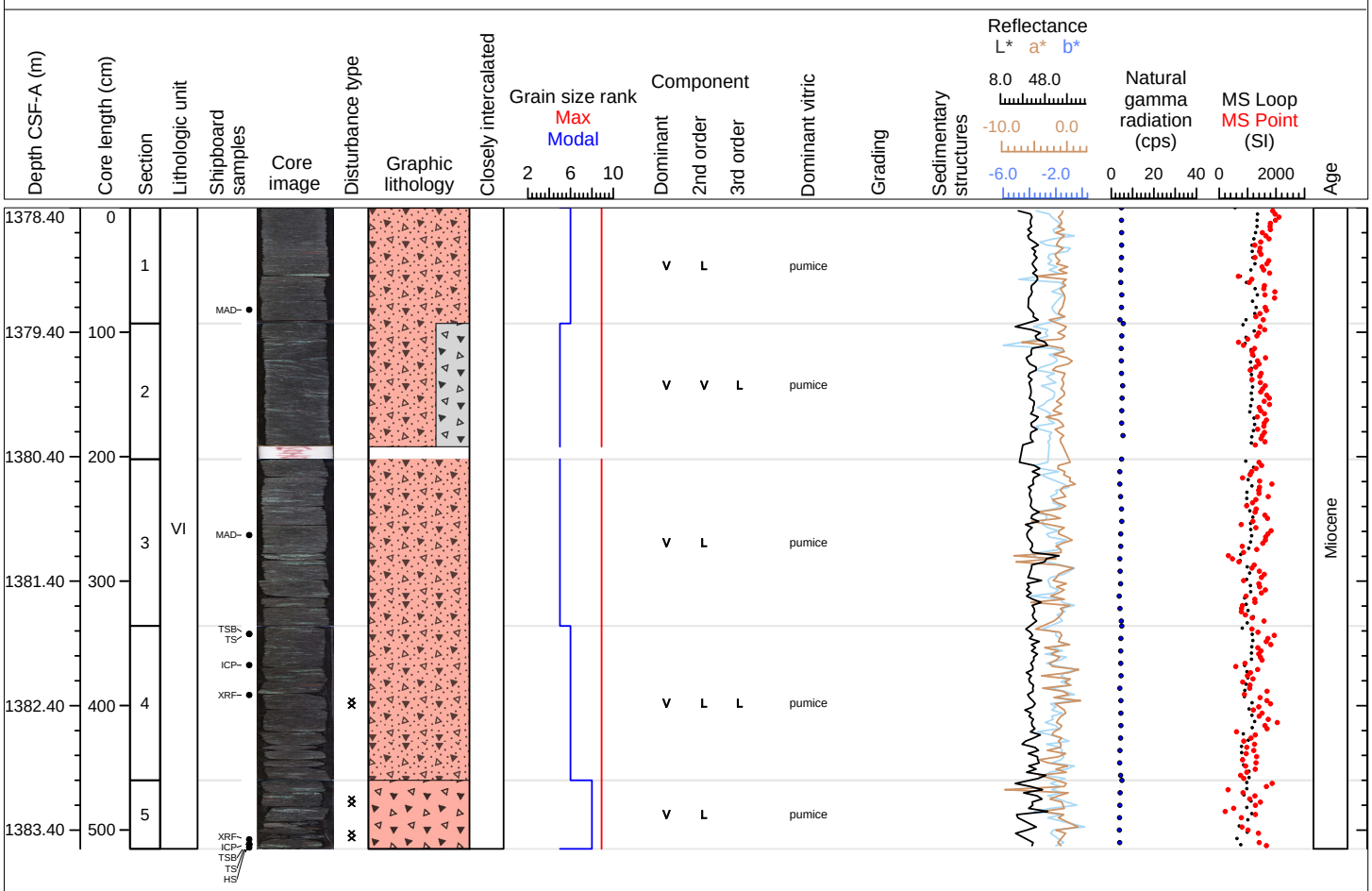
Hole 350-U1437E Core 33R, Interval 1368.7-1378.02 m (CSF-A)

lapilli-tuff intercalated with tuff and tuffaceous mudstone



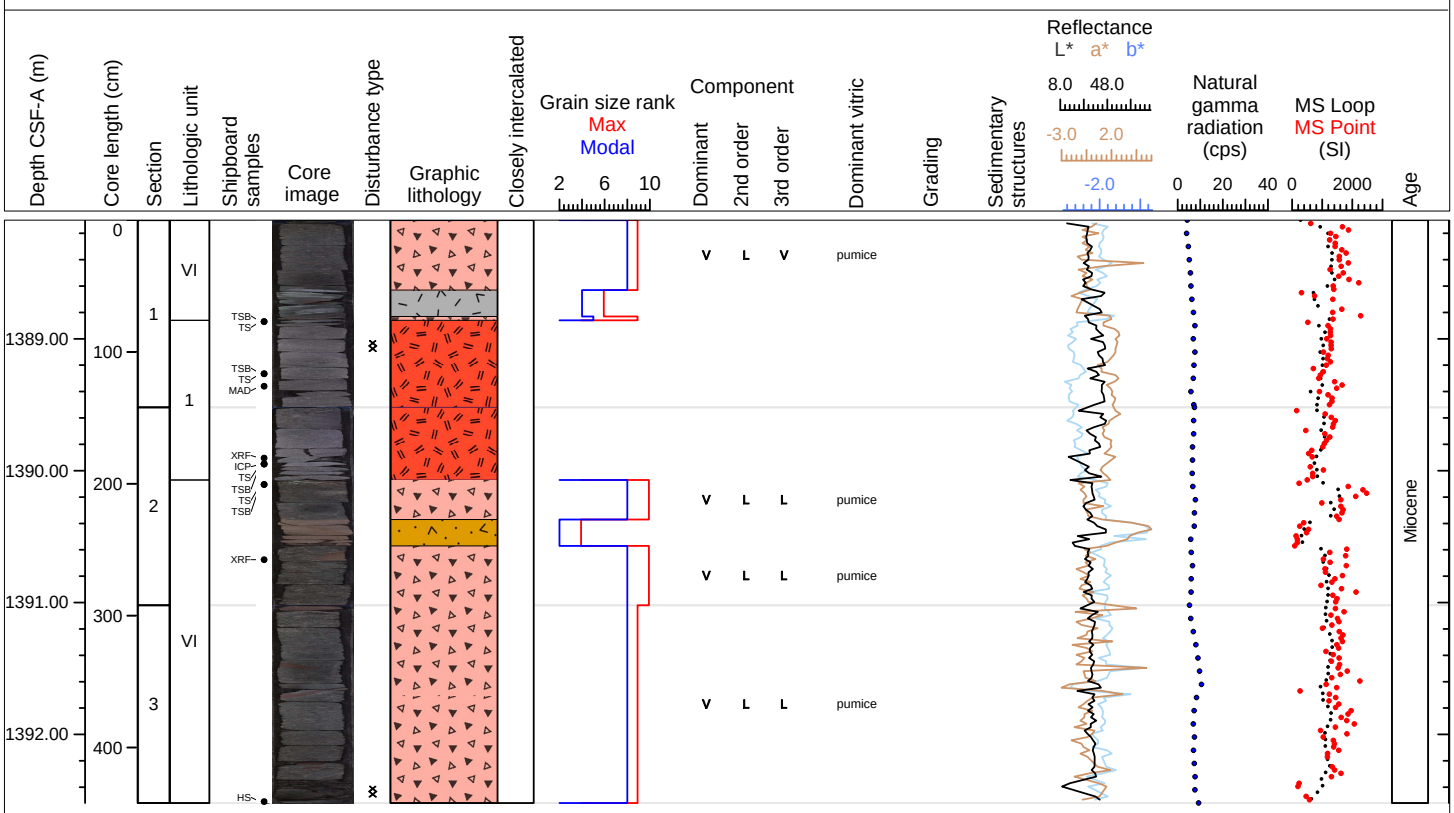
Hole 350-U1437E Core 34R, Interval 1378.4-1383.55 m (CSF-A)

evolved lapilli-tuff



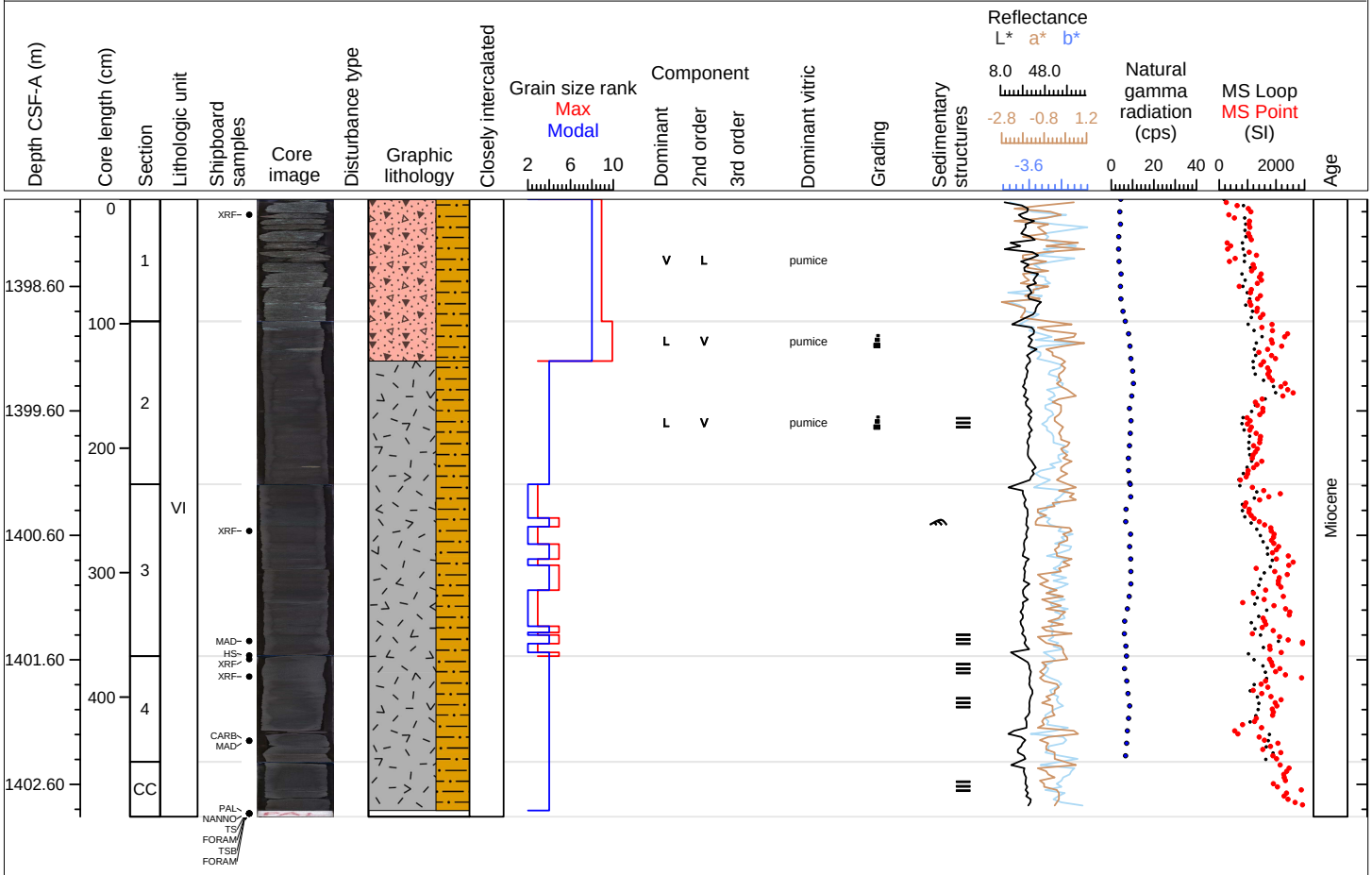
Hole 350-U1437E Core 35R, Interval 1388.1-1392.52 m (CSF-A)

evolved lapillistone with intercalted tuff and tuffaceous mudstone



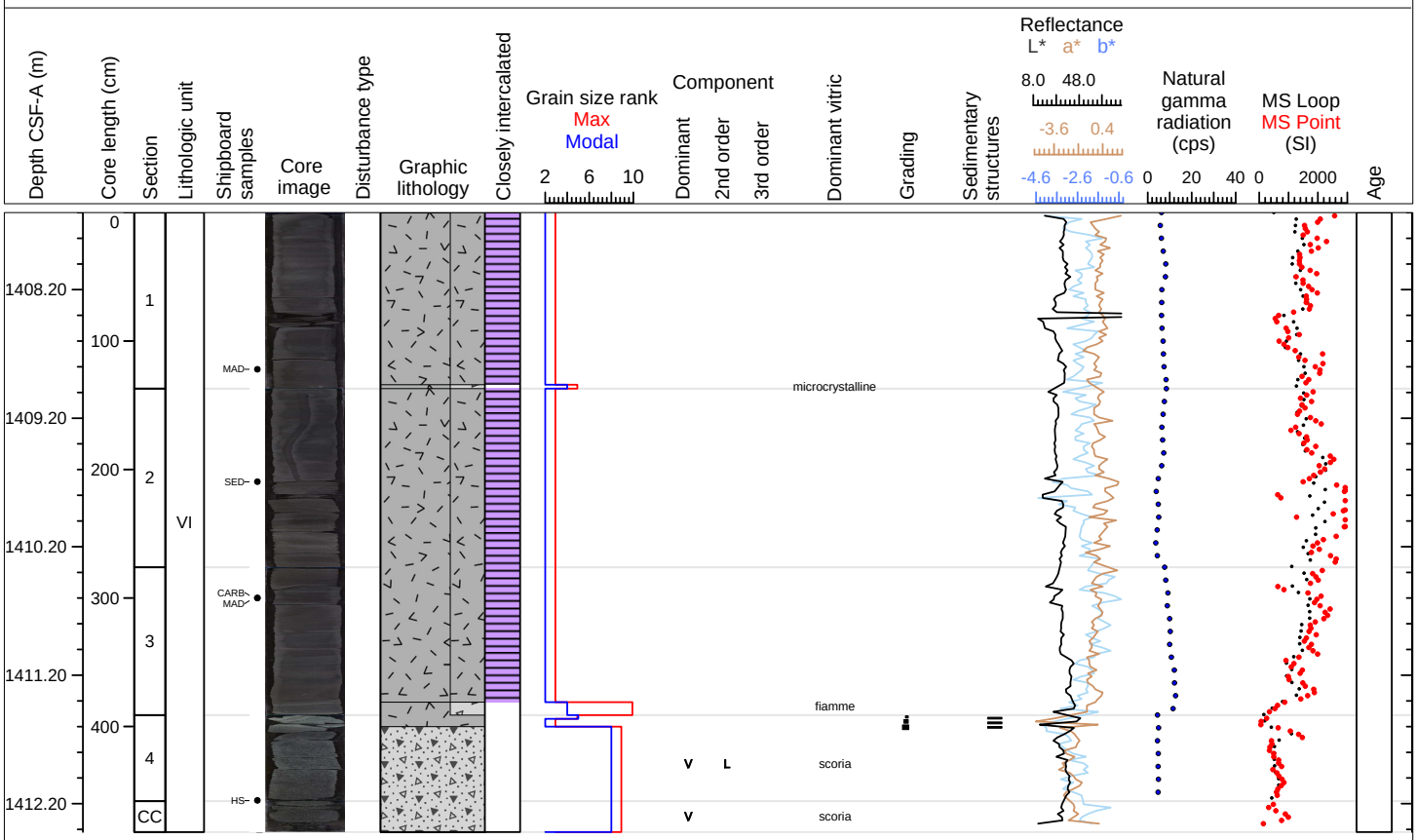
Hole 350-U1437E Core 36R, Interval 1397.9-1402.86 m (CSF-A)

tuff with mudstone



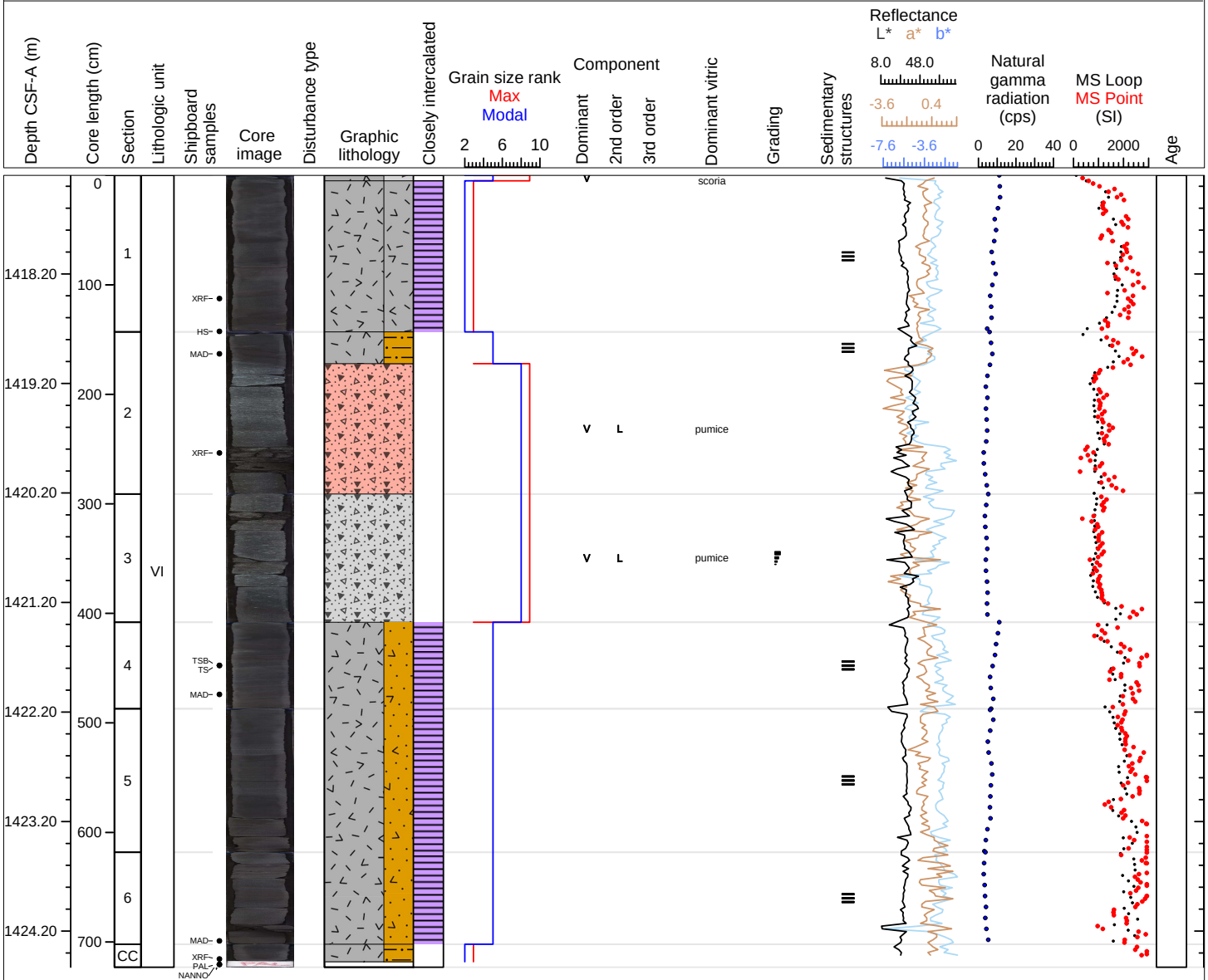
Hole 350-U1437E Core 37R, Interval 1407.6-1412.42 m (CSF-A)

intercalated tuff and tuffaceous mudstone



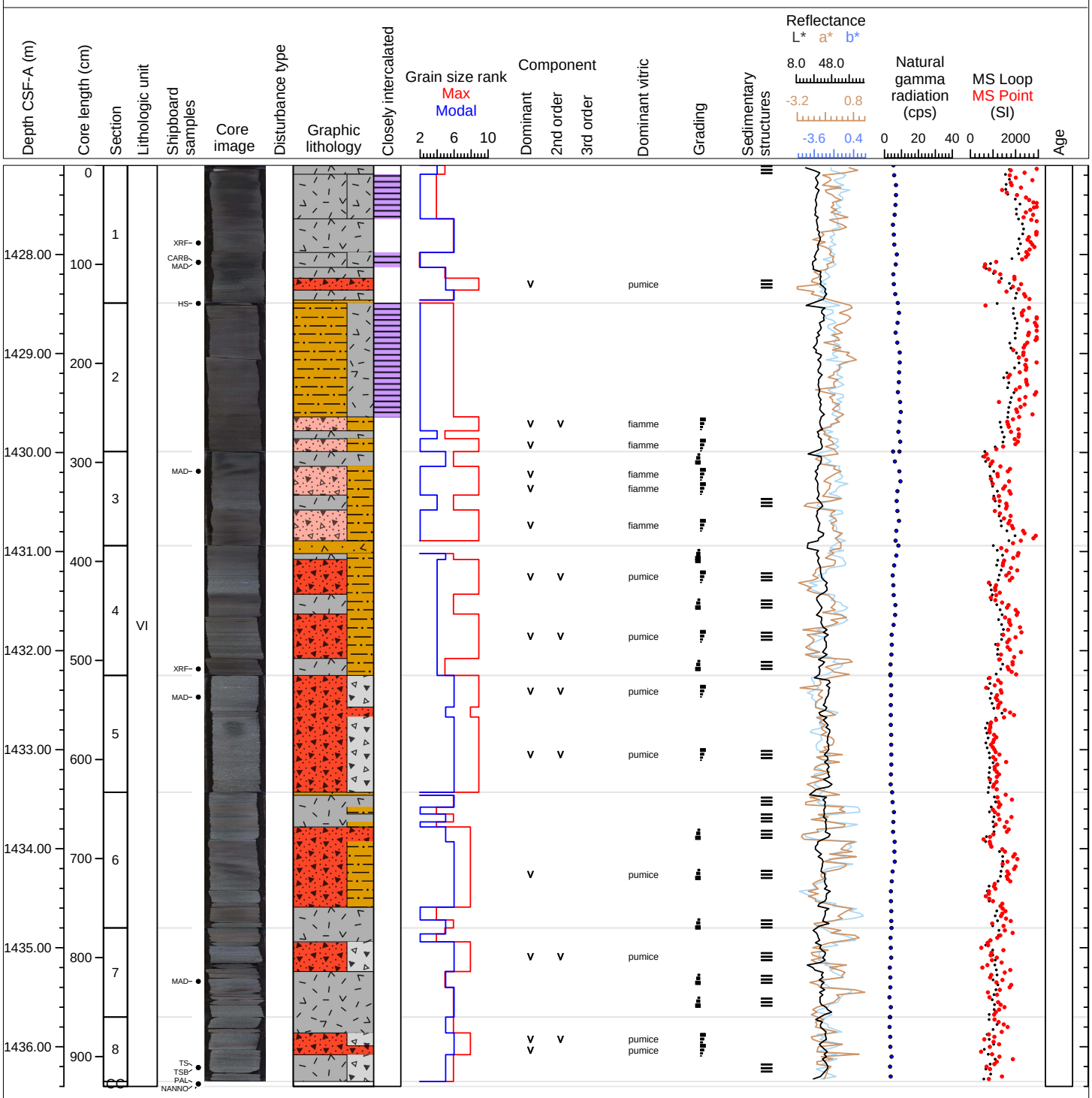
Hole 350-U1437E Core 38R, Interval 1417.3-1424.53 m (CSF-A)

intercalated tuff and tuffaceous mudstone



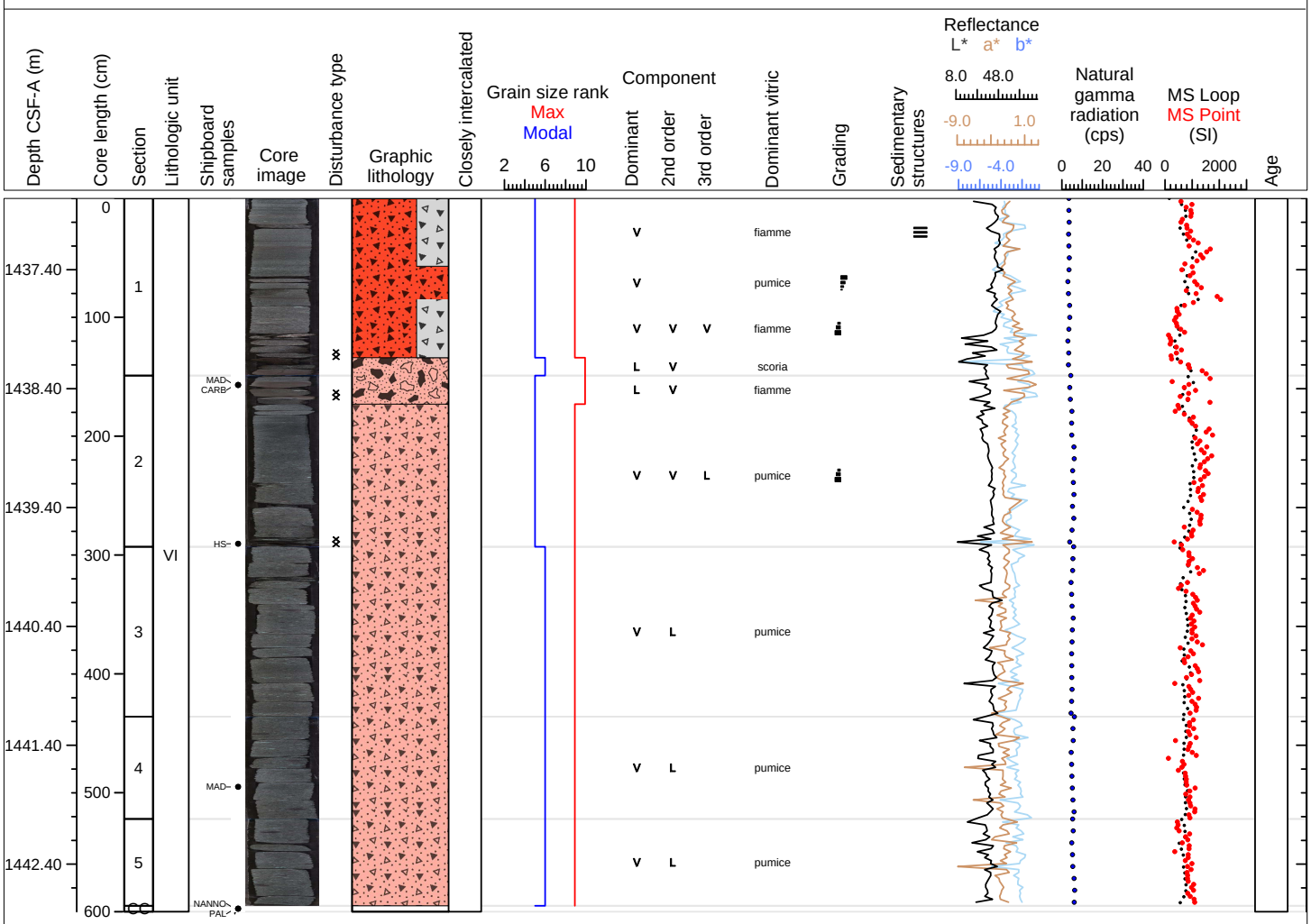
Hole 350-U1437E Core 39R, Interval 1427.1-1436.4 m (CSF-A)

intercalated tuff and lapilli-tuff



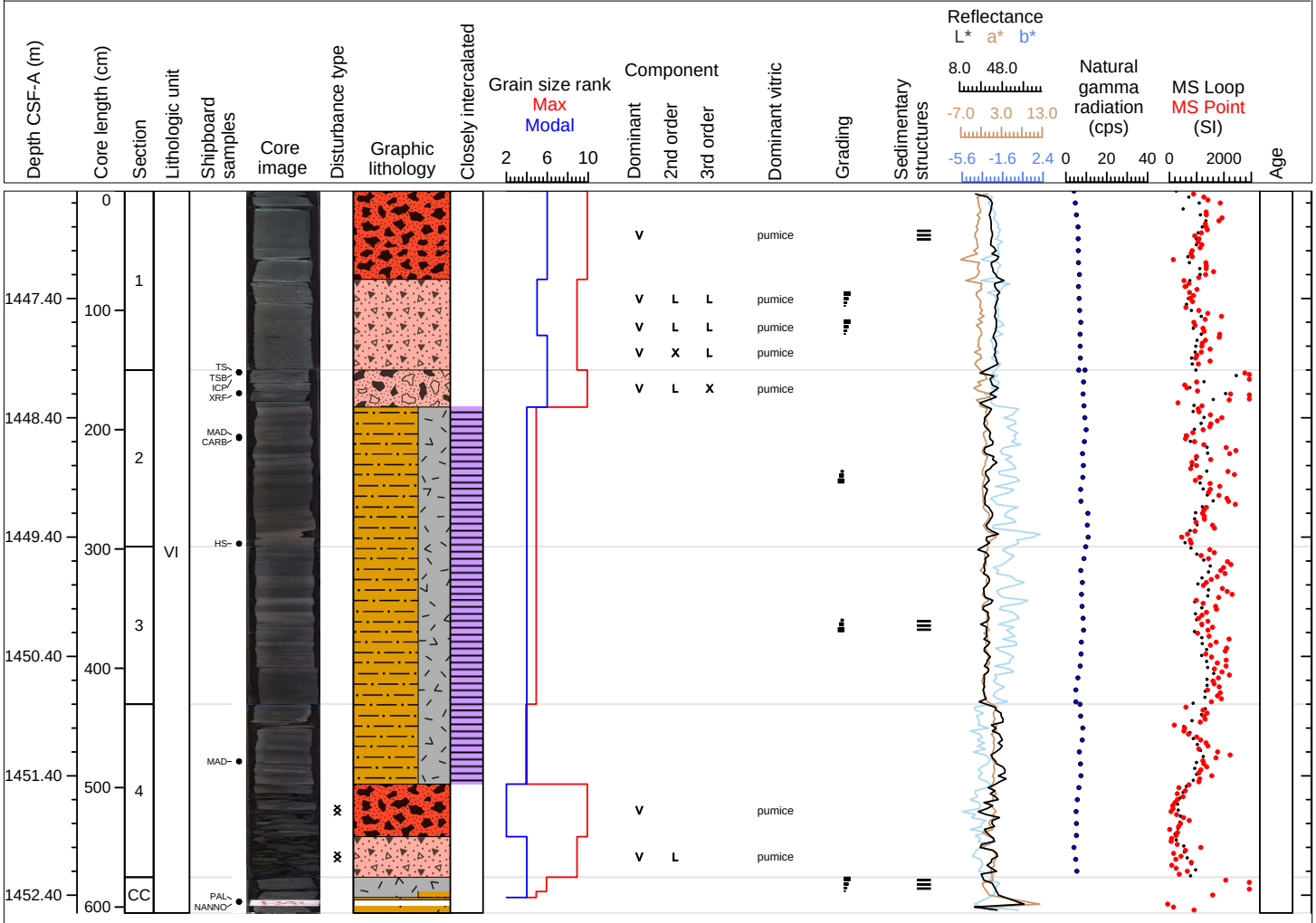
Hole 350-U1437E Core 40R, Interval 1436.8-1442.8 m (CSF-A)

lapilli-tuff and tuff-breccia



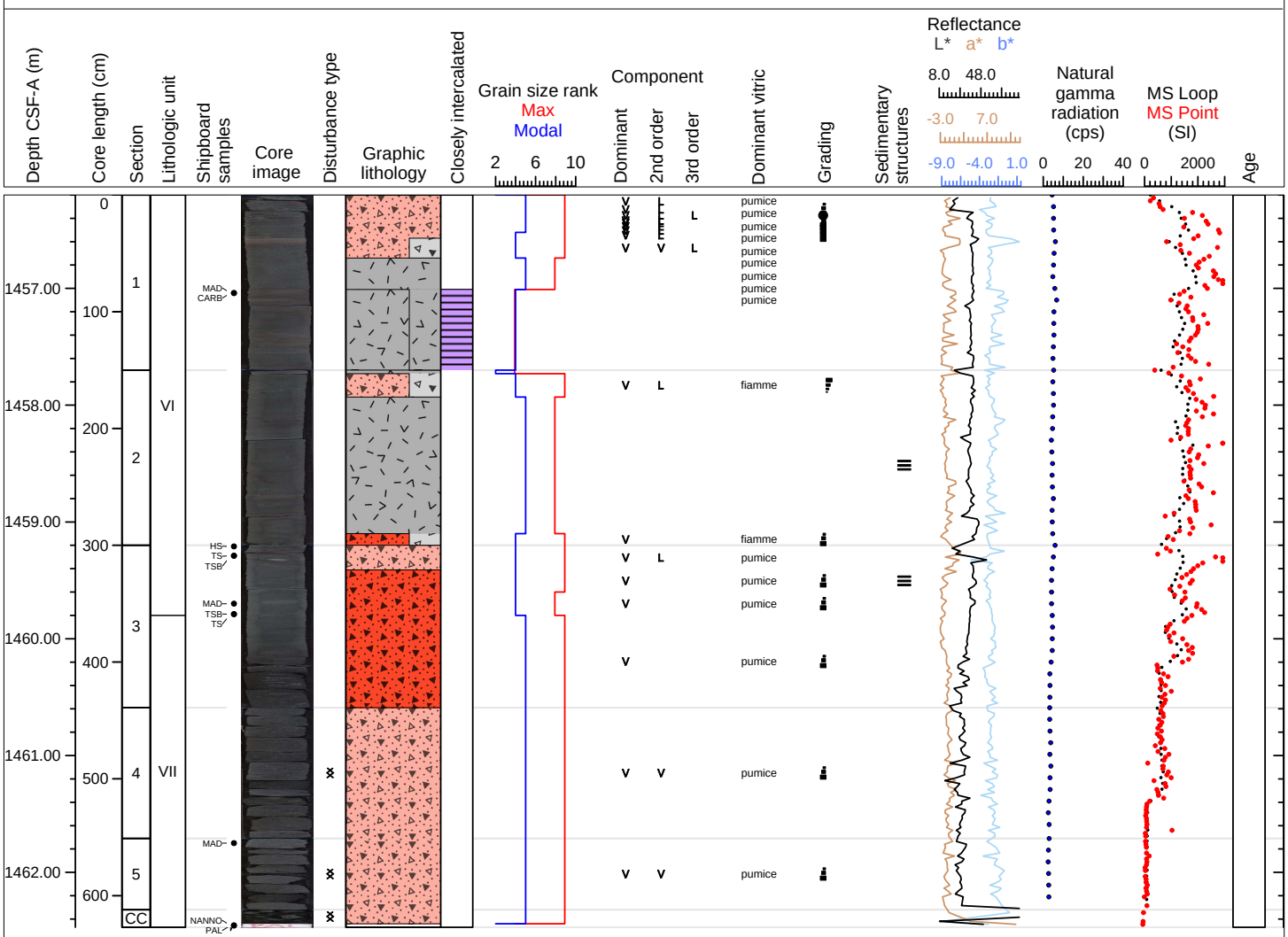
Hole 350-U1437E Core 41R, Interval 1446.5-1452.55 m (CSF-A)

intercalated tuffaceous mudstone, tuff, lapilli-tuff, and tuff breccia



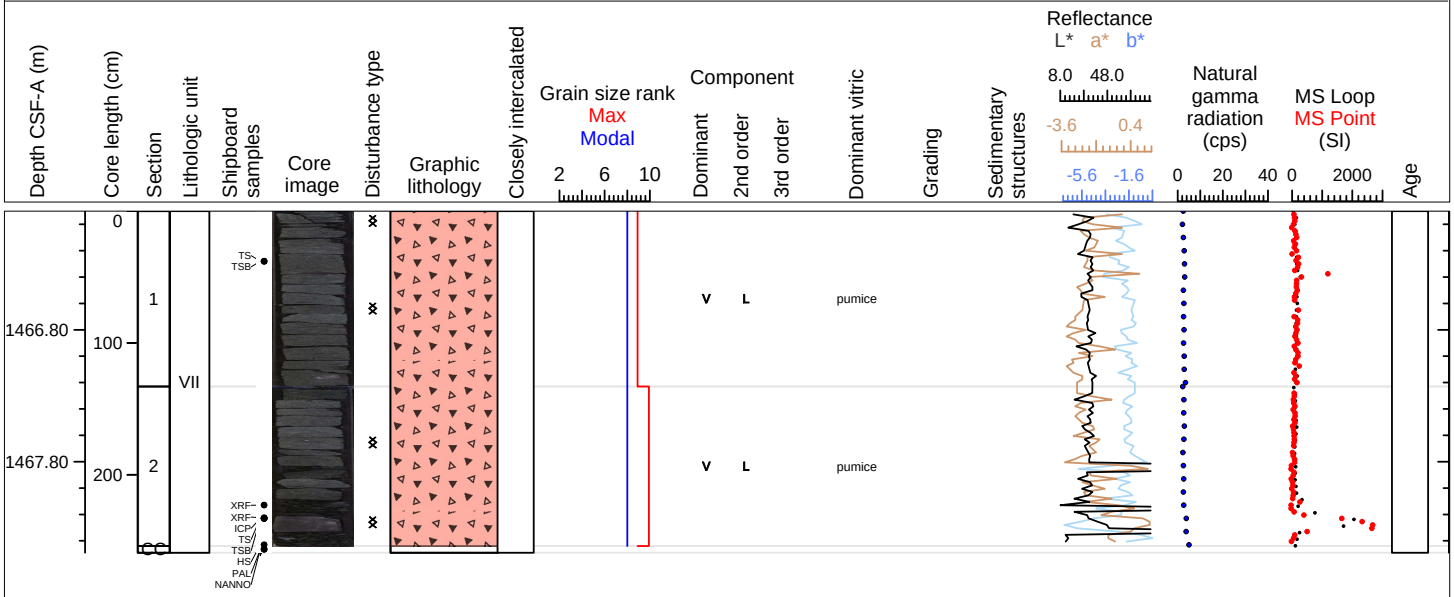
Hole 350-U1437E Core 42R, Interval 1456.2-1462.47 m (CSF-A)

