Geophysical Research Abstracts
Vol. 19, EGU2017-7957, 2017
EGU General Assembly 2017

Effects of mid Cretaceous paleoenvironmental changes on selected coccolith size

Cinzia Bottini, Giulia Faucher, and Elisabetta Erba
Università degli Studi di Milano, Department of Earth Sciences, Milano, Italy (cinzia.bottini@unimi.it)

In this study we performed morphometric analyses on selected nannofossil species through the Aptian – Cenomanian interval which was a time marked by global episodes including the early Aptian Oceanic Anoxic Event (OAE) 1a, the early Albian OAE 1b, the latest Albian OAE 1d, the Mid-Cenomanian Event (MCE I) and the latest Cenomanian OAE 2. The sections investigated are the Piobbico core and Monte Petrano (Umbria Marche Basin, Italy). The objective of the work was to identify possible long-term coccolith size variations and to understand their relation with paleoecological changes. The morphometric analyses were performed on two species: W. barnesiae and B. constans. W. barnesiae was selected since it is a resistant and opportunistic species, although deformed/malformed specimens were identified during maximum perturbation of OAE 1a. B. constans is instead considered to be a mesotrophic species, represented by relatively tiny coccoliths, and resulted from previous work to be affected by size reduction during OAE 1a and OAE 2. Since different hypotheses were formulated to interpret these changes in shape and size occurring under extreme paleoenvironmental conditions, we intended to see whether the same species were showing also variations on the long-term eventually in relation to variation in surface waters chemical-physical conditions.
The data collected revealed rather constant size of W. barnesiae, being within the range of variability, while B. constans is characterized by long-term size fluctuations. Specifically, an increasing trend in mean size is detected in the late Aptian and, through the lower-middle Albian, B. constans reached the largest size, followed by a partial decrease in the average size during the OAE 1d - OAE 2 interval. Statistical analyses were performed to attest if the size variations identified are of significant relevance and if it is possible to differentiate morphotypes of B. constans. Ultimately, morphometric data were correlated with nannofossil temperature and nutrient indices derived from quantitative nannofossil data compiled for the Aptian-Cenomanian interval. These indices are suggestive for fluctuating temperatures and surface water fertility, thus we intended to understand if one/or both parameters had an impact on B. constans including its capability of calcifying.