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PROGRAMME and ABSTRACTS

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and Ca concentration has an effect on the cellular process of coccolithophorid calcification. Preliminary results indicate a major effect on cellular calcification by changing the Ca concentration rather than varying the Mg concentration. Additionally, the two coccolithophore species are responding in different ways on a changing seawater Mg/Ca ratio. The results will give new insights into biogenic calcification of coccolithophores.

New constraints on the Pb and Nd isotopic evolution of NE Atlantic water masses

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In order to better understand long-term changes of the marine environment on a million-year time scale, the radiogenic isotope compositions of lead (Pb) and neodymium (Nd) have been applied from records in authigenic marine archives such as fish teeth, planktonic foraminifera, and ferromanganese crusts. These elements have residence times on the order of or shorter than the global mixing time of the ocean and their isotopic composition can therefore be used as proxies for paleocirculation and weathering inputs. Radiogenic isotopes are not influenced by biological or diagenetic fractionation processes, and change their values only as a function of water-mass mixing or by additions from external sources such as rivers, dust, and, in the case of Pb, hydrothermal inputs. Here we present time series of Pb and Nd isotope compositions measured on three ferromanganese crusts recording the evolution of eastern North Atlantic water masses over the past 15 Myr. The crusts are distributed along a depth profile (~800-4600 m) comprising the present-day depths of Mediterranean Outflow Water (MOW) and Eastern North Atlantic Deep Water.

A pronounced increase of $^{206}Pb/^{204}Pb$ in the two deeper crusts and a decrease in $^{143}Nd/^{144}Nd$ in all three crusts occurred between ~4 Myr and the present. These patterns are similar to the radiogenic isotope evolution at intermediate depths in the western North Atlantic basin, where they were interpreted to be a consequence of changes in continental weathering in Northern Canada and Greenland in the course of the onset of Northern Hemisphere Glaciation. This similarity suggests efficient mixing between the two basins. However, the major change in the Nd and Pb isotope signature in the eastern North Atlantic led the change in the western basin by 1-2 Myr, the reason of which will be discussed. The Pb isotope evolution during the Pliocene-Pleistocene can generally be explained by mixing between two end members, most likely unradiogenic MOW and more radiogenic Eastern North Atlantic Deep Water (including a Labrador Sea Water component). External sources such as Saharan dust are likely to have played a secondary role. The Pb isotope composition of the shallowest crust that grew within the present-day Mediterranean Outflow Water does not show significant Pb isotope changes, indicating that it was controlled by the same Pb sources throughout the past 15 Myr. These results indicate that MOW formed at least episodically during the Messinian Salinity Crisis and that cessations of MOW were too short to be resolved in the ferromanganese crust record.

Hydrogen isotope variations in hydrated volcanic glass as tracers of late Cenozoic precipitation and climate change

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Silicic volcanic ash deposits characterize large portions of the Miocene-to-recent sedimentary successions in many of the Cenozoic mountain ranges or continental plateaus. Within thousands of years after deposition at the Earth's surface, volcanic glass in these ashes incorporates relatively large amounts of water (3-5 wt.%). This hydration process provides a hydrogen isotope record that directly reflects pa-