$d^{13}C$ Isotope Geochemistry, a Tool to Place the Cenomanian-Turonian Boundary in Morocco

Ettachfini El Mostafa[1] and Andreu Bernard[2]
[1] University of Chouaib Doukkali, Faculty of Sciences, Lab. Geosc & Techniques of Environment, B.P. 20, 24000, El Jadida, Morocco
[2] LMTG, University of Toulouse, CNRS, IRD, OMP, 14, av. E. Belin F-31 400 Toulouse, Frensh

Paleoenvironmental disturbances of the global ocean are identified by numerous studies at the Cenomanian-Turonian boundary.

In the Moroccan Atlas, this boundary is characterized by a carbonate sedimentation characterized by bioclastic and lumachellic massive limestones overlapped by chalky, white and platy limestones. This lithologic unit is regarded as the regional manifestation of the OAE2 linked with a global eustatic rise. A geochemical correlation, coherent with biostratigraphic data, is proposed to precise the Cenomanian-Turonian boundary in the Moroccan Atlas.

From a paleontological point of view, this boundary is placed in a “precision interval” defined by the last occurrence of the planktic foraminifer Asterohedbergella asterospinosa at the base, and the first occurrence of the planktic foraminifer Helvetoglobotruncana helvetica, coeval with the ammonite Watinoceras sp., at the top of this interval.

From a geochemical point of view, a positive anomaly of the $d^{13}C$ is displayed, which take place close to this “precison interval”. It is located either in the lower part of this interval defined by the last occurrence of Asterohedbergella asterospinosa in the Upper Cenomanian, or above this interval, in levels defined by the first Turonian ammonites.

This isotopic signal, calibrated on various paleontological groups, is synchronous at the global oceanic scale. This event is identified as a “global oceanic geochemical event”.

Thereby, it can be used as a proxy in setting of the Cenomanian-Turonian boundary interval on outcrops where biostratigraphic records or markers are rare or absent.

Key Words: Biostratigraphy, Isotope Geochemistry, Cenomanian- Turonian Boundary, Morocco.