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Quaternary marine Os isotope records from the Atlantic Ocean.

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The osmium (Os) isotope composition of seawater largely reflects a balance of input from continental weathering, hydrothermal exchange at mid-ocean ridges and extraterrestrial dust. The temporal variation of seawater Os potentially provides both a stratigraphic chronology and key information on changes in the continental weathering flux. However, glacial Os isotope variations suggest that the residence time of this element in the oceans may be $<$ 4kyr (Oxburgh, 1998), which raises the possibility that there may be variations between the major oceans both at the present-day and in the past. Os isotope data for surface samples of Fe-Mn crusts do indeed suggest that the present-day North Atlantic may be more radiogenic than the Pacific or Indian Oceans, and this was attributed to the input of highly radiogenic Os from the weathering of adjacent old continental landmasses (Burton et al., 1999).

This study presents high-resolution seawater records for the Quaternary for Fe-Mn crusts from both North and South Atlantic. All samples have been independently dated using Be chronology. All three crusts show a shift towards more radiogenic Os isotope compositions over the past 3 Ma, but intra-ocean variations are significant and clearly resolved. Fe-Mn crust Vulcan 5 from the South Atlantic shows an evolution consistent with Pacific Fe-Mn crusts and sedimentary records, however, sample BM1969 from the NW Atlantic shows a much more radiogenic evolution over the same. While a crust from the central Atlantic shows an intermediate trend. The Os isotope composition of the present-day NW Atlantic is $>$3% higher than the South Atlantic, but this difference was ca. 10% at the early Pleistocene. These results suggest that Os isotopes, like those of Nd, Hf and Pb, are strongly affected by the input of old continental material in the NW Atlantic subsequent dispersal through water mass circulation, they also suggest

that Os isotope stratigraphy should be applied with caution.

R. Oxburgh, Earth Planet. Sci. Lett., 159, 183-191 (1998).

K.W. Burton et al., Earth Planet. Sci. Lett., 171, 185-197 (1999).