Figure F1. Location map, Expedition 402 sites (red) and sites previously drilled during Legs 42, 107, and 161 (yellow). White lines = location of seismic reflection lines in Figures F2, F7, F8, and F13. Map was created using Generic Mapping Tools software (Wessel et al., 2019).

Figure F2. Sites U1612, U1615, and U1616 (Vavilov Basin) and Holes 651A (projected) and 655B on Seismic Line MEDOC 9 (location in Figure F1). TWT = two-way traveltime, CDP = common depth point.

Figure F3. Main sedimentary lithologies sampled during Expedition 402, including MTDs and Messinian evaporites.

Figure F4. Basement lithologies, Expedition 402. A. Granitoid. B. Plagioclase-bearing lherzolite with pyroxene-rich veins crosscut by tremolite vein. C. Harzburgite with dispersed carbonate veins and typical mesh texture formed as a result of serpentinization. D. Dunite with serpentine veins. E. Fresh olivine gabbro. F. Diabase with ophitic texture.

Figure F5. Plutonic rock compositions plotted on TAS diagram, Sites U1612, U1614, and U1616. Classification is after Middlemost (1994).

Figure F6. V_P measurements, Expedition 402. Sites are ordered from west (Site U1613, Cornaglia Terrace) to east (Site U1617, Campania Terrace). V_P trends highlight the boundary between sediments and basement in Vavilov Basin and between Early Pliocene and Messinian sediments and evaporites in conjugate terraces. Dark blue dots = WRMSL V_P, light blue dots = discrete measurements taken with Gantry system.

Figure F7. Site U1613 (Cornaglia Terrace) on Seismic Line MEDOC 6 (location in Figure F1). TWT = two-way traveltime, CDP = common depth point.

Figure F8. Site U1614 (Vavilov Basin) on Seismic Line MEDOC 8 (location in Figure F1). TWT = two-way traveltime, CDP = common depth point.

Figure F9. Dip and structures of sediment bedding and mantle foliation. A. Dip of sediment bedding (red), MTDs (blue), and mantle foliation (green). B. Faulted and folded laminations (partially due to drilling disturbance; 402-U1614A-16X-1). C. Normal fault and boudinage in lamination (26X-6). Note higher fracture density. D. Sediment/basement interface marked by fault plane with striations (33X-4). Peridotite is highly weathered (reddish pattern) with weak mantle fabric (altered, black minerals). E. Pyroxene (Px)-rich impregnations in partially serpentinized (serp) peridotite at low angle to mantle fabric orientation (402-U1614C-24R-2). F. Weathered peridotite intruded by magmatic vein or mylonite, rimmed, and then partially replaced first by serpentine (Srp) and then by carbonate vein network (22R-1).

Figure F10. Dissolved oxygen concentration, Expedition 402 sites. Left: results from 0–6 mbsf. Right: summary view to maximum depth where oxygen could be measured (~200 mbsf). CSF-A = core depth below seafloor, Method A (equivalent to mbsf scale).

Figure F11. IRM curves of representative peridotite samples, Holes U1614C and U1616E. Curves are normalized the respective maximum values on logarithmic field scale.

Figure F12. Shaded relief bathymetry (grayscale) and regional heat flow data (colored symbols) in Vavilov Basin, Expedition 402 Sites U1612 and U1614–U1616 (stars); Leg 107 Sites 651, 652, and 655 (Kastens, Mascle, Auroux, et al., 1987) (diamonds); Leg 42 Site 373 (Shipboard Scientific Party, 1978) (square); and previous regional measurements (Della Vedova et al., 2001; Global Heat Flow Data Assessment Group et al., 2023) (circles). Map was created using Generic Mapping Tools software (Wessel et al., 2019).

Figure F13. Site U1617 (Campania Terrace) on Seismic Line MEDOC 6 (location in Figure F1). TWT = two-way traveltime, CDP = common depth point.

Figure F14. Planktic foraminifera species from different stages, Site U1617. Blue rectangles = important marker species in each geologic stage; the rest are prominent late Neogene species. CSF-A = core depth below seafloor, Method A (equivalent to mbsf scale). See lithology key in Figure F8 in the Expedition 402 methods chapter (Malinverno et al., 2025a).

Figure F15. Holes drilled during Expedition 402, shaded by drilling technique. d = days.

Figure F16. Inclination histograms of NRM after demagnetization for basement rocks, Holes U1614C and U1616E. Serpentinized peridotites from the two holes recorded opposite polarities.

Figure F17. Mg concentration in sediment IW, Expedition 402 sites. Mg variation with depth may be attributed to combination of extent of basement serpentinization, reactions between carbonate minerals, and hydrothermal fluid circulation. Heat flow values measured at each site (Table T1) are also shown.