

Ber. Inst. Erdwiss. K.-F.-Univ. Graz	ISSN 1608-8166	Band 20/1	Graz 2014
PANGEO AUSTRIA 2014	Graz, 14. September 2014 – 19. September 2014		

Weathering, ocean chemistry and climate change: New insights from non-traditional metal stable isotopes

JAMES, R.H.

University of Southampton, Ocean and Earth Science, National Oceanography Centre Southampton, Waterfront Campus,
European Way, Southampton SO14 3ZH, United Kingdom

Many lines of evidence, from both marine and terrestrial records, suggest that there have been dramatic changes in the Earth's climate system during the last 65 Ma that occur on both long (geological) and short timescales. The mechanisms that are responsible for these changes are less well established, but there is growing evidence that amongst the primary controls is the concentration of atmospheric carbon dioxide (CO₂), the principal greenhouse gas.

Weathering of continental rocks leads to drawdown of atmospheric CO₂. Weathering rates are controlled primarily by temperature and rainfall, creating a dynamic link between weathering and climate that represents an important feedback process in the Earth's climate system. As weathering products are ultimately delivered to the oceans via rivers, weathering also regulates ocean chemistry which, in turn, affects primary productivity and also levels of atmospheric CO₂.

We have identified a number of metal stable isotopes, including lithium and magnesium, which are sensitive to changes in continental weathering and erosion. In this talk, we will discuss their strengths and weaknesses, their potential for preservation in marine sedimentary records, and how these analyses have opened up new perspectives in understanding the linkages between weathering and climate.