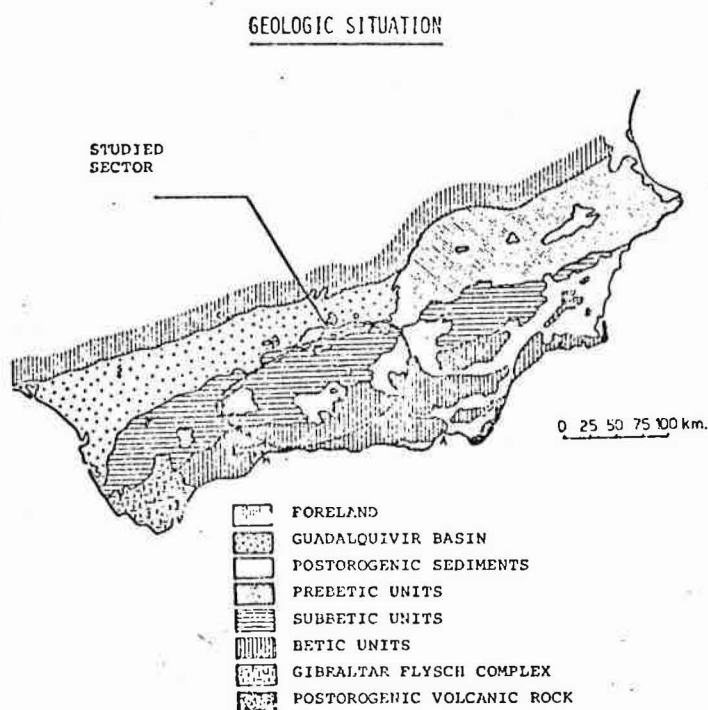


CORRELATION OF THE LATE OLIGOCENE AND EARLY MIOCENE IN THE TETHYS AREA. SPAIN: CENTRAL SECTOR OF THE BETIC CORDILLERES.

by

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The late Oligocene / early Miocene in the central sector of the Betic Cordilleres (South of Spain), is being studied by us, both in its bio and cronostratigraphic aspects, by mean of planktonic foraminifera. This time interval is very well represented in the above mentioned Tethys area. The more than 20 sections available now allow a detailed study of it.



STRUCTURAL SCHEME OF THE BETIC CORDILLERES
J. M. Fontboté (1965)

The Oligocene / - Miocene boundary is settled with the occurrence of *Globigerinoides primordius* BLOW -- and BANNER, a species which we consider the most appropriate; on the other hand, it is not possible to use - *Globorotalia kugleri* BOLLI because it is extremely rare in the Mediterranean area. For the Aquitanian / Burdigalian boundary the occurrence of *Globigerinoides altiaper-turus* BOLLI has been considered, and for the Burdigalian / Langhian boundary the datum plane of occurrence of *Praeorbulina*. Our own biozonation has been correlated --

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with the one of Blow, and in this study this last one has been mentioned, due to it's larger diffusion and to the limited extent of this report.

In the "Navazuelo" section, in the North of the Province of Granada, there is a continuous sequence ranging from the Chattian to the Aquitanian, which is the most complete among those which rise in the central sector of the Betic Cordilleres. Among the fossils found the planktonic foraminifera are the most frequent. Besides, there can be found a great amount of macroforaminifera and the existence of nanoplankton has also been observed; the other groups of fossils are less abundant, due perhaps to the type of marine deposit of flysch facies.

The Chattian in the "Navazuelo" series is represented by a rhythmic alternating of sandy limestone and marls of about 60 metres thickness. The Blow biozones N.1, N.2 and N.3 have been recognized. Above them there exist some 70 metres of mainly limestone material, with some marly levels in which we have recognized the zone N.4 (because of the occurrence of *Globigerinoides primordius* BLOW and BANNER), and consequently the Oligocene / Miocene boundary. Next, to it there are 45 metres of flysch facies, showing a good development of the marly interval which also belong to zone N.4. The uppermost part of this section is formed by 50 metres of very rhythmic flysch, the parallel and convolute lamination of which is greatly developed. In these last 50 metres there is a great reduction in the planktonic foraminifera and with some doubt it can be attributed to the lowermost part of Blow's N.5 zone, because of the occurrence of certain organisms which can be considered as *Globigerinoides trilobus* (REUSS) in coexistence with the latest *Globigerinoides primordius* BLOW and BANNER. We believe that according to the characteristics of the Navazuelo section it can be proposed as a Hypostratotype of the Oligocene / Miocene boundary.

In the "Las Latas" section, located 3 kilometres westward from the former, we have recognized in flysch facies material the lowermost and the middle part of Blow's N.5 zone, mainly due to the occurrence in this sequence of the *Globigerinoides altiaperturus* BOLLI. The uppermost part of this section would correspond to the Burdigalian, the deposit regime would be regressive, marine circalittoral, because of the

finding of *Clypeaster pentadactylus* PERON and GAUTHIER *Chlamys* sp. etc., in material poor in planktonic foraminifera but rich in macroforaminifera, which reached a considerable development in the area (about 200 metres -- thick).

In the lower Burdigalian the orogenic phase reaches its summit, that is why vast areas in the central sector of the Subbetic zone, could have remained emerged, or the deposited materials eroded. Further South in the other regions which were topographically lower and consequently immersed (as it happens in "La Viñuela" in the province of Málaga) the marine sedimentation continued. It is mainly of a marly type and although poor in planktonic foraminifera it has been possible to date Blow's N.6 biozone. On top of this series, the argillaceous cherty "Silexitas" levels, which are frequent in this epoch are found, in the studied Tethys area. Besides, we can mention the "Murchas" Formation in the Granada basin, the lower part of which corresponds to Blow's N.5 (pars)/N.6 zone.

Reverting to the central sector, about 10 kilometres Southeast of the "Navazuelo" section, we have found several sections with which it is possible to study the biostratigraphy of the material belonging to the middle Burdigalian / lower Langhian interval. We have selected the two sections described below as the most representative.

The "Gato" section is litologically very breccoid and conglomeratic, with alternating marly levels and sandy strata. The 130 metres thick section belongs to the upper part of Blow's N.6 zone and probably to Blow's N.7. They represent the immediately subsequent sediments to an orogenic phase (perhaps the most important in this region) of the Alpine folding. The compressing strength toward the Northwest continued as the folding of the series shows. A transgression phase, which starts at some intermittent intervals, will not reach its peak till after the Burdigalian.

The "Delgadillo" section represents the continuation of the "Gato" section. The series is well developed, reaching 210 metres thick (until the *Praeorbulina* datum). It is basically formed by sandy materials alternating with marly ones. The dip of the strata varies along the section, at the beginning it is 80° toward the Southeast and decreases

progressively to become only 20°. Blow' N.7 and N.8 zones have been re
cognized.

