

## Tracing sediment provenance in the Early Cretaceous Southern Ocean

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The Southern Ocean has proven to be a key area for the interplay of tectonics, ocean circulation and global climate in the Early Cretaceous. Here we present bulk-sediment geochemical data (Nd-Hf-Sr-Pb isotopes) of five ODP / DSDP cores from the gateways of the Southern and Atlantic Ocean basins (Weddell Sea, Mozambique Ridge, and Falkland Plateau) to trace sediment provenance and reconstruct water mass pathways, focussing on Berriasian - Aptian times. We show that weathering of the Karoo LIP results in large scale influence of the sedimentary record throughout the Southern Ocean. DSDP site 249 records the eruption of the central and southern portions of the Mozambique Ridge, although the isotopic composition of the core is offset from a pure volcanic endmember, which can be explained by additional input of Karoo sourced material from the African continent. ODP Site 692 and Hole 693a are also dominantly (>90%) composed of Jurassic volcanic material, however sediments at Site 692 originate from the Antarctic Peninsula, supporting modelling results [1] which indicate that strong eastward flowing surface currents were flowing through a proto-Drake Passage as early as the Valanginian. The opening of the Falkland Plateau gateway in the Aptian resulted in total reorganisation of ocean currents and sediment accumulation across the basin. Our results also indicate that the restricted nature of the Southern Ocean prior to the gateway opening resulted in greater control of eustatic sea level change over circulation and sediment accumulation within the basin.

[1] Dumman, Steinig et al. (2020), EPSL