lapilli-tuff and tuff



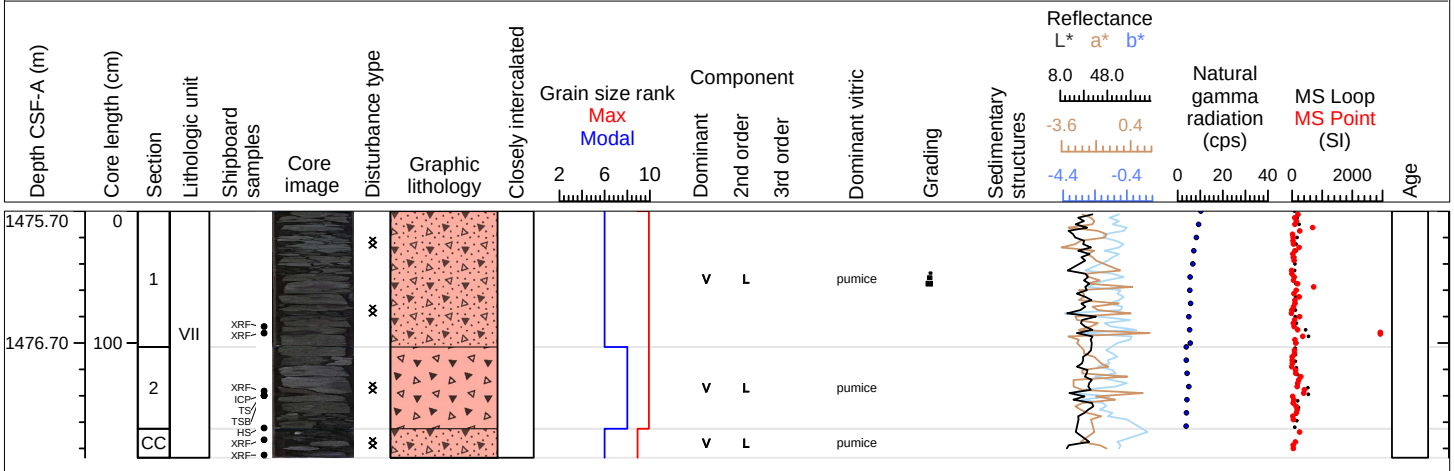
Hole 350-U1437E Core 43R, Interval 1465.9-1468.49 m (CSF-A)

lapillistone



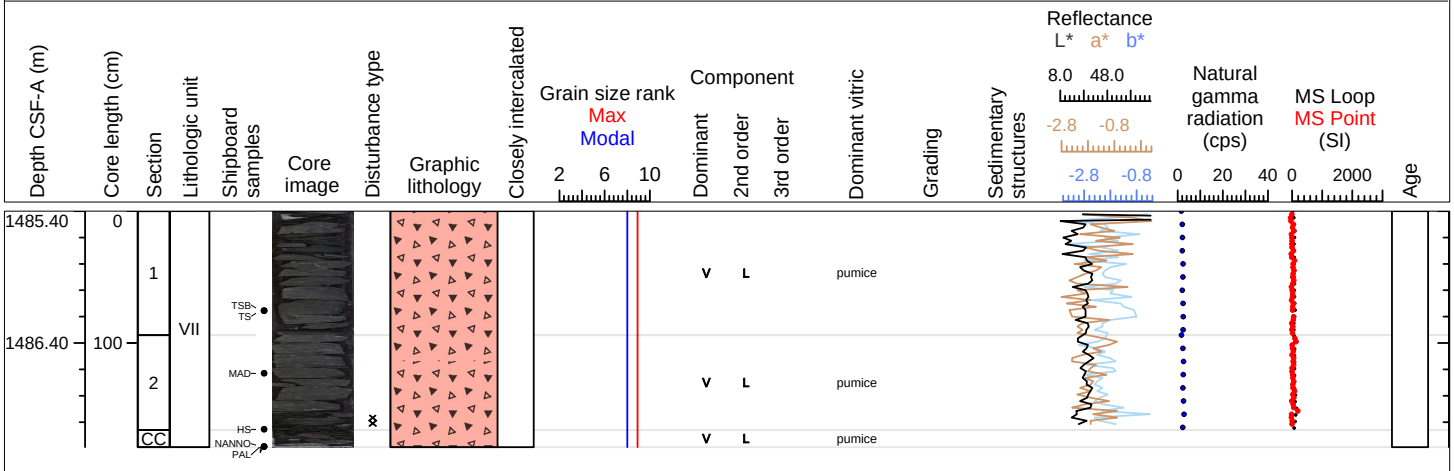
Hole 350-U1437E Core 44R, Interval 1475.7-1477.57 m (CSF-A)

lapilli-tuff and lapillistone



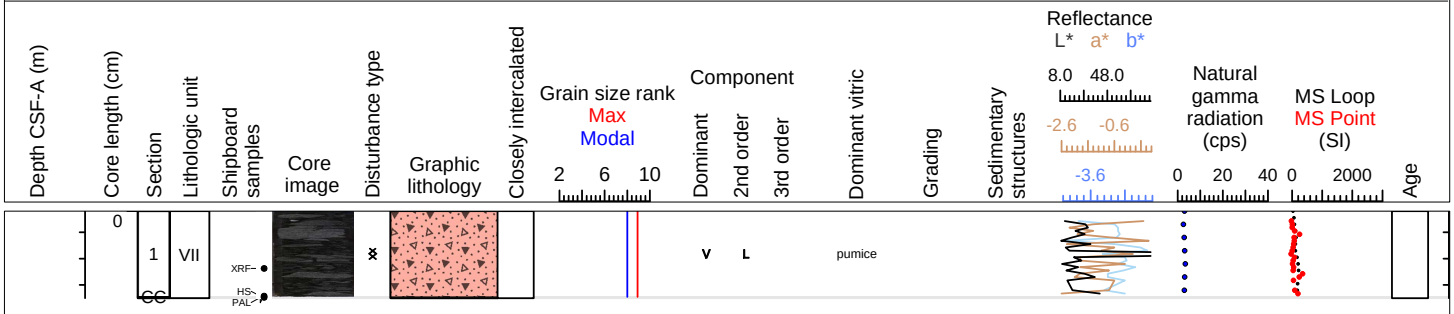
Hole 350-U1437E Core 45R, Interval 1485.4-1487.19 m (CSF-A)

clast-supported, polymictic lapillistone



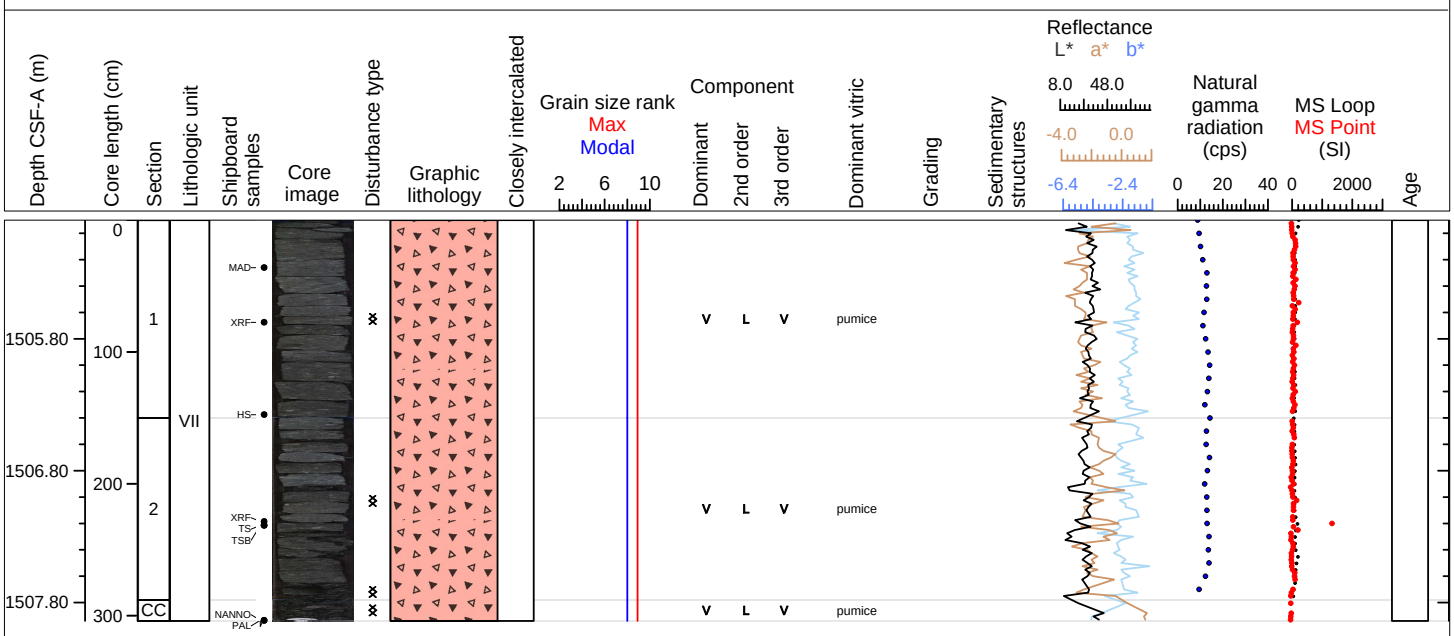
Hole 350-U1437E Core 46R, Interval 1495.2-1495.86 m (CSF-A)

clast-supported, polymictic lapilli-tuff



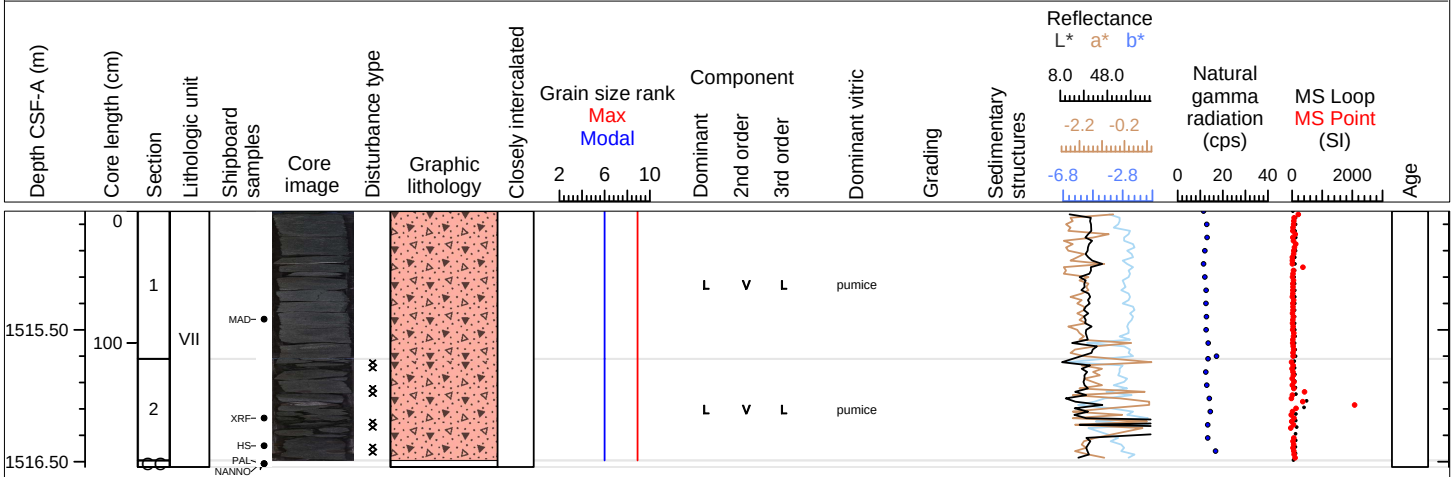
Hole 350-U1437E Core 47R, Interval 1504.9-1507.94 m (CSF-A)

clast-supported, polymictic lapillistone



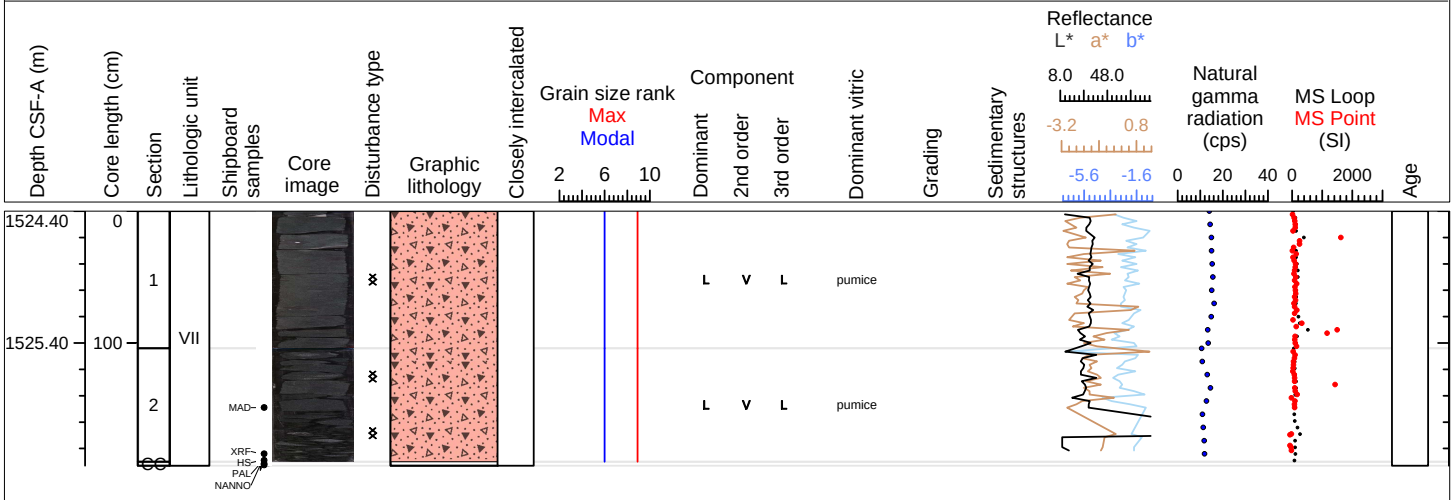
Hole 350-U1437E Core 48R, Interval 1514.6-1516.54 m (CSF-A)

matrix-supported lapilli-tuff



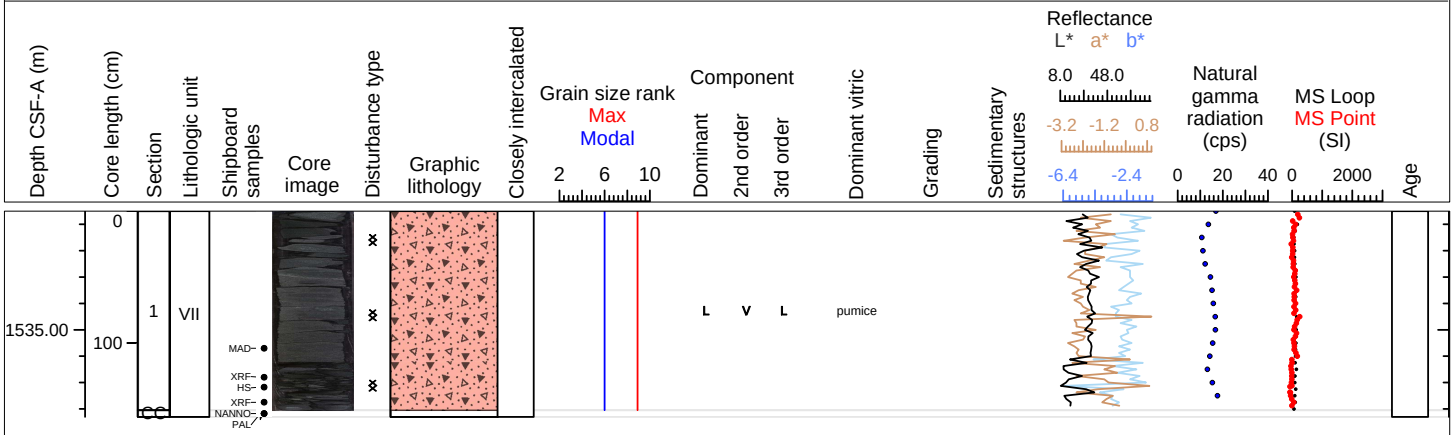
Hole 350-U1437E Core 49R, Interval 1524.4-1526.33 m (CSF-A)

polymictic lapilli-tuff



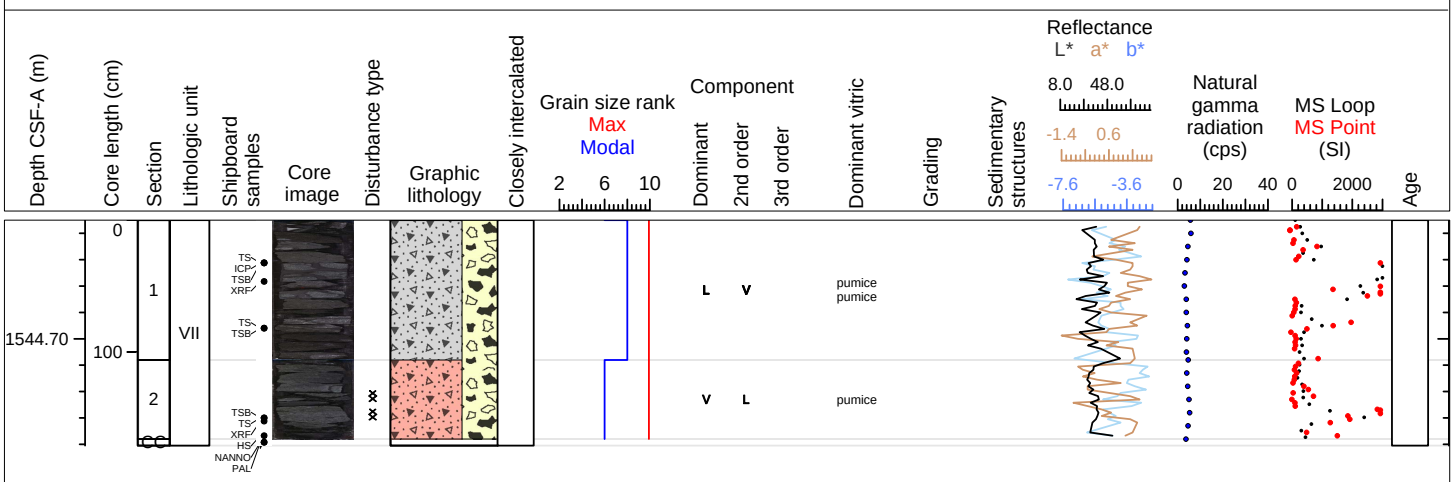
Hole 350-U1437E Core 50R, Interval 1534.1-1535.66 m (CSF-A)

polymictic lapilli-tuff



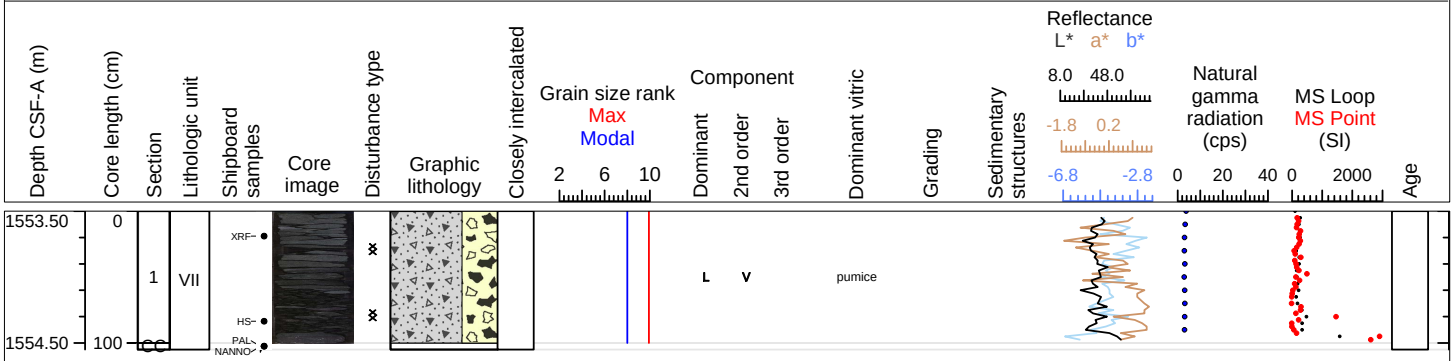
Hole 350-U1437E Core 51R, Interval 1543.8-1545.51 m (CSF-A)

polymictic lapilli-tuff



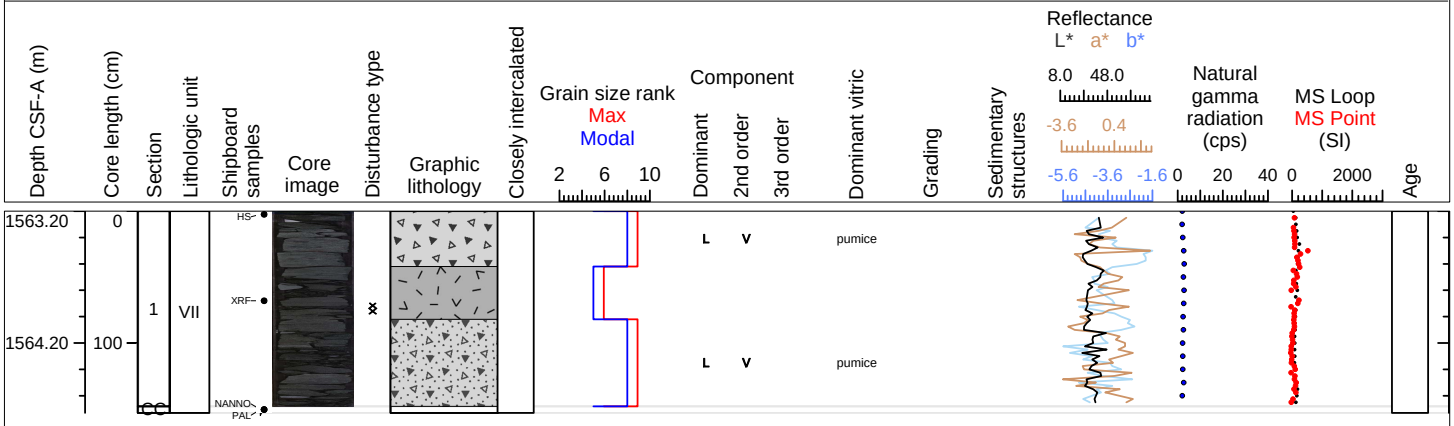
Hole 350-U1437E Core 52R, Interval 1553.5-1554.55 m (CSF-A)

polymictic lapilli-tuff



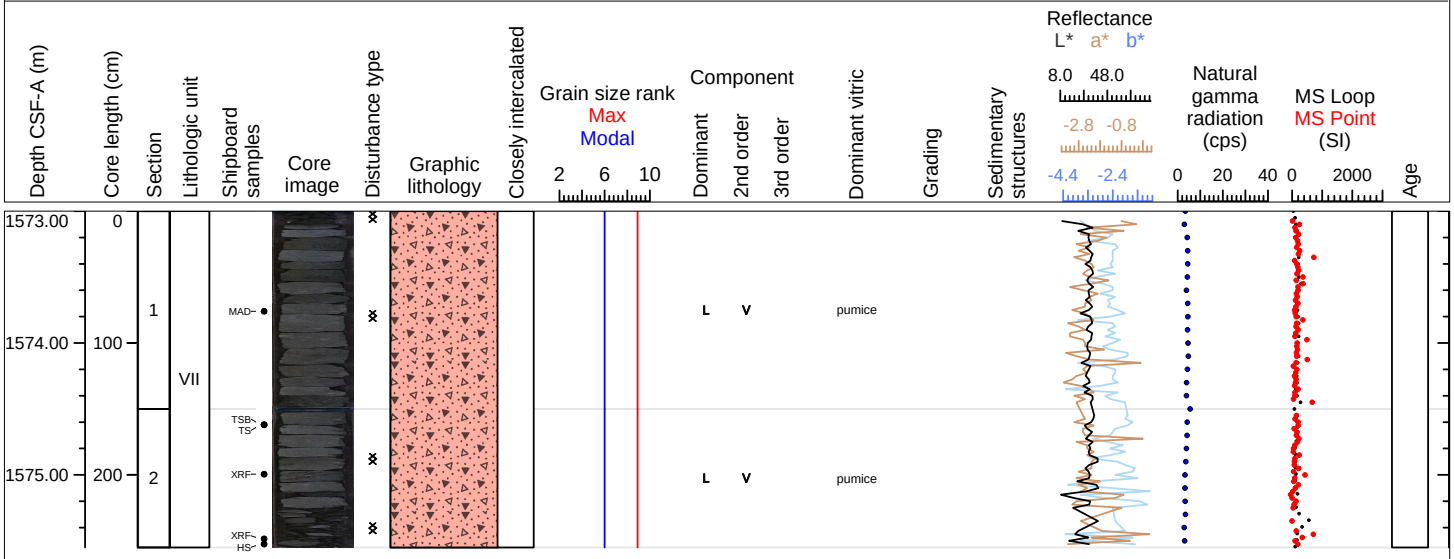
Hole 350-U1437E Core 53R, Interval 1563.2-1564.73 m (CSF-A)

polymictic lapilli-tuff



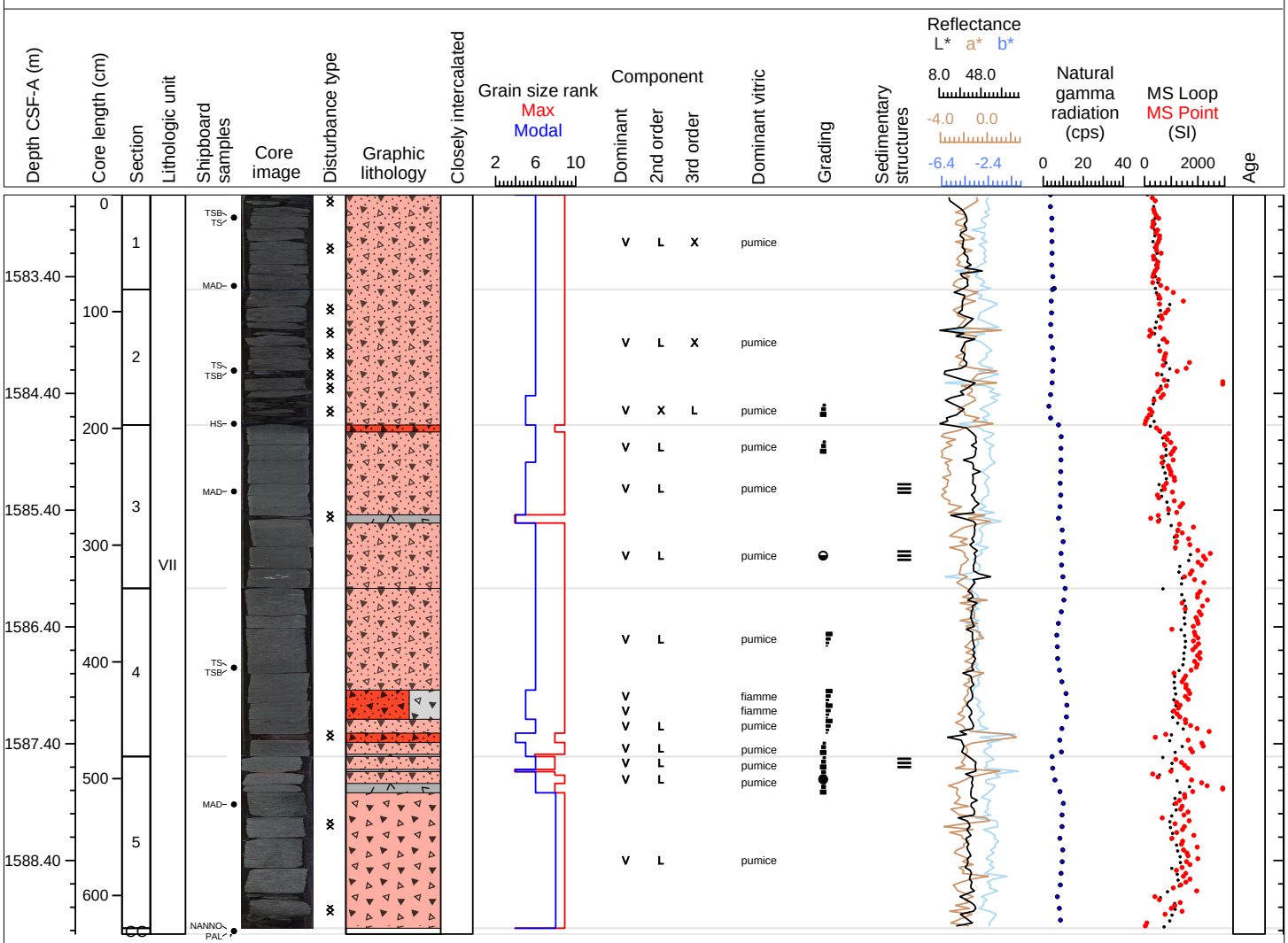
Hole 350-U1437E Core 54R, Interval 1573.0-1575.55 m (CSF-A)

polymictic lapilli-tuff with andesite clasts



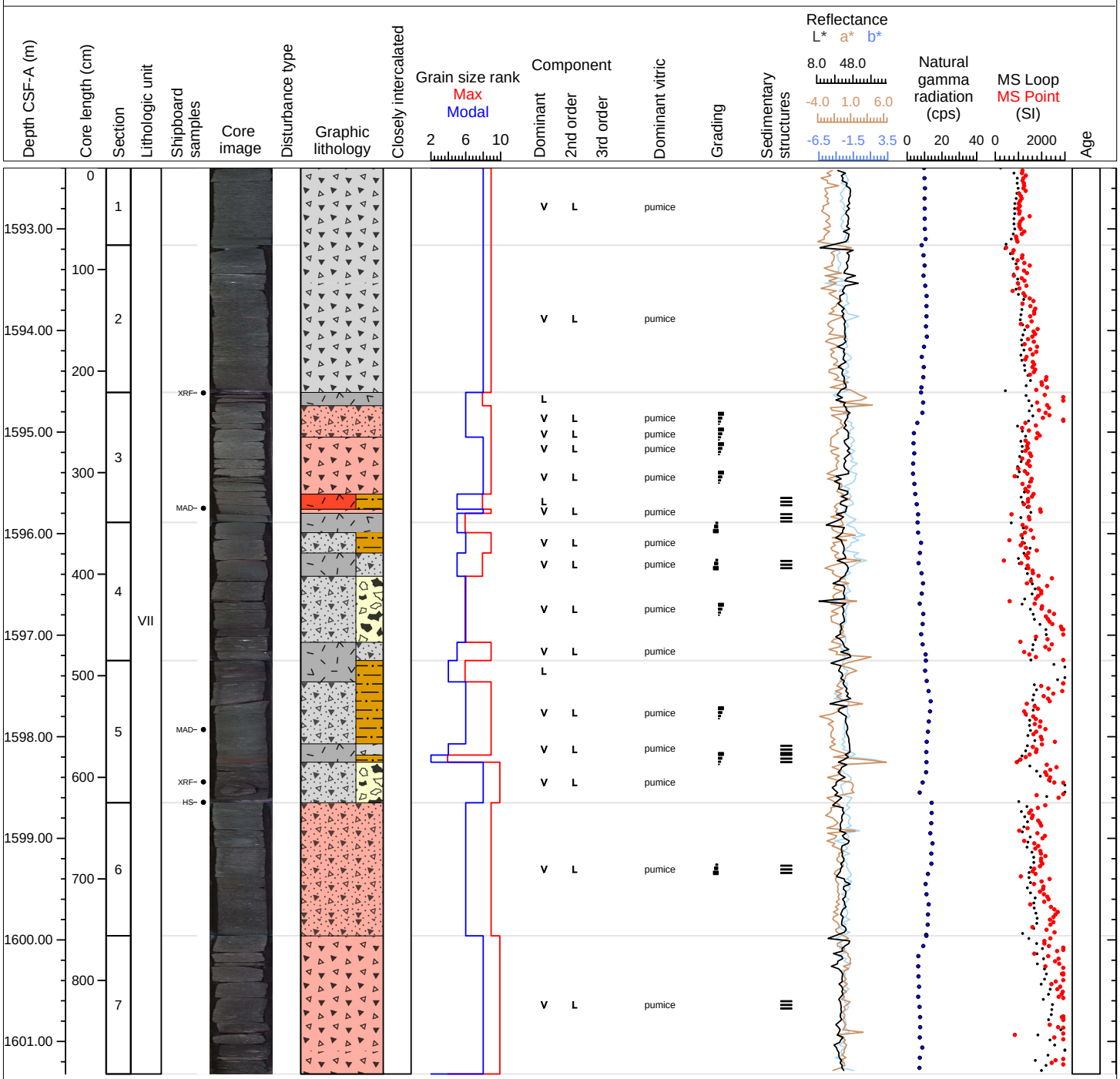
Hole 350-U1437E Core 55R, Interval 1582.7-1589.03 m (CSF-A)

polymict lapilli-tuff



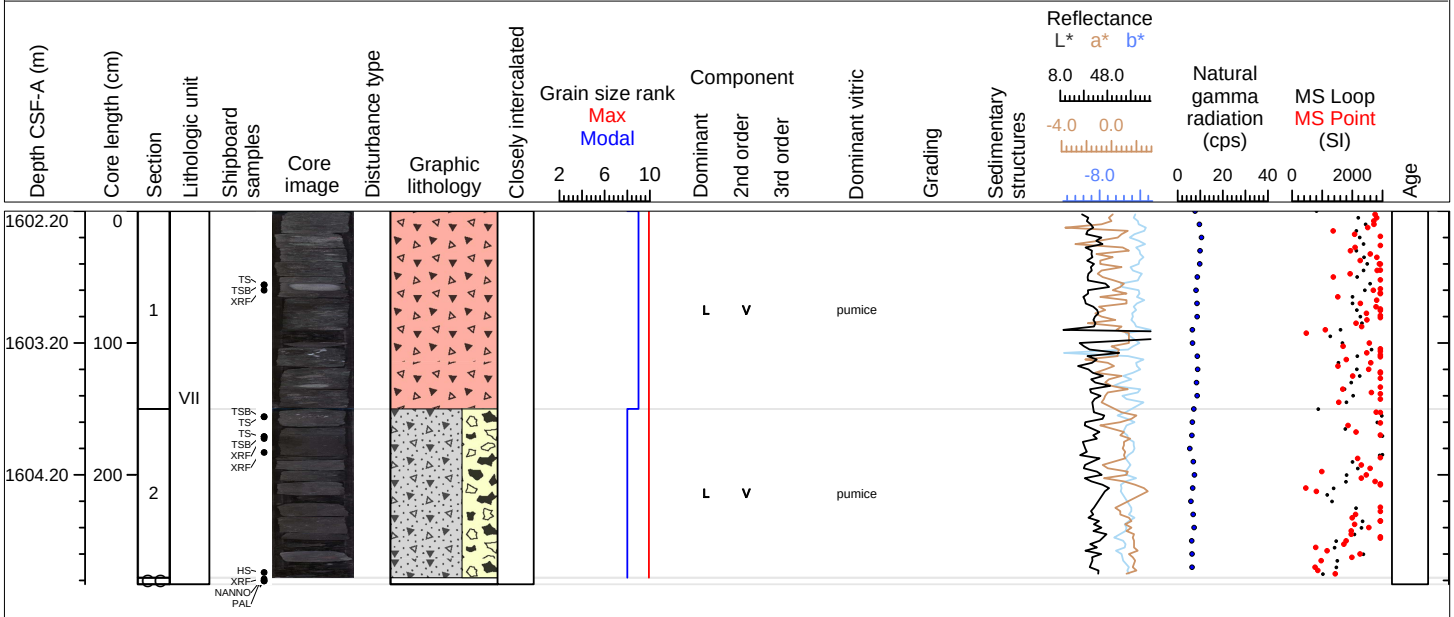
Hole 350-U1437E Core 56R, Interval 1592.4-1601.32 m (CSF-A)

polymictic lapilli-tuff and lapillistone



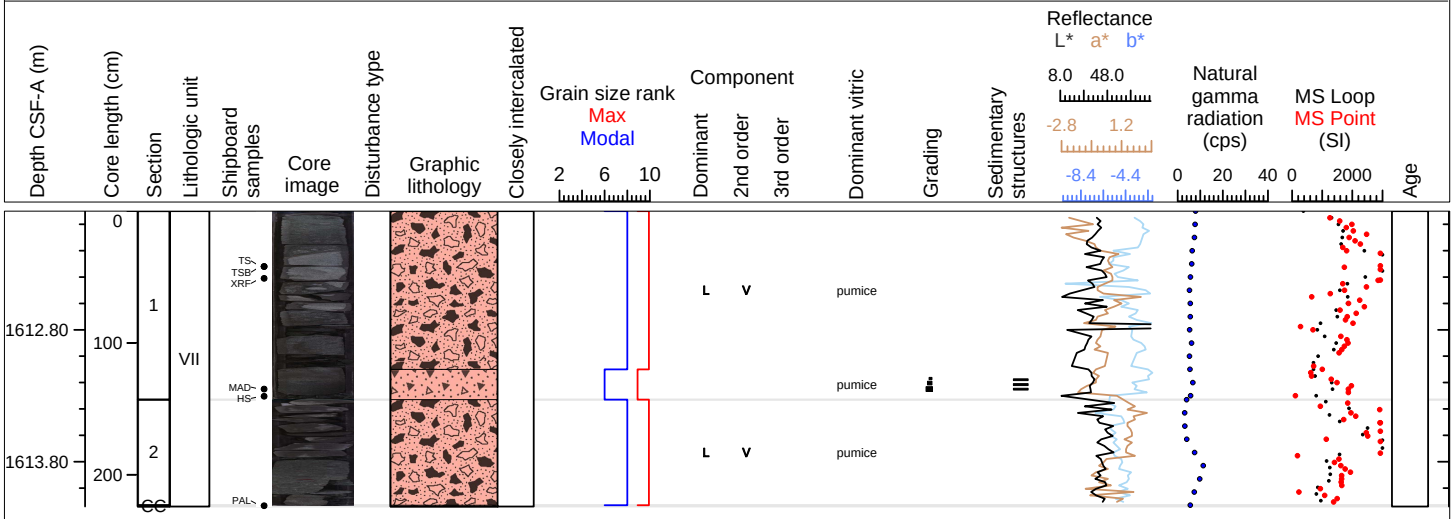
Hole 350-U1437E Core 57R, Interval 1602.2-1605.03 m (CSF-A)

polymictic lapilli-tuff and lapillistone



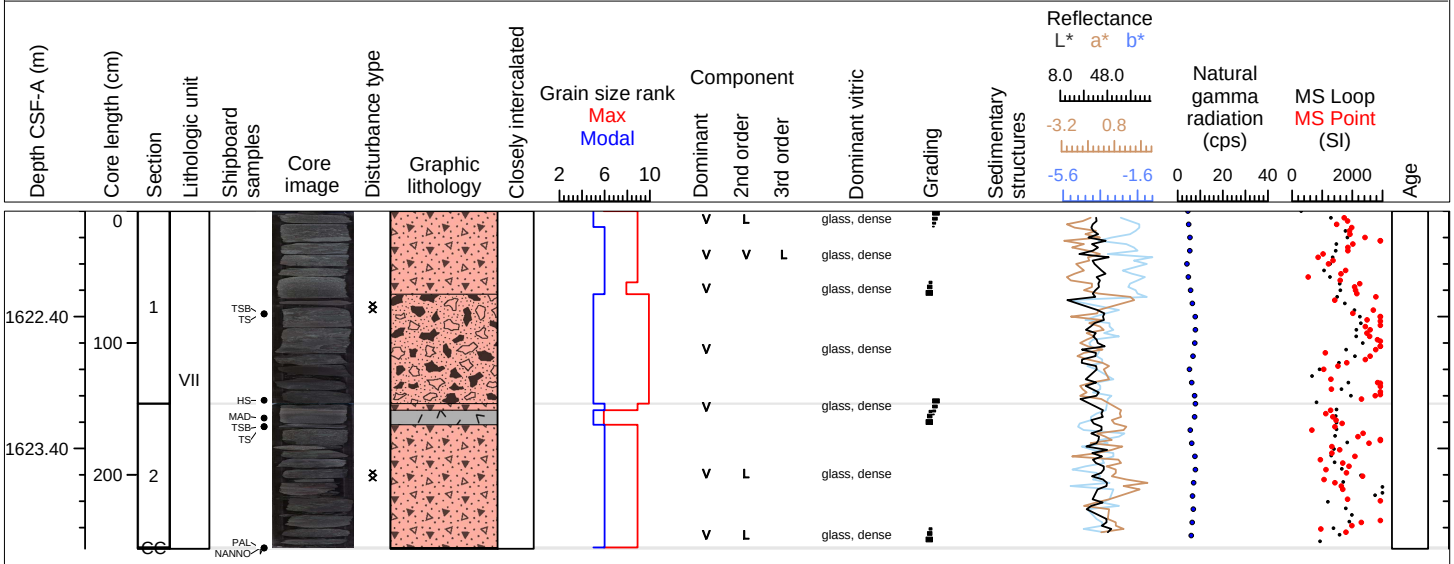
Hole 350-U1437E Core 58R, Interval 1611.9-1614.14 m (CSF-A)

