Figure F1. A. Bathymetric map showing the location of Site U1620 on the Svyatogor Ridge sediment drift. Regional bathymetric and tectonic features, locations of the Kongsfjorden (KF) and Isfjorden (IF) glacial troughs and the nearby Expedition 403 and ODP Leg 151 sites are shown. The MTF connects the actively spreading Knipovich Ridge (KR) and Molloy Ridge (MR) segments. Sites U1618 and U1619 are on the eastern and western terminations of the Vestnesa Ridge sediment drift, respectively. ODP Site 909 is on an abyssal hill south of the MTF, and ODP Site 908 is on the Hovgaard Ridge. B. Close-up view of Holes U1620A, U1620C, and U1620D. Hole U1620B (not shown) was abandoned after a poor mudline recovery, and Hole U1620C is located immediately adjacent to it, ~200 m northeast of Hole U1620A. Hole U1620D is located approximately halfway between Holes U1620A and U1620C along Seismic Line Svyatogor2014_3D-XL222.

Figure F2. Seismic profile along the southwest–northeast Seismic Line Svyatogor2014_3D-XL222 showing the location of Site U1620. Interpreted Reflector R7; maximum penetration; and interpreted location of the underlying basement, multiple faults, and free gas are shown. Time = two-way traveltime.

Figure F3. Paired core X-radiographs (left; black = high-density) and photographs (right) showing lithologic boundaries, Holes U1620A and U1620D. A. Sandy mud (35–26 cm) sharply overlying silty clay (35–41 cm) sediments. B. Transition between differently colored silty clay sediments and two very dark gray (2.5Y 3/1) sandy mud layers. C. Sharp transition (127 cm) from very dark greenish gray (10Y 3/1) silty clay to very dark gray (2.5Y 3/1) silty clay with an upper boundary gradational transition to very dark greenish gray (10Y 3/1) silty clay. D. Transition from black (N 1/) clay sediments containing sparse clasts to dark gray (N 4/) silty clay with dark patches. The uppermost part of the black lithology appears oxidized. Core images are brightened by 25%.

Figure F4. Paired core X-radiographs (left; black = high-density) and photographs (right) showing authigenic features, Holes U1620A and U1620D. A. Grayish brown (2.5Y 5/2) and dark gray (2.5Y 2.5/1) laminations within biscuited sediments. B. High-density authigenic nodules (light brown) in a darker gray silty clay lithology. C. Laminations of lighter brown high-density intervals with darker gray silty clay sediments. D. Biscuited silty clay sediments containing a high-density section of sediments (darker gray). E. Iron sulfide nodules within biscuited silty clay layers. Core images are brightened by 25%.

Figure F5. Paired core X-radiographs (left; black = high-density) and photographs (right) showing clasts, Hole U1620A. A. Sand containing dispersed clasts. B. Sandy layer (97–83 cm) containing sparse, unsorted clasts with a high concentration of clasts between 94 and 91 cm. C. Diamicton interval. D. Igneous clast with two different textures in a silty clay. Core images are brightened by 25%.

Figure F6. Paired core X-radiographs (left; black = high-density) and photographs (right) showing laminations, Holes U1620A and U1620D. A. Subtle laminations within the biscuits seen on the surface of the split core that do not show up in the X-radiograph image. B. High-density laminations that contain authigenic $CaCO_3$. C. Fine almost indistinct laminations. Core images are brightened by 25%.

Figure F7. Paired core X-radiographs (left, black = high-density) and photographs (right) showing typical bioturbations, Holes U1620A and U1620D. A. Moderate bioturbation with burrows filled with high-density authigenic iron sulfide minerals. B. Bioturbated sediment with burrows filled with less dense material than surrounding sediments. Core images are brightened by 25%.

Figure F8. Physical properties, Hole U1620A. Whole-round MS is shown in two different scales, red [0–4000 IU] to display the full range of observed values, highlighting the high values related to greigite/pyrite formation, and blue [0–200 IU] to display the variability of the sediment where greigite is 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.

Figure F9. Physical properties, Hole U1620C. Whole-round MS is shown in two different scales, red [0–4000 IU] to display the full range of observed values, highlighting the high values related to greigite/pyrite formation, and blue [0–200 IU] to display the variability of the sediment where greigite is 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. See legend for lithology in Figure F8.

