Geophysical Research Abstracts
Vol. 20, EGU2018-1942, 2018
EGU General Assembly 2018
© Author(s) 2017. CC Attribution 4.0 license.

Effects of different extraction techniques on Eocene foraminiferal assemblages

Roberta D'Onofrio and Valeria Luciani
Ferrara University, Department of Physics and Earth Science, Italy (dnfrrt@unife.it)

The study of foraminifera requires that their tests were observed as single individuals in order to correctly detect the morphological characters that allow species identification. Disaggregation of indurate rocks is therefore necessary to extract them. Multiple techniques for rock disaggregation have been proposed in the past decades but possible effects of diverse extraction methods on planktic foraminiferal assemblages are much less constrained. As the requirement of even more detailed data for quantitative analyses expanded in recent years it requires a detailed re-examination of laboratory procedure techniques. Studies based on micropaleontological quantitative data are indeed crucial for the paleoenvironmental interpretations thus it is essential to assess whether signals recorded by assemblages are genuine or affected by taphonomic process or laboratory procedures. Particularly relevant is the effects of dissolution on planktic foraminiferal assemblages that can modify the composition of assemblages enriching them in dissolution-resistant taxa. The dissolution susceptibility of planktic foraminifera is particularly important for the early Paleogene assemblages. This is because the early Paleogene interval is characterized by extreme global warming episodes, known as hyperthermals, which were marked by low carbonate contents in deep-sea settings. This correspondence has been mainly attributed to carbonate dissolution relating to massive and rapid carbon injection into the ocean and atmosphere, because this would reduce carbonate saturation horizons. However, less attention has been dedicated to recognize whether laboratory procedures can add secondary dissolution effects.

We present here results on planktic foraminiferal assemblages extracted with five disaggregation laboratory techniques: hydrogen peroxide at 10% and 30% concentration, neosteramina (surface active agent), acid acetic and liquid N2. Three samples were appropriately selected with different carbonate content. They come from the early Eocene Tethyan Terche section (Southern Alps, northeast Italy), previously studied for its foraminiferal, calcareous nannofossil and stable isotope content. The Terche section is of particular interest because it encompasses three hyperthemal events, ETM2, H2 and I1 that have induced some taphonomic dissolution on planktic foraminfera. This allows us to evaluate whether the different disaggregation methods can be responsible of additional dissolution. We assess for each method the treatment effectiveness in relation to time required to successfully extract planktic foraminiferal tests. In addition, we show for each method variations of several proxies to detect carbonate dissolution such as species diversity, genera and species abundance per gram of washed residue. We have further evaluated the fragmentation index (F-index), the planktic benthic ratio (P/B) and the weight percent coarse fraction (WPCF).

We demonstrate that the best-preserved foraminferal assemblages derive from the acetic acid and neosteramina treatments. Liquid N2 revealed to be the best treatment to adopt for samples with low $CaCO_3$ content. Dissolution effects appear moderate for all the methods adopted but they show a complex relationship with the initial composition ($CaCO_3$ %) of the samples and to the different susceptibility of the diverse species.