polymictic tuff-breccia and lapilli-tuff



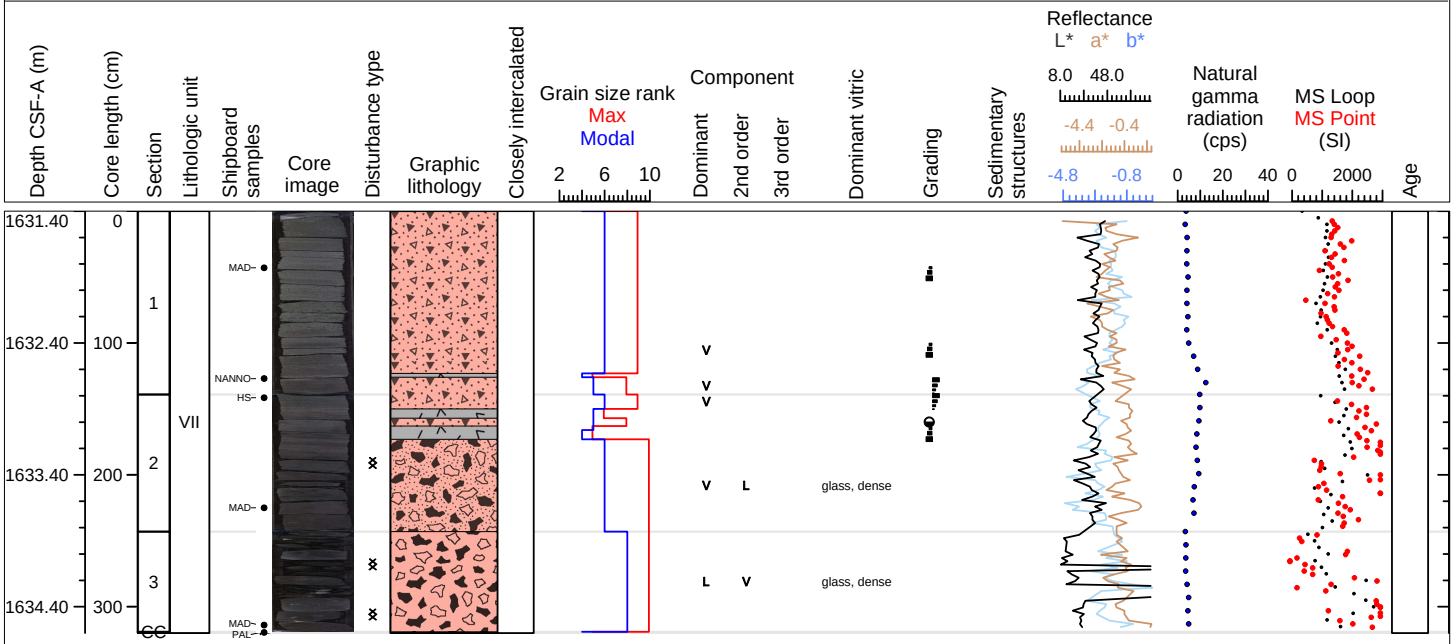
Hole 350-U1437E Core 59R, Interval 1621.6-1624.16 m (CSF-A)

polymictic lapilli-tuff and tuff



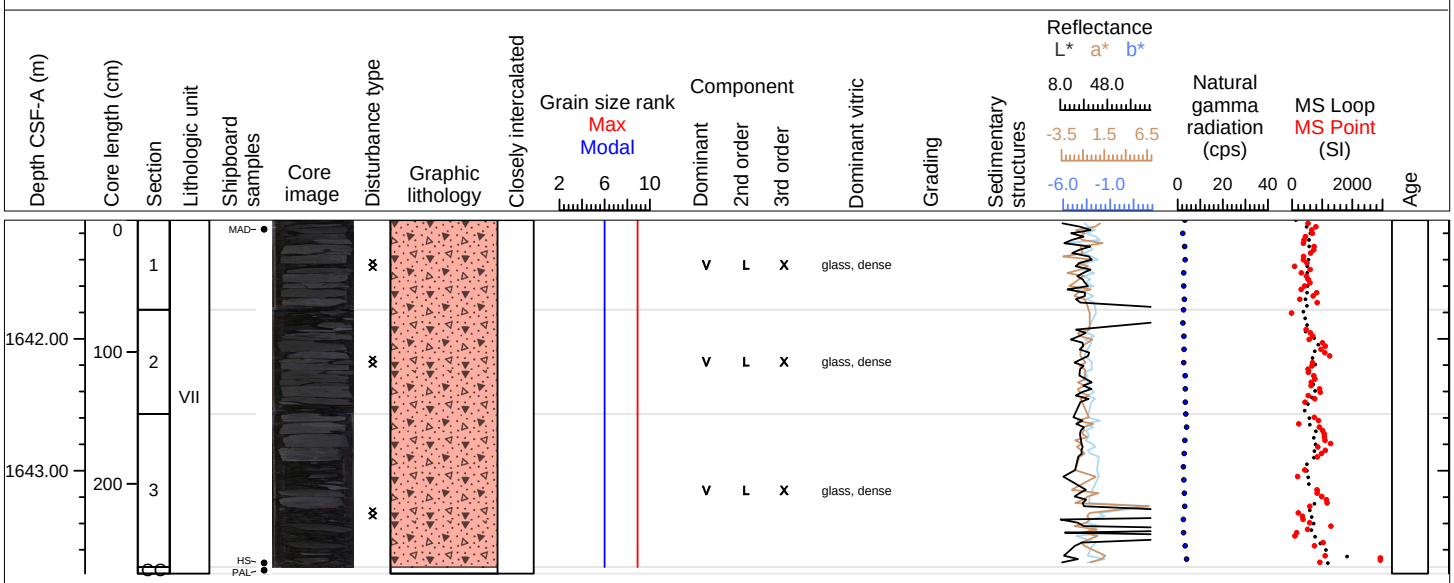
Hole 350-U1437E Core 60R, Interval 1631.4-1634.6 m (CSF-A)

polymict lapilli-tuff, breccia, and tuff



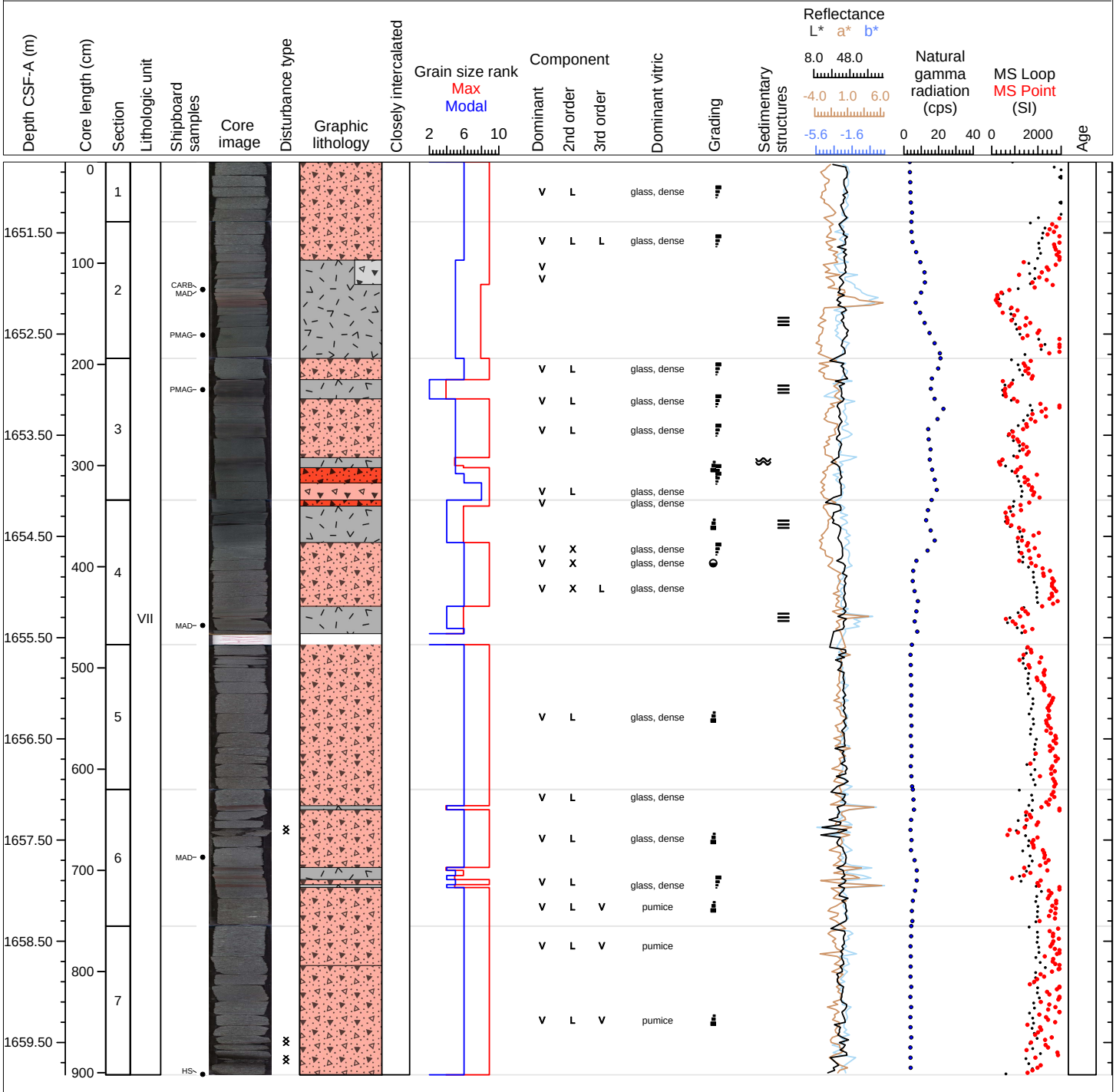
Hole 350-U1437E Core 61R, Interval 1641.1-1643.78 m (CSF-A)

polymictic lapilli-tuff



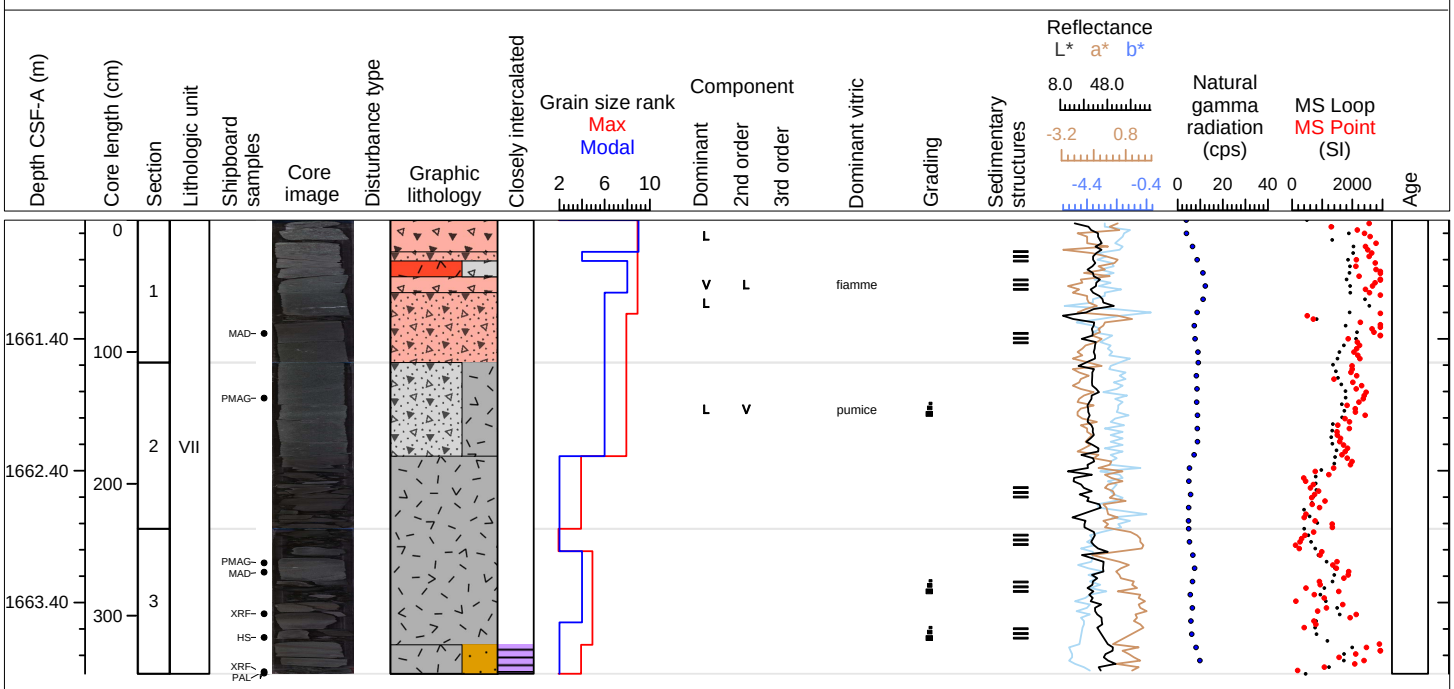
Hole 350-U1437E Core 62R, Interval 1650.8-1659.82 m (CSF-A)

Polymictic, matrix supported, evolved lapilli-tuff with layers of tuff. Pyx-fsp phyric andesite clasts.



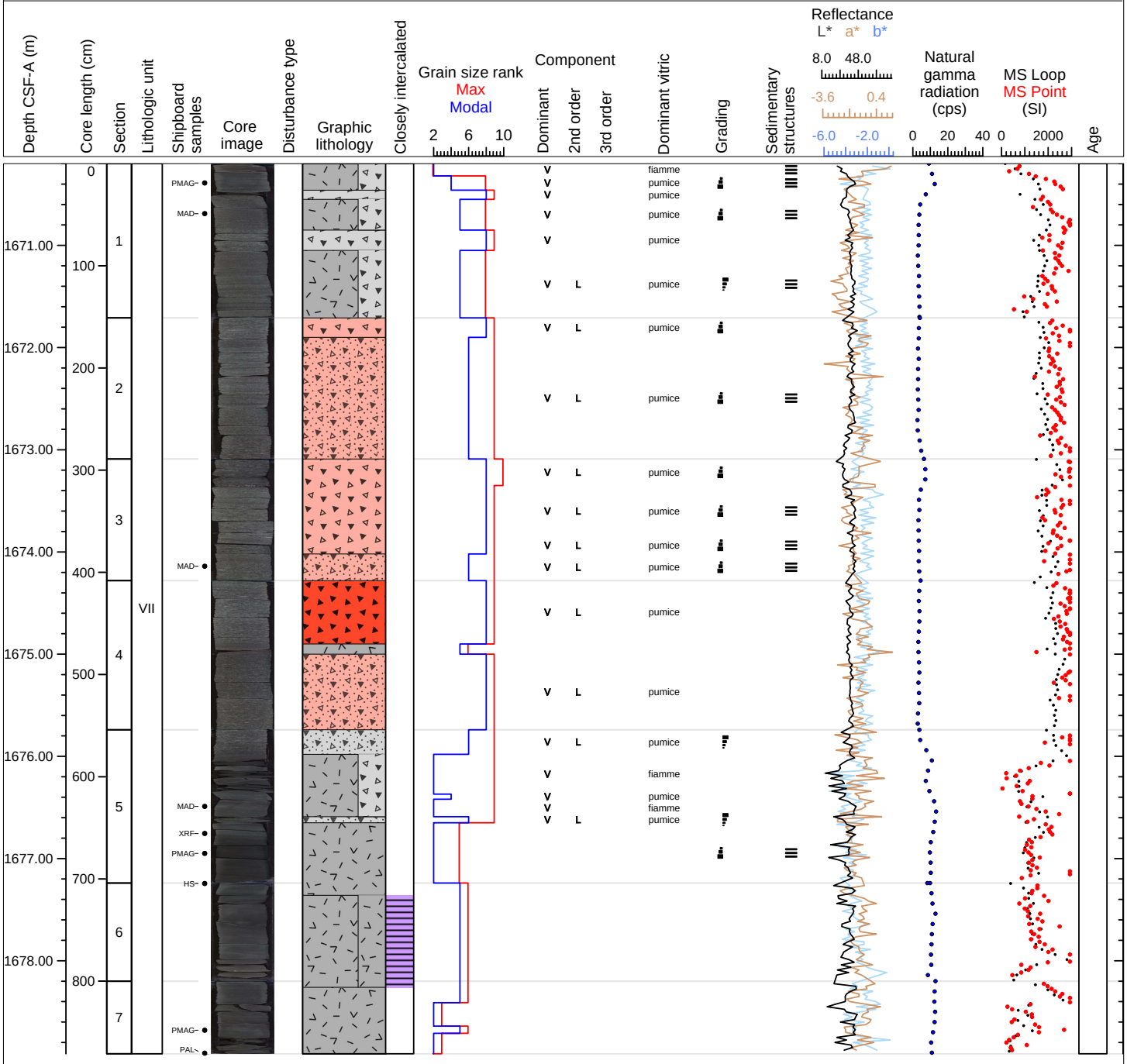
Hole 350-U1437E Core 63R, Interval 1660.5-1663.94 m (CSF-A)

intercalated tuff and polymictic lapilli-tuff and lapillistone



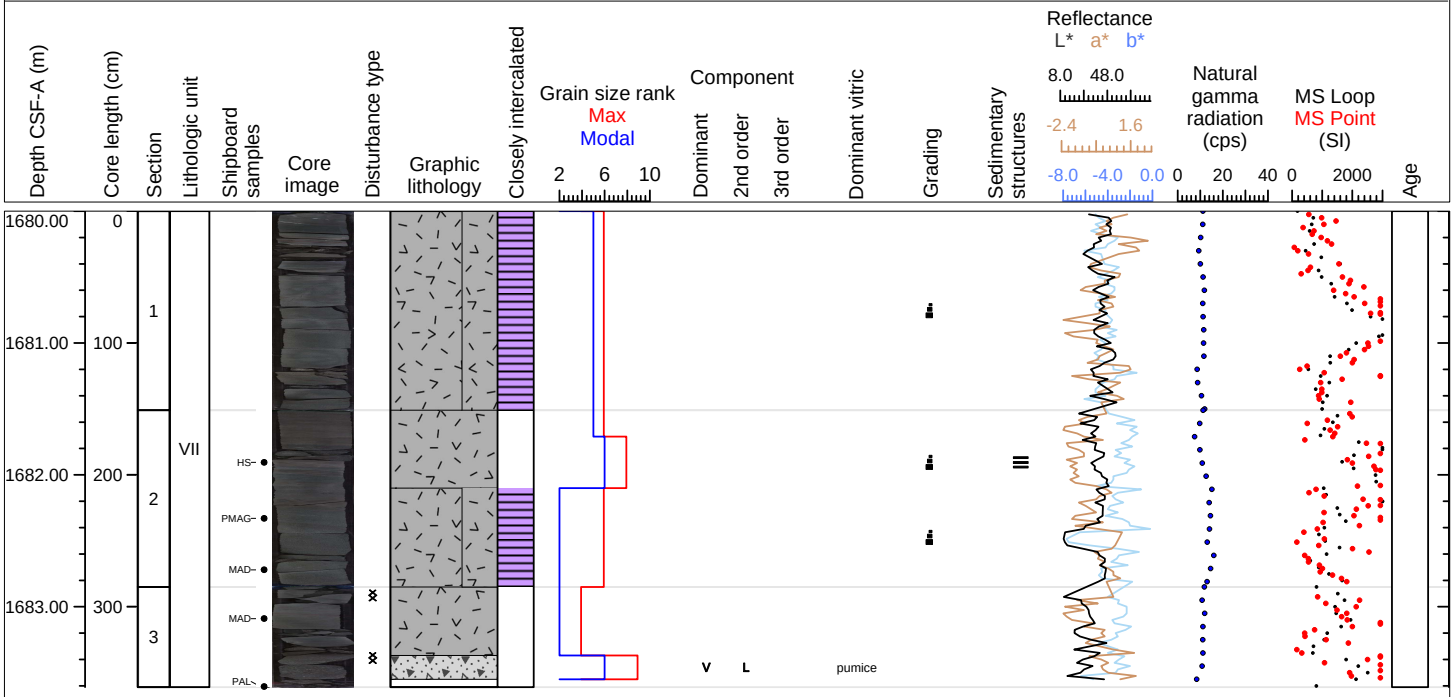
Hole 350-U1437E Core 64R, Interval 1670.2-1678.91 m (CSF-A)

tuff intercalated with polymictic lapilli-tuff and lapillistone



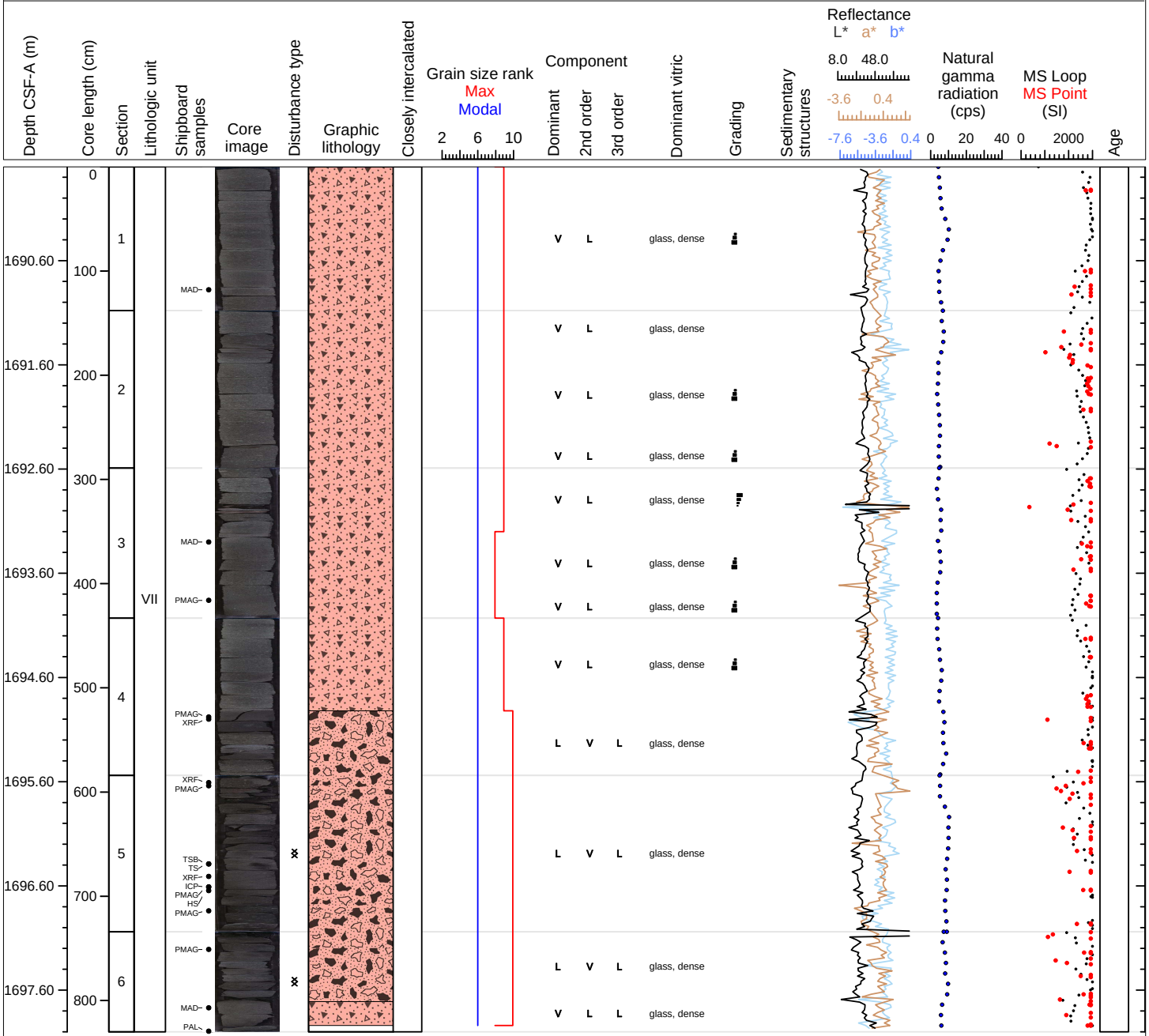
Hole 350-U1437E Core 65R, Interval 1680.0-1683.61 m (CSF-A)

tuff



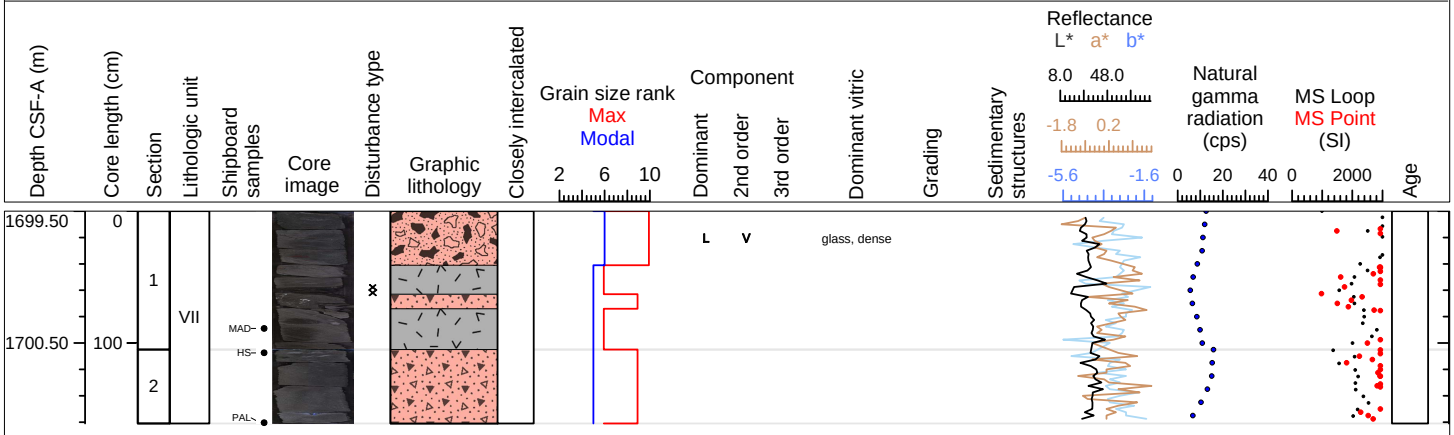
Hole 350-U1437E Core 66R, Interval 1689.7-1698.0 m (CSF-A)

polymict lapilli-tuff and tuff-breccia



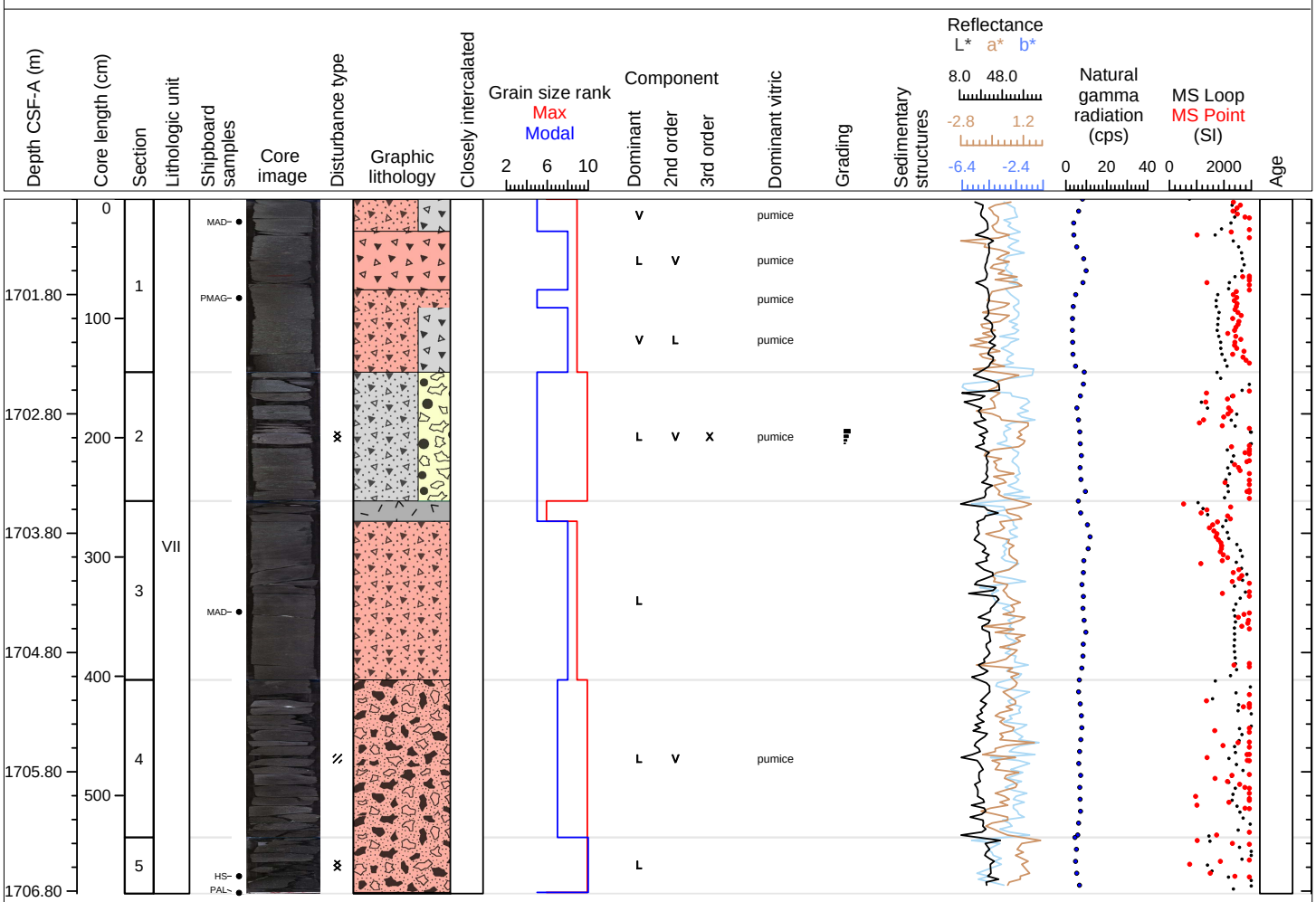
Hole 350-U1437E Core 67R, Interval 1699.5-1701.11 m (CSF-A)

diffuse normal fault in polymictic tuff-breccia, lapilli-tuff, and tuff



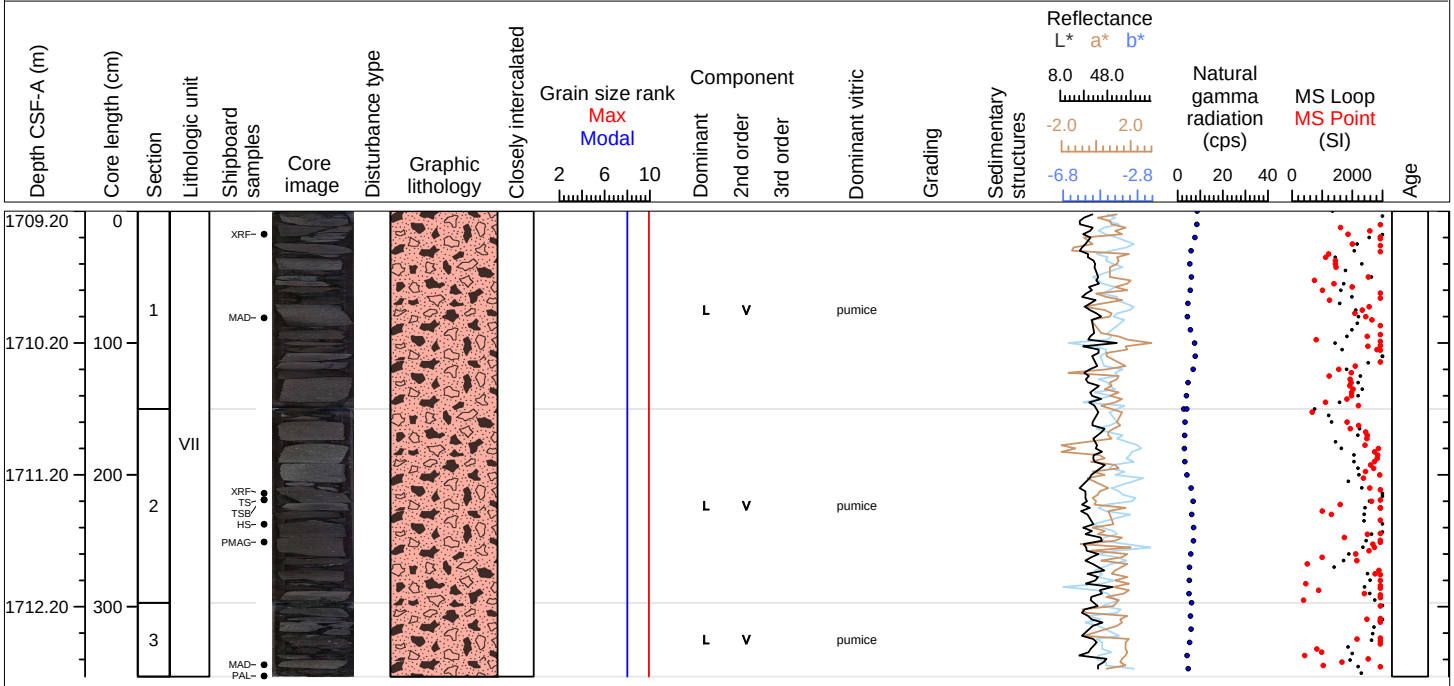
Hole 350-U1437E Core 68R, Interval 1701.0-1706.82 m (CSF-A)

polymictic lapilli-tuff and tuff-breccia



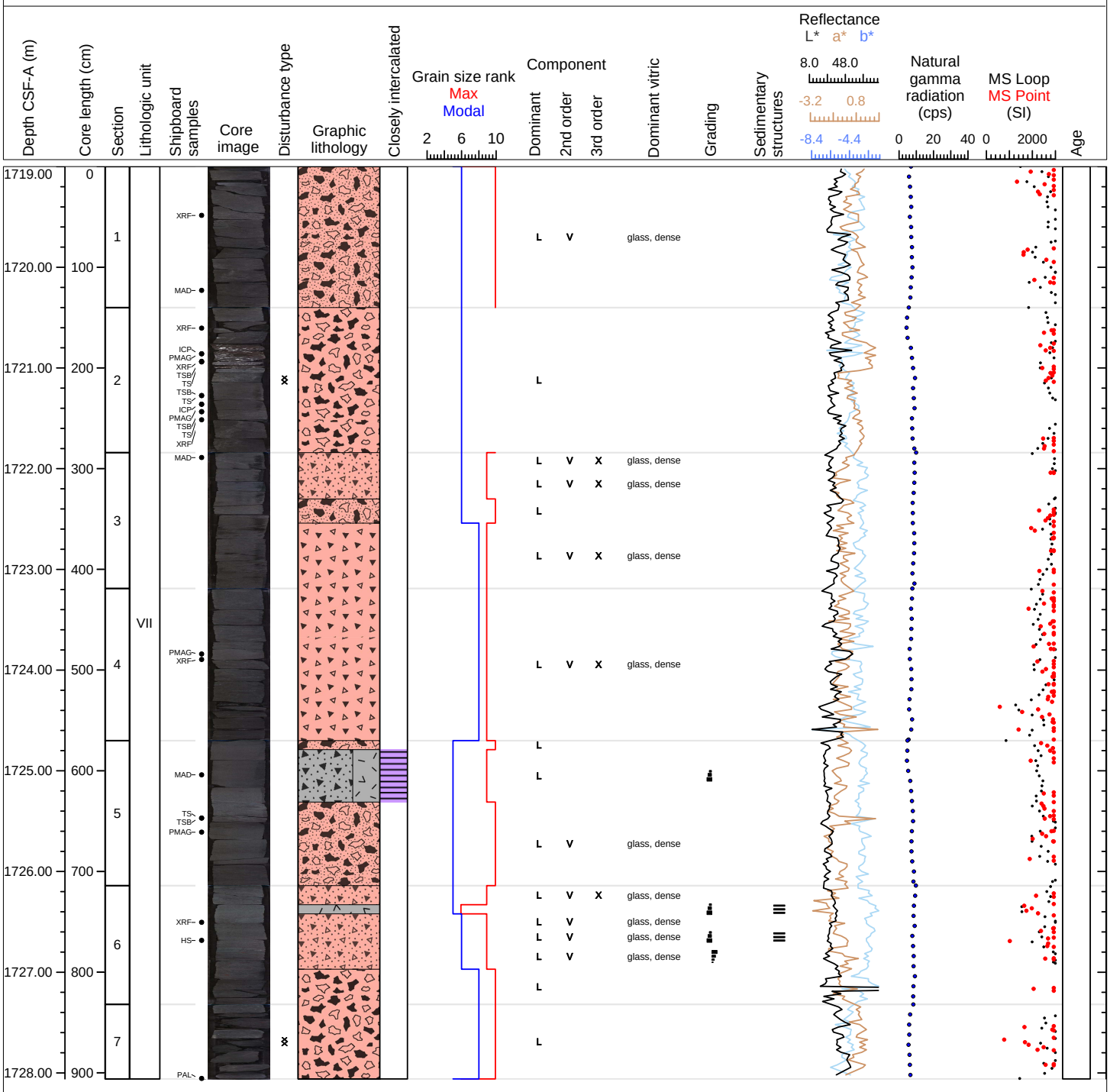
Hole 350-U1437E Core 69R, Interval 1709.2-1712.73 m (CSF-A)

