

**STRATIGRAPHIC AND BIOESTRATIGRAPHIC STUDIES: THEIR IMPLICATIONS  
TO THE STRUCTURAL ANALYSIS OF THE INTERNAL-EXTERNAL ZONE  
BOUNDARY OF THE BETIC CORDILLERA (S SPAIN)**

#TENT-MANCLÚS, José Enrique, \*MARTÍN-MARTÍN, Manuel, #MARTÍN-PÉREZ, José Antonio,  
+SERRANO, Francisco.

#Departamento de Estratigrafía y Paleontología. Univ. Granada. Facultad de Ciencias, 18071 Granada (Spain).

\*Laboratoire de Géologie Sédimentaire et Paléontologie. Univ. Paul-Sabatier. 39 allées Jules Guesde, 31062 Toulouse (France), and #Departamento de Estratigrafía y Paleontología. Univ. Granada. Facultad de Ciencias, 18071 Granada (Spain). mmartin@goliat.ugr.es

+ Departamento de Geología y Ecología, Facultad de Ciencias, Univ. de Málaga, 29071 Málaga (Spain)

The Betic Cordillera, the westernmost perimediterranean alpine belt, has classically been divided into the Internal and External Zones (Fallot, 1948). The Internal-External Zone boundary (IEZB) is well exposed in the Sierra Espuña area in the Murcia province (SE of Spain), with abundant Lower Miocene outcrops pre-, syn-, and late orogenic. After mapping and biostratigraphic studies Burdigalian dated materials are found in the Internal and the External zones, and in the deposits that seal the contact (IEZB) between them.

The Internal Zone lower and middle Burdigalian outcrops are assigned to the El Niño Formation (Martín-Martín, 1996) a transgressive formation over the metamorphic internal zone complex already structured.

In the External Zone the sedimentation in the same period of time is in a highly unstable regimen being recorded in the Manzano Formation (Tent-Manclús, 1998). The latest deposit before the structuration of the chain corresponds to a hard ground developed over an erosional surface over the Manzano Formation that could represent the time lapse in which the formation of the IEZB was formed (Tent-Manclús, 1998).

The upper Burdigalian seal the IEZB. They are basal to open platform marine deposits of the Bernabeles Formation (*sensus* Tent-Manclús, 1998).

The excellent outcrops of the Burdigalian in the area permit to date the collision between the Internal and the External Zones as late middle Burdigalian to early late Burdigalian by the presence of *Sphenolithus belemnus* in the last materials deposited in the Internal and External Zones and the association of *S. belemnus* and *Sphenolithus heteromorphus* in the first deposits that seal the IEZB. This is in good accordance with the structuration of the Internal-External zones of the perimediterranean alpine cordilleras proposed by Guerrero *et al.*, (1993), but this study allow us to precise much more.

**REFERENCES**

Fallot, P. (1948): *Est. Geol.*, 8, 83-172.

Martín-Martín, M. (1996): *Tesis Publ. Univ. Granada*, 297p

Tent-Manclús, J. E. (1998): *Tesis de Licenciatura Univ. de Granada*, 131p.

Guerrera, F., Martín-Algarra, A., & Perrone, V. (1993): *Terra Nova*, 5, 525-544.