

Development and occurrence of *Emiliana huxleyi* morphotypes in the North Atlantic Ocean during the last 270,000 years

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The currently-accepted morphotype classification for *Emiliana huxleyi* is based entirely 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 and to study chronological and geographic changes in the composition of *E. huxleyi* assemblages in the North Atlantic Ocean during the last 270,000 years.

In total, four sediment cores, aligned along a N–S transect covering the equatorial to subpolar North Atlantic Ocean, were investigated. Counts of morphometric coccolith parameters were conducted using an SEM, and measurements of these parameters on SEM images were analysed using statistical methods. Three normally-calcified morphotypes (Types A, B/C and O) and one heavily-calcified morphotype (here named Type T) could be distinguished in the fossil record. In addition, a morphotype (Type R*) characterised by extensive distal shield calcification, was observed. All records show a similar, but diachronous, size evolution of *E. huxleyi* coccoliths, with the largest coccolith sizes occurring during MIS 4 and MIS 3. A size increase at higher latitudes, with up to 30% larger coccoliths, was also observed. In addition, a dominance of *E. huxleyi* Type O was observed at low latitudes, although this morphotype has previously been considered to be a cold-water type.