Figure F10. Physical properties, Hole U1620D. Whole-round MS is shown in two different scales, red [0–4000 IU] to display the full range of observed values, highlighting the high values related to greigite/pyrite formation, and blue [0–200 IU] to display the variability of the sediment where greigite is 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. See legend for lithology in Figure F8.

Figure F11. Lithostratigraphic correlation, Holes U1620A, U1620C, and U1620D. Hole U1620B is excluded from this diagram because so little sediment was recovered. 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 clay with silty and sandy clay; silt with clayey and sandy silt as well as with sandy mud; and clayey, muddy, and silty sand. Clast abundance, laminations, degree of bioturbation, and degree of drilling disturbance are all color coded and shown as histograms. Dropstones are those recorded within GEODESC as lithologic comments during visual core description. See legend for lithology in Figure F8.

Figure F12. Ternary diagram of sand, silt, and clay percentages of sediment as inferred from smear slides, Hole U1620D.

Figure F13. Downhole mineralogy from smear slide analysis, Hole U1620D.

Figure F14. Biostratigraphic summary, Site U1620. Letters in parentheses refer to the hole(s) where the event is observed.

Figure F15. Age-depth model, Site U1620. All encountered biostratigraphic and paleomagnetic datums are shown. Calcareous nannofossils: Ehux = LO *E. huxleyi*, Gcar = acme *G. caribbeanica*, Plac HO = HO *P. lacunosa*, Hsel/Plac = *H. sellii*/*P. lacunosa*, Ret = *Reticulofenestra* spp., Plac LO = LO *P. lacunosa*. Dinocyst datums: Pstel = occurrence of *P. stellatum*, Ffil = HO *F. filifera*, acme Ffil/Htec = acme *F. filifera*/*H. tectata*, Lcan = *L. canalis*, Lcri = *L. crista*. Diatom datums: Fjous = HO *F. jouseae*. Foraminifer datums: Natl = HO *N. atlantica*. For paleomagnetic datums, see Paleomagnetism.

Figure F16. Biostratigraphy and paleoenvironment, Hole U1620A.

Figure F17. Biostratigraphy and paleoenvironment, Hole U1620C.

Figure F18. Biostratigraphy and paleoenvironment, Hole U1620D.

Figure F19. Cube measurements and WRMSL MS, Holes U1620A and U1620D. Thick low MS units below 350 mbsf are highlighted with a different shade of red. U1620D MS = downcore variability in whole-round MS measured on the WRMSL.

Figure F20. High-MS intervals, Hole U1620D. Photos and X-ray images are shown. Black dots = WRMSL loop measurements, gray dots = SHMSL point measurements.

Figure F21. Inclination, Holes U1620A, U1620C, and U1620D. Dashed lines = expected inclinations for a geocentric axial dipole at this latitude. U1620D XCB: gray line = only data below 300 mbsf.

Figure F22. MS and archive section half inclination for the uppermost 150 m, Holes U1620A, U1620C, and U1620D. Inclination: lines = APC-cored intervals, dots = XCB-cored intervals, orange squares = ChRM inclination values for cube samples taken from Hole U1620A.

Figure F23. Paleomagnetic and MS data, Holes U1620A and U1620D. Cube ChRM inclination: blue = Hole U1620A, red = Hole U1620D. Filtered cube ChRM inclination: samples with MS greater than 5×10^{-4} SI and maximum angular deviations greater than 20° are removed. Archive half inclination (Hole U1620D): APC sections after 15 mT peak AF demagnetization and XCB sections after 30 mT peak AF demagnetization. Red = intervals with MS <30 IU. MS (Hole U1620D) measured on the WRMSL. GPTS2020: Site U1620 polarity interpretation and correlation to the geomagnetic polarity timescale (Gradstein et al., 2020). Black = normal, white = reverse, gray = uncertain.

Figure F24. Orthogonal demagnetization plots illustrating the range of variability of demagnetization of discrete cube samples between 10 and 50 peak AF, Holes U1620A and U1620D. Blue squares = vertical projection, red squares = horizontal projection.

