

## PALEOENVIRONMENTAL CONDITIONS THAT RESTRICTED THE NEOGENE BASIN OF CHELIF: A CASE STUDY FROM DJEBEL MENI

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### I. Introduction

Quantitative and qualitative study of the benthic foraminifers of the Messinian diatomite formation in (the Western Dahra from the northern marge of Chelif lower basin). It has been carried out in order to clarify the paleogeographic conditions that have been prevailing during that period.

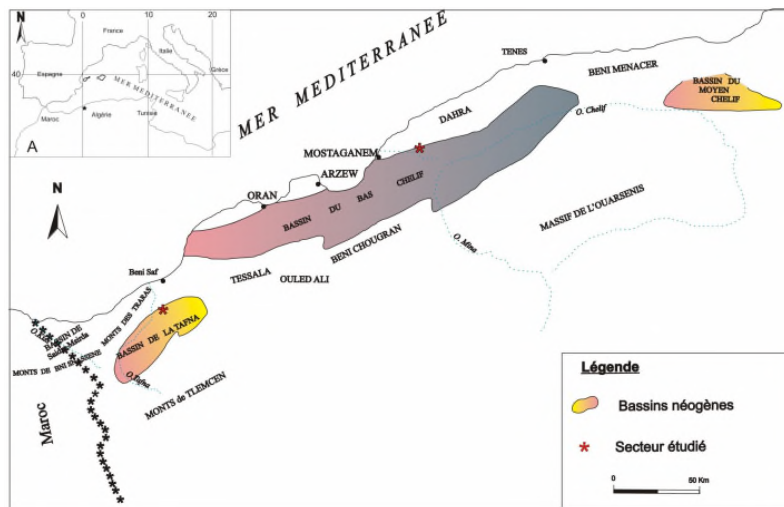


Fig.1: Chelif basin position (PERRODON, 1957 slightly modified)

### II. Systematic analysis

The study provides 131 species, that are divided in 08 associations with specific paleoenvironment for each. The division has been established on the basis of the frequency of the same taxon. (> 50% Dominant, 25 to 50% Abundant, 10 to 25% Frequent, <10 % Rare). Hereafter, these associations were gathered in 03 paleoecologic unites. The division was done on the basis of the taxon dominant. The first paleoecological unite is dominated by *Bolivina*, the second one is dominated by *Bulimina*, while the last one does not register any dominance. Henceforth, it has appeared that the environment known some restricted conditions toward the top of the section, characterized by low diversity benthic foraminifera populations, only the stress tolerant species (the opportunistic Species) could sustain. Moreover, it had become a shallow water materialized by the decrease in bathymetrical and oxygenation unlike the rest part of down the section.