Tuff breccia with plagioclase phyric andesite clasts



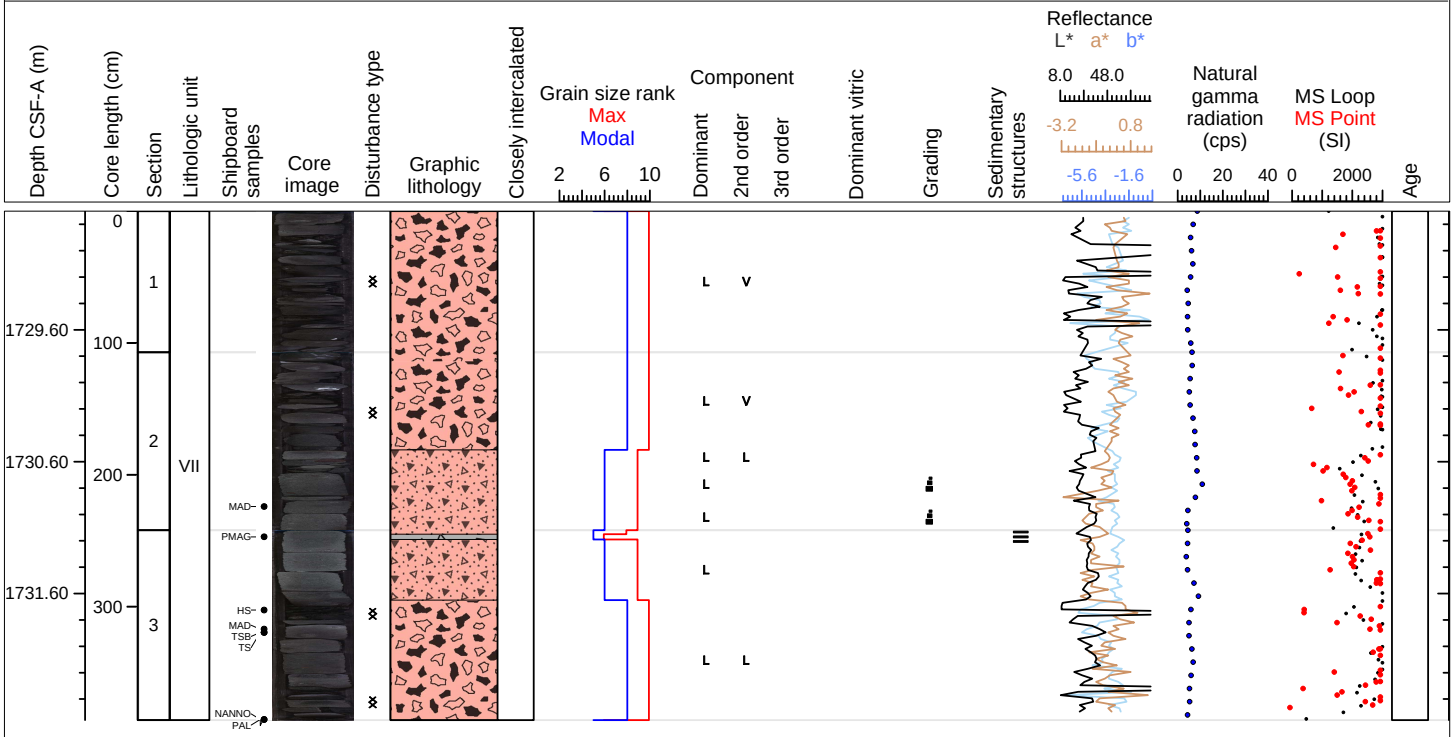
Hole 350-U1437E Core 70R, Interval 1719.0-1728.06 m (CSF-A)

polymict lapilli-tuff, tuff-breccia, breccia, and tuff



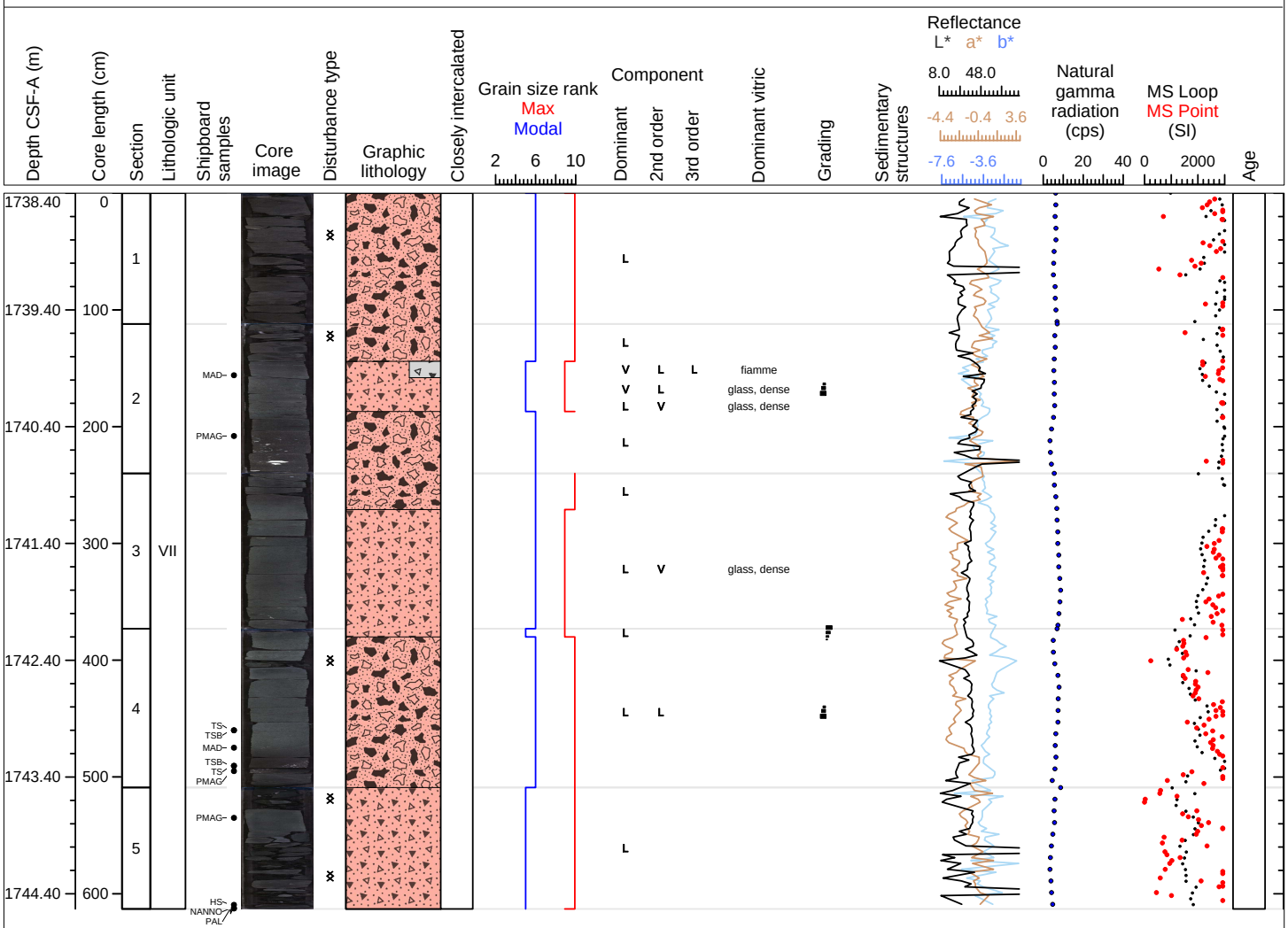
Hole 350-U1437E Core 71R, Interval 1728.7-1732.56 m (CSF-A)

polymictic breccia and lapilli-tuff



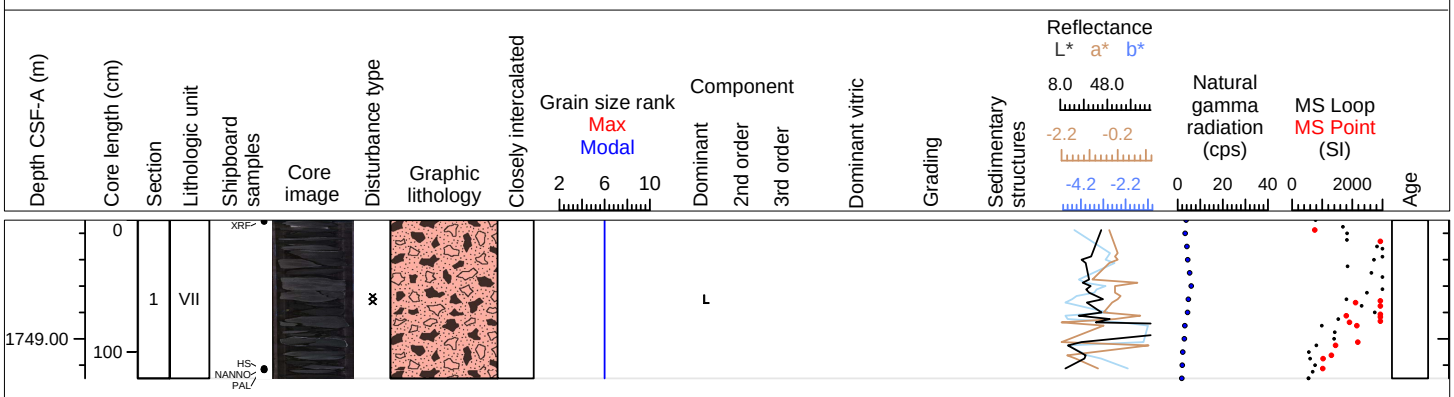
Hole 350-U1437E Core 72R, Interval 1738.4-1744.53 m (CSF-A)

matrix-supported, polymictic, evolved tuff breccia



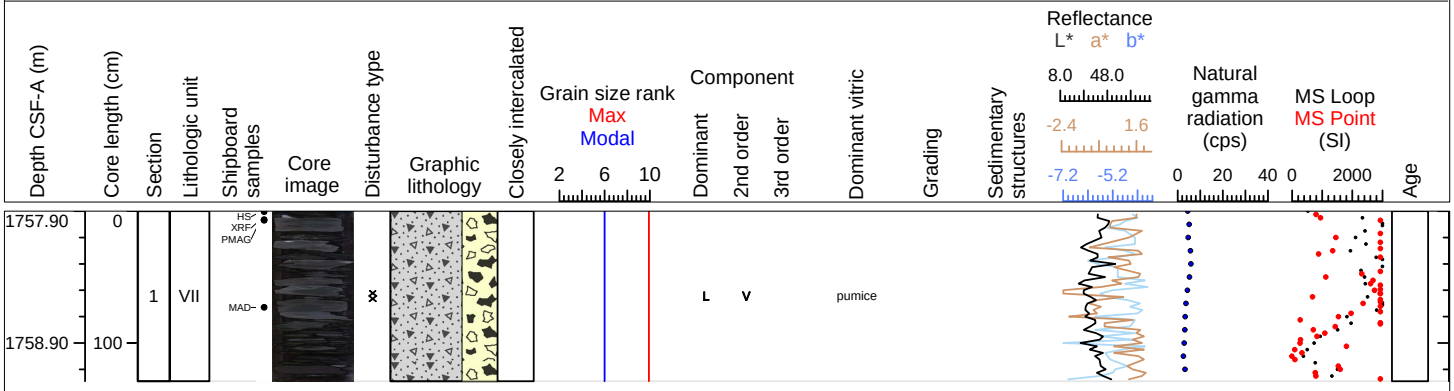
Hole 350-U1437E Core 73R, Interval 1748.1-1749.3 m (CSF-A)

polymictic tuff-breccia



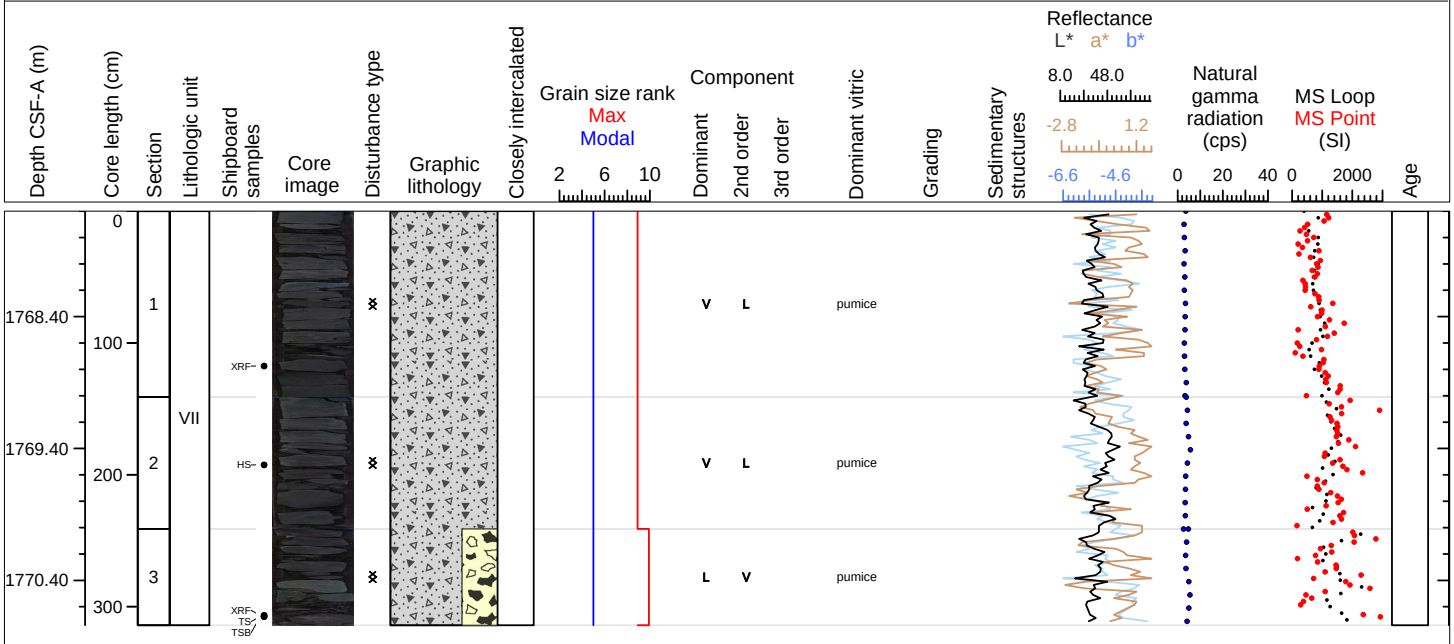
Hole 350-U1437E Core 74R, Interval 1757.9-1759.19 m (CSF-A)

Lapilli-tuff with cobble clast of pyroxene-feldspar phyric andesite



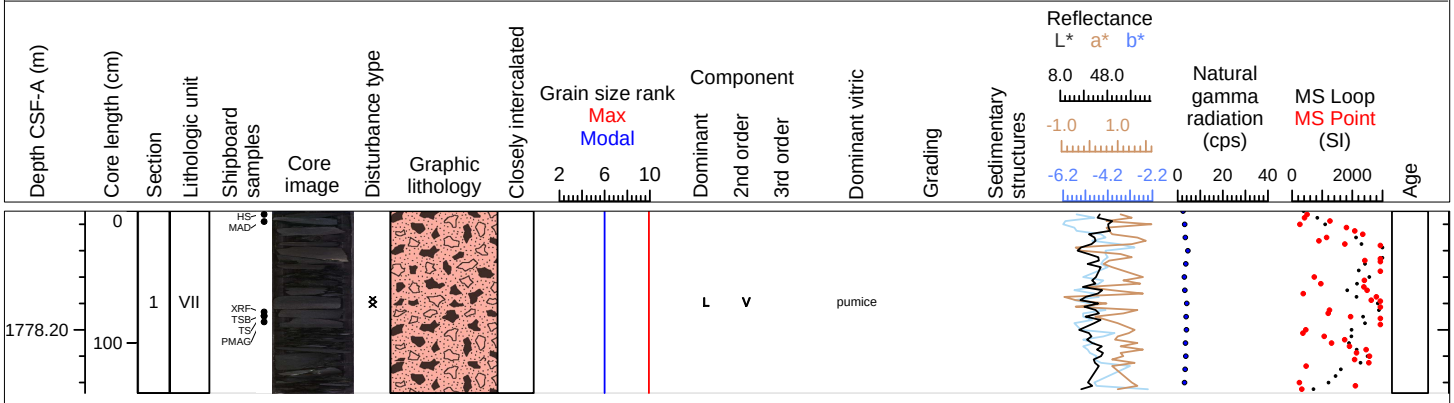
Hole 350-U1437E Core 75R, Interval 1767.6-1770.74 m (CSF-A)

Matrix supported polymictic lapilli-tuff with pebbles to coccbles of sparsely and moderatly phyric andesite



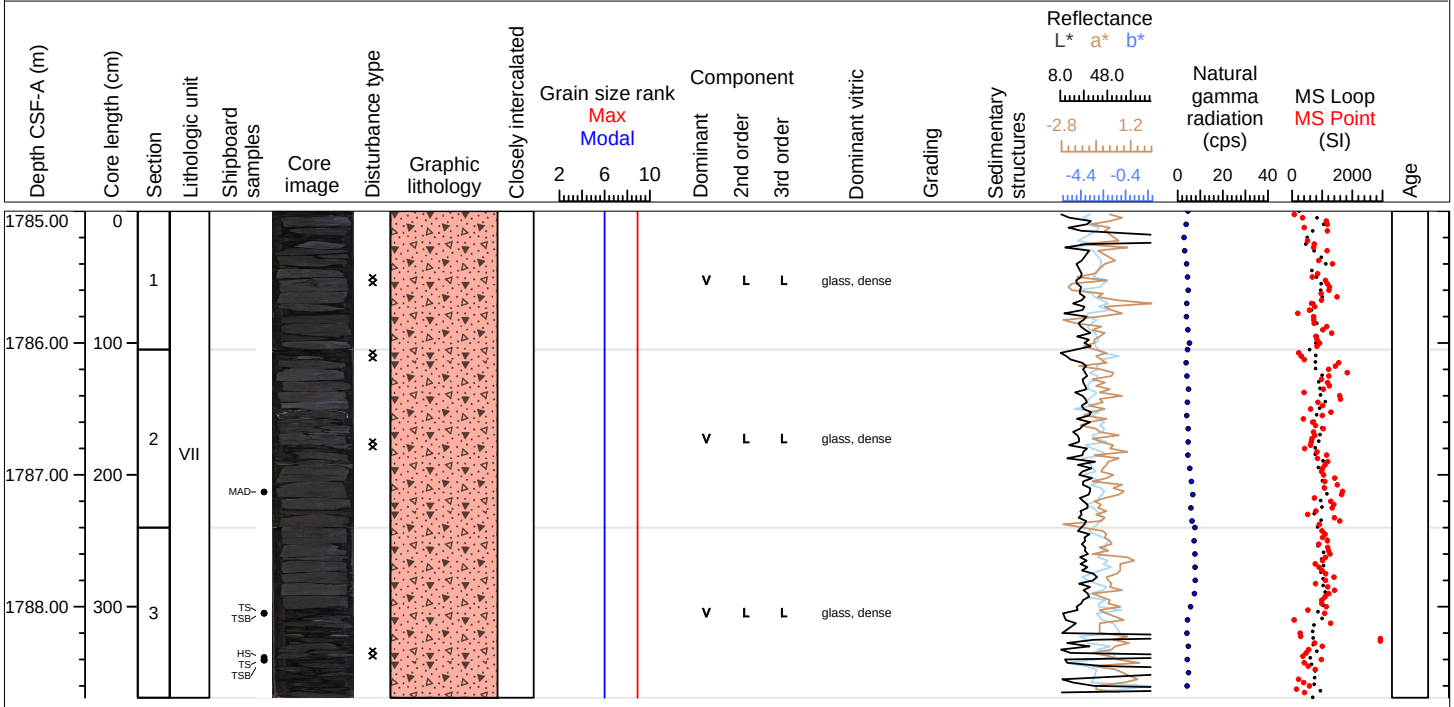
Hole 350-U1437E Core 76R, Interval 1777.3-1778.68 m (CSF-A)

polymictic tuff-breccia



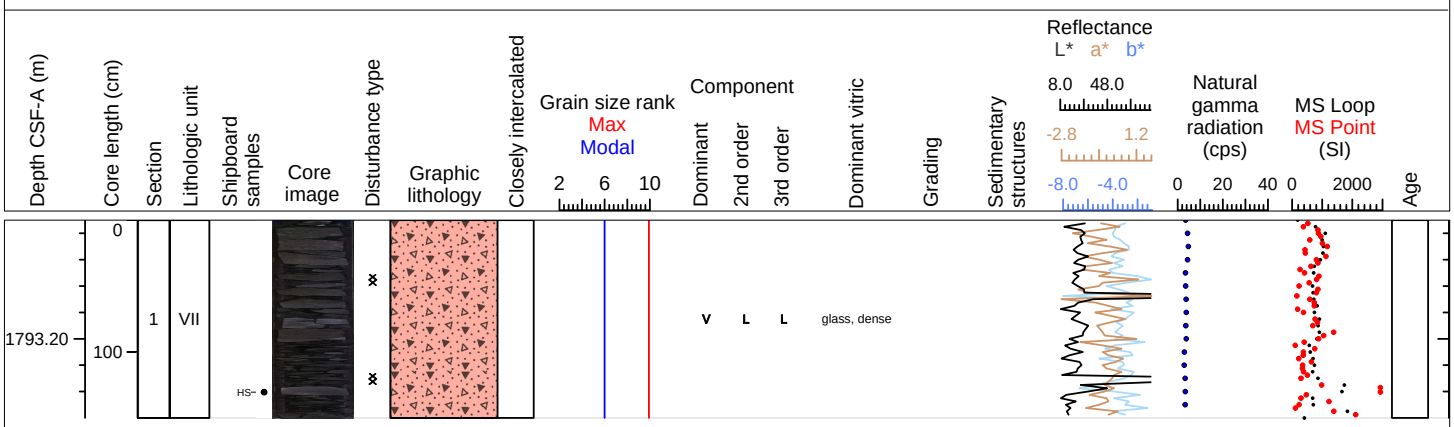
Hole 350-U1437E Core 77R, Interval 1785.0-1788.69 m (CSF-A)

polymictic lapilli-tuff



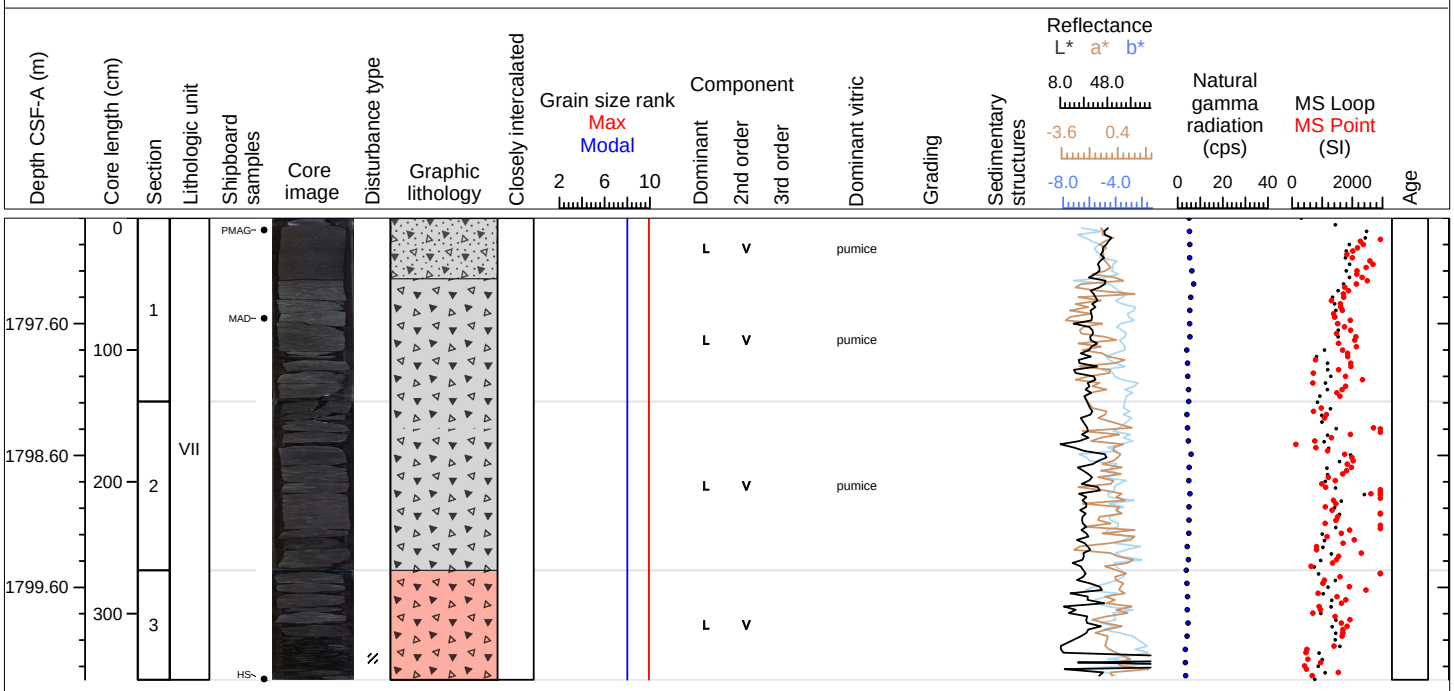
Hole 350-U1437E Core 78R, Interval 1792.3-1793.8 m (CSF-A)

polymictic lapilli-tuff



Hole 350-U1437E Core 79R, Interval 1796.8-1800.3 m (CSF-A)

lapillistone and lapilli-tuff with pebble to cobble size feldspar phyric andesite clast, vesicular basalt and aphyric rhyodacite



Sample	Top Depth [m]	Bottom Depth [m]	Lithology prefix	Principal lithology	Lithology suffix	Complete lithology name	Total of group estimate [%]	Sand texture [%]	Silt texture [%]	Clay texture [%]	Ash [%]	Siliciclastic [%]	Mineral grain roundness	Ash grain roundness	Mafic tephra abundance	Felsic tephra abundance	Lithic grains abundance	Quartz abundance	Calcite, allogenic abundance	Glass abundance	Palagonite abundance	Zeolite - phillipsite, clinoptilolite abundance	Clay minerals abundance	Feldspar abundance	Mica - biotite, muscovite abundance	Ferromagnesian - ol, pyx, amph abundance	Clay minerals, authigenic abundance	Calcite, authigenic abundance	Calcareous nannofossils abundance	Radiolarians abundance	General comment
350-U1437B-3H-5-W 148/149-SED	22.18	22.185								10	90				D		R			C				C		R					
350-U1437B-3H-6-W 88/89-SED	23.08	23.085									100			very angular		D				D				A		r					hornblende bearing
350-U1437B-4H-2-W 27/28-SED	25.97	25.975								20	80			very angular		D				D				R							
350-U1437B-5H-5-W 32/33-SED	40.02	40.03								5	95				D		R			D				C							
350-U1437B-10H-2-W 30/31-SED	81.5	81.51								10	90				C	D				D				C		R					with hornblende
350-U1437B-10H-6-W 29/30-SED	87.49	87.495									100				D	C	R			D				C							
350-U1437B-20F-2-W 100/101-SED	132.8	132.81								10	90					D				D				C							
350-U1437B-31X-2-W 65/69-SED	205.95	205.99	bimodal	ash		bimodal ash					100			angular	C	D				D				C		C					hornblende-bearing
350-U1437B-33X-1-W 125/126-SED	224.45	224.46								10	90				C	D				D				C							
350-U1437B-35X-2-W 6/7-SED	244.16	244.17								10	90					D				D				C		R					with hornblende
350-U1437B-36X-CC-W 10/11-SED	252.4	252.41								10	90				D					D				C		R					
350-U1437B-39X-1-W 73/74-SED	282.13	282.14								10	90				D					D				C							
350-U1437B-55X-1-W 63/64-SED	430.73	430.74								10	90				C	D				D				C							

Sample	Top Depth [m]	Bottom Depth [m]	Lithology prefix	Principal lithology	Lithology suffix	Complete lithology name	Total of group estimates [%]	Sand texture [%]	Silt texture [%]	Clay texture [%]	Ash [%]	Siliciclastic [%]	Mineral grain roundness	Ash grain roundness	Mafic tephra abundance	Felsic tephra abundance	Lithic grains abundance	Quartz abundance	Calcite, allogenic abundance	Glass abundance	Palagonite abundance	Zeolite - phillipsite, clinoptilolite abundance	Clay minerals abundance	Feldspar abundance	Mica - biotite, muscovite abundance	Ferromagnesian - ol, pyx, amph abundance	Clay minerals, authigenic abundance	Calcite, authigenic abundance	Calcareous nannofossils abundance	Radiolarians abundance	General comment
350-U1437D-4R-3-W 104/105-SED	450.58	450.59	bimodal	ash	with mud	bimodal ash with mud	100		10	30	60				A	C				A				C							
350-U1437D-4R-3-W 129/130-SED	450.83	450.84	bimodal	ash		bimodal ash	100			20	80				C	R				C				A		R					
350-U1437D-4R-3-W 75/76-SED	450.29	450.3	bimodal	ash		bimodal ash	100			20	80				C	A				D				Tr							
350-U1437D-11R-5-W 31/32-SED	520.81	520.82	evolved	tuff		evolved tuff	100			10	90		subangular	subangular	Tr	A		Tr		A	C		C				C			Tr	
350-U1437D-11R-6-W 16/17-SED	522.11	522.12					100			30	70		sub-rounded	angular	C	D		Tr		D	C										
350-U1437D-25R-6-A 50/51-SED	658.4	658.41	tuffaceous	mudstone		tuffaceous mudstone	100		70		30		angular	angular		A		Tr		A				Tr		Tr			R		
350-U1437D-26R-4-W 56/57-SED	665.16	665.17	mafic	tuff		mafic tuff	200	60	40		100		subangular	angular	A	Tr				A			Tr	A		A	Tr			Tr	hornblende
350-U1437D-28R-2-W 99/100-SED	681.99	682	evolved	tuff		evolved tuff	200	60	40		100		subangular		Tr	D	C	C		A				A	tr	A					hornblende, biotite, glass shards
350-U1437D-29R-1-W 17/18-SED	689.37	689.38	calcareous	mudstone		calcareous mudstone	100			100									C				A	Tr			A	C			perfectly euhedral calcite crystals in clay matrix
350-U1437D-29R-3-W 133/134-SED	693.34	693.35		mudstone		mudstone	100			96	2	2	angular	angular		R							D	R			D				
350-U1437D-29R-4-W 75/76-SED	694.26	694.27		mudstone	with crystals	mudstone with crystals	100			93	0.5	6.5	angular	angular		Tr							D	R			D				
350-U1437D-31R-4-W 55/56-SED	713.22	713.23	evolved	tuff	with crystals	evolved tuff with crystals	100				95	5			C	D								R							
350-U1437D-33R-3-W 50/51-SED	730.89	730.9	mafic	tuff		mafic tuff	100				100		angular	angular	D	R	Tr						R	C		Tr	R				
350-U1437D-35R-2-W 14/15-SED	748.85	748.86	tuffaceous, evolved	mudstone		tuffaceous, evolved mudstone	100			70	30		angular	subangular		A				C			D	R			D		Tr		
350-U1437D-36R-2-W 113/114-SED	759.83	759.84	clast-supported, polymictic, evolved	tuff	with siltstone	clast-supported, polymictic, evolved tuff with siltstone	100		20		80		subangular	sub-rounded		A		Tr		a			C				C				
350-U1437D-36R-2-W 62/63-SED	759.32	759.33	tuffaceous	mudstone		tuffaceous mudstone	100			80	20			angular		D				R				Tr							
350-U1437D-36R-4-W 56/57-SED	761.56	761.57	evolved	tuff		evolved tuff	100				100		angular	angular		D				D			Tr				Tr				

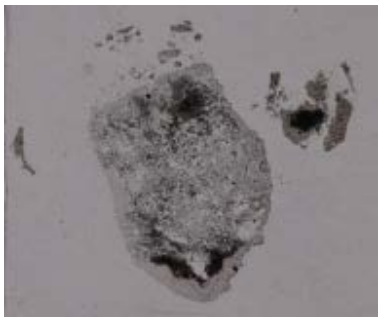
Sample	Top Depth [m]	Bottom Depth [m]	Lithology prefix	Principal lithology	Lithology suffix	Complete lithology name	Total of group estimates [%]	Sand texture [%]	Silt texture [%]	Clay texture [%]	Ash [%]	Siliciclastic [%]	Mineral grain roundness	Ash grain roundness	Mafic tephra abundance	Felsic tephra abundance	Lithic grains abundance	Quartz abundance	Calcite, allogenic abundance	Glass abundance	Palagonite abundance	Zeolite - phillipsite, clinoptilolite abundance	Clay minerals abundance	Feldspar abundance	Mica - biotite, muscovite abundance	Ferromagnesian - ol, pyx, amph abundance	Clay minerals, authigenic abundance	Calcite, authigenic abundance	Calcareous nannofossils abundance	Radiolarians abundance	General comment
350-U1437D-40R-1-W 128/129-SED	797.28	797.29	evolved	tuff	with crystals	evolved tuff with crystals	100			10	90		angular			R						C	R	A		C	R				
350-U1437D-40R-1-W 26/27-SED	796.26	796.27	evolved	tuff	with crystals	evolved tuff with crystals	100			10	90		angular			C							R	A		R	R				
350-U1437D-44R-5-W 135/136-SED	840.92	840.93	evolved	tuff		evolved tuff	100			20	80		angular	angular		D				A			R	C			R				
350-U1437D-44R-5-W 94/95-SED	840.51	840.52	tuffaceous, evolved	mudstone		tuffaceous, evolved mudstone	100			60	40		angular	angular		C	R			C			A	R			A				
350-U1437D-45R-1-W 45/46-SED	845.05	845.06	evolved white	tuff		evolved white tuff	100			20	80		angular	angular		D	Tr	Tr		D			C	C			C				
350-U1437D-49R-6-W 24/25-SED	880.23	880.24	evolved	tuff		evolved tuff	100				35	65	angular	angular		A								A		R					hornblende bearing, altered glass
350-U1437D-49R-6-W 38/39-SED	880.37	880.38	evolved	tuff		evolved tuff	100				90	10	angular	angular		D								R							altered glass
350-U1437D-49R-6-W 5/6-SED	880.04	880.05	evolved	tuff		evolved tuff	100				90	10	angular	angular		D								R							altered glass
350-U1437D-49R-6-W 8/9-SED	880.07	880.08	evolved	tuff		evolved tuff	100				65	35	angular	angular		D								C		Tr					altered glass fragments
350-U1437D-49R-CC-A 19/20-SED	882.38	882.39	evolved black	tuff		evolved black tuff	100			20	20	60	angular	angular					Tr	tr			C	D		R	C	Tr			
350-U1437D-61R-6-W 54/55-SED	995.98	995.99	evolved	lapilli-tuff		evolved lapilli-tuff						100	angular			A								C		C					coarse crystals (including epidote, maybe quartz), altered glass

THIN SECTION LABEL ID: **350-U1437B-26X-2-W 130/131-TSB-TS_4** Thin section no.: 4

Unit/Subunit: Piece no.: Observer: S. DeBari

Thin section summary: Single clast of highly vesicular, evolved pumice with occasional plagioclase phenocrysts, partially devitrified. Clast from mud.

