

Figure F1. Plate tectonic reconstructions using rotation poles published by Parsieglia et al. (2008). Rotation was performed with respect to Africa, thus the paleolatitude of the Agulhas Plateau may not be correct; it was likely higher. Thick lines = estimated location of paleospreading system (black = spreading axis). MB = Maurice Ewing Basin, MOZR = Mozambique Ridge, FAP = future position of Agulhas Plateau (AP), ANT = Antarctica, FI = Falkland Islands, AFFZ = Agulhas-Falkland Fracture Zone. A. 120 Ma. AP region was still occupied by Falkland Plateau (FP) with Maurice Ewing Bank (MEB) leaving no space for evolution of AP at this time. B. 105 Ma. AP region was cleared. This is the first possibility for formation of AP. C. 100 Ma. Reconstructions of AP, Northeast Georgia Rise (NEGR), and Maud Rise (MR) (with recent boundaries) show overlap between AP and NEGR, which is due to different dimensions of these structures at 100 Ma. D. 94 Ma. Formation of entire LIP (AP, NEGR, and MR) is complete. Bouvet triple junction is located at southwest tip of AP (Marks and Tikku, 2001), and subsequent spreading causes separation of the three fragments of the AP-NEGR-MR LIP. Reproduced from Parsieglia et al. (2008). By permission of Oxford University Press on behalf of the Royal Astronomical Society. This figure is not included under the Creative Commons CC-BY 4.0 license of this publication. For permissions, please email journals.permissions@oup.com.

Figure F2. Currents and water masses active in the African–Southern Ocean gateway. AC = Agulhas Current, NADW = North Atlantic Deep Water, AABW = Antarctic Bottom Water.

Figure F3. Agulhas Plateau (AP) and Transkei Basin bathymetry (Sandwell and Smith, 1997). Expedition 392 sites (red stars) on seismic lines (black lines) (Uenzelmann-Neben, 1998, 2005, 2014). Yellow diamond = Expedition 361 Site U1475 (Gruetzner et al., 2019; Hall et al., 2017). SA = South Africa, AB = Agulhas Bank, MOZR = Mozambique Ridge.

Figure F4. Pre-Expedition 392 seismostratigraphic model developed for the Agulhas Plateau (Allen and Tucholke, 1981; Tucholke and Carpenter, 1977; Uenzelmann-Neben, 2001, 2002). CDP = common depth point, TWT = two-way traveltime, M = Maastrichtian, LE = lower Eocene, LO = lower Oligocene, MM = middle Miocene, LP = lower Pliocene.

Figure F5. Pre-Expedition 392 seismostratigraphic model developed for the Transkei Basin (Schlüter and Uenzelmann-Neben, 2007). CDP = common depth point, TWT = two-way traveltime, B = top basement, K-Pg(?) = Cretaceous/Paleogene(?) boundary, E = late Eocene, O = Eocene/Oligocene boundary, M = middle Miocene, P = early Pliocene.

Figure F6. Seismic Line AWI-20050201 showing the location of Site U1579. Preliminary interpretation of seismic units according to the chronostratigraphic model is shown. The marked green reflection corresponds in structure to Reflector M of the pre-Expedition 392 seismostratigraphic model (Figure F4), the magenta reflection to Reflector LE, and the blue reflection to Reflector LO. CDP = common depth point, TWT = two-way traveltime, ZS = zeolitic silicified sediments.

Figure F7. Stratigraphic summary, Site U1579. Calcareous nannofossil zones: NP following Martini (1971); CC following Sissingh (1977); CN following Agnini et al. (2014). Physical properties of NGR: dark blue = U1579B, light blue = U1579D, black = 15-point moving average, cps = counts per second. WRMSL MS: brown = U1579B, orange = U1579D, black = 25-point moving average. Alkalinity measurements (open symbols = Holes U1579A, U1579B, and U1579D) are from pore waters. Carbonate content (black closed symbols = all holes) is from bulk sediments. Age model is based on biostratigraphy and magnetostratigraphy, with estimated sedimentation rates. Yellow rectangles = stratigraphic intervals for which a splice is constructed.