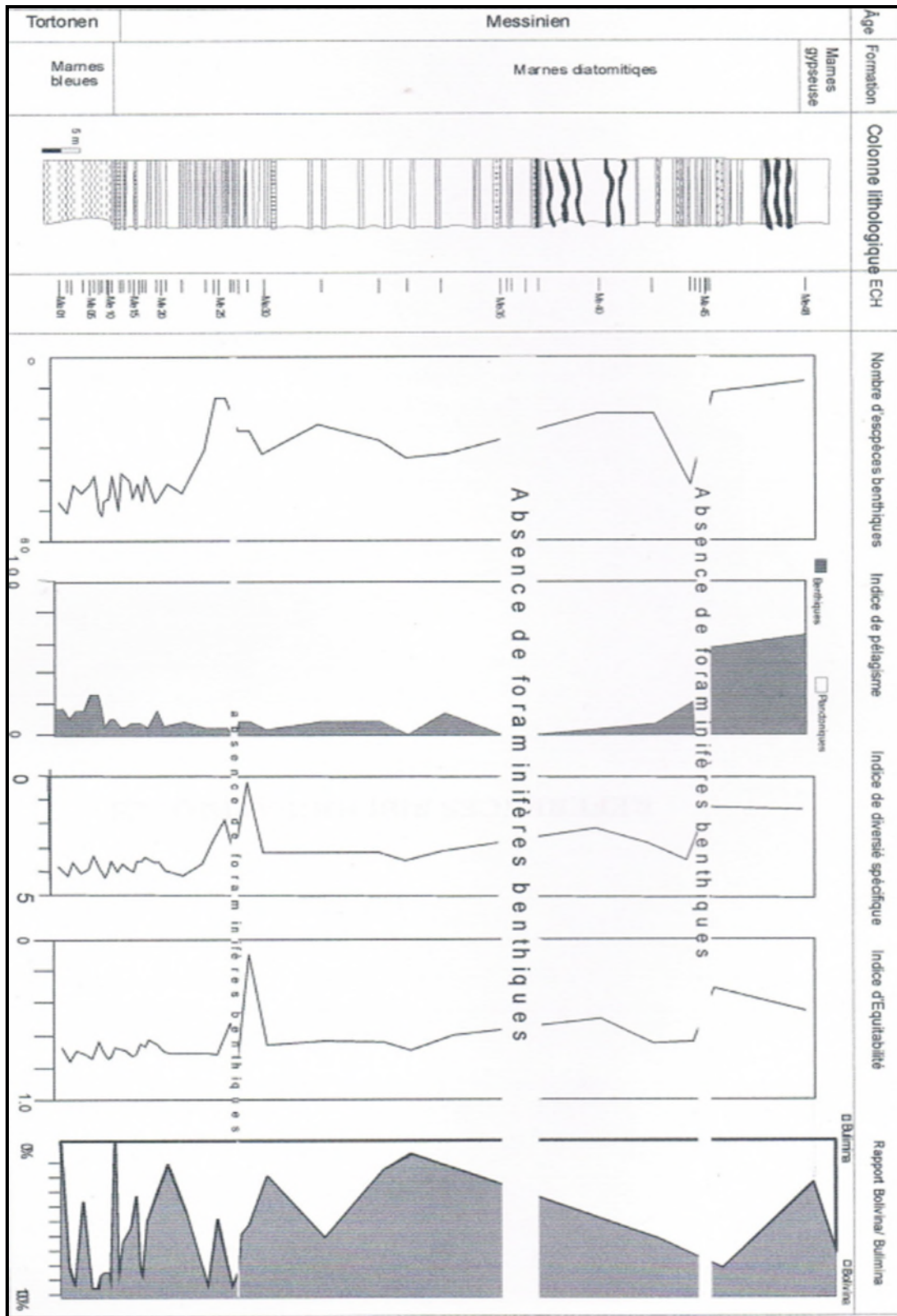


Fig. 3 : Curve of Paleoecologic indexes evolution

Alongside of this, the calculation of some bicenotic indexes (Number of benthic foraminifera, Specific diversity, Equitability, Pelagisme and the ratio *Bulimina/Bolivina* ) have reflected and exposed to a large extent the consistent and the coherence between them in terms of results. Thus, provided us the possibility to establish and reconstruct the paleoenvironment setting of that area.



### III. Evolution of Paleoecologic indexes

First, and by going upward the **Number of benthic foraminifera index** shows a significant decrease with some exceptions, and this it might due to the gradual environmental changes. Second, the **Pelagism index** shows an open environment with a few exclusions in the summit of the section, where the environment tends to be isolated and more restricted by the dominance of the benthic taxons. Third, **the Equitability index within which** the most samples show a value  $> 2$ , That is to say, the environment witnessed a well settings that had been prevailing at that time. Thus, these taxons are characterized by their mutual preference for well-oxygenated environments with normal salinities (Kouwenhoven . 2006). The exception is registered at the level of Me 29 and the last two ones Me 47, Me 48 it may indicates the dominance of specific taxons. As far as, the results of the **Specific Diversity** goes is in agreement with the former one (Equitability) alongside the section. The most samples show a value  $> 0.5$ , this means that the environment reflects the equilibrium. The exception is registered at the level of Me 29 and the last two ones Me 47, Me 48. This high diversity indicates an ecosystem suitable for many benthic species composed of both epifaunal and shallow infaunal taxons. Whereas, a low-diversity assemblage composed mainly of deep infaunal taxa, which indicates a specific restricted environment with stressed conditions (oxygen reduction, high salinity, high food supply) (A. Di Stefano et al.2010), The *Bolivina* and *Bulimina* groups are considered to have opportunistic behaviour and tolerance to dysoxia, but also to high bottom water salinity ( Van der Zwaan, 1982, 1983). Furthermore, **the ratio of *Bolivina/Bulimina*** . in the lower part of the section known the alternation between the two taxons. It is so clear that some time in favour the first one and the other time in second, so that, this indicates the fluctuation between the subtidal to the offshore.

### IV. Conclusion

The quantitative analysis (paleoecologic indexes) and the qualitative ones ( set of associations) reflect to a large extent the coherence and consistence between them. In the lower and the middle parts the Pelagism index shows an opened on toward the offshore with the high specific diversity and equitability. So that, this indicates a well conditions of the environment attested by species diversity of benthic foraminifera that profiler in subtidal to the offshore. Moreover, the summit of the section shows a decline of the curve, materialized by the diminish of the benthic foraminifera. A low equitability index and the ratio *Bolivina/ Bulimina* is in the favour of the former. The first and the second paleoecologic unites designate the dominance of some specific taxons, so that, the environment is so restricted characterized by reduction of the bathymetric with a low water oxygenated and lutites influx.

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