



Planktonic foraminiferal response to the Early Eocene Climatic Optimum at the Tethyan Possagno section (Italy)

V. Luciani (1), C. Agnini (2), J. Backman (3), L. Giusberti (2), R. Lucchi (1), G. Muttoni (4) and D. Rio (2, 5)

(1) Department of Earth Sciences, Ferrara University, Italy, (lcv@unife.it), (2) Department of Geosciences, Padova University, Italy, (3) Department of Geology and Geochemistry, Stockholm University, Sweden, (4) Department of Earth Sciences, Milano University, Italy, (5) CNR-IGG, Padova, Italy

The Early Eocene Climatic Optimum (EECO; Zachos et al., 2001, Science 292), between ca. 52 and 50 Ma (basically in Chron C23n), does represent the interval with the highest global temperature recorded in the past 70 myr. The EECO has been recently identified by Agnini et al. (2006) in the classical early Paleogene section of Possagno (Venetians Pre-Alps of northern Italy, Bolli, 1975 Schweiz. Paläontol. Abh 97). In this work we present the results of a high resolution quantitative study of the planktonic foraminifera in the interval of the Possagno section spanning from Chron C24r to Chron C20r, thus comprehending the EECO. Our aims are: 1) to provide an updated biostratigraphy and biochronology of planktonic foraminifera in the Early and Middle Eocene and 2) to contribute to a better understanding of the role of climate upon calcareous plankton evolution.

The biostratigraphic data indicate that the investigated interval is extended from the E3 to the base E8 zones of Berggren and Pearson (2005, J. Foram. Res. 35). The position of standard biohorizons are generally in good agreement with available literature data except for the lowest occurrence of *Guembelitroides nuttallii* that is recorded, though with rare specimens, in the lower part of the C23n (E5 zone), more than two million years older than previous estimates (Berggren and Pearson, 2005, J. Foram. Res. 35).

Our detailed study of planktonic foraminiferal assemblages shows a major change between 16 and 21 m-level with a marked decline of the cold indices subbotinids and an prominent increase of the warm acarininids (up to about 80% from about 50% in relative abundance). Above this interval, an increase of *Pseudohastigerina*, *Globanomalina*, *Planoglobanomalina*, and the recovery of subbotinids and decline of acarininids are observed. The above major change in the planktonic foraminiferal assemblages exactly corresponds with a major floral turnover described by Agnini et al., (2006, EPSL 241) and it is here interpreted as the response of the calcareous plankton community to the EECO. Interestingly, coeval with the EECO, globally and in the Possagno section, the $\delta^{13}\text{C}$ reached their lowest values of the entire Paleogene (except for short-lived hyperthermals). A link might be inferred between the evolution of the pelagic system and carbon cycle.