Figure F25. Age-depth relationship of the interpreted Site U1620 polarity zones, Holes U1620A, U1620C, and U1620D. Implied long-term linear accumulation rates = ~5 cm/ky (from around 0–1 Ma), ~7 cm/ky (1–2 Ma), and ~36 cm/ky (2–3 Ma). Square symbols bracket the depth uncertainty of the shipboard reversal assignment. Dashed line = approximate depth of Seismic Reflector R7.

Figure F26. Physical properties, Holes U1620A, U1620C, and U1620D. Lines = five-point running averages for GRA bulk density and MS. cps = counts per second.

Figure F27. MS, Site U1620. Measurements were taken on whole rounds using a pass-through loop sensor (WRMSL) and split archive-half sections using a point-source sensor (SHMSL).

Figure F28. NGR, GRA bulk density, and MS, Holes U1620A, U1620C, and U1620D. Circles = Hole U1620A, triangles = Hole U1620C, Xs = U1620D. cps = counts per second.

Figure F29. GRA bulk density and MAD, Holes U1620A and U1620D. Measurements were made on the WRMSL (GRA) and discrete samples (MAD).

Figure F30. MAD parameters, Holes U1620A and U1620D.

Figure F31. Thermal conductivity, Holes U1620A and U1620C. Orange = individual measurements, orange lines = standard deviation, purple = averages.

Figure F32. ASR initial results (403-U1620D-37X-4, 137–147 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 for ~14 days.

Figure F33. ASR initial results (403-U1620D-52X-CC, 24–33 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 for ~14 days.

Figure F34. ASR initial results (403-U1620D-68X-CC, 28–35 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 for ~14 days.

Figure F35. Violin plots summarizing physical property associations with preliminary lithostratigraphic units/subunits, Site U1620. cps = counts per second.

Figure F36. WRMSL MS, Holes U1620A, U1620C, and U1620D. 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 F37. Reflectance spectroscopy and colorimetry (RSC) L*, red-green-blue (RGB) red, WRMSL MS, and NGR, Site U1620. cps = counts per second.

Figure F38. Depth scale offset, Site U1620. A. Comparison of mbsf and CCSF scales in the splice and equations to convert between them. B. Growth of cumulative depth offset.

Figure F39. IW chloride, sodium, and salinity, Holes U1620A and U1620D. Black arrows = average seawater values.

Figure F40. IW sulfate, alkalinity, iron, and manganese, Holes U1620A and U1620D. Black arrows = average seawater values.

Figure F41. IW calcium, magnesium, strontium, silica, barium, and lithium, Holes U1620A and U1620D. Black arrows = average seawater values.

Figure F42. IW potassium and boron, Holes U1620A and U1620D. Black arrows = average seawater values.

Figure F43. IW ammonium and phosphate, Holes U1620A and U1620D. Black arrows = average seawater values.

Figure F44. Bulk sediment concentration records with smoothed lines for TC, $CaCO_3$, TOC, TN, and C/N ratio, Holes U1620A and U1620D.

Figure F45. Bulk sediment contents of TS, Holes U1620A and U1620D.

Figure F46. Concentrations of methane (CH_4), ethane (C_2H_6), heavier hydrocarbons (C_2–C_6), and methane/ethane ratios measured on headspace gas samples from 5 cm^3 of sediment, Holes U1620A, U1620C, and U1620D.

Figure F47. Low-resolution sedaDNA sampling, Hole U1620C. Dots = horizons sampled (n = 20), vertical dashed line = switch from APC to XCB drilling, green background = Subunit IA, blue background = Subunit IB, gray line = MS, blue line = moving average. A preliminary chronology derived from paleomagnetism is displayed at the top.

Figure F48. High-resolution sedaDNA targeted sampling of intervals with warmer interglacials, Hole U1620D. Dots = horizons sampled (n = 50 for MISs 5e through 11; n = 42 for MIS 31), gray line = MS, blue line = moving average. A preliminary chronology derived from paleomagnetism is displayed at the top.

Figure F49. Formation temperature, Holes U1620A, U1620C, and U1620D. Dashed line = linear regression results.

Figure F50. Downhole operations for the triple combo tool string, Hole U1620D.

Figure F51. Downhole logging data from the triple combo tool string, Hole U1620D. Data sets and abbreviations are shown in Table T14.

Figure F52. Core-log comparison, Hole U1620D. Core logging data are plotted versus meters CSF, and downhole logging data are plotted versus meters WMSF. cps = counts per second.