



Microevolution in planktonic foraminifera: some examples

Spezzaferri S. (1), M. Caron (1), D. Grosheny (2) , B. Beaudoin (3), and D. Desmares (2)

(1) Department of Geosciences, Geology and Paleontology, University of Fribourg, Ch du Musée 6, 1700 Fribourg Switzerland. E-mails: silvia.spezzaferri@unifr.ch; michele.caron@unifr.ch

(2) Ecole et Observatoire des Sciences de la Terre, Centre de Géochimie de la Surface-UMR 7517, 1 rue Blessig, F-67084 Strasbourg Cedex. E-mails: grosheny@illite.u-strasbg.fr, desmares@illite.u-strasbg.fr

(3) Ecole des Mines, Centre de Géotechnique et d'Exploitation du Sous-sol, Fontainebleau, Paris, M.3.01 / V.211, E-mail: Bernard.beaudoin@ensmp.fr

In biology, the term microevolution refers to the occurrence of small-scale changes in gene frequencies in a population over a few generations, also known as evolutionary changes at or below the level of species. It is accomplished by mutations driven sometimes by natural selection. In paleontological studies, it is not possible to obtain genetic information of extinct organisms, therefore, other criteria are in use depending on the fossil organisms.

Planktonic foraminifera, a group of marine unicellular shell-bearing protozoa that are able to produce calcitic tests are one of the most important tools for geologic, biostratigraphic and paleoenvironmental reconstructions because they are highly diversified and easily recognizable. They occur in all marine environments from the Polar region in both hemispheres to the Equator, in marginal to deep basins from the surface down to below the thermocline. They first occur in the Jurassic and are still one of the major components of the sediments deposited in the modern oceans. Some genera and species appear, evolve and become extinct in a very short time and, therefore, represent excellent marker fossils. The composition of assemblages reflects water mass conditions. Since some species have a very fast evolutionary rate their evolutionary

steps can be easily traced in marine sediments.

The criteria used to produce a biologically guided and evolutionary-based classification of planktonic foraminifera include general morphology, wall's texture and structures and comparison with their modern counterparts, when possible.

We present here the microevolution of some species of planktonic foraminifera and we analyze the environmental factors that may have driven it. In particular, we focus on the Cenozoic lineages *Paragloborotalia pseudokugleri-P.kugleri*, *Globigerinita glutinata-Globigerinatella insueta* and the Cretaceous lineages *Abathomphalus intermedius-A. mayaroensis* and *Rotalipora-Anaticinella*.