Plane-polarized:



Cross-polarized:

PRIMARY (IGNEOUS) MINERALOGY

Lithology:	sparsely plagioclase phyric pumice evolved	Texture:	vesicular
Grain size:	cryptocrystalline	Grain size distribution:	bimodal

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Clast			clay minerals	devitrification	carbonate	

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass			clay minerals	devitrification	carbonate	

THIN SECTION LABEL ID: **350-U1437B-38X-2-W 32/35-TSB (32-35)-TS_06** Thin section no.: 6

Unit/Subunit: Piece no.: Observer: JUTZ

Thin section summary: Stratified volcaniclastic interval with evolved glass shards and minor quartz fragments

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: glass is partly altered to clay

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	carbonate	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	quartz	anhedral	0.05	plagioclase	anhedral	0.05			

PRIMARY (IGNEOUS) MINERALOGY

Lithology:	dacite mudstone	Texture:	layered
Grain size:	fine grained	Grain size distribution:	varitextured

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass			clay minerals			

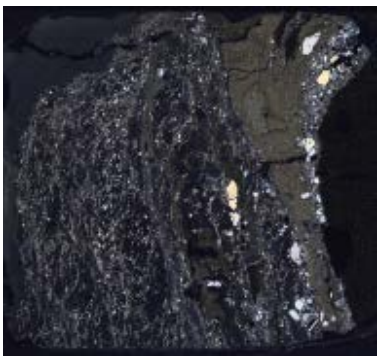
THIN SECTION LABEL ID: **350-U1437B-38X-2-W 35/38-TSB (35-38)-TS_07** Thin section no.: 7

Unit/Subunit: Piece no.: Observer: JUTZ

Thin section summary: Stratified interval with tuff and minor tuffaceous mudstone

Plane-polarized:

Cross-polarized:



SEDIMENT

Sample domain name: Domain no.: 0 Domain rel. abundance (%):

Sample domain name: intercalated 1 Domain no.: 1 Domain rel. abundance (%): 80

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	angular	-- -- -- -- --	pumice	angular	-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	quartz	anhedral	0.3	plagioclase	anhedral	0.1	amphibole	anhedral	0.15

Sample domain name: intercalated 2 Domain no.: 2 Domain rel. abundance (%): 20

Dominant particles: vitric **2nd order particles:** lithic **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	carbonate	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	quartz	anhedral	0.2	plagioclase	anhedral	0.08			

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: Domain no.: 0 Domain rel. abundance (%):

Sample domain name: Domain no.: 1 Domain rel. abundance (%): 80

Lithology:	dacite	Texture:	layered
Grain size:	coarse grained	Grain size distribution:	varitextured

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	1	0.1	

Sample domain name: **volcanic clast, evolved** Domain no.: 2 Domain rel. abundance (%): 20

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass			devitrification	clay minerals		

THIN SECTION LABEL ID: **350-U1437B-38X-2-W 38/41-TSB (38-41)-TS_08** Thin section no.: 8
Unit/Subunit: Piece no.: Observer: JUTZ
Thin section summary: Stratified tuff

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: Domain no.: 0 Domain rel. abundance (%):

Sample domain name: **intercalated 1** Domain no.: 1 Domain rel. abundance (%): 75

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.1	quartz	anhedral	0.05			

Sample domain name: **intercalated 2** Domain no.: 2 Domain rel. abundance (%): 25

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: Domain no.: 0 Domain rel. abundance (%):

Sample domain name: **volcanic clast, evolved** Domain no.: 1 Domain rel. abundance (%): 75

Lithology:	dacite	Texture:	layered
Grain size:	coarse grained	Grain size distribution:	varitextured

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	5	0.05	

Sample domain name: **volcanic clast, evolved** Domain no.: 2 Domain rel. abundance (%): 25

Lithology:	dacite	Texture:	layered
Grain size:	fine grained	Grain size distribution:	varitextured

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	5	0.05	

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass			devitrification	clay minerals		

THIN SECTION LABEL ID: **350-U1437B-38X-2-W 41/45-TSB (41-45)-TS_09** Thin section no.: 9

Unit/Subunit: Piece no.: Observer: JUTZ

Thin section summary: Stratified interval with tuffaceous mudstone and volcaniclastic beds

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: Domain no.: 0 Domain rel. abundance (%):

Sample domain name: **intercalated 1** Domain no.: 1 Domain rel. abundance (%): 50

Dominant particles: vitric **2nd order particles:** lithic **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	carbonate	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	quartz	anhedral	0.05	plagioclase	anhedral	0.05			

Sample domain name: **intercalated 2** Domain no.: 2 Domain rel. abundance (%): 50

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	quartz	anhedral	0.1	plagioclase	anhedral	0.1			

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: Domain no.: 0 Domain rel. abundance (%):

Sample domain name: Domain no.: 1 Domain rel. abundance (%): 50

Sample domain name: **volcanic clast, evolved** Domain no.: 2 Domain rel. abundance (%): 30

Lithology:	dacite	Texture:	layered
Grain size:	fine grained	Grain size distribution:	varitextured

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	5	0.05	

Sample domain name: **volcanic clast, evolved** Domain no.: 3 Domain rel. abundance (%): 20

Lithology:	dacite	Texture:	
Grain size:	fine grained	Grain size distribution:	

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass			clay minerals			

THIN SECTION LABEL ID: **350-U1437D-20R-CC-TSB-TS_47** Thin section no.: 47

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Mudstone with forams

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: fine-grained, unknown **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.05	clinopyroxene	anhedral	0.07			

THIN SECTION LABEL ID: **350-U1437D-22R-CC-TSB-TS_48** Thin section no.: 48

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Mudstone with forams

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: fine-grained, unknown **2nd order particles:** crystal **3rd order particles:** vitric

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.1						

THIN SECTION LABEL ID: **350-U1437D-24R-CC-TSB-TS_49** Thin section no.: 49

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Tuffaceous mudstone with forams

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: fine-grained, unknown **2nd order particles:** crystal **3rd order particles:** vitric

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	mudstone		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.3						

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric						
Lithic	mudstone					

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 90

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	30	100	devitrification	clay minerals	palagonite	

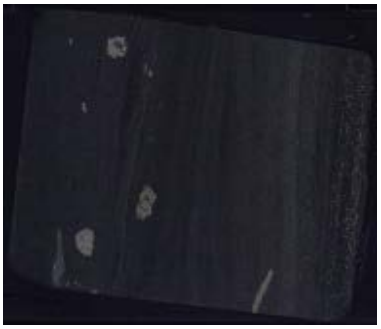
THIN SECTION LABEL ID: **350-U1437D-26R-CC-TSB-TS_50** Thin section no.: 50

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Mudstone

Plane-polarized:

Cross-polarized:



SEDIMENT

Dominant particles: fine-grained, unknown **2nd order particles:** crystal **3rd order particles:**

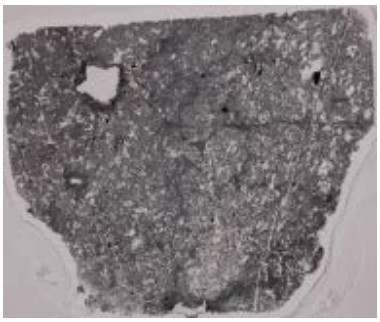
Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.03						

THIN SECTION LABEL ID: **350-U1437D-29R-2-W 3/4-TSB-TS_12** Thin section no.: 12

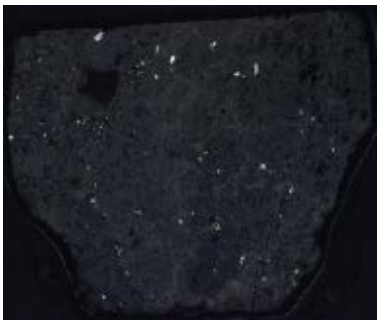
Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: Pumice clast from an andesite lapillistone

Plane-polarized:



Cross-polarized:



SEDIMENT

Sample domain name: **1 single pumice in matrix** Domain no.: Domain rel. abundance (%):

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --	evolved shards	sub-rounded	-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.3	orthopyroxene	subhedral	0.3	amphibole	subhedral	0.2

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	sub-rounded				
Lithic						

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **1 single pumice clast** Domain no.: Domain rel. abundance (%):

Lithology:	sparsely plagioclase phyric andesite pumice	Texture:	
Grain size:	cryptocrystalline	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	3	0.2	laths
Clinopyroxene	0.5	0.1	
Orthopyroxene	1	0.1	
Amphibole	0.5	0.1	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 95

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	95	70	clay minerals	devitrification	palagonite	

THIN SECTION LABEL ID: **350-U1437D-29R-2-W 28/31-TSB-TS_10** Thin section no.: 10

Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: Andesite lapilli tuff, pumice of two glass types clear and brown. Highly devitrified.

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: minor biotite, highly devitrified

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.4	orthopyroxene	anhedral	0.2	clinopyroxene	anhedral	0.3

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	rounded				
Lithic						

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **pumice clasts** Domain no.: Domain rel. abundance (%):

Lithology:	sparsely plagioclase phyric andesite	Texture:	
Grain size:	microcrystalline	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	3	0.2	laths

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 90

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	10	90	zeolite	clay minerals	oxyhydroxide	palagonite also occurs

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	97	90	devitrification	palagonite	clay minerals	
Plagioclase			epidote			

THIN SECTION LABEL ID: **350-U1437D-29R-2-W 91/94-TSB-TS_11** Thin section no.: 11

Unit/Subunit: Piece no.: Observer: NICH

Thin section summary: Layered andesitic tuff with pumice lapilli layers and crystal-rich layers (fp and px)

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: pumice-rich layer Domain no.: 1 Domain rel. abundance (%): 25

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.3	clinopyroxene	subhedral	0.2	opaque	subhedral	0.1

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	sub-rounded				
Lithic						

Sample domain name: crystal-rich layer Domain no.: 2 Domain rel. abundance (%): 40

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	1	clinopyroxene	subhedral	0.6	opaque	subhedral	0.1

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric						
Lithic	volcanic, evolved					

Sample domain name: intermediate layer Domain no.: 3 Domain rel. abundance (%): 35

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.7	clinopyroxene	subhedral	0.4	opaque	subhedral	0.1

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	sub-rounded				
Lithic	volcanic, evolved					

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **pumice clasts in pumice layer** Domain no.: 1 Domain rel. abundance (%):

Lithology:	aphyric andesite pumice	Texture:	
Grain size:	cryptocrystalline	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	1	0.5	

Sample domain name: **pumice clasts in intermediate layer** Domain no.: 3 Domain rel. abundance (%):

Lithology:	aphyric andesite pumice	Texture:	
Grain size:	cryptocrystalline	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	1	0.5	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 70

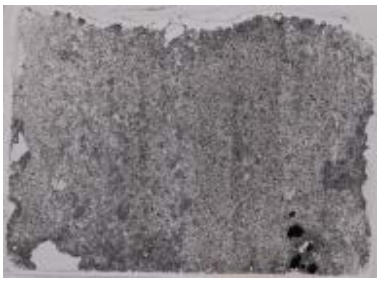
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	70	80	devitrification	palagonite	clay minerals	

THIN SECTION LABEL ID: **350-U1437D-30R-2-W 122/125-TSB-TS_13** Thin section no.: 13

Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: Layered andesite tuff with microcrystalline layers of glass, fsp, 2 amph, cpx, biotite and minor quartz interlayered with pumice and fsp. Significant devitrification.

Plane-polarized:



Cross-polarized:

SEDIMENT

Sample domain name: tephra layers Domain no.: 1 Domain rel. abundance (%): 33

General domain comment: 2 amphiboles, biotite and quartz also present, ribbons of mica in glass, possible spherulites. 2 populations of glass, clear and light brown.

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.2	amphibole	subhedral	0.1	clinopyroxene	anhedral	0.1

Sample domain name: pumice layers Domain no.: 2 Domain rel. abundance (%): 67

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.1	clinopyroxene	anhedral	0.2			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 85

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Patch			sulfide			

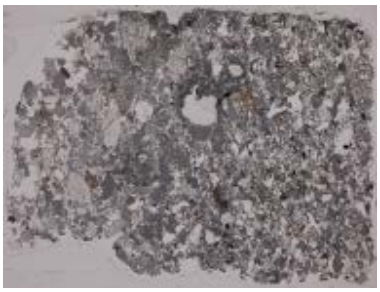
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass		85	clay minerals	palagonite	devitrification	

THIN SECTION LABEL ID: **350-U1437D-30R-6-W 58/61-TSB-TS_14** Thin section no.: 14

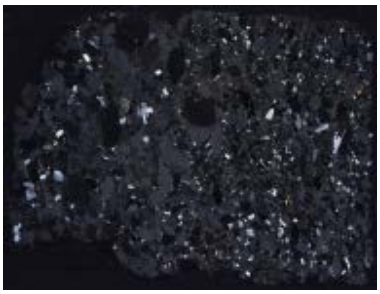
Unit/Subunit: Piece no.: Observer: NICH

Thin section summary: Andesitic tuff with crystals (fresh and devitrified glass, and plag and amph)

Plane-polarized:



Cross-polarized:



SEDIMENT

General domain comment: two populations of glass, clear and brown

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --	evolved shards	sub-rounded	-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	2	clinopyroxene	subhedral	0.3	amphibole	subhedral	0.2

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	sub-rounded				
Lithic						

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **pumice clasts** Domain no.: Domain rel. abundance (%):

Lithology:	aphyric andesite pumice	Texture:	
Grain size:	microcrystalline	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	0.8	0.5	laths
Amphibole	0.2	0.5	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 95

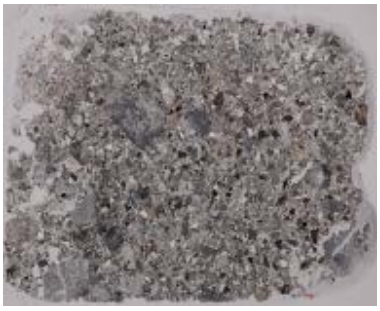
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	95	50	clay minerals	devitrification		brown and clear glass altering differently

THIN SECTION LABEL ID: **350-U1437D-31R-4-W 1/4-TSB-TS_16** Thin section no.: 16

Unit/Subunit: Piece no.: Observer: NICH

Thin section summary: Andesite tuff (fresh and devitrified glass, plag and trace amph)

Plane-polarized:



Cross-polarized:

SEDIMENT

General domain comment: two populations of glass, clear and brown

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --	evolved shards	sub-rounded	-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.5	amphibole	subhedral	0.4			

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	sub-rounded				
Lithic						

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **pumice clasts** Domain no.: Domain rel. abundance (%):

Lithology:	aphyric andesite pumice	Texture:	
Grain size:	microcrystalline	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	0.5	0.1	laths

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 60

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Clast			clay minerals	chlorite	epidote	opaque minerals

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	98	60	clay minerals	devitrification	palagonite	

THIN SECTION LABEL ID: **350-U1437D-31R-4-W 53/55-TSB-TS_15** Thin section no.: 15

Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: Andesite tuff, two types of evolved glass shards, fsp, opx, cpx, minor hrn. Relatively fresh.

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: minor hornblende, two types of glass shards - white and light brown.

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	sub-rounded	-- -- -- -- --	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.2	orthopyroxene	subhedral	0.3	clinopyroxene	subhedral	0.5

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 20

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			oxyhydroxide			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass			devitrification	clay minerals	zeolite	

THIN SECTION LABEL ID: **350-U1437D-34R-3-W 133/136-TSB-TS_30** Thin section no.: 30

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: Debris flow: pumice lapillus (1x2 cm) embedded in ash-bearing mudstone. Pumice is altered and completely devitrified, contains mm-sized plagioclase phenocrysts, rare pyroxene and got badly damaged during preparation.

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: mudstone Domain no.: Domain rel. abundance (%):

General domain comment: phenocrysts dispersed in nannofossil-bearing mudstone

Dominant particles: crystal **2nd order particles:** lithic **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.5	pyroxene	euhedral	0.4			

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric						
Lithic	mudstone					

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: pumice clast Domain no.: Domain rel. abundance (%):

Lithology:	sparsely plagioclase-augite phyric andesite pumice	Texture:	glassy matrix
Grain size:	cryptocrystalline	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	4	0.4	euhedral
Clinopyroxene	1	0.015	euhdral

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 100

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Clast		100	clay minerals			pumice, so initially glassy clast

Vesicles original (%)	Vesicle fill (%)	Vesicle fill dominant	Vesicle fill 2nd order	Vesicle fill 3rd order	Vesicle fill comment
		zeolite			

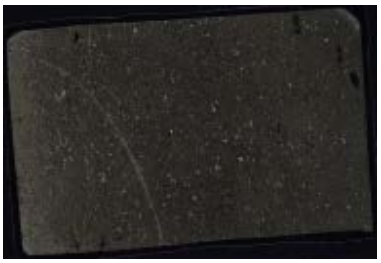
THIN SECTION LABEL ID: **350-U1437D-34R-6-W 81/85-TSB-TS_17** Thin section no.: 17

Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: Mudstone with forams, and minor glass shards and fragmented crystals.

Plane-polarized:

Cross-polarized:



SEDIMENT

General domain comment: 2 populations of evolved glass shards: clear and brown. Variable devitrification. Lots of forams. Crystals occur as fragments <200 microns. Sulphide occurs as stringers. FeO.OH also occurs in small amounts.

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.1	amphibole	subhedral	0.05	clinopyroxene	subhedral	0.05

THIN SECTION LABEL ID: **350-U1437D-36R-2-W 58/61-TSB-TS_19** Thin section no.: 19

Unit/Subunit: Piece no.: Observer: NICH

Thin section summary: Mudstone with forams and minor crystals

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: fine grained unknown **2nd order particles:** microfossil **3rd order particles:** crystal

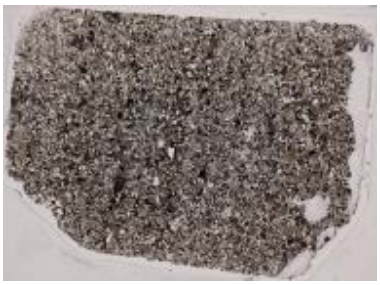
Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.05						

THIN SECTION LABEL ID: **350-U1437D-36R-CC-W 8/11-TSB-TS_18** Thin section no.: 18

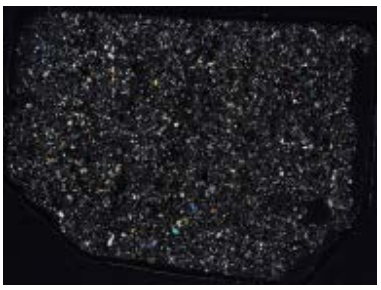
Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: Andesite tuff with feldspar and clinopyroxene

Plane-polarized:



Cross-polarized:



SEDIMENT

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	1	clinopyroxene	subhedral	0.8			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 50

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Clast			chlorite			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass			clay minerals	devitrification	palagonite	

THIN SECTION LABEL ID: **350-U1437D-38R-2-W 109/112-TSB-TS_20** Thin section no.: 20

Unit/Subunit: Piece no.: Observer: NICH

Thin section summary: Altered andesite tuff

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: pumice highly altered; clinopyroxene partially replaced

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lthic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.8	clinopyroxene	anhedral	0.3			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 50

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	90	50	chlorite	clay minerals		

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	10	50	clay minerals	palagonite	devitrification	

THIN SECTION LABEL ID: **350-U1437D-40R-7-W 46/49-TSB-TS_21** Thin section no.: 21

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: Altered glassy andesite tuff with blocky vesicular glass shards and minor feldspar and pyroxene. Some residual fresh glass.

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: glass shards are blocky with spherical vesicles; frothy and pumiceous shards are less frequent. Some of the glass shards have fresh cores

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	mafic shards	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	igneous, evolved	rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.1	pyroxene	subhedral	0.2			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 50

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	90	50	devitrification	clay minerals	palagonite	

THIN SECTION LABEL ID: **350-U1437D-41R-1-W 8/11-TSB-TS_22** Thin section no.: 22

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: Altered glassy andesite tuff with blocky to vesicle-rich glass shards and subordinate feldspar and pyroxene. Rare residual fresh glass. Bottom contact to mudstone.

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: tephra Domain no.: 1 Domain rel. abundance (%): 90

General domain comment: many blocky shards with spherical vesicles, mostly completely devitrified with only residual fresh glass. Volcanic crystal are fresh.

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	mafic shards	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	igneous, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.4	pyroxene	subhedral	0.2	amphibole	subhedral	0.3

Sample domain name: mudstone Domain no.: 2 Domain rel. abundance (%): 10

General domain comment: mudstone is full of small glass shards and subordinate mineral fragments; foraminfera are very rare

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	mafic shards	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.1						

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 20

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	75	20	devitrification	clay minerals	chlorite	

THIN SECTION LABEL ID: **350-U1437D-41R-1-W 54/57-TSB-TS_23** Thin section no.: 23

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: Mudstone with only traces of foraminifera, feldspar and pyroxene

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: massive mudstone with only trace of tiny volcanic particles, foraminafera are the most abundant larger component

Dominant particles: crystal **2nd order particles:** **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	mafic shards	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.05	pyroxene	subhedral	0.02	opaque	subhedral	0.05

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 95

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass		100	clay minerals			

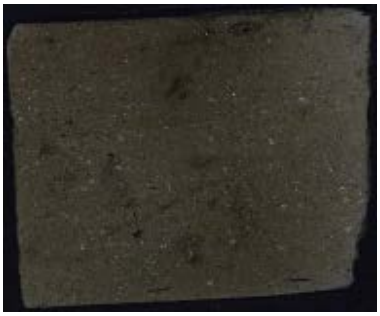
THIN SECTION LABEL ID: **350-U1437D-41R-2-W 44/46-TSB-TS_39** Thin section no.: 39

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: mudstone with foraminifera (for micropaleontology)

Plane-polarized:

Cross-polarized:



SEDIMENT

General domain comment: foraminifera; feldspar small and fragmented

Dominant particles: crystal **2nd order particles:** **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.1	pyroxene	euhedral	0.02	opaque	anhedral	0.1

THIN SECTION LABEL ID: **350-U1437D-41R-4-W 11/14-TSB-TS_24** Thin section no.: 24

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: Contact between light and dark layer of calcareous mudstone. Excepting color, there is little visible different, with the dark-colored mudstone slightly richer in volcanic minerals. Abundance of foraminifera shell is about the same.

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: dark-colored mudstone Domain no.: 1 Domain rel. abundance (%): 25

General domain comment: commonly well preserved foraminifera shells

Dominant particles: crystal **2nd order particles:** lithic **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.3	pyroxene	subhedral	0.05			

Sample domain name: light-colored mudstone Domain no.: 2 Domain rel. abundance (%): 75

General domain comment: well-preserved foraminifera shells

Dominant particles: crystal **2nd order particles:** **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.3	pyroxene	subhedral	0.05			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 90

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass		90	devitrification	clay minerals		

THIN SECTION LABEL ID: **350-U1437D-41R-5-W 44/47-TSB-TS_25** Thin section no.: 25

Unit/Subunit: Piece no.: Observer: RIBE

Thin section summary: Mudstone with andesitic glassy tuff with forams. Highly devitrified

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: mudstone Domain no.: 1 Domain rel. abundance (%): 25

Dominant particles: fine-grained, unknown **2nd order particles:** microfossil **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.5	opaque	anhedral	0.1	clinopyroxene	anhedral	0.05

Sample domain name: tuff Domain no.: 2 Domain rel. abundance (%): 75

General domain comment: glass is devitrified

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.8	clinopyroxene	anhedral	0.1	opaque	euhedral	0.2

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 90

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Patch		100	oxide	clay minerals	chlorite	epidote
Groundmass			clay minerals	carbonate		

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass		90	clay minerals			

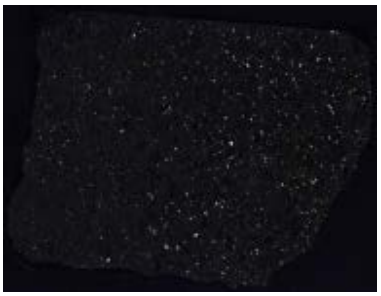
THIN SECTION LABEL ID: **350-U1437D-42R-5-W 40/43-TSB-TS_26** Thin section no.: 26

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: Andesite tuff, composed of highly altered pumice lapilli, fresh plagioclase and rare pyroxene in a matrix of clay. No biogenic clasts in matrix.

Plane-polarized:

Cross-polarized:



SEDIMENT

General domain comment: pumice are strongly altered; fresh plagioclase is far more abundant, only traces of pyroxene; melt inclusions of brown glass (several tens of micrometer) in plagioclase

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.2	pyroxene	euhedral	0.1	opaque	anhedral	0.2

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 100

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			chlorite	clay minerals		

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	75	100	clay minerals	devitrification	chlorite	

THIN SECTION LABEL ID: **350-U1437D-43R-1-W 134/136-TSB-TS_31** Thin section no.: 31

Unit/Subunit: Piece no.: Observer: RIBE

Thin section summary: highly altered andesitic tuff with crystals and devitrified glass

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: glass is devitrified

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.5	opaques	anhedral	0.3	clinopyroxene	anhedral	0.2

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 100

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			zeolite	clay minerals		

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	97	100	clay minerals	devitrification	zeolite	

THIN SECTION LABEL ID: **350-U1437D-43R-2-W 31/34-TSB-TS_27** Thin section no.: 27

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: Altered polymictic coarse-grained tuff with lithics, pumices, phenocrysts (plagioclase, subordinate pyroxene and rare amphibole) and foraminifera embedded into clayey matrix.

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: pumice highly altered

Dominant particles: lithic **2nd order particles:** vitric **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.5	pyroxene	euhedral	0.1	amphibole	euhedral	0.1

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 100

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	90	100	clay minerals	devitrification	zeolite	

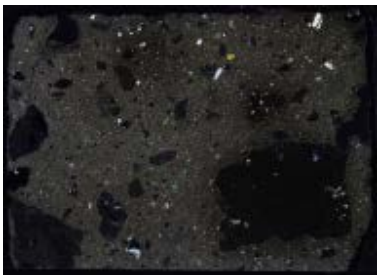
THIN SECTION LABEL ID: **350-U1437D-43R-6-W 49/51-TSB-TS_28** Thin section no.: 28

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: Altered lapillituff with cm-sized pumice clasts embedded in nannofossil-rich mudstone

Plane-polarized:

Cross-polarized:



SEDIMENT

General domain comment: foraminifera

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.6	pyroxene	euhedral	0.3	amphibole	euhedral	0.2

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	angular				
Lithic						

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **pumice clasts** Domain no.: Domain rel. abundance (%):

Lithology:	sparsely plagioclase-augite phyric andesite pumice	Texture:	glassy matrix
Grain size:	cryptocrystalline	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	3	1	euhedral
Clinopyroxene	2	0.7	partially altered

THIN SECTION LABEL ID: **350-U1437D-43R-6-W 54/56-TSB-TS_29** Thin section no.: 29

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: Very finegrained mudstone with altered, partially destroyed lithic volcanic clasts

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: fine-grained, unknown **2nd order particles:** vitric **3rd order particles:** microfossil

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.08						

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	sub-rounded				
Lithic						

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **pumice clasts** Domain no.: Domain rel. abundance (%):

Lithology:	highly altered sparsely phyric andesite pumice	Texture:	
Grain size:	cryptocrystalline	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	5	0.6	euhedral, embayed

THIN SECTION LABEL ID: **350-U1437D-47R-2-W 102/104-TSB-TS_32** Thin section no.: 32

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: Two cm-sized, altered andesitic lapilli with plagioclase and pyroxene phenocrysts in ash-bearing, nannofossil-rich mudstone. Lapilli are badly damaged by alteration.

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: foraminifera

Dominant particles: crystal **2nd order particles:** **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.1	pyroxene	euhedral	0.06			

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **pumice clast** Domain no.: Domain rel. abundance (%):

Lithology:	highly altered sparsely plagioclase-augite phyric andesite pumice	Texture:	glassy matrix
Grain size:	cryptocrystalline	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	3	1	euhedral, brown glassy melt inclusions (with fluid inclusions) common, being replaced
Clinopyroxene	1	0.5	euhedral, partially overprinted

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 40

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Patch		100	sulfide	clay minerals	chlorite	

THIN SECTION LABEL ID: **350-U1437D-49R-6-W 16/19-TSB-TS_33** Thin section no.: 33

Unit/Subunit: Piece no.: Observer: RIBE

Thin section summary: Altered andesitic tuff with crystals and devitrified glassy groundmass

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: glass is devitrified; opaques abundant

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.1	clinopyroxene	anhedral	0.1	amphibole	anhedral	0.1

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 90

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals	chlorite		

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	80	90	clay minerals	devitrification	chlorite	

THIN SECTION LABEL ID: **350-U1437D-49R-6-W 24/27-TSB-TS_34** Thin section no.: 34

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: Crystal-rich tuffstone with plagioclase, pyroxene, amphibole and lithics.

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: feldspar has small (<30 micrometer) light-colored melt-inclusions

Dominant particles: crystal **2nd order particles:** lithic **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.3	pyroxene	euhedral	0.2	amphibole	euhedral	0.1

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 30

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals	carbonate		
Clast						opaque minerals in clasts

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	30	100	devitrification			

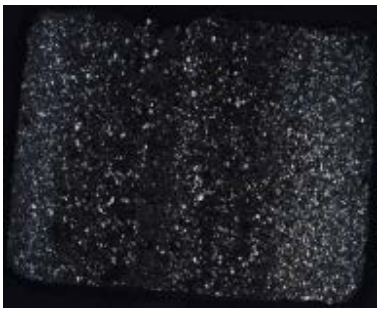
THIN SECTION LABEL ID: **350-U1437D-49R-6-W 41/44-TSB-TS_35** Thin section no.: 35

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: Banded crystal-rich tuffstone with plagioclase, pyroxene, amphibole and volcanic rock fragments. Rare foraminifera.

Plane-polarized:

Cross-polarized:



SEDIMENT

General domain comment: foraminifera

Dominant particles: crystal **2nd order particles:** lithic **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.7	pyroxene	euhedral	0.3	amphibole	euhedral	0.15

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 60

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			
Patch			clay minerals			smectite?

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	40	90	devitrification	clay minerals		

THIN SECTION LABEL ID: **350-U1437D-50R-2-W 114/116-TSB-TS_40** Thin section no.: 40

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: mudstone with foraminifera (for micropaleontology)

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: traces of tiny feldspar fragments

Dominant particles: crystal **2nd order particles:** **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.1	pyroxene	anhedral	0.05			

THIN SECTION LABEL ID: **350-U1437D-51R-1-W 50/52-TSB-TS_41** Thin section no.: 41

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: mudstone with foraminifera (for micropaleontology)

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: traces of tiny feldspar fragments

Dominant particles: crystal **2nd order particles:** **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.08						

THIN SECTION LABEL ID: **350-U1437D-54R-1-W 48/49-TSB-TS_42** Thin section no.: 42

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: mudstone with foraminifera (for micropaleontology)

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: traces of tiny feldspar fragments, only one mm-sized lithic

Dominant particles: crystal **2nd order particles:** lithic **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.15						

THIN SECTION LABEL ID: **350-U1437D-55R-6-W 95/97-TSB-TS_36** Thin section no.: 36

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: Altered vitric tuff with glass shards, crystals, lithics and rare pumice lapilli. Possibly residual fresh glass.

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: very heterogeneous appearance; residual fresh glass might be present

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	angular	-- -- -- -- --	evolved shards	angular	-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	1	opaque	euhedral	0.05			

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	angular				
Lithic						

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **pumice clasts** Domain no.: Domain rel. abundance (%):

Lithology:	sparsely plagioclase phyric andesite pumice	Texture:	
Grain size:	fine grained	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	4	1	euhedral, sometimes in crystal clots
Clinopyroxene	1	0.2	in clot with plagioclase

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 80

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			smectite

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	80	90	clay minerals	palagonite	zeolite	

THIN SECTION LABEL ID: **350-U1437D-56R-5-W 2/4-TSB-TS_37** Thin section no.: 37

Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: andesitic tuff with plag, cpx and minor hornblende.Light brown and clear glass.

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	angular	-- -- -- -- --	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.1	clinopyroxene	subhedral	0.2	amphibole	subhedral	0.1

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 80

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			smectite

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	70	100	clay minerals	zeolite	devitrification	

THIN SECTION LABEL ID: **350-U1437D-57R-1-W 62/65-TSB-TS_57** Thin section no.: 57

Unit/Subunit: Piece no.: Observer: NICH

Thin section summary: Altered tuff with crystals

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: fine-grained, unknown **2nd order particles:** crystal **3rd order particles:** microfossil

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.2	opaques	subhedral	0.1			

THIN SECTION LABEL ID: **350-U1437D-57R-5-W 19/22-TSB-TS_38** Thin section no.: 38

Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: andesitic lapilli-tuff with clear glass, plag, cpx, minor hornblende.

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	sub-rounded	-- -- -- -- --	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.05	clinopyroxene	subhedral	0.1	amphibole	subhedral	0.1

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric						
Lithic	igneous, evolved					

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 70

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			zeolite	clay minerals	chlorite	

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	90	100	zeolite	clay minerals	devitrification	

Vesicles original (%)	Vesicle fill (%)	Vesicle fill dominant	Vesicle fill 2nd order	Vesicle fill 3rd order	Vesicle fill comment
		prehnite			

THIN SECTION LABEL ID: **350-U1437D-58R-2-W 50/52-TSB-TS_43** Thin section no.: 43

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: Highly altered vitric tuff with crystals (plagioclase, rare pyroxene) and foraminafera. Glass (frothy, bubble-wall) is entirely decomposed.

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: abundant glass shards (pumiceous, frothy, bubble-wall shards), but all entirely altered. Plagioclase looks remarkably fresh. Pyroxenes are rare.

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.2	clinopyroxene	subhedral	0.15			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 80

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	80	90	zeolite	clay minerals	palagonite	

Vesicles original (%)	Vesicle fill (%)	Vesicle fill dominant	Vesicle fill 2nd order	Vesicle fill 3rd order	Vesicle fill comment
		zeolite			

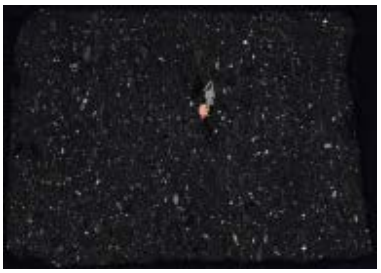
THIN SECTION LABEL ID: **350-U1437D-59R-3-W 28/30-TSB-TS_44** Thin section no.: 44

Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: andesitic lapilli tuff, with clear glass, plag, hornblende and cpx.

Plane-polarized:

Cross-polarized:



SEDIMENT

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	sub-rounded	-- -- -- -- --	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.1	amphibole	subhedral	0.3	clinopyroxene	subhedral	0.1

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 80

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			smectite

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	70	100	zeolite	clay minerals	devitrification	

Vesicles original (%)	Vesicle fill (%)	Vesicle fill dominant	Vesicle fill 2nd order	Vesicle fill 3rd order	Vesicle fill comment
		zeolite	clay minerals		

THIN SECTION LABEL ID: **350-U1437D-59R-3-W 51/53-TSB-TS_45** Thin section no.: 45

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Mudstone with forams

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: fine-grained, unknown **2nd order particles:** lithic **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.05						

THIN SECTION LABEL ID: **350-U1437D-59R-5-W 139/141-TSB-TS_46** Thin section no.: 46

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Rhyodacitic tuff with feldspar crystals and rare quartz

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: altered, with prehnite cavities

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	angular	-- -- -- -- --	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.1	quartz	subhedral	0.3	clinopyroxene	subhedral	0.05

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 80

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			chlorite	clay minerals		sericite

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	70	100	zeolite	devitrification	devitrification	

Vesicles original (%)	Vesicle fill (%)	Vesicle fill dominant	Vesicle fill 2nd order	Vesicle fill 3rd order	Vesicle fill comment
		prehnite			

THIN SECTION LABEL ID: **350-U1437D-61R-2-W 119/122-TSB-TS_51** Thin section no.: 51

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Tuffaceous mudstone with a mudstone layer at the bottom

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: Domain no.: 1 Domain rel. abundance (%): 80

Dominant particles: fine-grained, unknown **2nd order particles:** crystal **3rd order particles:** vitric

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.3	clinopyroxene	subhedral	0.1	calcite	subhedral	0.15

Sample domain name: Domain no.: 2 Domain rel. abundance (%): 20

Dominant particles: fine-grained, unknown **2nd order particles:** vitric **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.15						

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 80

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			carbonate	clay minerals		

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	20	70	devitrification			

THIN SECTION LABEL ID: **350-U1437D-61R-5-W 71/74-TSB-TS_52** Thin section no.: 52

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Crystal-rich andesitic tuff with feldspar, pyroxene and hornblende

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: Common opaues and some sulphides

Dominant particles: fine-grained, unknown **2nd order particles:** crystal **3rd order particles:** vitric

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	rounded	-- -- -- -- --	evolved shards		-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.2	clinopyroxene	subhedral	0.2	amphibole	subhedral	0.1

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 20

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass		20	clay minerals			

THIN SECTION LABEL ID: **350-U1437D-61R-6-W 49/52-TSB-TS_53** Thin section no.: 53

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Crystal-rich andesitic tuff with with feldspar, pyroxenes and opaques

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: Common opaques, tarce sulphides

Dominant particles: crystal **2nd order particles:** fine-grained, unknown **3rd order particles:** vitric

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	rounded	-- -- -- -- --	evolved shards		-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.1	clinopyroxene	subhedral	0.1	opaque	euhedral	0.2

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 50

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass		50	clay minerals			

THIN SECTION LABEL ID: **350-U1437D-61R-7-W 68/71-TSB-TS_54** Thin section no.: 54

Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: Tuffaceous mudstone with forams

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: fine-grained, unknown **2nd order particles:** microfossil **3rd order particles:** vitric

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.1						

THIN SECTION LABEL ID: **350-U1437D-62R-1-W 96/99-TSB-TS_55** Thin section no.: 55

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Crystal rich andesitic tuff with microcrystalline feldspar and pyroxene

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** fine-grained, unknown

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.1	clinopyroxene	subhedral	0.05	opaque	euhedral	0.1

THIN SECTION LABEL ID: **350-U1437D-63R-1-W 97/100-TSB-TS_56** Thin section no.: 56

Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: Layered andesitic tuff, crystal-rich and altered fiamme-rich layers.

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: crystal rich layers Domain no.: 1 Domain rel. abundance (%):

Dominant particles: crystal **2nd order particles:** vitric **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	sub-rounded	-- -- -- -- --	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.25	clinopyroxene	subhedral	0.1			

Sample domain name: fiamme layers Domain no.: 2 Domain rel. abundance (%):

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	fiamme	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.25						

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 15

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

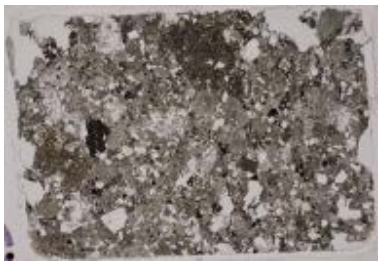
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass		15	clay minerals			

THIN SECTION LABEL ID: **350-U1437D-64R-1-W 35/39-TSB-TS_58** Thin section no.: 58

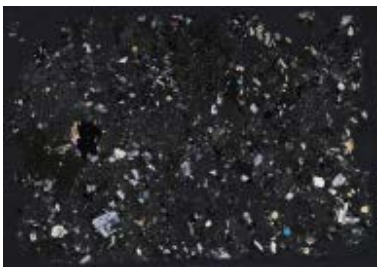
Unit/Subunit: Piece no.: Observer: NICH

Thin section summary: Grain supported andesite tuff with lithic clasts

Plane-polarized:



Cross-polarized:



SEDIMENT

Dominant particles: lithic **2nd order particles:** crystal **3rd order particles:** vitric

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	1.5	clinopyroxene	subhedral	0.7	amphibole	anhedral	0.1

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	sub-rounded				
Lithic	volcanic, evolved	sub-rounded				

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **pumice clasts** Domain no.: 1 Domain rel. abundance (%): 2

Lithology:	sparsely plagioclase phyric andesite pumice clast	Texture:	porphyritic / porphyry
Grain size:	cryptocrystalline	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	3	1.5	oscillatory zoned, sieve textures, melt inclusions

Sample domain name: **lithic clasts** Domain no.: 2 Domain rel. abundance (%): 10

Lithology:	sparsely plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	microcrystalline	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	1	0.3	
Opaques	1	0.25	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 60

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals	oxyhydroxide		
Clast			clay minerals	oxyhydroxide		locally perlitic

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass		60	clay minerals			

THIN SECTION LABEL ID: **350-U1437D-64R-1-W 99/101-TSB-TS_59** Thin section no.: 59

Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: Grain supported lapilli tuff with lithic clasts

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: lithic **2nd order particles:** vitric **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	1	amphibole	subhedral	0.3	clinopyroxene	subhedral	0.3

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric						
Lithic	volcanic, evolved	sub-rounded				

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **lithic clast** Domain no.: Domain rel. abundance (%):

Lithology:	amygdaloidal plagioclase-phyric andesite	Texture:	porphyritic / porphyry
Grain size:	microcrystalline	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	9	1	
Amphibole	1	0.25	altered

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 60

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass		60	clay minerals			

THIN SECTION LABEL ID: **350-U1437D-65R-1-W 37/42-TSB-TS_60** Thin section no.: 60

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Mudstone with plagioclase crystals and forams

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: fine-grained, unknown **2nd order particles:** microfossil **3rd order particles:** crystal

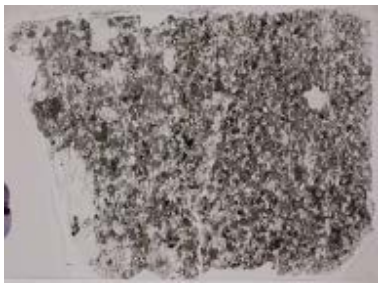
Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.15						

THIN SECTION LABEL ID: **350-U1437D-65R-2-W 122/125-TSB-TS_61** Thin section no.: 61

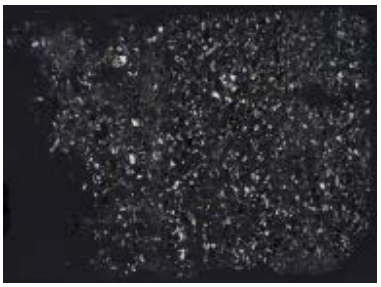
Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Crystal-rich andesitic tuff with feldspar, hornblende and a single andesitic clast

Plane-polarized:



Cross-polarized:



SEDIMENT

Dominant particles: crystal **2nd order particles:** vitric **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.4	amphibole	anhedral	0.3			

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric						
Lithic	volcanic, evolved					

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: 1 Domain rel. abundance (%): 1

Lithology:	moderately plagioclase phyric andesite	Texture:	porphyritic / porphyry
Grain size:	microcrystalline	Grain size distribution:	inequigranular

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	15	0.1	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 20

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

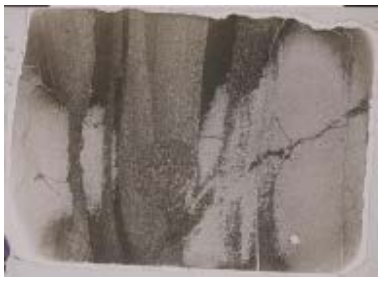
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass		20	clay minerals			

THIN SECTION LABEL ID: **350-U1437D-66R-2-W 64/68-TSB-TS_71** Thin section no.: 71

Unit/Subunit: Piece no.: Observer: NICH

Thin section summary: Banded andesitic tuff

Plane-polarized:



Cross-polarized:

SEDIMENT

Sample domain name: dark layers Domain no.: 1 Domain rel. abundance (%): 40

General domain comment: carbonate present

Dominant particles: fine-grained, unknown **2nd order particles:** vitric **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.1	clinopyroxene	anhedral	0.1			

Sample domain name: light layers Domain no.: 2 Domain rel. abundance (%): 60

Dominant particles: fine-grained, unknown **2nd order particles:** vitric **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal									

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 95

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass		90	clay minerals			

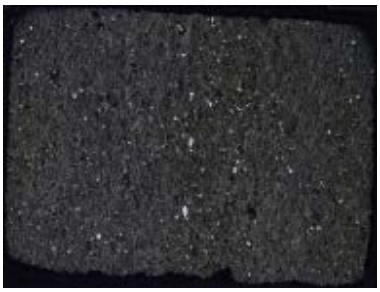
THIN SECTION LABEL ID: **350-U1437D-66R-3-W 132/136-TSB-TS_72** Thin section no.: 72

Unit/Subunit: Piece no.: Observer: RIBE

Thin section summary: Crystal-rich, stratified andesitic tuff with altered glass and hornblende, glauconite crystal.

