Figure F1. Bathymetric map showing the locations of Sites U1618 and U1619 on the eastern and western terminations of the Vestnesa Ridge sediment drift, respectively. Site U1618 is located ~22 km from the shelf edge of the Kongsfjorden glacial trough in northwestern Spitsbergen. The Molloy Transform Fault (MTF) is parallel to and south of the Vestnesa Ridge and connects the actively spreading Knipovich and Molloy Ridge segments. ODP Site 909 is located on an abyssal hill south of the MTF. Inset: close-up view of Holes U1618A–U1618C. Holes U1618B and U1618C are respectively located 50 and 25 m southeast of Hole U1618A along Seismic Line CAGE20-5-HH-02-2D. Seismic trace numbers (yellow) are shown.

Figure F2. Seismic profile along northwest–southeast Seismic Line CAGE20-5-HH-02-2D showing the location of Site U1618. Interpreted reflectors R1, R5, and R7 and the maximum penetration depth (414 mbsf) are shown. Time is two-way traveltime.

Figure F3. Paired core photographs (left) and X-radiographs (right; black = high density) showing typical lithologies, Holes U1618B and U1618C. A. Structureless silty clay. B. Gravel layer. C. Silty clay with common clasts. D. Transition from sandy mud with abundant clasts (bottom) into slightly bioturbated clay. E. Large clast (>3 cm). F. Muddy diamicton with large clasts.

Figure F4. Paired core photographs (left) and X-radiographs (right; black = high density) showing sedimentologic features, Hole U1618B. A. Authigenic iron sulfides nodules. B. Authigenic carbonate concretions. C. Debrite with contorted muddy clasts and layers in a muddy matrix.

Figure F5. Paired core photographs (left) and X-radiographs (right; black = high density) showing laminations, Hole U1618B. A. Planar laminations. B. Faint lamination in moderately biscuited sediments.

Figure F6. Paired core photographs (left) and X-radiographs (right; black = high density) showing bioturbation, Holes U1618B and U1618C. A, C. Moderate bioturbation with iron-sulfide burrow infillings. B. Bioturbated silty clay and a sandy silt layer with clasts. D. Moderately bioturbated clay in biscuited sediments.

Figure F7. Lithostratigraphic correlation, Site U1618. Unit and subunit boundaries are displayed in relation to their location at section breaks and within core sections rather than at the corresponding depth because overlapping sections occurred due to gas expansion and are not correctly displayed on the CSF-A depth scale. Core lithology is simplified by grouping (silty/sandy) clay and clay; (clayey/sandy) silt, silt and sandy mud; (clayey/silty) sand and sand; (sandy/muddy) gravel and gravel; and (muddy/sandy) diamicton. Clast abundance, laminations, degree of bioturbation, and degree of drilling disturbance are all color coded and shown as histograms.

Figure F8. Downhole mineralogy from smear slide analysis, Hole U1618C.

Figure F9. Physical properties, Hole U1618A. Whole-round MS is shown in two different scales, red [0–4000 IU] to display the full range observed, highlighting the high values related to iron sulfide minerals, and blue [0–200 IU] to display the variability of the sediment where iron sulfide minerals are not dominant. Density and CIELAB L*, a*, and b* are displayed as dots superimposed with an 11-point running mean. Unit and subunit boundaries are displayed in relation to their location at section breaks and within core sections rather than at the corresponding depth because overlapping sections occurred due to gas expansion and are not correctly displayed on the CSF-A depth scale. cps = counts per second. For lithology legend see Figure F7.

Figure F10. Physical properties, Hole U1618B. Whole-round MS is shown in two different scales, red [0–4000 IU] to display the full range observed, highlighting the high values related to iron sulfide minerals, and blue [0–200 IU] to display the variability of the sediment where iron sulfide minerals are not dominant. Density and CIELAB L*, a*, and b* are displayed as dots superimposed with an 11-point running mean. Unit and subunit boundaries are displayed in relation to their location at section breaks and within core sections rather than at the corresponding depth because overlapping sections occurred due to gas expansion and are not correctly displayed on the CSF-A depth scale. For lithology legend see Figure F7. cps = counts per second.

