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New findings on the aspect of margin segmentation along the South African margin

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So far research on the break-up character of the South African margin including the abundance and distribution of break-up related volcanics did not reveal any indication for a margin segmentation. As margin segmentation was previously shown for the conjugated South American margin, a non-segmented African margin would be surprising at least, no matter how asymmetric the Late Cretaceous break-up is suggested to have been. Based on a dense grid of multichannel seismic data and potential field data, we conclude that previous interpretations may have overlooked structural details such as margin segmentation due to low data coverage.
From our interpretation it is possible to infer that the African margin is indeed segmented. Segments along the margin are characterized by a right stepping pattern in distribution of break-up related volcanics. These volcanics are visible in seismic data as seaward dipping reflector sequences (SDRS). Magnetic data coverage still is insufficient to derive the same conclusion. However, the SDRS generally correlate with a positive magnetic anomaly, which therefore can be used to extrapolate the approximate coverage of volcanic material and to fill gaps in the seismic data coverage. Gravity maps aid to the interpretation of segments along the South African margin, as lower order transform faults visible further offshore widely match the segment boundaries as interpreted in the seismic data. Margin-parallel dip of the SDRS in parts of the study area is an indicator for a more complex and literally segmented break-up / subsidence history of the South African margin than previously accounted for. Along the 2000 km of continental margin between the Florianopolis Fracture Zone in the North and the Hope Transfer Zone in the South, we identified at least 4 prominent transfer zones or segment boundaries and propose several more, less significant ones. Rightward stepping patterns of segments proposed from the change in distribution of volcanic material at each segment boundary possibly reflects inhibited rift propagation from South to North during opening of the South Atlantic. Segment boundaries or transfer zones are possibly early stage images of oceanic transform faults. Along the margin, as well as within the individual segments, characteristics of the emplaced volcanics vary greatly, for example in volume, apparent dip and number of SDR wedges separated by prominent individual reflectors.