# Organic carbon burial in the Cretaceous Transkei Basin: first bulk geochemical results from IODP U1851

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IODP Expedition 392 drill sites on the Agulhas Plateau and Transkei Basin were located at high latitudes during the Late Cretaceous (65°–58°S) and positioned in the gateway between the opening South Atlantic, Southern Ocean, and southern Indian Ocean basins (Uenzelmann-Neben et al., 2022).

A ~994 m thick Pleistocene–Campanian succession composed of calcareous and siliciclastic sediments was recovered at Site U1581 from the central Transkei Basin. Shipboard observations confirmed two principally different lithofacies in the Cretaceous: mudstones and coarser-grained silt and sandstone, suggesting contrasting sedimentation processes, i) pelagic deposition and ii) localized event-driven sedimentation, respectively. Initial findings from bulk geochemical analysis show variations and similarities between both sediment types. We present high-resolution Maastrichtian to Campanian bulk geochemical records to explore controls on the organic carbon system in the Cretaceous Transkei Basin.

Bulk geochemical analysis on a total of 518 samples (shipboard and post-cruise) were obtained from a 582 m thick middle Paleocene to Campanian section (average depth resolution 1.1 m or ~60 Kyrs). We applied a detailed sediment facies analysis, identifying 6 lithologies using spectrally improved core photographs and shipboard information. Facies A, B, and C, consisting of fine-grained mudstones, are interpreted as pelagic deposits, while facies D, E, and F of coarse-grained silt and sandstones represent mass transport and therefore event-driven processes (e.g turbidites). Total organic carbon (TOC) is overall low, ranging from just above 0% to 1.2%, with a mean value of 0.5%. We analyse TOC and bulk organic stable carbon isotope (δ13Corg) down core and for their relationships between both variables to distinguish pelagic and mass transport sedimentation.

TOC is relatively low and rather constant in the Cretaceous Transkei Basin, suggesting persistent and efficient processes impacting organic carbon burial. We suggest that the strong geochemical similarities between pelagic and mass transport sediments reflect persistent oxic redox conditions which drove effective remineralisation of the organic fraction, despite overall elevated sedimentation rates.

References

#### Gabriele Uenzelmann-Neben, Steven M. Bohaty, Laurel B. Childress, and the Expedition 392 Scientists, 2022. Expedition 392 Preliminary Report: Agulhas Plateau Cretaceous Climate. International Ocean Discovery Program. <https://doi.org/10.14379/iodp.pr.392.2022>