Figure F1. Location of Sites U1586, U1587, U1385, U1588, and U1391 and selected piston cores from the continental slope of the southwestern Iberian Margin. Map is modified from Hodell et al. (2023) and was made with GeoMapApp (**https://www.geomapapp.org**) using the bathymetry of Zitellini et al. (2009).

Figure F2. Bathymetric transect of Expedition 397 sites designed to simulate a paleo-CTD with which to study past changes in deep water mass structure, ventilation, and carbon storage. (Figure made by Helder Pereira using Mirone and iVew4D software).

Figure F3. Location of Site U1588 on the PPA at a water depth of 1339 mbsl. See Figures F1 and F2 for broader bathymetric context. (Figure made by Helder Pereira using Mirone and iVew4D software.)

Figure F4. Salinity and silicate profiles on WOCE Line A03 (36°N) showing proposed site locations on the Iberian margin (Schlitzer, 2000). Tongue of high salinity water between 600 and 1200 m is MOW. High Si (>35 µmol/kg) below 3000 m represents a contribution from LDW sourced from the Southern Ocean. Water masses do not have clearly defined boundaries but rather consist of a series of core layers bordered by transition (mixing) zones between adjacent layers. The positions of Expedition 397 sites are shown relative to each of the identified subsurface water masses.

Figure F5. Bathymetric map showing Seismic Lines TGS-NOPEC PD00-613 and TGS-NOPEC PD00-510, the location of Site U1588, and Piston Core JC89-13.

Figure F6. Original and interpreted Seismic Profile TGS-NOPEC PD00-613 showing the location of Site U1588. The depth of penetration and age of the reflectors have been revised to reflect the actual depth and age of the recovered sediment (data courtesy of TGS ASA). Penetration = ~400 mbsf. TWT = two-way traveltime, CMP = common midpoint.

Figure F7. Original and interpreted Seismic Profile TGS-NOPEC PD00-510 showing the location of Site U1588. The depth of penetration and age of the reflectors have been revised to reflect the actual depth and age of the recovered sediment (data courtesy of TGS ASA). Penetration = ~400 mbsf. TWT = two-way traveltime, CMP = common midpoint.

Figure F8. Lithofacies 1, Site U1588. All images: upper left = transmitted light brightfield, lower left = cross-polarized light (XPL), right = section half images, which include the interval where smear slides were taken.

Figure F9. Nannofossil ooze with diatoms and clay, Hole U1588C. Left: section half images of (A) 1–17 cm and (D) 94–113 cm. Center: transmitted light brightfield image of smear slides of (B) 6 cm and (E) 100 cm, showing nannofossil ooze with diatoms and clay. Right: XPL image of smear slides of (C) 6 cm and (F) 100 cm.

Figure F10. 40 cm pyritized burrow, Hole U1588C. The burrow was broken during XCB drilling. Note the distinct biscuiting.

Figure F11. Deep-sea coral, Hole U1588B.

Figure F12. Drilling disturbance examples, Site U1588. A. Slurry. B. Gas expansion. C. Fall-in. D. Disturbed bedding. E. Biscuiting.

Figure F13. $CaCO_3$, L*, and MS, Site U1588.

Figure F14. Lithologic summary, Site U1588. ? = uncertainty. Colors are based on visual description and L*a*b* values (see Physical properties). Color is independent of lithology and is related to relative amounts of minor constituents such as pyrite and glauconite. Nannofossil biozones and paleomagnetic boundaries are summarized from shipboard data and may disagree. Inset: cropped section of Seismic Line PD00 Line 613 showing location along transect and depth of Holes U1588A–U1588D. SB = seabed, MPle = middle Pleistocene, TWT = two-way traveltime, CMP = common midpoint.

Figure F15. Preliminary age model based on calcareous nannofossils and planktonic foraminifer events.

Figure F16. Paleomagnetism data after 20 mT AF demagnetization, Hole U1588A. Chron: black = normal polarity zone/boundary, white = reversed polarity zone/boundary, gray = uncertain polarity zone/boundary. Squares = depths where discrete cube samples were collected. Inclination: dashed lines = expected GAD inclinations at the site latitude during reversed and normal polarities. Pink shading = strongly disturbed intervals. Declination: gray = measured declination values, green = declination values corrected using core orientation data collected with the Icefield MI-5. Susceptibility: magenta = SHMSL, black = WRMSL.

Figure F17. Paleomagnetism data after 20 mT AF demagnetization, Hole U1588B. Chron: black = normal polarity zone/boundary, white = reversed polarity zone/boundary, gray = uncertain polarity zone/boundary. Inclination: dashed lines = expected GAD inclinations at the site latitude during reversed and normal polarities. Pink shading = strongly disturbed intervals. Declination: gray = measured declination values, green = declination values corrected using core orientation data collected with the Icefield MI-5. Susceptibility: magenta = SHMSL, black = WRMSL.