Figure F11. Physical properties, Hole U1618C. Whole-round MS is shown in two different scales, red [0–4000 IU] to display the full range observed, highlighting the high values related to iron sulfide minerals, and blue [0–200 IU] to display the variability of the sediment where iron sulfide minerals are not dominant. Density and CIELAB L*, a*, and b* are displayed as dots superimposed with an 11-point running mean. Unit and subunit boundaries are displayed in relation to their location at section breaks and within core sections rather than at the corresponding depth because overlapping sections occurred due to gas expansion and are not correctly displayed on the CSF-A depth scale. For lithology legend see Figure F7. cps = counts per second.

Figure F12. Ternary diagram of sand (top), silt (bottom left), and clay (bottom right) percentages of sediment as inferred from smear slides, Hole U1618C.

Figure F13. XRD results, Site U1618. Calculated relative abundances of different clay minerals are shown. Visual core descriptions for Holes U1618A–U1618C show lithologic changes downhole.

Figure F14. Biostratigraphic summary, Site U1618. Letters in parentheses = hole(s) where the event is observed.

Figure F15. Age-depth model, Site U1618. All encountered biostratigraphic and paleomagnetic datums are shown. Calcareous nannofossils: Ehux = LO *E. huxleyi*, Gcar = acme *G. caribbeanica*, Geph.sm = LDO small *Gephyrocapsa*, Geph.med = LO medium *Gephyrocapsa*, Cpel = *C. pelagicus*. Diatoms: P.cf.curv = HO *P.* cf. *curvirostris*. Dinocysts: Pstel = occurrence of *P. stellatum*, Ffil = HO *F. filifera*, Htec = HO *H. tectata*. Foraminifers: Gobl = LO *G. obliquus*. Paleomagnetic boundaries: B/M = Bruhnes/Matuyama boundary, M/G = Matuyama/Gauss boundary.

Figure F16. Biostratigraphy and paleoenvironment, Hole U1618A.

Figure F17. Biostratigraphy and paleoenvironment, Hole U1618B.

Figure F18. Biostratigraphy and paleoenvironment, Hole U1618C.

Figure F19. Interval containing several centimeter-scale greigite nodules (403-U1618B-25X-1). A. MS, NRM intensity after 30 mT peak AF demagnetization, and inclination after 30 mT AF demagnetization. This interval has among the highest MS values measured at Site U1618, and the inclination indicates the possibility for both reverse and normal magnetized sediments in this section. B, C. Photograph and X-ray image of the nodules. D. AF demagnetization of an ARM and 300 mT IRM (IRM300) imparted to the sample (Table T5). E. Bulk XRD results of the nodule confirming the sample is mostly greigite and associated with siderite.

Figure F20. Rock magnetic data collected on sediments, Site U1618. Green stars/dashed lines = greigite nodule. IRM100 = IRM acquired after 100 mT. IRM300 = IRM acquired after 300 mT. HIRM = hard IRM. 30mT (subscript) = measurement after 30 mT peak AF demagnetization.

Figure F21. Inclinations measured on archive-half sections, Site U1618. Dashed lines = predicted values for a GAD at this latitude (see Table T5 in the Expedition 403 methods chapter [Lucchi et al., 2026]).

Figure F22. Archive-half paleomagnetic measurements around and below the onset of what is interpreted to be Chron C1n (Brunhes), Site U1618. MS was measured on the WRMSL. NRM intensity and inclination were taken after 15 mT peak AF demagnetization.

Figure F23. Representative AF demagnetization behavior of discrete cube samples, Holes U1618A and U1618B. Blue squares are in the vertical (*X*, *Z*) plane; red line is in the horizontal (*X*, *Y*) plane.

Figure F24. Archive-half and discrete sample paleomagnetic measurements, Site U1618. Archive-half NRM intensity and inclination are plotted after 15 mT peak AF demagnetization for APC/HLAPC cores and 30 mT peak AF demagnetization for XCB cores. Shading is proportional to the difference from predicted inclinations based on a GAD. Cube samples are plotted as symbols and are the ChRM determined through PCA analysis. Colored symbols = more reliable data with ARM_{30mT}/ARM values < 0.65 and maximum angular deviation values < 20°. Polarity interpretation focused on defining the major polarity zones and can be correlated to the major polarity zones of the geomagnetic polarity timescale (GPTS). Black = normal, white = reverse, gray = intervals that may represent shorter polarity zones but require further investigation.

Figure F25. Physical properties, Site U1618. Lines = running averages. cps = counts per second.

Figure F26. MS, Site U1618. Measurements were taken on whole rounds using a pass-through loop sensor (WRMSL) and on split archive-half sections using a point-source sensor (SHMSL).

