

Figure F1. Bathymetric map of the western Spitsbergen (Svalbard) archipelago margin, eastern Fram Strait, where Expedition 403 took place. Sites U1621–U1623 are located in the Bellsund drift, the southernmost sector cored during the expedition. Pink dots = Ocean Drilling Program sites of reference drilled during the previous expedition to the region (Leg 151 in the Yermak Plateau and the western Spitsbergen margin).

Figure F2. Correlation matrix of elements (Rb, K, Fe, Si, Al, Ti, Zr, S, Mn, Br, Ca, and Sr) measured at a low resolution on the primary splice, Site U1623. The lower left triangle is a representation of the complete correlation between elements; the upper right triangle is a representation of the statistically significant correlations ($p < 0.05$). Correlation is represented on a color gradient from intense blue (positive correlation) to intense red (negative correlation). Lighter blue and red colors indicate weak positive and negative correlations, respectively. The matrix was computed in R using Spearman rank correlations.

Figure F3. Correlation matrices of elements (Rb, K, Fe, Si, Al, Ti, Zr, S, Mn, Br, Ca, and Sr) measured at a low resolution on the primary splice of Site U1623 for Unit I, Subunit IIA, and Subunit IIB. The representation includes just the statistically significant correlations ($p < 0.05$). Correlation is represented on a color gradient from intense blue (positive correlation) to intense red (negative correlation). Lighter blue and red colors indicate weak positive and negative correlations, respectively. The matrices were computed in R using Spearman rank correlations.

Figure F4. Shipboard MS and spectral NGR with low-resolution XRF core scans at Site U1623 performed over the primary splice (Lucchi et al., 2026a). instr. units = dimensionless instrumental units, cps = counts per second. Unit I: silty clay with sandy mud, occasional diamictos, and variable clast content and bioturbation; Subunits IIA and IIB: silty clay with increased sandy mud and diamicton (St. John et al., 2026).

Figure F5. Shipboard MS and spectral NGR with low-resolution XRF core scans at Site U1623 performed over the primary splice. instr.units = dimensionless

instrumental units, cps = counts per second. Elemental ratios are presented as ln ratios. Levels of excitation, 10kV and 30kV, are indicated. Unit I: silty clay with sandy mud, occasional diamictos, and variable clast content and bioturbation; Subunits IIA and IIB: silty clay with increased sandy mud and diamicton (St. John et al., 2026).

Figure F6. Shipboard MS and spectral NGR with low-resolution XRF core scans at Site U1623 performed over the alternate splice. instr. units = dimensionless instrumental units, cps = counts per second. Elemental ratios are presented as ln ratios. Lithostratigraphic Unit I is shown (Lucchi et al., 2026a). Levels of excitation, 10kV and 30kV, are indicated. Below ~38 m CCSF-A, XRF scans are on primary splice as shown in Figures F2 and F3. Two additional alternate splice sections not shown in this plot are 403-U1623D-13H-6A (120.320–120.720 m CCSF-A) and 403-U1623C-20F-1A (140.436–141.136 m CCSF-A).

Figure F7. Shipboard MS and spectral NGR with high-resolution XRF core scans (403-U1623F-2H-2A and 2H-3A and 3H-1A and 3H-2A; Lithostratigraphic Unit I). instr.units = dimensionless instrumental units, cps = counts per second. Elemental ratios are presented as ln ratios. Levels of excitation, 10kV and 30kV, are indicated.

Figure F8. Shipboard MS and spectral NGR with high-resolution XRF core scans (403-U1623G-1H-1A through 1H-5A, 2H-1A through 2H-6A, and 3H-1A; Lithostratigraphic Unit I). instr. units = dimensionless instrumental units, cps = counts per second. Elemental ratios are presented as ln ratios. Levels of excitation, 10kV and 30kV, are indicated.

Figure F9. Shipboard MS and spectral NGR with high-resolution XRF core scans (403-U1623A-10H-6A; Lithostratigraphic Unit I). instr. units = dimensionless instrumental units, cps = counts per second. Elemental ratios are presented as ln ratios. Levels of excitation, 10kV and 30kV, are indicated.