Seasonal impact of exported particulate matter on the TEX_{86}-proxy in the upwelling area off Cape Blanc, Atlantic Ocean, NW Africa

F. EBERSBACH[1*], N.I. GOLDENSTEIN[1], M.H. IVERSEN[1, 2], J.S. LIPP[1], M. ELVERT[1], F. SULZ[1] AND K.-U. HINRICHS[1]

[1] MARUM - Center for Marine Environmental Sciences, University of Bremen, Bremen, Germany
[2]Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research, Bremerhaven, Germany
*Corresponding autor: febersbach@marum.de

Marine ammonia oxidising archaea (AOA) inhabiting the upper part of the ocean synthesise membrane lipids that are imprinted with information regarding environmental conditions. Preserved in sediments, lipid biomarkers from AOA are frequently used to reconstruct past sea surface temperature (SST) by applying the TEX_{86}-proxy [1]. Since the relevant AOA are too small (0.2 µm in diameter) and neutrally buoyant to sink on their own, sinking particles might serve as possible transport vehicles as they shuttle particulate organic matter (POM) to depth. Generally, two different pathways for particle formation are distinguished: direct aggregation of phytoplankton cells into phyto-detrital aggregates and grazing by zooplankton, which produces reprocessed faecal material.

Here we present POM and TEX_{86} data collected during different seasonal states of the phytoplankton bloom using short-term drifting traps (100 – 400 m) in the upwelling area off Cape Blanc, Mauritania, in the years 2012, 2013 and 2015. TEX_{86} results vary more pronounced with different stages of the bloom than with seasonal development of the upwelling that is extensive for spring blooms and just developing for autumn blooms. TEX_{86}-based temperatures were lower in an early/moderate bloom (export system dominated by phyto-detritus) than during a later stage of the bloom (export system dominated by faecal matter). Nonetheless, TEX_{86}-derived temperatures from POM increased with depth irrespective of seasonal bloom conditions and did not resemble SST. These findings point towards an impact of other environmental factors than temperature alone on the TEX_{86} signal. Seasonal settings such as plankton community composition, nutrient availability and prevailing export system should be further examined for the evaluation of the TEX_{86}-proxy.

[1] Schouten *et al.* (2002) *EPSL* **204,** 265-274.