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Reconstructing provenance changes in sediments supplying the South East African margin

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Sediment provenance is of key importance for understanding transport history and characterising sediment source regions in the marine and terrestrial environment. Radiogenic isotopes are widely used to identify inland and coastal sediment origins. They document changes in detrital terrigenous sediment fluxes which can be related to continental hydrological variability. Understanding sediment sources to the ocean is a pre-requisite before interpreting past climate archives in marine sediment cores.

South African coastal drainage basins are composed of various geological units, each reflected by different radiogenic isotope signals in the sediment. In addition to the age and nature of their source rocks, the sediment type influences this radiogenic signature.

Here, we present a review of the present-day radiogenic isotopic fingerprints of South African river catchments signals from new river sediment samples with the aim to gain a broad spatial coverage of the source rocks in the region and their relative contributions of terrigenous sediment delivered to the ocean. This information will be applied to marine sediment core MD20-3591 (36° 43.707 S; 22° 9.151 E, water depth 2464m), located offshore South Africa which has the potential to record both Agulhas Current and terrestrial variability. The core site receives a significant amount of terrigenous material from the African continents via riverine input. During the last glacial period, these rivers flowed across the continental shelf within a subdued incised valley. The Gourritz River catchment drains the Cape Supergroup and Karoo Supergroup, typical of these southern drainage basins, whereas the eastern Cape rivers drain the Karoo Supergroup geological unit which is capped by the Drakensberg basalts.

We are using the knowledge gained from these new South African terrestrial river sediment samples to identify the sources and transport pathways of the terrigenous sediments in

MD20-3591. Of particular interest is the sensitivity of the radiogenic isotopic signatures to grain size variabilities and how this relationship can help to define local or distal sediments. These records will allow us to explore variability in regional hydroclimate in relation to the abundant archaeological evidence of cultural and technological innovations of Middle Stone Age humans in southern Africa.