Grain size-specific organic carbon isotope stratigraphy of continental margin sediments

P. WENK[1]*, C. MCINTYRE[1], C. MAGILL[1], A. MARTÍNEZ-GARCÍA[1], D. HODELL[2] AND T. I. EGLINTON[1]

[1]Department of Earth Sciences, ETH Zürich, 8092 Zürich, Switzerland.

[2]Department of Earth Sciences, University of Cambridge, Cambridge, CB2 3EQ, U.K.

(*correspondence: pa.wenk@hotmail.com)

Marine sediments serve as an important archive for palaeoclimate research. A wide variety of proxies exist for the identification assessment of past climate and oceanographic changes, and it is crucial for accurate interpretation that such proxy signals can be precisely dated. With respect to molecular proxies, diverging biomarker ages within a single sediment layer may occur due to the varying origins and transport pathways of the deposited matter. Here, we examine organic components associated with different grain size fractions separated from a kasten core recovered from the southwest Iberian margin in order to better understand sedimentological influences on proxy records.

The studied interval covers the period since the last glacial termination. The sediment was separated into clay (<2μm), fine silt (2-10μm), sortable silt (10-63μm) and sand (63-200μm) fractions, which were subsequently analyzed for mineralogical, elemental, isotopic and biomarker characteristics.

The resulting record reveals marked ^{14}C age differences within a single sediment layer of more than 5000 years (Figure 1). The age differences exhibit strong grain size-specific dependency, as well as varying amplitudes. These variations may be explained by changing sediment redistribution processes that, in turn, influence the properties of specific grain size fractions. Stable carbon isotopic and biomarker compositions, together with ^{14}C ages of planktonic foraminifera, imply strong sedimentological control on bulk and molecular proxy records.

The implications of our findings for reconstruction of past paleoceanographic and paleoclimate variability will be discussed.