Plane-polarized:

Cross-polarized:



SEDIMENT

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	sub-rounded	-- -- -- -- --	mafic shards	angular	-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.1	clinopyroxene	anhedral	0.1	hornblende	anhedral	0.2

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 20

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals	palagonite		

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass		20	clay minerals	palagonite		
Amphibole			chlorite			

THIN SECTION LABEL ID: **350-U1437D-68R-2-W 43/46-TSB-TS_62** Thin section no.: 62

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Tuffaceous mudstone and a large porphyritic andesitic clast with accessory hornblende

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: fine-grained, unknown **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	1.7	amphibole	anhedral	0.5			

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric						
Lithic	volcanic, evolved	rounded				

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: 1 Domain rel. abundance (%): 40

Lithology:	moderately plagioclase phyric andesite	Texture:	porphyritic / porphyry
Grain size:	fine grained	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	15	1	zoned
Amphibole	0.1	0.5	2 grains observed

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 20

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

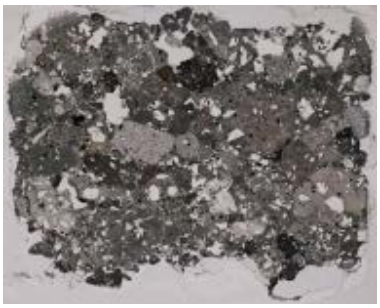
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass		20	clay minerals			

THIN SECTION LABEL ID: **350-U1437D-69R-1-W 35/38-TSB-TS_63** Thin section no.: 63

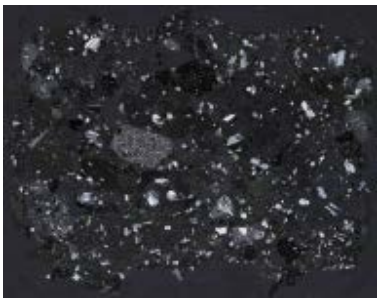
Unit/Subunit: Piece no.: Observer: DEBA

Thin section summary: Andesitic lapilli tuff, with many >2 mm clasts containing plagioclase, hornblende, and pyroxene

Plane-polarized:



Cross-polarized:



SEDIMENT

Dominant particles: lithic **2nd order particles:** vitric **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	glass, dense	rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	1	amphibole	subhedral	0.8			

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	glass, dense	rounded				
Lithic	volcanic, evolved	rounded				

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: 1 Domain rel. abundance (%):

Lithology:	moderately pyroxene-hornblende-plagioclase phyric andesite clast	Texture:	porphyritic
Grain size:	microcrystalline	Grain size distribution:	inequigranular

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	17	0.75	
Clinopyroxene	1	0.5	
Amphibole	1.5	0.5	
Opaques	0.5	0.4	

Sample domain name: **glass, dense** Domain no.: 2 Domain rel. abundance (%):

Lithology:	moderately pyroxene-hornblende-plagioclaste phyric andesite clast	Texture:	porphyritic
Grain size:	cryptocrystalline	Grain size distribution:	inequigranular

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	17	0.75	
Clinopyroxene	1	0.5	
Amphibole	1.5	0.5	
Opaques	0.5	0.4	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 40

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			
Clast			clay minerals			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass		40	clay minerals			

THIN SECTION LABEL ID: **350-U1437D-70R-5-W 50/53-TSB-TS_64** Thin section no.: 64

Unit/Subunit: Piece no.: Observer: DEBA

Thin section summary: Andesitic tuff with crystals of plag, cpx, oxides with a section of tuffaceous mudstone with crystals

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: mudstone Domain no.: 1 Domain rel. abundance (%): 15

General domain comment: dense glass clasts were plucked from mudstone part of thin section (they are missing)

Dominant particles: fine-grained, unknown **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.2	opaque	anhedral	0.1	clinopyroxene	subhedral	0.2

Sample domain name: tuff Domain no.: 2 Domain rel. abundance (%): 85

General domain comment: one hornblende grain, all glass is altered

Dominant particles: fine-grained, unknown **2nd order particles:** crystal **3rd order particles:** vitric

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	altered glass	rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.5	clinopyroxene	anhedral	0.3	opaque	anhedral	0.2

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 50

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

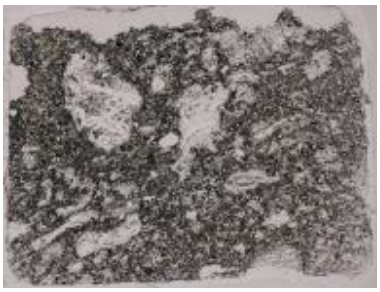
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass		50	clay minerals			

THIN SECTION LABEL ID: **350-U1437D-70R-6-W 82/84-TSB-TS_65** Thin section no.: 65

Unit/Subunit: Piece no.: Observer: RIBE

Thin section summary: Highly altered andesitic lapilli-tuff with crystals and pumice.

Plane-polarized:



Cross-polarized:

SEDIMENT

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	altered glass	angular	-- -- -- -- --	evolved shards	rounded	-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.4	opaques	anhedral	0.2			

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	rounded				
Lithic						

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 40

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

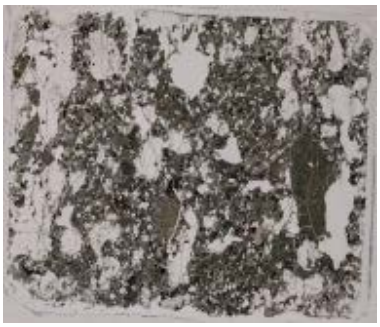
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass		40	clay minerals			

THIN SECTION LABEL ID: **350-U1437D-71R-2-W 109/112-TSB-TS_70** Thin section no.: 70

Unit/Subunit: Piece no.: Observer: RIBE

Thin section summary: Crystal-rich andesitic lapilli-tuff with highly altered glassy groundmass and hornblendes

Plane-polarized:



Cross-polarized:

SEDIMENT

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	altered glass	angular	-- -- -- -- --	evolved shards	rounded	-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.3	clinopyroxene	anhedral	0.4	amphibole	anhedral	0.2

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	sub-rounded				
Lithic						

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 20

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

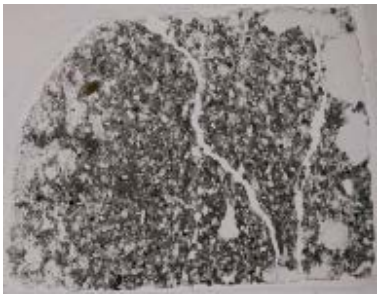
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass		20	clay minerals			

THIN SECTION LABEL ID: **350-U1437D-71R-3-W 6/10-TSB-TS_66** Thin section no.: 66

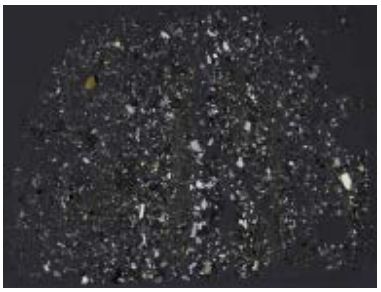
Unit/Subunit: Piece no.: Observer: RIBE

Thin section summary: Highly altered and devitrified andesitic lapilli-tuff with crystals

Plane-polarized:



Cross-polarized:



SEDIMENT

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	altered and devitrified glass	angular	-- -- -- -- --	evolved shards	angular	-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.3	amphibole	anhedral	0.7	opaque	anhedral	0.2

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 20

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

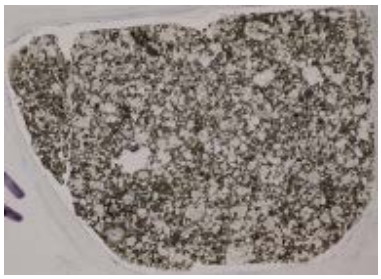
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass		20	clay minerals			

THIN SECTION LABEL ID: **350-U1437D-72R-1-W 49/51-TSB-TS_68** Thin section no.: 68

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Andesitic lapilli-tuff with plag phyric dense glass clear clast altered to palagonite

Plane-polarized:



Cross-polarized:

SEDIMENT

General domain comment: One single grain of quartz observed

Dominant particles: vitric **2nd order particles:** lithic **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	glass, dense	rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.5						

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	glass, dense	rounded				
Lithic	volcanic, evolved	rounded				

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: 1 Domain rel. abundance (%): 10

Lithology:	sparsely plagioclase phyric andesite	Texture:	porphyritic / porphyry
Grain size:	fine grained	Grain size distribution:	inequigranular

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	10	0.5	altered

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 50

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			locally perlitic

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass		50	clay minerals			

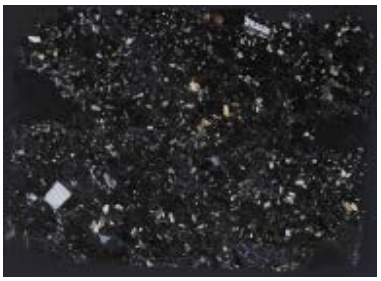
THIN SECTION LABEL ID: **350-U1437D-72R-2-W 3/5-TSB-TS_67** Thin section no.: 67

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Andesitic lapilli-tuff with numerous clast of moderatly phyric plagioclase andesite

Plane-polarized:

Cross-polarized:



SEDIMENT

Dominant particles: lithic **2nd order particles:** vitric **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	1						

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	sub-rounded				
Lithic	volcanic, evolved	sub-rounded				

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: 1 Domain rel. abundance (%): 50

Lithology:	moderately plagioclase phyric andesite	Texture:	porphyritic / porphyry
Grain size:	fine grained	Grain size distribution:	inequigranular

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	10	1	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 60

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

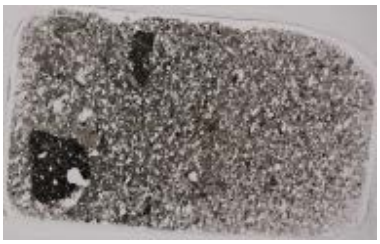
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass		60	clay minerals			

THIN SECTION LABEL ID: **350-U1437D-72R-3-W 62/65-TSB-TS_69** Thin section no.: 69

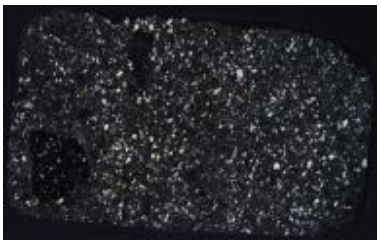
Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Crystal-rich andesitic tuff with volcanic andesitic clasts

Plane-polarized:



Cross-polarized:



SEDIMENT

Dominant particles: crystal **2nd order particles:** vitric **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	glass, dense	rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.3	clinopyroxene	subhedral	0.5	amphibole	subhedral	0.2

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric						
Lithic	volcanic, evolved	rounded				

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: 1 Domain rel. abundance (%): 5

Lithology:	moderately plagioclase phyric andesite	Texture:	porphyritic / porphyry
Grain size:	microcrystalline	Grain size distribution:	inequigranular

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	10	0.2	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 40

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals	oxyhydroxide		perlitic

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass		40	clay minerals			

THIN SECTION LABEL ID: **350-U1437E-5R-1-W 16/19-TSB-TS_73** Thin section no.: 73

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Andesitic tuff with altered evolved glass shards, plagioclase amd pyroxene

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.2	clinopyroxene	anhedral	0.1	opaque	euhedral	0.1

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 60

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

THIN SECTION LABEL ID: **350-U1437E-5R-1-W 83/87-TSB-TS_74** Thin section no.: 74

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Tuffaceous mudstone rich in foraminifer and with plagioclase crystals

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: microfossil **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.1	clinopyroxene	anhedral	0.1			

THIN SECTION LABEL ID: **350-U1437E-5R-2-W 5/8-TSB-TS_75** Thin section no.: 75

Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: Tuffaceous mudstone with altered volcaniclastic clasts

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: Domain no.: 0 Domain rel. abundance (%):

Dominant particles: fine-grained, unknown **2nd order particles:** microfossil **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.1	clinopyroxene	anhedral	0.06			

Sample domain name: Domain no.: 1 Domain rel. abundance (%): 70

Dominant particles: fine-grained, unknown **2nd order particles:** microfossil **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.1	clinopyroxene	anhedral	0.06			

Sample domain name: **clasts** Domain no.: 2 Domain rel. abundance (%): 30

Dominant particles: vitric **2nd order particles:** lithic **3rd order particles:** fine-grained, unknown

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --	fine grained unknown		-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	1.6						

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	sub-rounded				
Lithic						

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **igneous clast, evolved** Domain no.: 2 Domain rel. abundance (%):

Lithology:	andesite	Texture:	
Grain size:	cryptocrystalline	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	20	0.25	zoned

Sample domain name: **volcanic clast, evolved** Domain no.: 2 Domain rel. abundance (%):

Lithology:	andesite	Texture:	
Grain size:	microcrystalline	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	1	0.2	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 80

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Clast			clay minerals	chlorite	chalcedony	

THIN SECTION LABEL ID: **350-U1437E-5R-2-W 71/74-TSB-TS_76** Thin section no.: 76

Unit/Subunit: Piece no.: Observer: DEBA

Thin section summary: Contact between microfossil rich, tuffaceous mudstone with crystals and altered evolved tuff with crystals

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: intercalated 1 Domain no.: 1 Domain rel. abundance (%): 20

Dominant particles: fine-grained, unknown **2nd order particles:** microfossil **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.3	clinopyroxene	anhedral	0.2	opaque	anhedral	0.3

Sample domain name: intercalated 1 Domain no.: 2 Domain rel. abundance (%): 80

General domain comment: altered glass, one crystal of prehnite?

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --	evolved shards	sub-rounded	-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.2	opaque	anhedral	0.2	clinopyroxene	anhedral	0.2

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 80

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass			clay minerals			

THIN SECTION LABEL ID: **350-U1437E-6R-3-W 106/109-TSB-TS_77** Thin section no.: 77

Unit/Subunit: Piece no.: Observer: DEBA

Thin section summary: lithic rich tuff with crystals of plag, opaques, cpx and volcanic lithics (one hypabyssal)

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: altered glas

Dominant particles: lithic **2nd order particles:** crystal **3rd order particles:** vitric

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	rounded	-- -- -- -- --	hypabyssal, evolved	rounded	-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.5	opaque	anhedral	0.5	clinopyroxene	anhedral	0.5

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 90

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			chlorite			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase			prehnite			occasional prehnite grains
Glass			chlorite			pervasive

THIN SECTION LABEL ID: **350-U1437E-6R-4-W 71/74-TSB-TS_78** Thin section no.: 78

Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: Fine grained evolved green tuff with plagioclase, clinopyroxene and hornblende.

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.1	clinopyroxene	anhedral	0.1	hornblende	subhedral	0.1

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 95

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	90	95	clay minerals	oxide		

THIN SECTION LABEL ID: **350-U1437E-7R-3-W 119/121-TSB-TS_79** Thin section no.: 79

Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: Evolved tuff with plagioclase and clinopyroxene

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.3	clinopyroxene	subhedral	0.1	opaque	subhedral	0.2

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 90

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			oxyhydroxide	prehnite		

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	10	5	epidote			
Glass	90	100	clay minerals	devitrification		

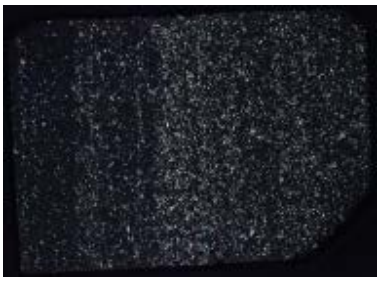
THIN SECTION LABEL ID: **350-U1437E-7R-4-W 31/34-TSB-TS_80** Thin section no.: 80

Unit/Subunit: Piece no.: Observer: DEBA

Thin section summary: Intercalated crystal rich tuff with tuff, plagioclase, prehnite, quartz, highly altered

Plane-polarized:

Cross-polarized:



SEDIMENT

Sample domain name: intercalated 1 Domain no.: Domain rel. abundance (%): 80

General domain comment: altered glass

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	microcrystalline		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.2	prehnite	subhedral	0.3	quartz	anhedral	0.2

Sample domain name: intercalated 2 Domain no.: Domain rel. abundance (%): 20

General domain comment: altered glass

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	microcrystalline		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.2	quartz	anhedral	0.2	prehnite	subhedral	0.2

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 90

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass			chlorite	prehnite	carbonate	

THIN SECTION LABEL ID: **350-U1437E-7R-7-W 71/73-TSB-TS_81** Thin section no.: 81

Unit/Subunit: Piece no.: Observer: GILL

Thin section summary: laminated evolved tuff

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: zeolite

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.1	quartz	anhedral	0.1	clinopyroxene	anhedral	0.1

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 80

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			chlorite	clay minerals	prehnite	oxyhydroxide

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Clinopyroxene	1	50	chlorite			
Plagioclase	20	5	chlorite	sericite		
Glass	79	100	chlorite	clay minerals	prehnite	

THIN SECTION LABEL ID: **350-U1437E-8R-1-W 59/62-TSB-TS_82** Thin section no.: 82

Unit/Subunit: Piece no.: Observer: GILL

Thin section summary: evolved tuff with plagioclase, quartz and hornblende

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: zeolite

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.5	quartz	anhedral	0.2	hornblende	euhedral	0.1

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 90

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals	epidote		
Patch			prehnite	zeolite		

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	20	50	epidote	calcite		

THIN SECTION LABEL ID: **350-U1437E-8R-4-W 45/48-TSB-TS_83** Thin section no.: 83

Unit/Subunit: Piece no.: Observer: RIBE

Thin section summary: closely intercalated evolved tuff with evolved, crystal-rich tuff

Plane-polarized:

Cross-polarized:

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 85

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			zeolite	clay minerals	prehnite	

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	15	5	sericite	prehnite		

THIN SECTION LABEL ID: **350-U1437E-8R-5-W 60/63-TSB-TS_84** Thin section no.: 84

Unit/Subunit: Piece no.: Observer: RIBE

Thin section summary: Contact between tuffaceous mudstone and closely intercalated evolved tuff with crystal-rich lapilli-tuff. Glass is mostly altered into chlorite and clay. Some biogenic pyrite. Flattened scoria replaced by chlorite and few diabasic lithic clasts.

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: Domain no.: 0 Domain rel. abundance (%):

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	glass, dense		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.3	quartz	anhedral	0.2	clinopyroxene	anhedral	0.5

Sample domain name: **intercalated 1** Domain no.: 1 Domain rel. abundance (%): 45

General domain comment: foraminifers, biogenic pyrite, groundmass glass is altered into clay minerals, the few fresh glass shards are mostly crystallized into plagioclase, epidote. 2 types of pyroxenes.

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	glass, dense	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.3	quartz	anhedral	0.1	clinopyroxene	anhedral	0.2

Sample domain name: **intercalated 2** Domain no.: 2 Domain rel. abundance (%): 45

General domain comment: zoning in feldspars, chlorite in groundmass, pumices are fully crystallized into feldpars, prehnite, calcite, few opaques. 2 types of pyroxenes.

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	fiamme	sub-rounded	-- -- -- -- --	pumice	sub-rounded	-- -- -- -- --	scoria	sub-rounded	-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.6	quartz	anhedral	0.2	clinopyroxene	anhedral	0.5

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric						
Lithic	igneous, evolved					

Sample domain name: **intercalated 1** Domain no.: 3 Domain rel. abundance (%): 10

Dominant particles: crystal **2nd order particles:** vitric **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.01	quartz	anhedral	0.01			

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **igneous clast, evolved** Domain no.: 2 Domain rel. abundance (%):

Lithology:	andesite	Texture:	diabasic
Grain size:	fine grained	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	50	0.2	spherulitic
Clinopyroxene	10	0.7	
Opaques	5	0.2	tabular

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 90

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals	prehnite	chalcedony	
Clast			clay minerals	chlorite	amphibole, green	interlayered smectite/chlorite and chlorite/amphibole

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase			chlorite			

THIN SECTION LABEL ID: **350-U1437E-8R-7-W 13/16-TSB-TS_125** Thin section no.: 125

Unit/Subunit: Piece no.: Observer: ANDR

Thin section summary: tuffaceous mudstone with fiamme (lapilli)

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** microfossil

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	angular	-- -- -- -- --	pumice	angular	-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral							

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	fiamme	angular				
Lithic						

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	100	100	clay minerals	chlorite	chalcedony	

THIN SECTION LABEL ID: **350-U1437E-8R-7-W 17/20-TSB-TS_126** Thin section no.: 126

Unit/Subunit: Piece no.: Observer: ANDR

Thin section summary: tuffaceous mudstone with fiamme and burrows

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: Domain no.: 1 Domain rel. abundance (%): 80

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --	evolved shards	angular	-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral							

Sample domain name: Domain no.: 2 Domain rel. abundance (%): 20

Dominant particles: fine-grained, unknown **2nd order particles:** vitric **3rd order particles:** microfossil

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards		-- -- -- -- --	pumice		-- -- -- -- --			-- -- -- -- --
Lithic	mudstone		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral							

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	80	100	clay minerals	chlorite	chalcedony	
Patch	20	100	clay minerals	chlorite	chalcedony	

THIN SECTION LABEL ID: **350-U1437E-8R-7-W 28/31-TSB-TS_127** Thin section no.: 127

Unit/Subunit: Piece no.: Observer: ANDR

Thin section summary: tuff overlying tuffaceous mudstone

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: Domain no.: 1 Domain rel. abundance (%): 60

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --	evolved shards	angular	-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal									

Sample domain name: Domain no.: 2 Domain rel. abundance (%): 40

Dominant particles: fine-grained, unknown **2nd order particles:** vitric **3rd order particles:** microfossil

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards		-- -- -- -- --	pumice		-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal									

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	100	100	clay minerals	chlorite	carbonate	prehnite

THIN SECTION LABEL ID: **350-U1437E-9R-3-W 103/106-TSB-TS_85** Thin section no.: 85

Unit/Subunit: Piece no.: Observer: DEBA

Thin section summary: pyrite in tuff intercalated with mudstone. Glass inside pyrite is relatively fresh

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: intercalated 2 Domain no.: Domain rel. abundance (%): 20

General domain comment: vitric components all altered

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	glass, dense		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	quartz	anhedral	0.2	plagioclase	anhedral	0.2	opaque	anhedral	0.2

Sample domain name: intercalated 1 Domain no.: Domain rel. abundance (%): 40

Dominant particles: fine-grained, unknown **2nd order particles:** crystal **3rd order particles:** microfossil

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.2	quartz	anhedral	0.2			

Sample domain name: intercalated 3 Domain no.: Domain rel. abundance (%): 40

Dominant particles: crystal **2nd order particles:** vitric **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	glass, dense		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	pyrite			quartz	anhedral	0.2	plagioclase	anhedral	0.2

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 60

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 60

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass			chlorite	prehnite		

THIN SECTION LABEL ID: **350-U1437E-10R-1-W 15/18-TSB-TS_86** Thin section no.: 86

Unit/Subunit: Piece no.: Observer: GILL

Thin section summary: tuffaceous mudstone with crystals

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: biotite, hornblande,some fresh glass, rare sulfide

Dominant particles: fine-grained, unknown **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.2	quartz	anhedral	0.2	clinopyroxene	anhedral	0.1

THIN SECTION LABEL ID: **350-U1437E-11R-1-W 31/33-TSB-TS_87** Thin section no.: 87

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: tuffaceous mudstone with forams and plagioclase crystals

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: biotite

Dominant particles: fine-grained, unknown **2nd order particles:** microfossil **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.2						

THIN SECTION LABEL ID: **350-U1437E-15R-5-W 97/100-TSB-TS_88** Thin section no.: 88

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Andesitic crystal-rich tuff with plagioclase, pyroxene and opaques

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: crystal **2nd order particles:** vitric **3rd order particles:** fine-grained, unknown

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.3	clinopyroxene	anhedral	0.1	opaque	subhedral	0.2

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 60

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals	chlorite		

THIN SECTION LABEL ID: **350-U1437E-16R-2-W 62/65-TSB-TS_89** Thin section no.: 89

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Tuffaceous mudstone with a crystal and ltihic-rich andesitic tuff

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: Domain no.: 0 Domain rel. abundance (%):

Sample domain name: **intercalated 1** Domain no.: 1 Domain rel. abundance (%): 70

Dominant particles: crystal **2nd order particles:** microfossil **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.1						

Sample domain name: **intercalated 2** Domain no.: 2 Domain rel. abundance (%): 30

Dominant particles: crystal **2nd order particles:** lithic **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.2	clinopyroxene	anhedral	0.2			

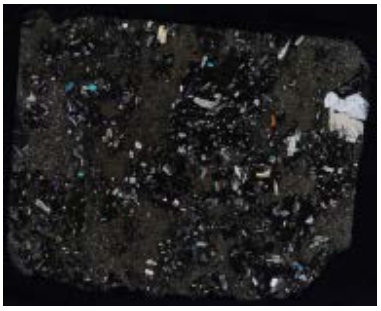
THIN SECTION LABEL ID: **350-U1437E-16R-6-W 0/3-TSB-TS_90** Thin section no.: 90

Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: Clinopyroxene (fresh) and plagioclase (altered) in alter fiamme clasts

Plane-polarized:

Cross-polarized:



SEDIMENT

Dominant particles: fine-grained, unknown **2nd order particles:** crystal **3rd order particles:** microfossil

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	2	clinopyroxene	subhedral	1			

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	fiamme	sub-rounded				
Lithic						

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **pumice clast** Domain no.: Domain rel. abundance (%): 75

Lithology:	augite-plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	cryptocrystalline	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	10	0.8	exsolved and altered
Clinopyroxene	10	0.5	fresh

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 85

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Clast	75	85	clay minerals	chlorite		

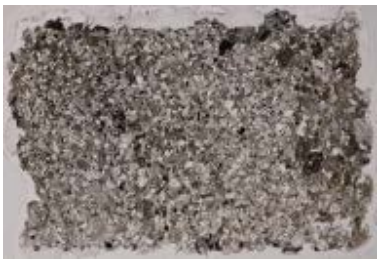
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Clinopyroxene	10	10	other			
Plagioclase	10	60	sericite	amphibole, green		
Glass	80	100	clay minerals	chlorite	carbonate	

THIN SECTION LABEL ID: **350-U1437E-16R-6-W 114/117-TSB-TS_91** Thin section no.: 91

Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: Pumice lapilli tuff with plagioclase and clinopyroxene

Plane-polarized:



Cross-polarized:

SEDIMENT

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	1	clinopyroxene	anhedral	0.8			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 75

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	5	100	clay minerals	chalcedony	prehnite	clays includ chlorite

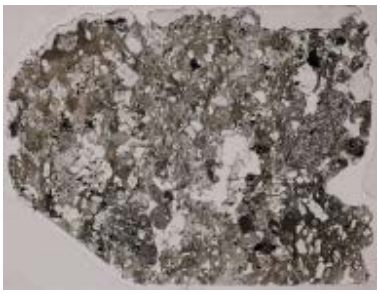
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Clinopyroxene	10	5				
Plagioclase	15	30	sericite	clay minerals		
Glass	75	100	devitrification	clay minerals	prehnite	+chalcedony

THIN SECTION LABEL ID: **350-U1437E-17R-2-W 114/117-TSB-TS_92** Thin section no.: 92

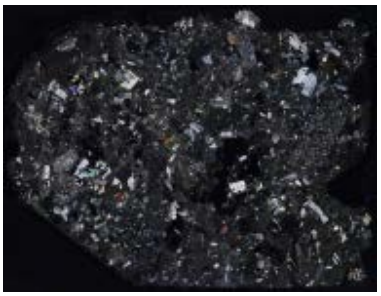
Unit/Subunit: Piece no.: Observer: DEBA

Thin section summary: Lapillistone with clasts (many >2 mm) of volcanic, hypabyssal and plutonic rocks (including pumice)

Plane-polarized:



Cross-polarized:



SEDIMENT

Dominant particles: lithic **2nd order particles:** vitric **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	rounded	-- -- -- -- --	tuff, evolved	rounded	-- -- -- -- --	plutonic	rounded	-- -- -- -- --
Crystal	plagioclase	subhedral	20	clinopyroxene	anhedral	13	opaque	anhedral	0.7

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric						
Lithic	volcanic, evolved	rounded	plutonic, mafic	rounded	hypabyssal	rounded

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: 1 Domain rel. abundance (%):

Lithology:	highly augite-plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	fine grained	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	15	0.7	
Clinopyroxene	3	0.5	
Opaques	3	0.3	

Sample domain name: **hypabyssal clast** Domain no.: 2 Domain rel. abundance (%):

Lithology:	hypabyssal andesite clast	Texture:	diabasic
Grain size:	fine grained	Grain size distribution:	equigranular

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	75	0.7	
Clinopyroxene	15	0.5	
Opaques	10	0.4	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 50

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Clast	40	50	chalcedony	clay minerals		

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 50

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	60	100	clay minerals	chlorite	chalcedony	

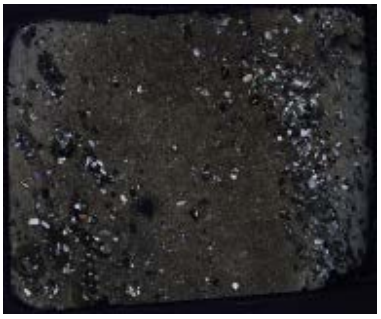
THIN SECTION LABEL ID: **350-U1437E-18R-4-W 54/57-TSB-TS_93** Thin section no.: 93

Unit/Subunit: Piece no.: Observer: DEBA

Thin section summary: Tuffaceous mudstone with pumice lapilli and crystals of plag, cpx, and hblde

Plane-polarized:

Cross-polarized:



SEDIMENT

General domain comment: glass is altered

Dominant particles: fine-grained, unknown **2nd order particles:** vitric **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	1	clinopyroxene	anhedral	1	hornblende	anhedral	0.4

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 30

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Clast			clay minerals	zeolite		

THIN SECTION LABEL ID: **350-U1437E-18R-4-W 79/82-TSB-TS_94** Thin section no.: 94

Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: Evolved tuff with plagioclase, clinopyroxene and hornblende

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards		-- -- -- -- --	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --
Lithic	igneous, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.6	clinopyroxene	anhedral	0.3	hornblende	subhedral	0.2

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 90

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	90	100	clay minerals	chlorite	chalcedony	prehnite also

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Clinopyroxene	1	0				
Amphibole	1	0				
Plagioclase	10	10	sericite			

THIN SECTION LABEL ID: **350-U1437E-19R-1-W 81/84-TSB-TS_95** Thin section no.: 95

Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: Brown and green layer tuff very fine grained

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: some layers still green

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.1	clinopyroxene	subhedral	0.1	opaque	subhedral	0.2

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 95

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass		100	clay minerals	chlorite	prehnite	

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Clinopyroxene	1	0				
Plagioclase	5					

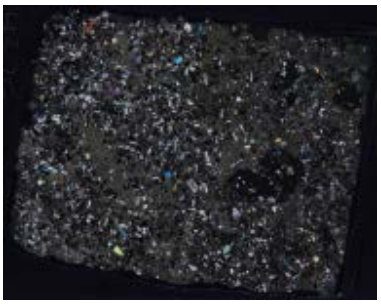
THIN SECTION LABEL ID: **350-U1437E-19R-1-W 127/130-TSB-TS_96** Thin section no.: 96

Unit/Subunit: Piece no.: Observer: RIBE

Thin section summary: Evolved, crystal-rich tuff with andesitic lapilli and fiamme. Highly altered glass.

Plane-polarized:

Cross-polarized:



SEDIMENT

General domain comment: biotite, highly altered glassy groundmass, zoning and melt inclusions in feldspars, lithic clasts are mostly andesitic.

Dominant particles: lithic **2nd order particles:** crystal **3rd order particles:** vitric

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	scoria	sub-rounded	-- -- -- -- --	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --
Lithic	igneous, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.5	clinopyroxene	subhedral	0.3	hornblende	subhedral	0.3

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	scoria	sub-rounded	fiamme	sub-rounded		
Lithic						

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: Domain rel. abundance (%):

Lithology:	andesite clast	Texture:	porphyritic / porphyry
Grain size:	microcrystalline	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	2	0.6	exdolved, melt inclusions, poekilitic
Clinopyroxene	1	0.5	exsolved, melt inclusions, poekilitic.
Opaques	1	0.2	tabular

Sample domain name: **Volcanic clast, evolved** Domain no.: Domain rel. abundance (%):

Lithology:	andesite fiamme	Texture:	porphyritic / porphyry
Grain size:	cryptocrystalline	Grain size distribution:	equigranular

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	1	0.05	

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	40	100	clay minerals	chlorite	prehnite	plus chalcedony
Clast	30	95	clay minerals	chalcedony	prehnite	chalcedony

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Clinopyroxene	5	10	prehnite			
Plagioclase	20	10	chlorite			

THIN SECTION LABEL ID: **350-U1437E-20R-2-W 22/25-TSB-TS_97** Thin section no.: 97

Unit/Subunit: Piece no.: Observer: RIBE

Thin section summary: Matrix supported, monomitic evolved lapilli-tuff with 2 larges fiamme. The fiamme at the bottom is more flattened. Hornblende and biotite.

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: altered glass. opaques, hornblende, biotite.