Figure F27. NGR, GRA bulk density, and MS, Site U1618. Circles = Hole U1618A, triangles = Hole U1618B, Xs = Hole U1618C. cps = counts per second.

Figure F28. GRA bulk density and MAD, Site U1618. Measurements were made on the WRMSL (GRA) and discrete samples (MAD).

Figure F29. MAD parameters, Site U1618.

Figure F30. Thermal conductivity, Site U1618. Orange = individual measurements, orange lines = SD, purple = averages.

Figure F31. ASR initial results, Sample 403-U1618B-6H-9, 81–91 cm. Top: temperature monitoring data used to ensure water bath temperatures were stable. Middle: results from a dummy channel used to ensure that the data logger was operating correctly. Bottom: average values of the 11 ASR measurements collected from the 18 strain gauges every 10 min over ~14 days.

Figure F32. ASR initial results, Sample 403-U1618A-40X-4, 0–10 cm. Top: temperature monitoring data used to ensure water bath temperatures were stable. Middle: results from a dummy channel used to ensure that the data logger was operating correctly. Bottom: average values of the 11 ASR measurements collected from the 18 strain gauges every 10 min over ~14 days.

Figure F33. ASR initial results, Sample 403-U1618B-53X-2, 0–10 cm. Top: temperature monitoring data used to ensure water bath temperatures were stable. Middle: results from a dummy channel used to ensure that the data logger was operating correctly. Bottom: average values of the 11 ASR measurements collected from the 18 strain gauges every 10 min over ~14 days.

Figure F34. Violin plots summarizing physical property associations with preliminary lithostratigraphic units/subunits, Hole U1618A. cps = counts per second.

Figure F35. WRMSL MS data, Holes U1618A–U1618C. Top: MS splice constructed by combining data from all holes. Break in scale is due to high values at some depths with high concentration of authigenic greigite minerals.

Figure F36. Spliced composite records of reflectance spectroscopy and colorimetry (RSC) a*, red-green-blue (RGB) red, WRMSL MS, and NGR, Site U1618. cps = counts per second.

Figure F37. Depth scale offset, Site U1618. A. Comparison of CSF-A and CCSF depth scales in the splice and equations to convert between them. B. Growth of cumulative depth offset.

Figure F38. IW chloride, sodium, and salinity, Site U1618. Black arrows = average seawater values.

Figure F39. IW sulfate, alkalinity, iron, and manganese, Site U1618. Black arrows = average seawater values.

Figure F40. IW calcium, magnesium, strontium, silicon, barium, and lithium, Site U1618. Black arrows = average seawater values.

Figure F41. IW potassium and boron, Site U1618. Black arrows = average seawater values.

Figure F42. IW ammonium and phosphate, Site U1618. Black arrows = average seawater values.

Figure F43. Bulk sediment contents of $CaCO_3$, TC, TOC, TN, and C/N ratio, Site U1618.

Figure F44. Bulk sediment contents of TS, Site U1618.

Figure F45. Methane (CH_4) and ethane (C_2H_6) concentrations and methane/ethane (C_1/C_2) ratios measured on headspace samples from 5 cm^3 of sediment, Holes U1618A–U1618C.

Figure F46. Low-resolution sedaDNA sampling, Hole U1618B. Dots = samples.

Figure F47. High-resolution sedaDNA targeted sampling of the recent past to MIS 5e, Hole U1618C. Blue line = MS data used to help refine sampling strategy, dots = samples.

Figure F48. Formation temperature, Holes U1618A and U1618B. Dashed line = linear regression result.

Figure F49. Downhole operations for triple combo and FMS-sonic tool strings, Hole U1618B. DSF = drilling depth below seafloor.

Figure F50. Downhole logging data from the triple combo and FMS-sonic tool strings, Hole U1618B. Data sets and abbreviations are shown in Table T15.

Figure F51. Core-log comparison derived from logging and core laboratory measurements, Hole U1618B. Data from shipboard tracks and downhole logging are plotted on the mbsf depth scale. Core logging data are plotted versus meters CSF, and downhole logging data are plotted versus meters WMSF. A. Density logs from HLDS data versus GRA density data. B. APS porosity data versus porosity from MAD measurements using discrete samples from Cores 403-U1618A-8H through 37X and 403-U1618B-34X through 47X. C. HSGR data versus natural gamma ray data. cps = counts per second. D. MSS data versus MS scanning data from the WRMSL.