Figure F8. Seismic Line AWI-98015 showing Site U1580. Preliminary interpretation of seismic units according to the chronostratigraphic model is shown. The marked green reflection corresponds in structure to Reflector M of the pre-Expedition 392 seismostratigraphic model (Figure F4), the magenta reflection to Reflector LE, and the blue reflection to Reflector LO. CDP = common depth point, TWT = two-way traveltime, ZS = zeolitic silicified sediments.

Figure F9. Stratigraphic summary, Holes U1580A and U1580B. Calcareous nannofossil zones: NP following Martini (1971); CC following Sissingh (1977); CN following Agnini et al. (2014). Black NGR data = 15-point moving average, cps = counts per second, black WRMSL MS data = 25-point moving average in black). K concentrations (gray diamonds) are from pore waters. Carbonate content (open circles) is from bulk sediments. TOC content (black circles) is measured on SRA. Age model is based on biostratigraphy and magnetostratigraphy, with reference to the GTS2020 (Gradstein et al., 2020) with estimated sedimentation rates.

Figure F10. Seismic Line AWI-20050008 showing Site U1581. Preliminary interpretation of seismic units according to the chronostratigraphic model are shown. The marked purple reflection corresponds in structure to the top of basement (Figure F5), the brown reflection to what was originally interpreted as a black shale prior to drilling, the pale green reflection to Reflector O, the red reflection to Reflector M, and the rose reflection to Reflector P. CDP = common depth point.

Figure F11. Stratigraphic summary, Site U1581. Calcareous nannofossil zones: NP following Martini (1971); CC following Sissingh (1977); CN following Agnini et al. (2014). Black NGR data = 15-point moving average, cps = counts per second, black WRMSL MS data = 25-point moving average. Ca (green circles) and Mg concentrations (red circles) are from pore waters. Carbonate (white diamonds) and TOC (black diamonds) contents are from bulk sediments (open circles). Age model is based on biostratigraphy and magnetostratigraphy, with reference to the GTS2020 (Gradstein et al., 2020) with estimated sedimentation rates.

Figure F12. Seismic Line AWI-98011 showing Site U1582. Preliminary interpretation of seismic units according to the chronostratigraphic model is shown. The marked purple reflection corresponds in structure to the top of basement (Figure F4), the magenta reflection to Reflector M, the blue reflection to Reflector LE, and the green reflection to Reflector LO. CDP = common depth point, TWT = two-way traveltime.

Figure F13. Stratigraphic summary, Site U1582. Black NGR data = 15-point moving average, cps = counts per second, WRMSL MS data = 25-point moving average. Carbonate contents are from bulk sediments (open circles). Age model is based on biostratigraphy, with reference to the GTS2020 (Gradstein et al., 2020).

Figure F14. Lithologic summary with NGR and MS, Sites U1579–U1582. cps = counts per second.

Figure F15. Lithostratigraphic overview of recovered sediments, Expedition 392. Benthic foraminiferal oxygen isotopes are compiled by combining CENOG-RID of Westerhold et al. (2020) with the Cretaceous compilation of Huber et al. (2018). VPDB = Vienna Pee Dee belemnite. Sediments (excluding basalts from Sites U1579 and U1580) recovered at Sites U1579–U1582 are shown, each indicating hiatuses, indicators of stratigraphic depth of the sequence (on the CSF-A scale), and key climatic events and named sedimentary sequences. O/M = Oligocene/Miocene boundary, EOT = Eocene–Oligocene transition, MECO = Middle Eocene Climatic Optimum, ELMO = Eocene layer of mysterious origin, PETM = Paleocene/Eocene Thermal Maximum, ELPE = early late Paleocene hyperthermal event, LDE = Latest Danian Event, K/Pg = Cretaceous/Paleogene boundary, C-T = Cenomanian–Turonian interval.

Figure F16. Age-depth plots, Expedition 392. The four sedimentary sequences recovered at the Agulhas Plateau and Transkei Basin are shown. Ages according to the GTS2020 (Gradstein et al., 2020). Insert map modified from Figure F3. Upward triangle = nannofossil base, downward triangle = nannofossil top, diamond = foraminiferal datum, circle = dinocyst datum, plus sign = magnetic polarity reversal, vertical line = datum depth uncertainty, horizontal line = age uncertainty, horizontal arrow = sediment could be younger (left arrow) or older (right arrow) than the position of the datum, wavy line = unconformity, pale red box = assemblage based age ranges for Site U1582, question mark = uncertainty.