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	fiamme	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.4	hornblende	subhedral	0.3	quartz	subhedral	0.2

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	fiamme	sub-rounded				
Lithic						

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: Domain rel. abundance (%):

Lithology:	andesite fiamme	Texture:	porphyritic / porphyry
Grain size:	fine grained	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	3	0.4	altered and sometimes replaced by chalcedony. zoned.
Amphibole	1	0.3	anhedral
Opaques	1	0.2	tabular

Sample domain name: **volcanic clast, evolved** Domain no.: Domain rel. abundance (%):

Lithology:	rhyodacite fiamme	Texture:	porphyritic /
Grain size:	fine grained	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	2	2	zoned, melt inclusions. Locally replaced by prehnite.
Amphibole	1	0.1	anhedral
Biotite	1	0.2	
Quartz	1	0.2	
Opaques	1	0.1	

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	95	100	clay minerals	prehnite	carbonate	clay-chlorite
Clast	10	100	chalcedony	clay minerals	chlorite	
Patch	10	100	chalcedony			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	5	50	prehnite			

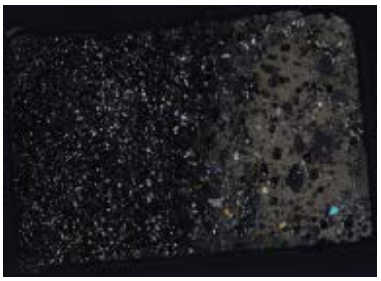
THIN SECTION LABEL ID: **350-U1437E-21R-6-W 91/94-TSB-TS_98** Thin section no.: 98

Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: Intercalated matrix supported tuff, clast supported tuff and crystal rich tuff

Plane-polarized:

Cross-polarized:



SEDIMENT

Sample domain name: Domain no.: 0 Domain rel. abundance (%):

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Sample domain name: Domain no.: 1 Domain rel. abundance (%): 40

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	1	clinopyroxene	subhedral	0.8	hornblende	subhedral	0.1

Sample domain name: Domain no.: 2 Domain rel. abundance (%): 40

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.2	clinopyroxene	subhedral	0.2	opaque	subhedral	0.2

Sample domain name: Domain no.: 3 Domain rel. abundance (%): 20

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards		-- -- -- -- --	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.6	clinopyroxene	subhedral	0.6	opaque	subhedral	0.4

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 80

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	80	100	clay minerals	chlorite	chalcedony	prehnite

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	10	30	chlorite	sericite		

THIN SECTION LABEL ID: **350-U1437E-22R-4-W 75/78-TSB-TS_99** Thin section no.: 99

Unit/Subunit: Piece no.: Observer: ANDR

Thin section summary: Evolved pumice- and shard-rich tuff with muddy matrix and forams

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: vitric **2nd order particles:** vitric **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --	evolved shards	angular	-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.1	opaque	anhedral				

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	fiamme	angular				
Lithic						

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	90	100	clay minerals	chalcedony	carbonate	
Clast	10	100	clay minerals	chlorite		

THIN SECTION LABEL ID: **350-U1437E-22R-4-W 102/105-TSB-TS_100** Thin section no.: 100

Unit/Subunit: Piece no.: Observer: ANDR

Thin section summary: Evolved lapilli-tuff with fiamme in a matrix of pumice grain and shards with mud

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: Domain no.: 1 Domain rel. abundance (%): 80

General domain comment: eutaxitic fabric

Dominant particles: vitric **2nd order particles:** vitric **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --	evolved shards	angular	-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.1	opaque	anhedral				

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	fiamme	angular				
Lithic	volcanic, evolved	rounded				

Sample domain name: Domain no.: 2 Domain rel. abundance (%): 20

Dominant particles: vitric **2nd order particles:** vitric **3rd order particles:** microfossil

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	angular	-- -- -- -- --	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.1						

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	80	100	clay minerals	chlorite	chalcedony	iron oxyhydroxide
Clast	20	100	chlorite	clay minerals	oxide	

THIN SECTION LABEL ID: **350-U1437E-22R-4-W 121/124-TSB-TS_101** Thin section no.: 101

Unit/Subunit: Piece no.: Observer: ANDR

Thin section summary: Evolved lapilli-tuff intercalated with tuffaceous mudstone and tuff

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: Domain no.: 1 Domain rel. abundance (%): 50

Dominant particles: vitric **2nd order particles:** vitric **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --	evolved shards	angular	-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.1	opaque	anhedral				

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	fiamme	angular				
Lithic						

Sample domain name: Domain no.: 2 Domain rel. abundance (%): 35

Sample domain name: Domain no.: 3 Domain rel. abundance (%): 15

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	angular	-- -- -- -- --	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal									

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	100	100	clay minerals			

THIN SECTION LABEL ID: **350-U1437E-22R-6-W 50/53-TSB-TS_102** Thin section no.: 102
Unit/Subunit: Piece no.: Observer: BERG
Thin section summary: tuffaceous mudstone with lapilli with a crystal-rich andesitic tuff layer

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: Domain no.: 0 Domain rel. abundance (%):

Sample domain name: Domain no.: 1 Domain rel. abundance (%): 90

Dominant particles: fine-grained, unknown **2nd order particles:** vitric **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.1						

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	fiamme	angular				
Lithic						

Sample domain name: Domain no.: 2 Domain rel. abundance (%): 10

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.2						

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 20

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	80	20	clay minerals			

Vesicles original (%)	Vesicle fill (%)	Vesicle fill dominant	Vesicle fill 2nd order	Vesicle fill 3rd order	Vesicle fill comment
		prehnite			

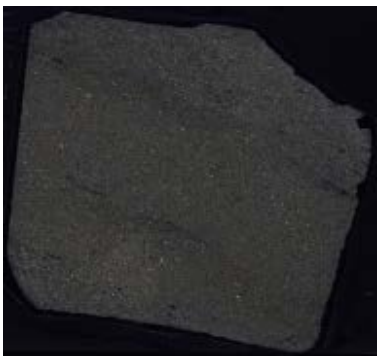
THIN SECTION LABEL ID: **350-U1437E-25R-3-W 74/76-TSB-TS_103** Thin section no.: 103

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Matrix-supported lapilli-tuff with fiamme and tuffaceous mudstone

Plane-polarized:

Cross-polarized:



SEDIMENT

Sample domain name: Domain no.: 0 Domain rel. abundance (%):

Sample domain name: Domain no.: 1 Domain rel. abundance (%): 80

Dominant particles: vitric **2nd order particles:** fine-grained, unknown **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.1	opaque	euhedral	0.1	clinopyroxene	anhedral	0.1

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	fiamme	sub-rounded				
Lithic						

Sample domain name: Domain no.: 2 Domain rel. abundance (%): 20

Dominant particles: fine-grained, unknown **2nd order particles:** vitric **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.1	opaque	euhedral	0.1	clinopyroxene	anhedral	

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	90	100	clay minerals	chlorite		
Clast	10	100	clay minerals	chlorite		

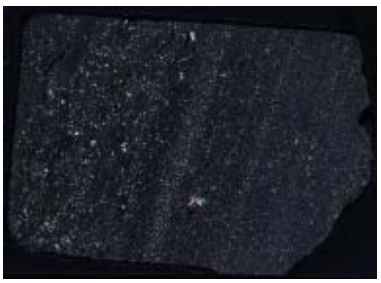
THIN SECTION LABEL ID: **350-U1437E-25R-4-W 78/81-TSB-TS_104** Thin section no.: 104

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Graded, crystal rich to crystal poor andesitic tuff with mudstone

Plane-polarized:

Cross-polarized:



SEDIMENT

Dominant particles: crystal **2nd order particles:** fine-grained, unknown **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	igneous, mafic	rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.3	clinopyroxene	anhedral	0.2	amphibole	subhedral	0.2

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	75	100	clay minerals	chlorite	chalcedony	iron oxyhdroxide, oxides, zeolite
Patch	10	100	chalcedony	chlorite		

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Clinopyroxene	5	20	prehnite			
Plagioclase	10	20	prehnite			

THIN SECTION LABEL ID: **350-U1437E-26R-2-W 85/88-TSB-TS_105** Thin section no.: 105

Unit/Subunit: Piece no.: Observer: NICH

Thin section summary: Tuffaceous mudstone with forams

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: fine-grained, unknown **2nd order particles:** vitric **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.2	amphibole	subhedral	0.2	clinopyroxene	subhedral	0.1

THIN SECTION LABEL ID: **350-U1437E-26R-2-W 93/96-TSB-TS_106** Thin section no.: 106

Unit/Subunit: Piece no.: Observer: NICH

Thin section summary: Intercalated tuff with crystals and tuffaceous mudstone

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: Domain no.: 1 Domain rel. abundance (%): 66

Dominant particles: fine-grained, unknown **2nd order particles:** vitric **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.05	opaque	anhedral	1			

Sample domain name: Domain no.: 2 Domain rel. abundance (%): 33

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.1	opaque	subhedral	0.1	clinopyroxene	subhedral	0.15

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	90	100	chlorite	clay minerals	chalcedony	prehnite
Patch	10	100	chlorite	clay minerals	chalcedony	

THIN SECTION LABEL ID: **350-U1437E-26R-4-W 63/66-TSB-TS_107** Thin section no.: 107

Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: Intercalated lapilli-tuff with tuff

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: intercalated 1 Domain no.: 0 Domain rel. abundance (%):

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Sample domain name: Domain no.: 1 Domain rel. abundance (%): 70

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	fiamme	sub-rounded	-- -- -- -- --	evolved shards	sub-rounded	-- -- -- -- --			-- -- -- -- --
Lithic	igneous, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.3	clinopyroxene	subhedral	0.5			

Sample domain name: Domain no.: 2 Domain rel. abundance (%): 30

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	igneous, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.5	clinopyroxene	subhedral	0.5	hornblende	anhedral	0.25

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 90

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals	prehnite		

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	10					
Glass	90	100	clay minerals	chlorite	prehnite	+chalcedony

THIN SECTION LABEL ID: **350-U1437E-27R-1-W 99/102-TSB-TS_108** Thin section no.: 108

Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: andesite tuff with plagioclase, hornblende and clinopyroxene

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	sub-rounded	-- -- -- -- --	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.25	hornblende	subhedral	0.2	clinopyroxene	subhedral	0.2

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 95

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	95	100	clay minerals	prehnite	chalcedony	

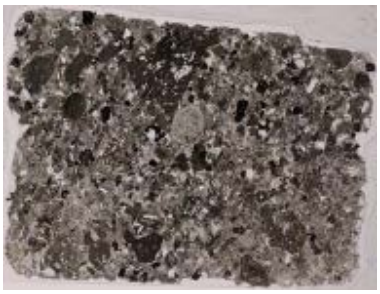
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Clinopyroxene	1	0				
Amphibole	1	0				
Plagioclase	5	10	prehnite			
Glass	95	100	clay minerals	chalcedony	prehnite	

THIN SECTION LABEL ID: **350-U1437E-28R-1-W 4/7-TSB-TS_109** Thin section no.: 109

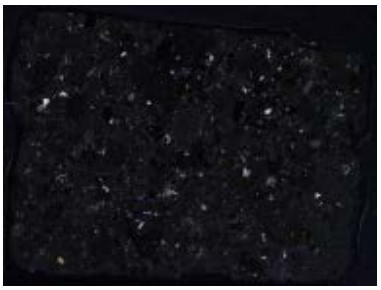
Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: heterolithic andesite tuff composed of a variety of vitric and lithic lapilli clasts set in fine-grained crystal-rich matrix

Plane-polarized:



Cross-polarized:



SEDIMENT

Dominant particles: vitric **2nd order particles:** lithic **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --	mudstone	rounded	-- -- -- -- --	volcanic, mafic	sub-rounded	-- -- -- -- --
Crystal	plagioclase	subhedral	1	opaque	anhedral	2	clinopyroxene	subhedral	0.3

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	rounded				
Lithic	volcanic, evolved	sub-rounded	mudstone	rounded	volcanic, mafic	sub-rounded

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: Domain rel. abundance (%):

Lithology:	augite-plagioclase phyric andesite clast	Texture:	porphyritic /
Grain size:	microcrystalline	Grain size distribution:	inequigranular

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	4	0.1	mostly altered, larger crystals partially replaced
Clinopyroxene	1	0.05	mostly altered
Opaques	1	0.1	euhedral

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	10	100	chlorite	chalcedony	clay minerals	
Clast	60	100	clay minerals	chalcedony	chlorite	for vitric clasts as lithic clasts not altered

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase		5	sericite			

THIN SECTION LABEL ID: **350-U1437E-28R-2-W 98/101-TSB-TS_110** Thin section no.: 110

Unit/Subunit: Piece no.: Observer: GILL

Thin section summary: polymictic lapilli tuff with dark & light pumice

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.1	clinopyroxene		0.1			

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	sub-rounded				
Lithic						

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: 1 Domain rel. abundance (%):

Lithology:	moderately augite-plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	fine grained	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	10		
Clinopyroxene	1		

Sample domain name: **volcanic clast, evolved** Domain no.: 2 Domain rel. abundance (%):

Lithology:	moderately augite-plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	fine grained	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	10		
Clinopyroxene	1		

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	75	100	chalcedony	chlorite	clay minerals	prehnite
Clast	20	100	clay minerals	chalcedony		vitric clast alteration. Minor lithic clasts no alteration

THIN SECTION LABEL ID: **350-U1437E-28R-4-W 56/60-TSB-TS_111** Thin section no.: 111

Unit/Subunit: Piece no.: Observer: GILL

Thin section summary: contact between tuff and overlying mudstone

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: 1 Domain no.: 1 Domain rel. abundance (%):

General domain comment: quartz, opaques; total crystals ~10%

Dominant particles: fine-grained, unknown **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.05	clinopyroxene		0.05			

Sample domain name: 2 Domain no.: 2 Domain rel. abundance (%):

General domain comment: boundary sharp over 0.5 mm; more clear than dark pumice; fresh minerals

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.1	clinopyroxene		0.05			

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	30	100	chalcedony	chalcedony	clay minerals	prehnite
Clast	60	100	clay minerals	chalcedony	devitrification	vitric clast alteration. Minor lithic clasts no alteration

THIN SECTION LABEL ID: **350-U1437E-29R-3-W 38/41-TSB-TS_112** Thin section no.: 112

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: heterolithic andesite tuff composed with two cm-sized pumice clasts set into ash-sized vitric and lithic clast with crystal and mudstone. Still fresh plagioclase and pyroxenes, trace of amphibole

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: vitric **2nd order particles:** lithic **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --	mudstone	rounded	-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.7	clinopyroxene	anhedral	0.6	hornblende	anhedral	0.3

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	rounded				
Lithic	mudstone	sub-rounded				

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **pumice clast** Domain no.: Domain rel. abundance (%):

Lithology:	rhyodacite pumice	Texture:	
Grain size:	cryptocrystalline	Grain size distribution:	

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	10	100	clay minerals	chlorite	chalcedony	prehnite
Clast	75	100	clay minerals	chalcedony		

THIN SECTION LABEL ID: **350-U1437E-30R-3-W 67/70-TSB-TS_113** Thin section no.: 113

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: finegrained andesitic tuff with mud overlying ash-bearing mud

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: mudstone Domain no.: 1 Domain rel. abundance (%): 40

Dominant particles: crystal **2nd order particles:** lithic **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.1	clinopyroxene	subhedral	0.03			

Sample domain name: tuff Domain no.: 2 Domain rel. abundance (%): 60

Dominant particles: crystal **2nd order particles:** lithic **3rd order particles:** vitric

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	glass, dense	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.1	clinopyroxene	euhedral	0.05			

SECONDARY (ALTERATION) MINERALOGY

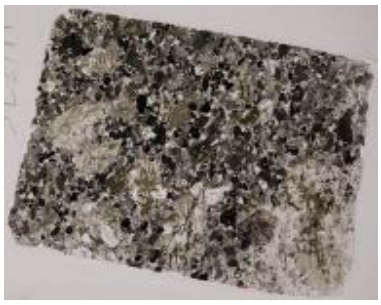
Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	100	100	clay minerals	chalcedony	prehnite	calcite

THIN SECTION LABEL ID: **350-U1437E-31R-2-W 0/4-TSB-TS_114** Thin section no.: 114

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: Heterolithic andesite lapillituff with altered glass shards and porphyritic pumice lapilli. Plagioclase and clinopyroxene

Plane-polarized:



Cross-polarized:

SEDIMENT

Dominant particles: vitric **2nd order particles:** lithic **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.5	clinopyroxene	euhedral	0.8			

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	angular				
Lithic	volcanic, evolved	angular				

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **pumice clast** Domain no.: 1 Domain rel. abundance (%): 85

Lithology:	plagioclase phyric andesite clast	Texture:	porphyritic /
Grain size:	cryptocrystalline	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	4	0.4	euhedral and up to 2 mm large, partially replaced
Clinopyroxene	1	0.15	

Sample domain name: **volcanic clast, evolved** Domain no.: 2 Domain rel. abundance (%): 15

Lithology:	augite-plagioclase phyric andesite clast	Texture:	porphyritic /
Grain size:	microcrystalline	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	4	0.2	
Clinopyroxene	1	0.1	

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	20	100	chlorite	chalcedony	clay minerals	prehnite
Clast	75	100	clay minerals	chlorite	chalcedony	

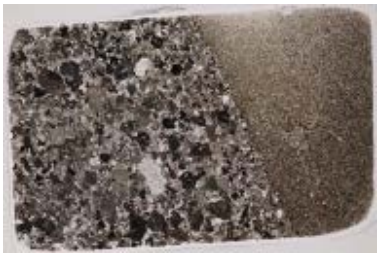
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	15	30	chalcedony			

THIN SECTION LABEL ID: **350-U1437E-31R-3-W 83/87-TSB-TS_115** Thin section no.: 115

Unit/Subunit: Piece no.: Observer: GILL

Thin section summary: contact between lapilli-tuff and underlying mudstone

Plane-polarized:



Cross-polarized:

SEDIMENT

Sample domain name: Domain no.: 1 Domain rel. abundance (%):

General domain comment: opaques; glass clear shards appear fresh

Dominant particles: fine-grained, unknown **2nd order particles:** vitric **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	glass, dense	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.2	clinopyroxene		0.05	quartz		

Sample domain name: Domain no.: 2 Domain rel. abundance (%):

General domain comment: several types of cm-size clasts

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.3	clinopyroxene		0.05			

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	sub-rounded				
Lithic						

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: Domain rel. abundance (%):

Lithology:	moderately augite-plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	coarse grained	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	10		fresh, trachytic
Clinopyroxene	1		fresh

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	10	100	chlorite	chalcedony		
Clast	85	100	clay minerals	chlorite		

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	5	40	chalcedony			

THIN SECTION LABEL ID: **350-U1437E-31R-5-W 64/68-TSB-TS_116** Thin section no.: 116

Unit/Subunit: Piece no.: Observer: GILL

Thin section summary: polymictic lapilli tuff with light colored pumice and darker lithics

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: rare free fresh hornblende 0,1 mm

Dominant particles: vitric **2nd order particles:** lithic **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.5	clinopyroxene		0.1	zeolite	anhedral	

SECONDARY (ALTERATION) MINERALOGY

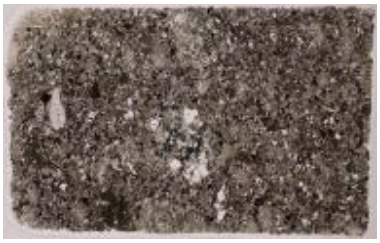
Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	45	100	chlorite	clay minerals	chalcedony	prehnite and iron oxyhydroxide
Clast	50	100	clay minerals	chalcedony	chlorite	

THIN SECTION LABEL ID: **350-U1437E-32R-3-W 97/100-TSB-TS_117** Thin section no.: 117

Unit/Subunit: Piece no.: Observer: GILL

Thin section summary: polymictic lapilli tuff with light colored pumice and darker lithics

Plane-polarized:



Cross-polarized:

SEDIMENT

Dominant particles: vitric **2nd order particles:** lithic **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.4	clinopyroxene	anhedral	0.2	hornblende	euhedral	

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	sub-rounded				
Lithic						

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	50	100	clay minerals	chlorite	chalcedony	prehnite
Clast	40	90	clay minerals	chlorite	chalcedony	

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	10	20	chalcedony			

THIN SECTION LABEL ID: **350-U1437E-33R-2-W 36/39-TSB-TS_118** Thin section no.: 118

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: heterolithic andesite lapillituff with volcanic and pumice clasts. Plagioclase, clinopyroxene and rare amphibole

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: vitric **2nd order particles:** lithic **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.7	clinopyroxene	euhedral	0.2	hornblende	euhedral	0.4

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	angular				
Lithic	volcanic, mafic	angular				

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: Domain rel. abundance (%):

Lithology:	augite-plagioclase phyric andesite clast	Texture:	porphyritic /
Grain size:	fine grained	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	8	0.5	some clast contain plagioclase up to 2 mm in size
Clinopyroxene	1	0.3	
Amphibole	1	0.4	euhedral

SECONDARY (ALTERATION) MINERALOGY

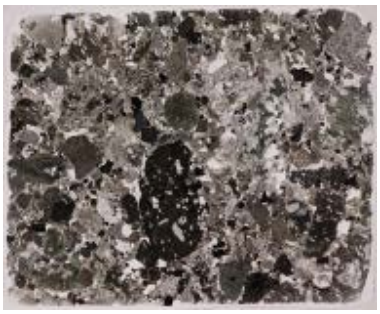
Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	50	100	chalcedony	chlorite	clay minerals	
Clast	50	80	clay minerals	chlorite	other	red mineral

THIN SECTION LABEL ID: **350-U1437E-34R-4-W 5/8-TSB-TS_119** Thin section no.: 119

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: lapillistone with plag phyric andesitic clasts, pumice clasts and zeolite cement

Plane-polarized:



Cross-polarized:

SEDIMENT

Dominant particles: lithic **2nd order particles:** vitric **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	1	clinopyroxene	euhedral	0.5	hornblende	euhedral	0.5

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	angular				
Lithic	volcanic, evolved	angular				

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **andesitic clast** Domain no.: 1 Domain rel. abundance (%): 40

Lithology:	augite-plagioclase phyric andesite clast	Texture:	trachytic
Grain size:	fine grained	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	25	1	eudehral
Clinopyroxene	5	0.5	
Amphibole	1	0.5	
Opaques	1	0.2	euhedral

Sample domain name: **pumice** Domain no.: 2 Domain rel. abundance (%): 40

Lithology:	aphyric andesite clast	Texture:	aphyric
Grain size:	cryptocrystalline	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	2	2	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 20

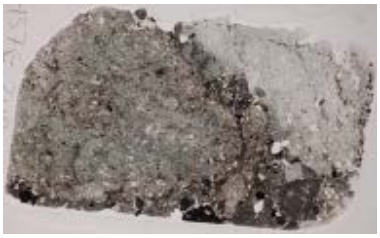
Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals	chlorite	zeolite	zeolites

THIN SECTION LABEL ID: **350-U1437E-34R-5-W 50/53-TSB-TS_120** Thin section no.: 120

Unit/Subunit: Piece no.: Observer: DEBA

Thin section summary: matrix-supported, polymictic, evolved lapilli-tuff with 1.5 cm pumice clast (now chalcedony), 2 cm andesitic volcanic lithic clast (w/ plag), and <2 cm clasts of mafic and evolved volcanic lithics with cpx and plag

Plane-polarized:



Cross-polarized:

SEDIMENT

Dominant particles: lithic **2nd order particles:** vitric **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, mafic	rounded	-- -- -- -- --	volcanic, evolved	rounded	-- -- -- -- --			-- -- -- -- --
Crystal									

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	rounded				
Lithic	volcanic, evolved	rounded				

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **igneous clast, evolved** Domain no.: 1 Domain rel. abundance (%): 60

Lithology:	sparsely plagioclase phyric andesite clast	Texture:	
Grain size:	microcrystalline	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	2	0.5	

Sample domain name: **pumice clast** Domain no.: 2 Domain rel. abundance (%): 40

Lithology:	sparsely plagioclase phyric rhyolite clast	Texture:	recrystallized
Grain size:	cryptocrystalline	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	4	0.7	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 80

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass			chalcedony			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 80

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			zeolite			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 80

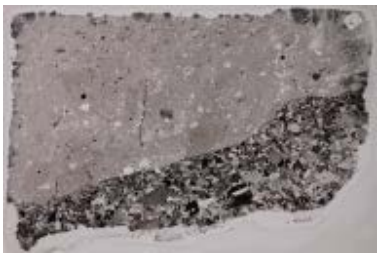
Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

THIN SECTION LABEL ID: **350-U1437E-35R-1-W 76/78-TSB-TS_121** Thin section no.: 121

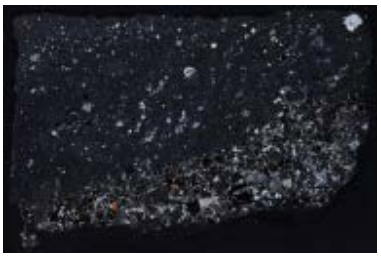
Unit/Subunit: Piece no.: Observer: HAME

Thin section summary: Rhyolite-dacite and surrounding matrix-supported lapilli-tuff, with peperite texture

Plane-polarized:



Cross-polarized:



SEDIMENT

Dominant particles: lithic **2nd order particles:** vitric **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	2	clinopyroxene		1			

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	sub-rounded				
Lithic						

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **massive lava** Domain no.: 1 Domain rel. abundance (%): 75

Lithology:	highly quartz-amphibole-plagioclase phyric rhyodacite intrusive sheets	Texture:	porphyritic / porphyry
Grain size:	cryptocrystalline	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	15	4	euhedral
Amphibole	3	1	euhedral
Quartz	5	3	
Opaques	1	0.5	

Sample domain name: **volcanic clast, mafic** Domain no.: 2 Domain rel. abundance (%): 15

Lithology:	moderately plagioclase phyric andesite clast	Texture:	trachytic
Grain size:	cryptocrystalline	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	10	1	some clast have more plag
Opaques	1	0.5	

Sample domain name: **pumice** Domain no.: 3 Domain rel. abundance (%): 10

Lithology:	aphyric andesite clast	Texture:	recrystallized
Grain size:	cryptocrystalline	Grain size distribution:	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 20

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	76	10	clay minerals			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 20

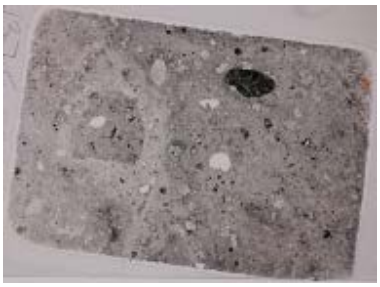
Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	20	100	clay minerals	chlorite	zeolite	
Clast	80	90	clay minerals	chlorite	zeolite	

THIN SECTION LABEL ID: **350-U1437E-35R-1-W 115/118-TSB-TS_122** Thin section no.: 122

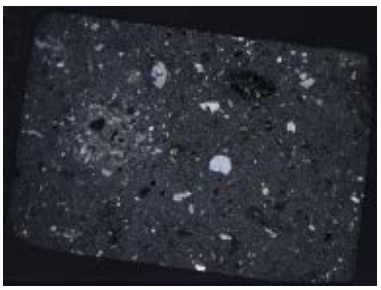
Unit/Subunit: Piece no.: Observer: HAME

Thin section summary: highly quartz-amphibole-plagioclase phyric rhyodacite intrusive sheet

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **massive lava** Domain no.: 1 Domain rel. abundance (%): 75

Lithology:	highly quartz-amphibole-plagioclase phyric rhyodacite intrusive sheets	Texture:	porphyritic / porphyry
Grain size:	microcrystalline	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	12	2	euhedral
Amphibole	5	1	euhedral
Quartz	3	2	up to 5mm
Opaques	1	0.5	

Sample domain name: **xenoliths** Domain no.: 2 Domain rel. abundance (%): 15

Lithology:	highly plagioclase phyric andesite xenolith	Texture:	porphyritic / porphyry
Grain size:	cryptocrystalline	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	40	1.5	
Opaques	2	0.5	

Sample domain name: **xenoliths** Domain no.: 3 Domain rel. abundance (%): 10

Lithology:	highly augite-plagioclase phyric andesite xenolith	Texture:	porphyritic / porphyry
Grain size:	fine grained	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	20	2.5	euhedral
Clinopyroxene	5	1	with alteration rim
Opaques	1	0.2	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 10

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 50

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass				chlorite		

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Clinopyroxene		80	epidote			
Plagioclase		40	sericite			

SECONDARY (ALTERATION) MINERALOGY

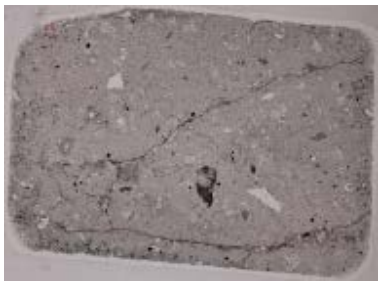
Total alteration in rock, bulk estimate (%): 60

THIN SECTION LABEL ID: **350-U1437E-35R-2-W 42/44-TSB-TS_123** Thin section no.: 123

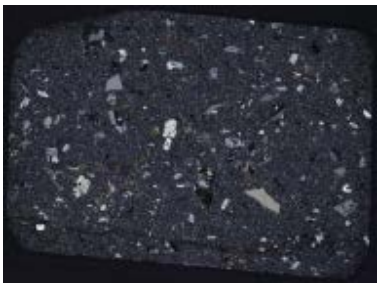
Unit/Subunit: Piece no.: Observer: HAME

Thin section summary: highly quartz-amphibole-plagioclase phyric rhyodacite intrusive sheet

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Lithology:	highly quartz-amphibole-plagioclase phyric rhyodacite intrusive sheets	Texture:	porphyritic / porphyry
Grain size:	microcrystalline	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	15	6	euhedral
Amphibole	5	1	euhedral
Quartz	3	4	up to 8mm
Opaques	1	0.5	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 10

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	76	10	clay minerals			

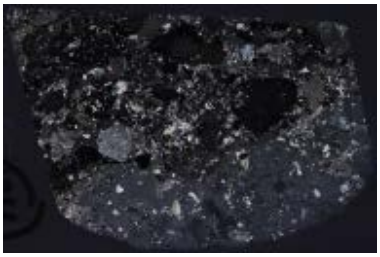
THIN SECTION LABEL ID: **350-U1437E-35R-2-W 58/59-TSB-TS_124** Thin section no.: 124

Unit/Subunit: Piece no.: Observer: DEBA

Thin section summary: Rhyolite-dacite and surrounding matrix-supported lapilli-tuff, with peperite texture

Plane-polarized:

Cross-polarized:



SEDIMENT

Dominant particles: lithic **2nd order particles:** vitric **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	rounded	-- -- -- -- --	scoria	rounded	-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	rounded	-- -- -- -- --	volcanic, mafic	rounded	-- -- -- -- --			-- -- -- -- --
Crystal									

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	scoria	rounded	pumice	rounded		
Lithic	volcanic, mafic	rounded	volcanic, evolved	rounded		

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **rhyolite-dacite intrusive sheet** Domain no.: 1 Domain rel. abundance (%): 80

Lithology:	moderately quartz-hornblende-plagioclase phyric rhyodacite intrusive sheets	Texture:	porphyritic / porphyry
Grain size:	microcrystalline	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	10	1	
Amphibole	1	0.5	
Quartz	1	0.5	
Opaques	1	0.5	

Sample domain name: **volcanic clast, mafic** Domain no.: 2 Domain rel. abundance (%): 8

Lithology:	highly augite-plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	microcrystalline	Grain size distribution:	inequigranular

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	20	0.5	
Clinopyroxene	5	0.5	

Sample domain name: **scoria clast** Domain no.: 3 Domain rel. abundance (%): 8

Lithology:	amygdaloidal plagioclase-phyric scoria clast	Texture:	amygdaloidal
Grain size:	cryptocrystalline	Grain size distribution:	

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	3	0.7	

Sample domain name: **pumice** Domain no.: 4 Domain rel. abundance (%): 4

Lithology:	rhyodacite clast	Texture:	
Grain size:	cryptocrystalline	Grain size distribution:	

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	5	100	clay minerals	chlorite	prehnite	
Clast	45	100	clay minerals	chalcedony		

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	10	50	prehnite	chalcedony		

THIN SECTION LABEL ID: **350-U1437E-36R-CC-PAL-TSB-TS_128** Thin section no.: 128

Unit/Subunit: Piece no.: Observer: DEBA

Thin section summary: Tuffaceous mudstone with microfossils

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: fine-grained, unknown **2nd order particles:** vitric **3rd order particles:** microfossil

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	opaque	anhedral	0.4						

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 50

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals	chalcedony		

THIN SECTION LABEL ID: **350-U1437E-38R-4-W 38/41-TSB-TS_129** Thin section no.: 129

Unit/Subunit: Piece no.: Observer: GILL

Thin section summary: contact between tuff and underlying tuffaceous mudstone

Plane-polarized:

Cross-polarized:

SEDIMENT

Sample domain name: Domain no.: 1 Domain rel. abundance (%):

General domain comment: subtle lamination; pumice to 1 cm; some glass still reflective

Dominant particles: fine-grained, unknown **2nd order particles:** vitric **3rd order particles:** microfossil

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.1	clinopyroxene		0.1			

Sample domain name: Domain no.: 2 Domain rel. abundance (%):

General domain comment: fresh minerals; more dark scoria up-section; forams continue into tuff

Dominant particles: vitric **2nd order particles:** vitric **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	rounded	-- -- -- -- --	scoria	rounded	-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.2	clinopyroxene		0.1			

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	90	100	clay minerals	prehnite	chalcedony	

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	10	30	sericite	chalcedony		

THIN SECTION LABEL ID: **350-U1437E-39R-8-W 49/53-TSB-TS_130** Thin section no.: 130

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Strongly altered tuff with fiamme and plagioclase crystals

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: strongly altered glass

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --	evolved shards		-- -- -- -- --	fiamme		-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.4	clinopyroxene	anhedral	0.3	opaque	euhedral	

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	fiamme	rounded				
Lithic						

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 80

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

THIN SECTION LABEL ID: **350-U1437E-41R-2-W 1/3-TSB-TS_131** Thin section no.: 131

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Sparsely vesicular, highly augite-plagiocase phyric andesite clast

Plane-polarized:

Cross-polarized:

PRIMARY (IGNEOUS) MINERALOGY

Lithology:	augite-plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	fine grained	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	25	1	
Clinopyroxene	5	1	
Opaques	1	0.2	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 5

Vesicles original (%)	Vesicle fill (%)	Vesicle fill dominant	Vesicle fill 2nd order	Vesicle fill 3rd order	Vesicle fill comment
		zeolite	clay minerals		

THIN SECTION LABEL ID: **350-U1437E-42R-3-W 7/11-TSB-TS_140** Thin section no.: 140

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Crystal rich andesitic tuff with layers of different grain size

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: brown altered glass shards

Dominant particles: crystal **2nd order particles:** vitric **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	glass, dense		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.5	clinopyroxene	anhedral	0.5	opaque	euhedral	0.5

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals	chalcedony	clay minerals	

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass			chalcedony	clay minerals		

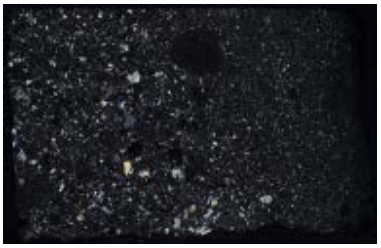
THIN SECTION LABEL ID: **350-U1437E-42R-3-W 57/61-TSB-TS_141** Thin section no.: 141

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Crystal-rich andesitic tuff with a single lapilli of sparsely plagioclase phyric andesite clast

Plane-polarized:

Cross-polarized:



SEDIMENT

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	glass, dense		-- -- -- -- --	mafic shards		-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.5	clinopyroxene	anhedral	0.5	opaque	anhedral	0.2

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric						
Lithic	volcanic, evolved	rounded				

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: Domain rel. abundance (%):

Lithology:	sparsely plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	microcrystalline	Grain size distribution:	inequigranular

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	2	0.5	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 60

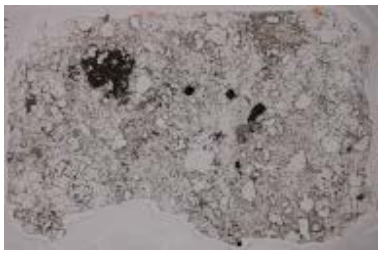
Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals	chlorite		

THIN SECTION LABEL ID: **350-U1437E-43R-1-W 36/40-TSB-TS_142** Thin section no.: 142

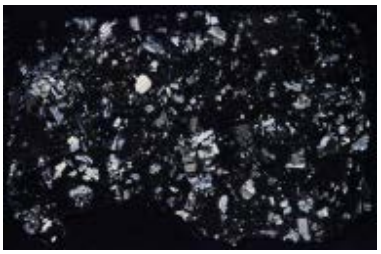
Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Tuff with colorless vitric matrix and plagioclase feldspars with two lapilli

Plane-polarized:



Cross-polarized:



SEDIMENT

General domain comment: remobilized hyaloclastite

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	glass, dense		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	1						

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric						
Lithic	volcanic, evolved	rounded				

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: Domain rel. abundance (%):

Lithology:	moderately plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	microcrystalline	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	8	0.5	
Clinopyroxene	2	0.5	
Orthopyroxene	1	0.5	

Sample domain name: **volcanic clast, evolved** Domain no.: Domain rel. abundance (%):

Lithology:	moderately plagioclase-augite phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	fine grained	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	6	1.1	sieve texture
Clinopyroxene	1	0.5	sieve texture

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 20

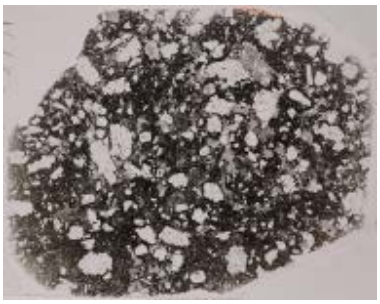
Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			
Clast			clay minerals			

THIN SECTION LABEL ID: **350-U1437E-43R-2-W 99/101-TSB-TS_132** Thin section no.: 132

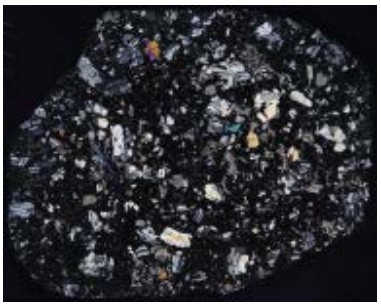
Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Sparsely vesicular, highly augite-plagiocase phyric andesite clast

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Lithology:	augite-plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	fine grained	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	30	2	euhedral
Clinopyroxene	5	0.5	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 10

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass			clay minerals			

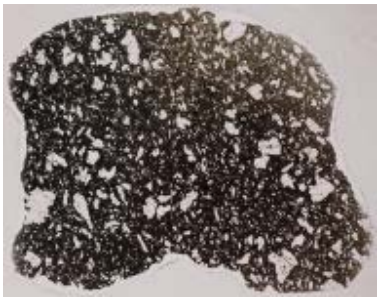
Vesicles original (%)	Vesicle fill (%)	Vesicle fill dominant	Vesicle fill 2nd order	Vesicle fill 3rd order	Vesicle fill comment
		zeolite	carbonate	clay minerals	

THIN SECTION LABEL ID: **350-U1437E-44R-2-W 36/38-TSB-TS_133** Thin section no.: 133

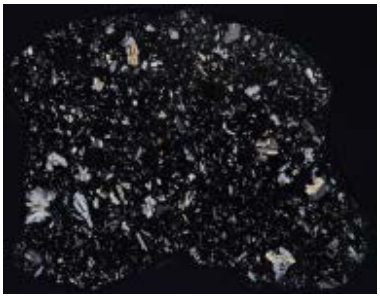
Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: Porphyritic plagioclase-rich andesite, moderately altered

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Lithology:	augite-plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	fine grained	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	30	1.5	euhedral, with mostly devitrified and sometimes still glassy inclusions
Clinopyroxene	3	0.6	euhedral, sometimes altered at rim

SECONDARY (ALTERATION) MINERALOGY

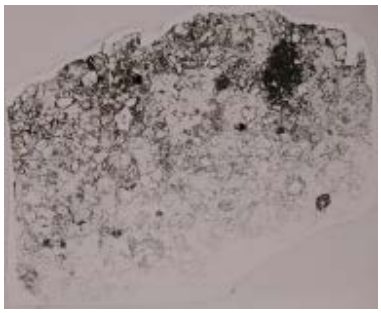
Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	60	30	clay minerals			

THIN SECTION LABEL ID: **350-U1437E-45R-1-W 74/77-TSB-TS_134** Thin section no.: 134

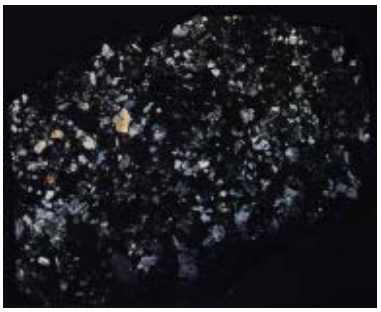
Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: Heterolithic lapillituff with abundant large plagioclases, subordinate pyroxene and volcanic and cumulate rock clast set into a glassy, altered matrix

Plane-polarized:



Cross-polarized:



SEDIMENT

General domain comment: very fresh plagioclase with sometimes glassy melt inclusions

Dominant particles: crystal **2nd order particles:** lithic **3rd order particles:** vitric

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	igneous, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	2	clinopyroxene	euhedral	0.8			

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric						
Lithic	volcanic, evolved	sub-rounded				

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: 1 Domain rel. abundance (%): 9

Lithology:	augite-plagioclase phyric andesite clast	Texture:	
Grain size:	fine grained	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	80	1	euhedral, often as single phenocrysts
Clinopyroxene	20	0.5	euhedral, incipient alteration at rims

Sample domain name: **cumulate clast** Domain no.: 2 Domain rel. abundance (%): 10

Lithology:	augite-plagioclase phyric cumulate clast	Texture:	
Grain size:	fine grained	Grain size distribution:	unimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	70	0.6	intergrown with other plagioclase and pyroxenes, curved boundaries
Clinopyroxene	30	0.5	intergrown with plagioclase, curved boundaries

SECONDARY (ALTERATION) MINERALOGY

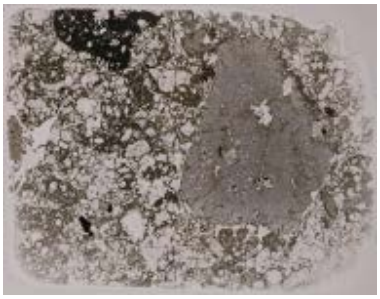
Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	100	5	chalcedony	clay minerals	chlorite	

THIN SECTION LABEL ID: **350-U1437E-47R-2-W 80/83-TSB-TS_135** Thin section no.: 135

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: Heterolithic lapillituff with plagioclase, pyroxene, pumice and volcanic rock fragments. One cm-size lapillus of augite-oxide-plagioclase phyric pumice (altered). Set into altered, cemented groundmass

Plane-polarized:



Cross-polarized:

SEDIMENT

General domain comment: vitric matrix, glassy melt inclusions in pyroxene

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	2.1	clinopyroxene	euhedral	0.5			

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric						
Lithic	volcanic, evolved	sub-rounded				

PRIMARY (IGNEOUS) MINERALOGY

Lithology:	augite-plagioclase phyric dacite clast	Texture:	porphyritic / porphyry
Grain size:	fine grained	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	4	0.7	euhedral. sometimes glomerophyric
Clinopyroxene	1	0.5	euhedral, glomerophyric
Opaques	1	0.3	

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	30	100	chlorite	clay minerals	chalcedony	prehnite and epidote
Clast	60	100	clay minerals	chlorite	chalcedony	

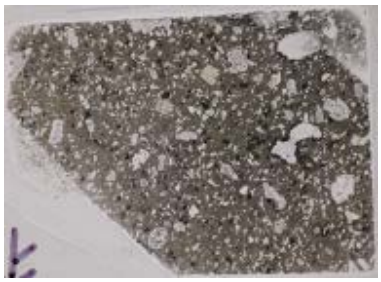
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	7	70	chalcedony	chlorite	epidote	

THIN SECTION LABEL ID: **350-U1437E-51R-1-W 31/34-TSB-TS_136** Thin section no.: 136

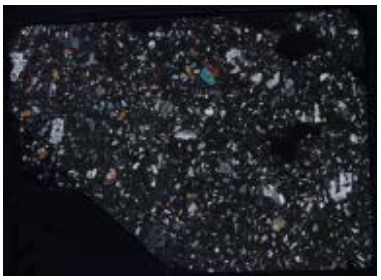
Unit/Subunit: Piece no.: Observer: DEBA

Thin section summary: highly pyroxene plagioclase phyric andesite clast. Ghost phenocrysts of a mafic phase, maybe amphibole?