Figure F18. Paleomagnetism data after 20 mT AF demagnetization, Hole U1588C. Chron: black = normal polarity zone/boundary, white = reversed polarity zone/boundary, gray = uncertain polarity zone/boundary. Inclination: dashed lines = expected GAD inclinations at the site latitude during reversed and normal polarities. Pink shading = strongly disturbed intervals. Susceptibility: magenta = SHMSL, black = WRMSL.

Figure F19. Paleomagnetism data after 20 mT AF demagnetization, Hole U1588D. Chron: black = normal polarity zone/boundary, white = reversed polarity zone/boundary, gray = uncertain polarity zone/boundary. Inclination: dashed lines = expected GAD inclinations at the site latitude during reversed and normal polarities. Pink shading = strongly disturbed intervals. Declination: gray = measured declination values, green = declination values corrected using core orientation data collected with the Icefield MI-5. Susceptibility: magenta = SHMSL, black = WRMSL.

Figure F20. Discrete cube sample AF demagnetization results, Hole U1588A. Results are organized by sample depth. All samples: left = intensity variation with progressive AF demagnetization, middle = NRM demagnetization data on orthogonal (Zijderveld) projections, right = equal area projections. Orthogonal projection plots: blue squares = horizontal projections, red circles = vertical projections. Equal area projection plots: solid circles = positive inclinations, open circles = negative inclinations. Measurements that were influenced by flux jumps and measurements from the first few demagnetization steps (typically <4–10 mT) that are heavily influenced by drilling-induced overprint are removed. (Continued on next two pages.)

Figure F21. Dissolved SO_4 with alkalinity and headspace CH_4; dissolved Fe, Mn, and Ba; NH_4 and PO_4; and pH, Hole U1588A. Dashed line = methane data, showing that the measured concentrations are likely too low due to gas expansion and fracturing of sediment that led to gas loss.

Figure F22. Dissolved Na, K, and Cl concentrations, Hole U1588A.

Figure F23. Dissolved Ca, Sr, and Mg, Hole U1588A.

Figure F24. Dissolved Si, Li, and B, Hole U1588A.

Figure F25. Discrete measurements of $CaCO_3$ by coulometry and ICP-AES L* reflectance, Hole U1588A.

Figure F26. Discrete measurements of $CaCO_3$ with NGR, Hole U1588A. cps = counts per second.

Figure F27. Crossplot and linear regression of $CaCO_3$ and L* reflectance, Hole U1588A. Red line = linear regression with 95% confidence interval (CI) for all car-

bonate data (including direct measurements by coulometry and calculated values from bulk sediment ICP-AES data), black solid line = linear regression with 95% CI for all coulometry data.

Figure F28. Crossplot and linear regression of $CaCO_3$ and NGR, Hole U1588A. cps = counts per second, red line = linear regression with 95% CI for all carbonate data (including direct measurements by coulometry and calculated values from bulk sediment ICP-AES data), black line = linear regression with 95% CI for all coulometry data.

Figure F29. TOC, TN, C/N, and TS vs. top depth, Hole U1588A.

Figure F30. Crossplots of sedimentary major and minor element concentrations, Hole U1588A.

Figure F31. Downhole profiles of bulk sedimentary Ca/Ti, Si/Al, Ti/Al, Zr/Al, K/Al, biogenic Ba (Ba-bio), and Sr/Ca, Hole U1588A.

Figure F32. GRA and MAD bulk density, porosity, thermal conductivity (TCON), and *P*-wave velocity (PWC), Hole U1588A. ma-20 = moving average of 20 points.

Figure F33. MS (WRMSL), MSP (SHMSL), NGR, and L*a*b* values, Hole U1588A. Solid lines = moving average of 20 points, cps = counts per second.

Figure F34. NGR; and K, Th, and U deconvolved and extracted from NGR spectra; and U/Th and K/Th ratios, Hole U1588A. All data from section edges (top and bottom) were eliminated. cps = counts per second.

Figure F35. Whole-round X-ray image of extreme gas expansion, Hole U1588A.

Figure F36. APCT-3 plots of heat flow calculations, Hole U1588A. A. Downcore thermal conductivity data. B. Thermal resistance calculated from thermal conductivity measurements. C. In situ APCT-3 data for Cores 4H, 7H, 10H, and 13H. Red square = average value of minimum mudline temperatures.

Figure F37. Composite section construction using MS in 50 m CCSF-B intervals, Site U1588. (Continued on next page.)

Figure F38. Spliced composite records of WRSML MS, L* color reflectance, RGB blue, and NGR, Site U1588 (CCSF-B* depth scale). The composite ends at the last tie between Holes U1588B, U1588C, and U1588D; Hole U1588D extends to 415 m (driller's depth). cps = counts per second.

Figure F39. Depth scales, Site U1588. Left: comparison of CSF-B and CCSF-B depth scales. A 1:1 line is shown for comparison. Right: comparison of the growth of cumulative depth offset and CSF-B depth scale.