

Examining the Effects of Grain Size and Marine Barite on Sr Isotopes in Terrigenous Sediment from U1479, Cape Basin, South Africa

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The Agulhas Current provides a link between the Indian Ocean's warm salty water and the South Atlantic. It flows to the west along the southern coast of Africa and turns around to flow back east at the southern point of the continent. Today it is estimated that approximately 10% of the Agulhas Current "leaks" into the South Atlantic. The amount of leakage at any given time in geologic history is of great interest because of the potential the extra salt it adds has to enhance North Atlantic Deepwater production. Previous work has shown that Sr isotopes in the <63 micron terrigenous fraction reveal significant source fractions from the Agulhas current in the Cape Basin (Franzese et al., 2006, EPSL). IODP Expedition 361 scientists agreed to work with the <2 µm size fraction on the expedition projects in order to better compare with each other and because it was agreed that the finest particles travel farthest. However, in order to connect these results with the previous studies, we are working to directly compare the <2 and bulk <63 micron fractions at Site U1479. Site U1479 is a core located directly in the path of the Agulhas leakage. We measured Sr isotope ratios in the <63 and <2 micron size fractions on a set of terrigenous samples from U1479 from 10ka-120ka. In addition to probing for the grain size effects, we extracted barite from samples to examine the effects of barite on the results following the approach of Jewell et al. (2022, Chem. Geol.). Although offset to slightly lower values, the <63 and <2 fractions follow the same pattern, with higher values in the fine fraction as expected from clay minerals having lower Sr and higher Rb concentrations. The removal of barite in the <63 micron fraction also leads to a small offset but parallel pattern of variability. The results reveal lower proportions of Agulhas provenance in the LGM compared to the Holocene and MIS3 as previously found in the Cape Basin.