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Lithology:	highly augite-plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	cryptocrystalline	Grain size distribution:	seriate

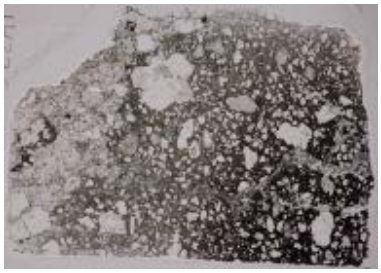
Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	25	1	Sieve texture, disequilibrium
Clinopyroxene	5	1	some fresh, some altered to prehnite?

THIN SECTION LABEL ID: **350-U1437E-51R-1-W 80/84-TSB-TS_137** Thin section no.: 137

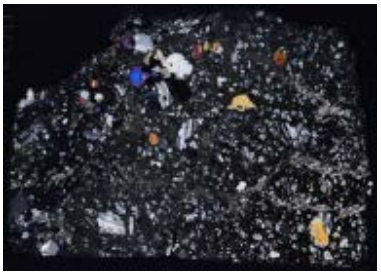
Unit/Subunit: Piece no.: Observer: NICH

Thin section summary: Highly clinopyroxene-plagioclase phyric andesite clast margin within lapilli tuff. Andesite clast shows a chilled margin and completely altered, formerly glassy groundmass. Lapilli tuff contains moderately altered glassy clasts.

Plane-polarized:



Cross-polarized:



SEDIMENT

Sample domain name: 1 Domain no.: 1 Domain rel. abundance (%): 25

General domain comment: glassy matrix, glassy melt inclusions in cpx and plag

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	glass, dense	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	4	clinopyroxene	subhedral	2.4			

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, mafic** Domain no.: 2 Domain rel. abundance (%): 75

Lithology:	highly augite-plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	cryptocrystalline	Grain size distribution:	seriate

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	30	2	euhedral, some with sieve textures, glassy inclusions, more xsed away from clast boundary
Clinopyroxene	10	0.5	euhedral, glomeroporphyritic, glassy melt inclusions
Olivine			may have formerly been in the assemblage; completely altered?

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 40

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	85	50	clay minerals	chlorite		

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Glass	85	50	clay minerals			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 50

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	70	100	clay minerals	chlorite		

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Olivine	2	100	chlorite			
Glass	70	100	clay minerals			

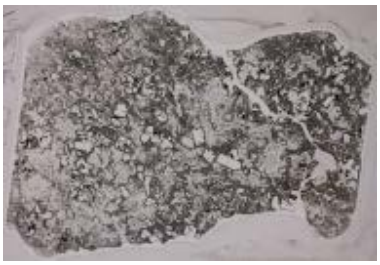
Vesicles original (%)	Vesicle fill (%)	Vesicle fill dominant	Vesicle fill 2nd order	Vesicle fill 3rd order	Vesicle fill comment
1	100	clay minerals	zeolite		

THIN SECTION LABEL ID: **350-U1437E-51R-2-W 42/46-TSB-TS_138** Thin section no.: 138

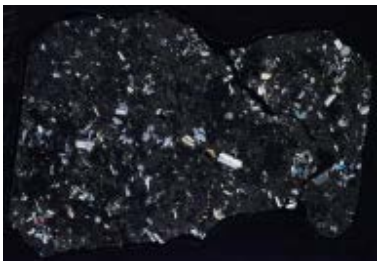
Unit/Subunit: Piece no.: Observer: DEBA

Thin section summary: highly pyroxene plagioclase phyric andesite, hypocrystalline with patchy devitrification

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Lithology:	highly augite-plagioclase phyric andesite clast	Texture:	hypocrystalline
Grain size:	cryptocrystalline	Grain size distribution:	seriate

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	20	1	microphenocrysts to phenocrysts
Clinopyroxene	5	0.5	no microphenocrysts
Opaques	1	0.3	

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	74	40	clay minerals			
Patch	5	100	epidote			

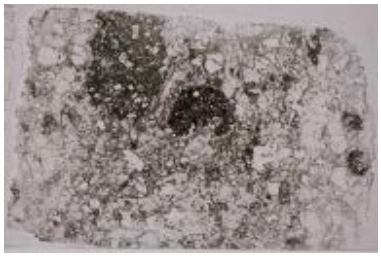
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Clinopyroxene	5	1	clay minerals			
Plagioclase	20	10	clay minerals			

THIN SECTION LABEL ID: **350-U1437E-54R-2-W 10/14-TSB-TS_139** Thin section no.: 139

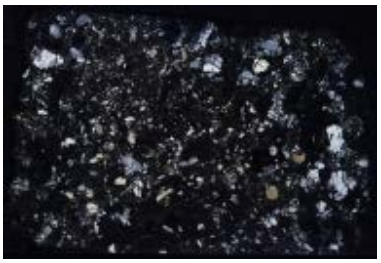
Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Lapilli-tuff with plagioclase-phyric andesite clasts and colorless glassy matric

Plane-polarized:



Cross-polarized:



SEDIMENT

Dominant particles: vitric **2nd order particles:** lithic **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	glass, dense	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	1	clinopyroxene	subhedral	0.5			

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	glass, dense	rounded				
Lithic	volcanic, evolved	sub-rounded				

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: Domain rel. abundance (%):

Lithology:	moderately augite-plagioclase phyric andesite clast	Texture:	polycrystalline
Grain size:	microcrystalline	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	18	0.5	euhedral
Clinopyroxene	2	0.2	sub

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	20	60	clay minerals	chlorite	chalcedony	
Clast	60	30	clay minerals	chalcedony	chlorite	sometime along fractures and includes zeolite
Patch	5	100	clay minerals	chlorite	chalcedony	carbonate

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Clinopyroxene	2	10	clay minerals			
Plagioclase	18	10	clay minerals	chlorite		

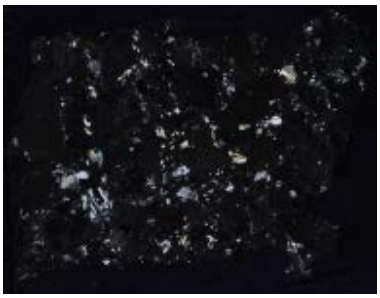
THIN SECTION LABEL ID: **350-U1437E-55R-1-W 18/21-TSB-TS_143** Thin section no.: 143

Unit/Subunit: Piece no.: Observer: RIBE

Thin section summary: matrix-supported polymictic lapilli-tuff with glassy matrix, pumice lapilli. Glass is mostly altered into clay.

Plane-polarized:

Cross-polarized:



SEDIMENT

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	glass, dense	angular	-- -- -- -- --	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.5	clinopyroxene	subhedral	0.7	opaque	euhedral	0.1

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric	pumice	rounded				
Lithic						

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: Domain rel. abundance (%):

Lithology:	sparsely plagioclase phyric andesite pumice	Texture:	highly vesicular
Grain size:	microcrystalline	Grain size distribution:	equigranular

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	1	0.2	subhedral

Sample domain name: **volcanic clast, evolved** Domain no.: Domain rel. abundance (%):

Lithology:	sparsely plagioclase phyric andesite pumice	Texture:	highly vesicular
Grain size:	microcrystalline	Grain size distribution:	equigranular

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	3	0.3	subhedral

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	40	50	clay minerals	chalcedony	chlorite	
Clast	60	30	clay minerals	chalcedony	chlorite	a red clast is altered to clays
Patch	5	100	chalcedony	clay minerals	amphibole, pale or colorless	

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Clinopyroxene	10	5	clay minerals			
Plagioclase	5	5	clay minerals			
Glass	80	50	clay minerals			

THIN SECTION LABEL ID: **350-U1437E-55R-2-W 68/71-TSB-TS_144** Thin section no.: 144

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Lapillistone with three augite-plagioclase phyric andesite clast and no matrix

Plane-polarized:

Cross-polarized:

SEDIMENT

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.5	clinopyroxene	euhedral	0.5			

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric						
Lithic	volcanic, evolved	rounded				

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: 1 Domain rel. abundance (%):

Lithology:	sparsely augite-plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	microcrystalline	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	3	0.5	
Clinopyroxene	1	0.5	

Sample domain name: **volcanic clast, evolved** Domain no.: 2 Domain rel. abundance (%):

Lithology:	moderately augite-plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	microcrystalline	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	12	1	some with resorbed glassy cores
Clinopyroxene	3	0.5	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 60

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals	carbonate		
Clast			clay minerals			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	10	2	clay minerals			
Glass	40	40	clay minerals			

Vesicles original (%)	Vesicle fill (%)	Vesicle fill dominant	Vesicle fill 2nd order	Vesicle fill 3rd order	Vesicle fill comment
10	8	zeolite	carbonate		

THIN SECTION LABEL ID: **350-U1437E-55R-4-W 66/70-TSB-TS_145** Thin section no.: 145

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: andesitic tuff with an altered vitric matrix with plagioclase and clinopyroxene crystals

Plane-polarized:

Cross-polarized:

SEDIMENT

General domain comment: one grain of quartz with melt imclusion?

Dominant particles: vitric **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	glass, dense		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	euhedral	0.5	clinopyroxene	subhedral	0.5			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 60

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			chlorite	clay minerals		

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	15	5	clay minerals	epidote		
Glass			chlorite	clay minerals		

Vesicles original (%)	Vesicle fill (%)	Vesicle fill dominant	Vesicle fill 2nd order	Vesicle fill 3rd order	Vesicle fill comment
5	0				

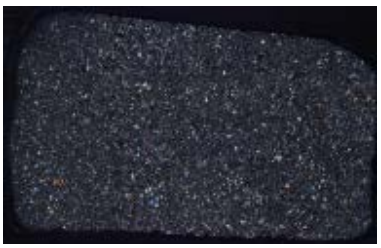
THIN SECTION LABEL ID: **350-U1437E-57R-1-W 55/57-TSB-TS_146** Thin section no.: 146

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Crystal-rich andesitic tuff clast with plagioclase and pyroxene

Plane-polarized:

Cross-polarized:



SEDIMENT

Dominant particles: crystal **2nd order particles:** vitric **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	glass, dense		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	anhedral	0.3	clinopyroxene	anhedral	0.3			

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric						
Lithic	volcanic, evolved	sub-rounded				

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 50

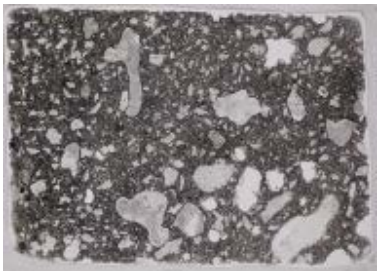
Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

THIN SECTION LABEL ID: **350-U1437E-57R-2-W 5/7-TSB-TS_147** Thin section no.: 147

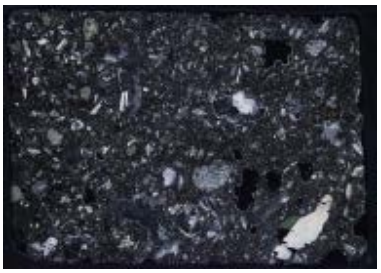
Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: highly vesicular, highly augite-plagioclase phyric andesite clast

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Lithology:	highly augite-plagioclase phyric andesite clast	Texture:	polycrystalline
Grain size:	fine grained	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	28	1	
Clinopyroxene	2	0.2	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 40

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	28	10	clay minerals	epidote		along fractures
Glass			clay minerals			

Vesicles original (%)	Vesicle fill (%)	Vesicle fill dominant	Vesicle fill 2nd order	Vesicle fill 3rd order	Vesicle fill comment
30	20	zeolite	epidote		

THIN SECTION LABEL ID: **350-U1437E-57R-2-W 20/22-TSB-TS_148** Thin section no.: 148

Unit/Subunit: Piece no.: Observer: STRA

Thin section summary: boundary of phyric augite-plagioclase andesite clast against clast-supported, polymictic lapillituff

Plane-polarized:

Cross-polarized:

SEDIMENT

Dominant particles: lithic **2nd order particles:** crystal **3rd order particles:** vitric

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	0.6						

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: Domain rel. abundance (%):

Lithology:	highly augite-plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	fine grained	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	28	1	plagioclase is incipiently altered
Clinopyroxene	2	0.5	mostly altered, fresh clinopyroxene is rare

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	70	0				

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Clinopyroxene	2	90	amphibole, brown			
Plagioclase	28	10	sericite	chlorite		

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	20	100	clay minerals	prehnite	chlorite	zeolite
Clast	75	70	clay minerals	prehnite		

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	5	30	chalcedony	chlorite		

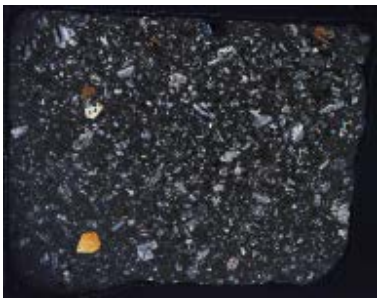
THIN SECTION LABEL ID: **350-U1437E-58R-1-W 41/43-TSB-TS_149** Thin section no.: 149

Unit/Subunit: Piece no.: Observer: NICH

Thin section summary: highly augite-plagioclase phyric andesite clast; mafic crystal phase completely replaced -> olivine shapes and fractures

Plane-polarized:

Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Lithology:	highly augite-plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	microcrystalline	Grain size distribution:	seriate

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	29	0.8	partially resorbed, crystallized inclusions
Clinopyroxene	1	1	fresh

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	30	33	clay minerals			

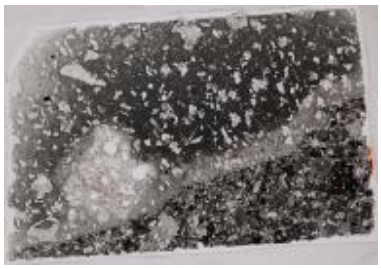
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Olivine	1	100	chlorite	iddingsite		difficult to determine for certain; mafic phase replaced could be cpx
Plagioclase	29	20	clay minerals	epidote		

THIN SECTION LABEL ID: **350-U1437E-59R-1-W 77/79-TSB-TS_150** Thin section no.: 150

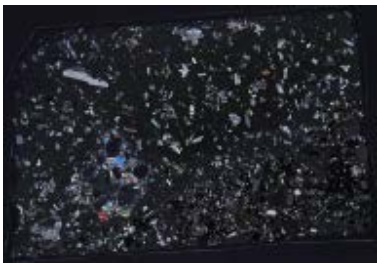
Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: lapilli-tuff with a single clast of highly augite-plagioclase phyric andesite and chilled margin

Plane-polarized:



Cross-polarized:



SEDIMENT

Dominant particles: lithic **2nd order particles:** **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal									

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: Domain rel. abundance (%):

Lithology:	highly augite-plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	microcrystalline	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	20	1	partially resorbed, crystallized inclusions
Clinopyroxene	5	0.8	fresh

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	40	35	clay minerals			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	25	15	clay minerals	epidote		

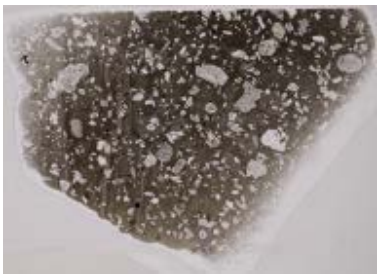
Vesicles original (%)	Vesicle fill (%)	Vesicle fill dominant	Vesicle fill 2nd order	Vesicle fill 3rd order	Vesicle fill comment
		zeolite			

THIN SECTION LABEL ID: **350-U1437E-59R-2-W 16/19-TSB-TS_151** Thin section no.: 151

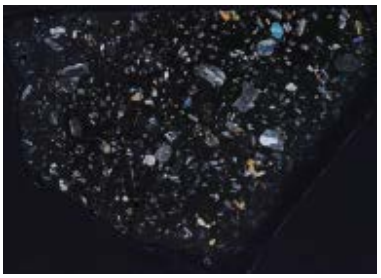
Unit/Subunit: Piece no.: Observer: DEBA

Thin section summary: Highly pyroxene-plagioclase phyric andesite with large opx crystal with mantle of brown alteration. Many pseudomorphed mafic minerals (all opx? some ol?)

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Lithology:	highly orthopyroxene-clinopyroxene-plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	microcrystalline	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	15	1	
Clinopyroxene	7	1	
Orthopyroxene	1	2	one 2 mm partially altered crystal
Opaques	0.5	0.3	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 5

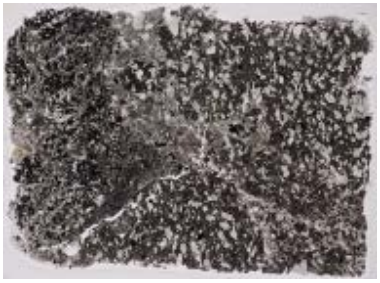
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Orthopyroxene			clay minerals			

THIN SECTION LABEL ID: **350-U1437E-66R-5-W 84/86-TSB-TS_152** Thin section no.: 152

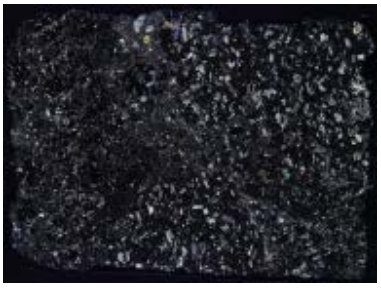
Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: clast supported lapilli-tuff with highly clinopyroxene plagioclase phyric andesite clast

Plane-polarized:



Cross-polarized:



SEDIMENT

Dominant particles: lithic **2nd order particles:** fine-grained, unknown **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	pumice	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	feldspar	subhedral	1	clinopyroxene	subhedral	1	opaque	subhedral	1

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric						
Lithic	volcanic, evolved	sub-rounded				

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: Domain rel. abundance (%):

Lithology:	highly clinopyroxene plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	cryptocrystalline	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	25	0.8	subhedral, some are fragmented, some occur in glomerocrysts with cpx, all are altered giving a dappled effect
Clinopyroxene	5	0.4	Subhedral. Some occur in glomerocrysts.
Opaques	2	0.2	

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Patch		10	chalcedony	chlorite		

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Clinopyroxene	5	10	amphibole	chlorite		
Amphibole	1	100	chlorite			
Plagioclase	25	50	sericite	chlorite		
Glass	59	80	devitrification	clay minerals	chlorite	was a glassy groundmass to the clasts

Vesicles original (%)	Vesicle fill (%)	Vesicle fill dominant	Vesicle fill 2nd order	Vesicle fill 3rd order	Vesicle fill comment
5	100	chalcedony	chlorite	clay minerals	

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	20	100	chlorite	clay minerals	chalcedony	
Clast	70	80	devitrification	clay minerals		clasts in host are fragmented in the matrix but most are different to the main clast.
Patch		20		clay minerals	chlorite	

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	10	50	sericite	chlorite		
Clinopyroxene		0				
Glass						clast groundmass was formerly glassy

Vesicles original (%)	Vesicle fill (%)	Vesicle fill dominant	Vesicle fill 2nd order	Vesicle fill 3rd order	Vesicle fill comment
5	100	chlorite	chalcedony	clay minerals	vesicles in clasts

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	75	30	clay minerals			

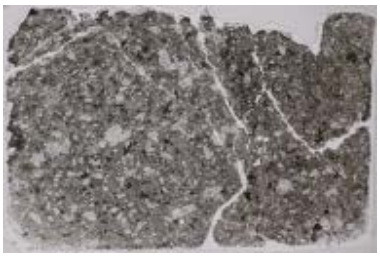
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Clinopyroxene	10	0				
Plagioclase	15	70	sericite	chalcedony	chlorite	

THIN SECTION LABEL ID: **350-U1437E-69R-2-W 68/70-TSB-TS_153** Thin section no.: 153

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Highly augite-plagioclase phyric andesite clast with orthopyroxene replaced by chlorite

Plane-polarized:



Cross-polarized:

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: Domain rel. abundance (%):

Lithology:	highly augite-plagioclase-olivine phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	microcrystalline	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	20	0.7	euhedral
Clinopyroxene	5	0.5	subhedral

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

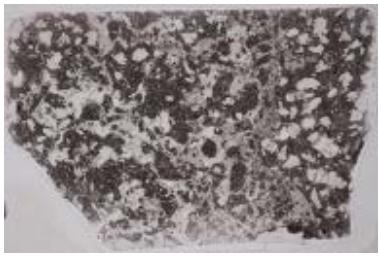
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	20	15	clay minerals	epidote		
Orthopyroxene			chlorite			

THIN SECTION LABEL ID: **350-U1437E-70R-2-W 53/55-TSB-TS_154** Thin section no.: 154

Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Moderately augite-plagioclase phyric, moderately vesicular andesite clast

Plane-polarized:



Cross-polarized:

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: Domain rel. abundance (%):

Lithology:	moderately augite-plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	microcrystalline	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	13	0.5	euhedral
Clinopyroxene	2	0.5	

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	13	10	clay minerals	epidote		

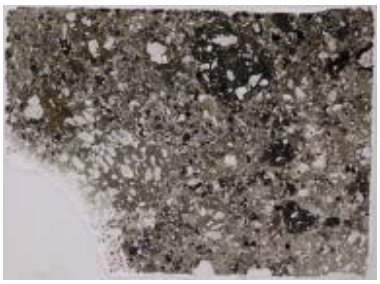
Vesicles original (%)	Vesicle fill (%)	Vesicle fill dominant	Vesicle fill 2nd order	Vesicle fill 3rd order	Vesicle fill comment
20	15	zeolite	clay minerals		

THIN SECTION LABEL ID: **350-U1437E-70R-2-W 86/89-TSB-TS_155** Thin section no.: 155

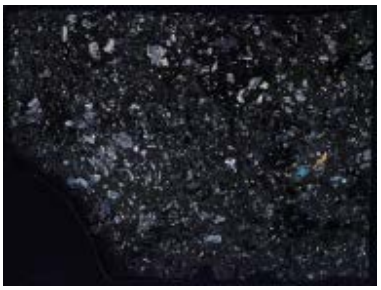
Unit/Subunit: Piece no.: Observer: BERG

Thin section summary: Clast supported andesitic lapilli-tuff with moderately augite plagioclase phyric andesite clasts

Plane-polarized:



Cross-polarized:



SEDIMENT

Dominant particles: lithic **2nd order particles:** **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	feldspar	euhedral	0.5	clinopyroxene	subhedral	0.5			

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric						
Lithic	volcanic, evolved					

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: Domain rel. abundance (%):

Lithology:	moderately augite-plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	microcrystalline	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	13	0.5	
Clinopyroxene	2	0.5	

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass			clay minerals	chlorite		

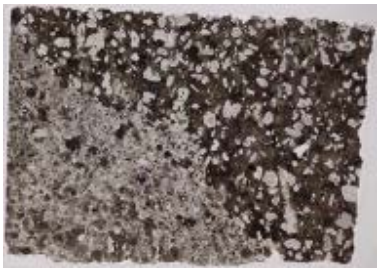
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	13	10	clay minerals	epidote		
Glass			clay minerals			

THIN SECTION LABEL ID: **350-U1437E-70R-2-W 102/105-TSB-TS_156** Thin section no.: 156

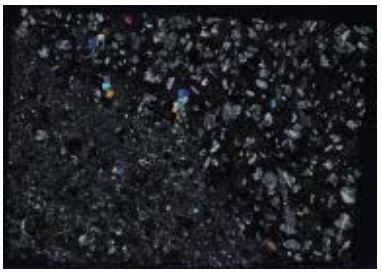
Unit/Subunit: Piece no.: Observer: RIBE

Thin section summary: Angular moderately pyroxene-feldspar andesitic clast with jig saw fits. Host rock is tuff.

Plane-polarized:



Cross-polarized:



SEDIMENT

General domain comment: andesitic clast in tuff with jig saw fits

Dominant particles: lithic **2nd order particles:** vitric **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	glass, dense		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	feldspar	anhedral	0.1	clinopyroxene	subhedral	0.3	opaque	euhedral	0.1

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric						
Lithic	volcanic, evolved	angular				

PRIMARY (IGNEOUS) MINERALOGY

Lithology:	moderately pyroxene feldspar phyric andesite clast	Texture:	glomeroporphyritic
Grain size:	medium grained	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	13	1.4	sieve texture, not well preserved, zoning
Clinopyroxene	2	0.7	poecelitic
Opaques	1	0.3	

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	80	50	clay minerals			
Patch	5	100	chlorite	clay minerals		

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	20	40	chlorite	clay minerals		

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	50	80	chlorite	clay minerals		
Clast	40	70	clay minerals	chlorite		

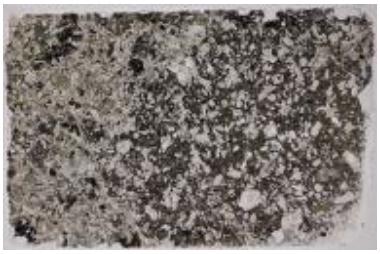
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Clinopyroxene	1	10	chlorite	clay minerals		
Plagioclase	9	70	chalcedony	chlorite		

THIN SECTION LABEL ID: **350-U1437E-70R-5-W 75/79-TSB-TS_157** Thin section no.: 157

Unit/Subunit: Piece no.: Observer: DEBA

Thin section summary: lapilli tuff with small and large clasts of highly amygdaloidal clinopyroxene plagioclase phyric andesite. Clasts have boundaries suggestive of in situ emplacement (coliform, engulf surrounding lapilli tuff)

Plane-polarized:



Cross-polarized:

SEDIMENT

Dominant particles: lithic **2nd order particles:** vitric **3rd order particles:**

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	glass, dense		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --	volcanic, mafic	sub-rounded	-- -- -- -- --			-- -- -- -- --
Crystal	plagioclase	subhedral	1	clinopyroxene	subhedral	1	opaque	anhedral	0.4

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric						
Lithic	volcanic, evolved	sub-rounded				

PRIMARY (IGNEOUS) MINERALOGY

Lithology:	amygdaloidal pyroxene-plagioclase phyric andesite clast	Texture:	porphyritic /
Grain size:	microcrystalline	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	10	1	
Clinopyroxene	5	1	

SECONDARY (ALTERATION) MINERALOGY

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase			clay minerals			

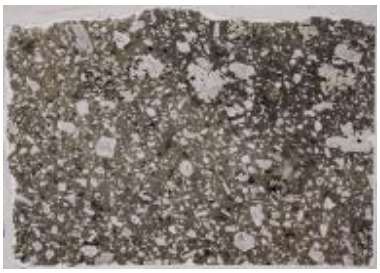
Vesicles original (%)	Vesicle fill (%)	Vesicle fill dominant	Vesicle fill 2nd order	Vesicle fill 3rd order	Vesicle fill comment
35	35	clay minerals	zeolite		

THIN SECTION LABEL ID: **350-U1437E-71R-3-W 76/79-TSB-TS_158** Thin section no.: 158

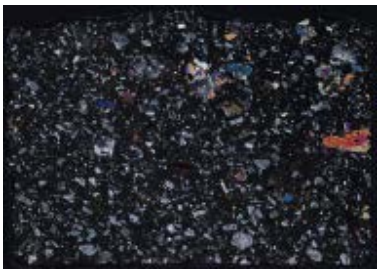
Unit/Subunit: Piece no.: Observer: RIBE

Thin section summary: moderately pyroxene-feldspar phyric andesitic clast

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Lithology:	moderately pyroxene feldspar phyric andesite clast	Texture:	non-vesicular
Grain size:	fine grained	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	14	1.2	sieve texture, exsolution, zoning
Clinopyroxene	2	2	poecelitic

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	83	0				
Patch	2	100	amphibole, green			

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Clinopyroxene	2	30	chlorite	amphibole	clay minerals	
Amphibole		80	clay minerals	chlorite		

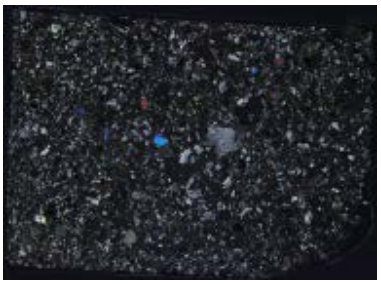
THIN SECTION LABEL ID: **350-U1437E-72R-4-W 85/89-TSB-TS_159** Thin section no.: 159

Unit/Subunit: Piece no.: Observer: ANDR

Thin section summary: coarse sand-sized tuff of plagioclase fragments, rounded and subrounded andesite lithics (plagioclase-phyric), and rare blocky glass shards. A few granule-sized lapilli.

Plane-polarized:

Cross-polarized:



SEDIMENT

Dominant particles: crystal **2nd order particles:** lithic **3rd order particles:** vitric

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	evolved shards	angular	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	feldspar	subhedral	0.2						

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	55	100	chlorite	clay minerals	chalcedony	
Clast	30	50	clay minerals			

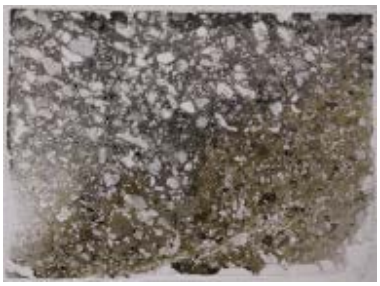
Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	15	60	chlorite	clay minerals	prehnite	

THIN SECTION LABEL ID: **350-U1437E-72R-4-W 116/119-TSB-TS_160** Thin section no.: 160

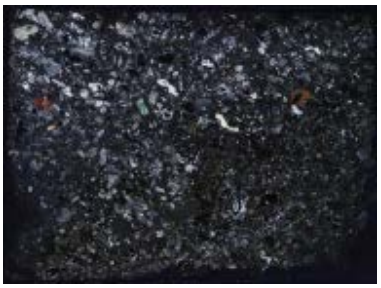
Unit/Subunit: Piece no.: Observer: RIBE

Thin section summary: Sharp and irregular contact between moderately feldspar pyric andesitic clast and green tuff

Plane-polarized:



Cross-polarized:



SEDIMENT

General domain comment: tuff is generally altered into chlorite

Dominant particles: lithic **2nd order particles:** vitric **3rd order particles:** crystal

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric	glass, dense		-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	feldspar	subhedral	1	clinopyroxene	subhedral	0.6	opaque	euhedral	0.2

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric						
Lithic	volcanic, evolved	angular				

PRIMARY (IGNEOUS) MINERALOGY

Lithology:	moderately pyroxene feldspar phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	medium grained	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	15	0.7	sieve texture, not well preserved, zoning
Clinopyroxene	3	1	poecelitic, mostly anhedral
Opaques	2	0.1	

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	75	50	clay minerals	chlorite		

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Clinopyroxene	3	10	chlorite			
Plagioclase	15	40	sericite	clay minerals	chlorite	

Vesicles original (%)	Vesicle fill (%)	Vesicle fill dominant	Vesicle fill 2nd order	Vesicle fill 3rd order	Vesicle fill comment
7	100	chalcedony	chl	clay minerals	zeolite

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	55	100	chlorite	clay minerals		
Clast	30	50	chlorite	clay minerals		
Patch	10	100	chlorite	clay minerals		

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Clinopyroxene	5	5	chlorite			
Plagioclase	10	30	chlorite	clay minerals		

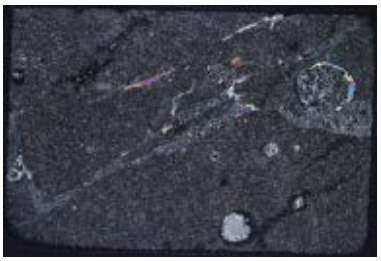
THIN SECTION LABEL ID: **350-U1437E-75R-3-W 65/68-TSB-TS_161** Thin section no.: 161

Unit/Subunit: Piece no.: Observer: RIBE

Thin section summary: Highly pyroxene-feldspar phyric andesitic clast with diabasic texture and alteration veins.

Plane-polarized:

Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Lithology:	highly pyroxene feldspar phyric andesite clast	Texture:	diabasic
Grain size:	microcrystalline	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	28	0.2	euhedral, intersertal, sieve texture, embayment and exsolutions.
Clinopyroxene	2	0.1	anhedral

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	70	70	chalcedony	chlorite	clay minerals	

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	28	90	chalcedony			

Vesicles original (%)	Vesicle fill (%)	Vesicle fill dominant	Vesicle fill 2nd order	Vesicle fill 3rd order	Vesicle fill comment
1	100	chlorite	clay minerals	chalcedony	

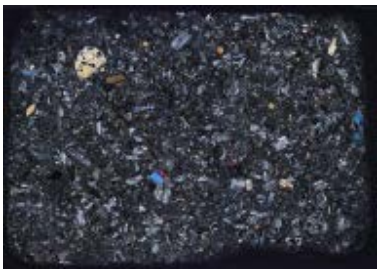
THIN SECTION LABEL ID: **350-U1437E-76R-1-W 78/81-TSB-TS_162** Thin section no.: 162

Unit/Subunit: Piece no.: Observer: BARK

Thin section summary: moderately pyroxene feldspar phyric andesite clast

Plane-polarized:

Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: Domain rel. abundance (%):

Lithology:	moderately pyroxene feldspar phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	microcrystalline	Grain size distribution:	bimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	15	1	sub
Clinopyroxene	5	0.6	
Opaques	1	0.1	

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	80	0				
Patch	5	100	zeolite	chlorite	chalcedony	

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Plagioclase	15	40	sericite	chlorite	clay minerals	

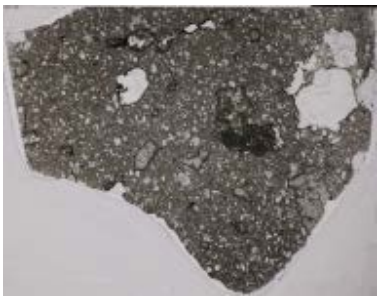
Vesicles original (%)	Vesicle fill (%)	Vesicle fill dominant	Vesicle fill 2nd order	Vesicle fill 3rd order	Vesicle fill comment
5	100	zeolite	chlorite	clay minerals	

THIN SECTION LABEL ID: **350-U1437E-77R-3-W 64/66-TSB-TS_163** Thin section no.: 163

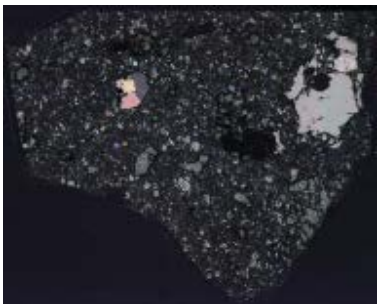
Unit/Subunit: Piece no.: Observer: NICH

Thin section summary: moderately augite-plagioclase phyric andesite clast, microporphyritic, with patches of alteration and filled vesicles (moderately vesicular)

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Lithology:	moderately augite-plagioclase phyric andesite clast	Texture:	microporphyritic
Grain size:	microcrystalline	Grain size distribution:	seriate

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	9	0.5	sieve texture, resorbed crystals
Clinopyroxene	1	0.2	

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Patch	5	100	chalcedony	clay minerals		

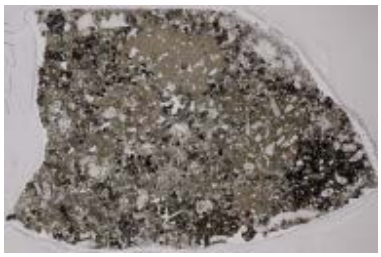
Vesicles original (%)	Vesicle fill (%)	Vesicle fill dominant	Vesicle fill 2nd order	Vesicle fill 3rd order	Vesicle fill comment
15	100	carbonate	chalcedony	clay minerals	carbonate fills large irregular shaped vesicles

THIN SECTION LABEL ID: **350-U1437E-77R-3-W 100/101-TSB-TS_164** Thin section no.: 164

Unit/Subunit: Piece no.: Observer: ANDR

Thin section summary: medium sand to granule lapilli-tuff - feldspar and lithic-rick matrix, and green (non-vesicular) and red (scoriaceous) lapilli

Plane-polarized:



Cross-polarized:

SEDIMENT

Dominant particles: fine-grained, unknown **2nd order particles:** crystal **3rd order particles:** lithic

Grain Type	Dominant grains	Dominant roundness	Dominant max size (mm)	2nd order grains	2nd order roundness	2nd order max size (mm)	3rd order grains	3rd order roundness	3rd order max size (mm)
Vitric			-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Lithic	volcanic, evolved	sub-rounded	-- -- -- -- --			-- -- -- -- --			-- -- -- -- --
Crystal	feldspar	subhedral	0.1						

Clast Type	Dominant clasts	Dominant clast roundness	2nd order clasts	2nd order clast roundness	3rd order clasts	3rd order clast roundness
Vitric						
Lithic	volcanic, evolved	sub-rounded	volcanic, evolved	sub-rounded		

PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic clast, evolved** Domain no.: 1 Domain rel. abundance (%): 70

Lithology:	sparsely plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	microcrystalline	Grain size distribution:	unimodal

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	2	0.2	

Sample domain name: **volcanic clast, evolved** Domain no.: 2 Domain rel. abundance (%): 30

Lithology:	sparsely plagioclase phyric andesite clast	Texture:	porphyritic / porphyry
Grain size:	cryptocrystalline	Grain size distribution:	seriate

Phenocrysts	Present [%]	Size mode (mm)	Comments
Plagioclase	5	0.25	sieve textured

SECONDARY (ALTERATION) MINERALOGY

Alteration Domain	Original [%]	Altered [%]	DOMINANT	2nd Order	3rd Order	Comments
Groundmass	70	100	stilpnomelane	clay minerals	chlorite	
Clast	30	40	clay minerals	stilpnomelane		

Mineral	Original [%]	Altered [%]	DOMINANT	2nd ORDER	3rd ORDER	Comment
Clinopyroxene	5	20	stilpnomelane			
Plagioclase	5	50	clay minerals	chlorite		

Vesicles original (%)	Vesicle fill (%)	Vesicle fill dominant	Vesicle fill 2nd order	Vesicle fill 3rd order	Vesicle fill comment
5	100	stilpnomelane	clay minerals	chlorite	vesicles in clasts