Occurrence and development of *Emiliania huxleyi* morphotypes in the North Atlantic Ocean during the last 280,000 years

Karl-Heinz Baumann

University of Bremen, Department of Geosciences, Klagenfurter Strasse 2-4, D-28359 Bremen, Germany. baumann@uni-bremen.de

Anne Strack

University of Bremen, MARUM - Center for Marine Environmental Sciences, Leobener Strasse 8, D-28359 Bremen, Germany

The currently accepted *E. huxleyi* morphotype classification is entirely based on modern samples and the stratigraphic range of distinct morphotypes is unknown. Therefore, the main objective of this study was to investigate the occurrence of known *E. huxleyi* morphotypes in the fossil record in the North Atlantic Ocean. Countings of morphometric coccolith parameters were conducted using SEM and measurements of these parameters on SEM images were analysed by discriminant analyses. The visual assignment of distinct coccoliths to known *E. huxleyi* morphotypes was validated by group assignments using a leave- one-out cross-validation procedure.

Four known *E. huxleyi* morphotypes were distinguished: Three lightly calcified morphotypes (Type A, Type B/C and Type O) and one heavily calcified morphotype (here named Type T), which corresponds to the known Type A overcalcified morphotype. Furthermore, a new *Retriculofenestra*-like morphotype (Type R*) was observed, which is characterized by extensive distal shield calcification. All investigated records showed a similar but diachronous size evolution of *E. huxleyi* coccoliths with highest coccolith sizes during MIS 4 and MIS 3, respectively. A size increasing trend with higher latitudes with up to 30% larger coccoliths was also observed. In addition, low latitude records showed a dominance of *E. huxleyi* Type O, although this morphotype was previously considered as a cold-water indicator. The results are validated in the context of available information from the cores.