

Correlation problems in the marine Mediterranean Neogene

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Studies in the marine Mediterranean focussing on the two older HRI's, HRI 2 and 3, point out the still existing problems in these high resolution intervals. For some problems solutions are going to be accepted, for others further investigations are needed.

Correlation problems of HRI 2:

1) Diachroneity of *N. acostaensis* FO, which historically defines the Serravallian/Tortonian boundary, and of *P. siakensis* between the Mediterranean and Atlantic (Fig. 1).

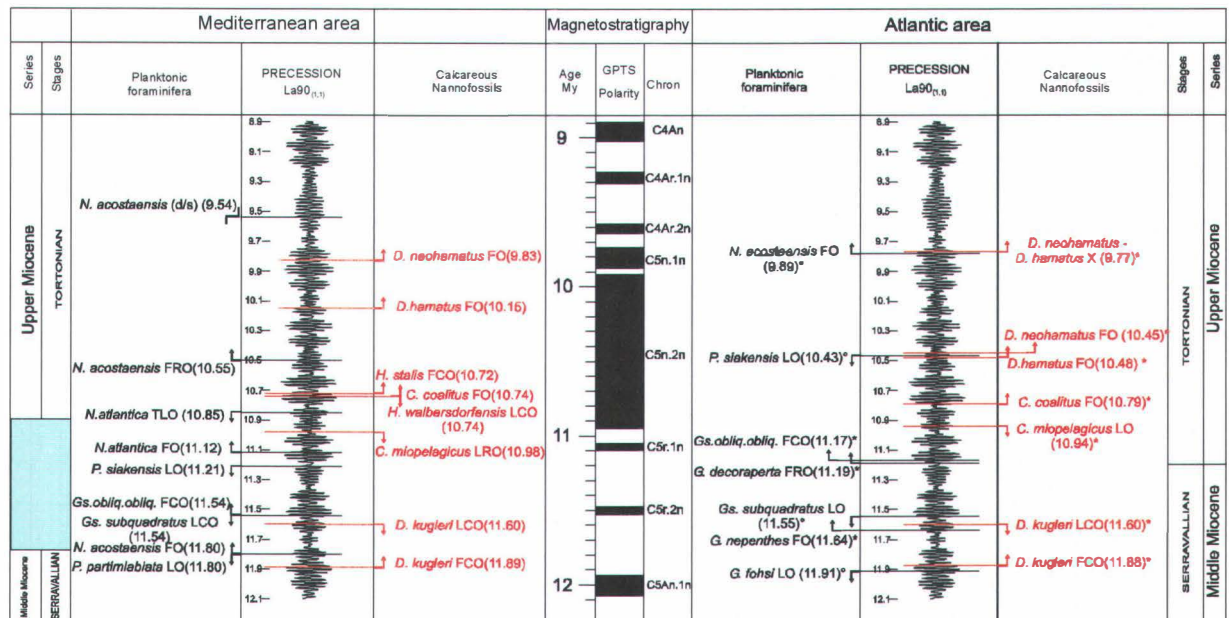


Fig. 1: Comparison of the Mediterranean with the Atlantic area of planktonic foraminifera and calcareous nannofossil events in HRI 2.

2) Lack of magnetostratigraphy.

3) Re-calibration of the Serravallian/Tortonian boundary timing.

Conclusions:

The problem of the Serravallian/Tortonian boundary is close to be solved, although *N. acostaensis* FO and *P. siakensis* LO are diachronous events (Fig. 2), and they cannot be used to define the boundary.

Through the astronomical tuning the LCO of *Globigerinoides subquadratus* (11.54 / 11.55 Ma) seems to be an isochronous event between the Mediterranean and extra-Mediterranean area (Tab. 1, Fig. 3).

The magnetostratigraphic tool is up to now missing and this renders the data as still being in progress.

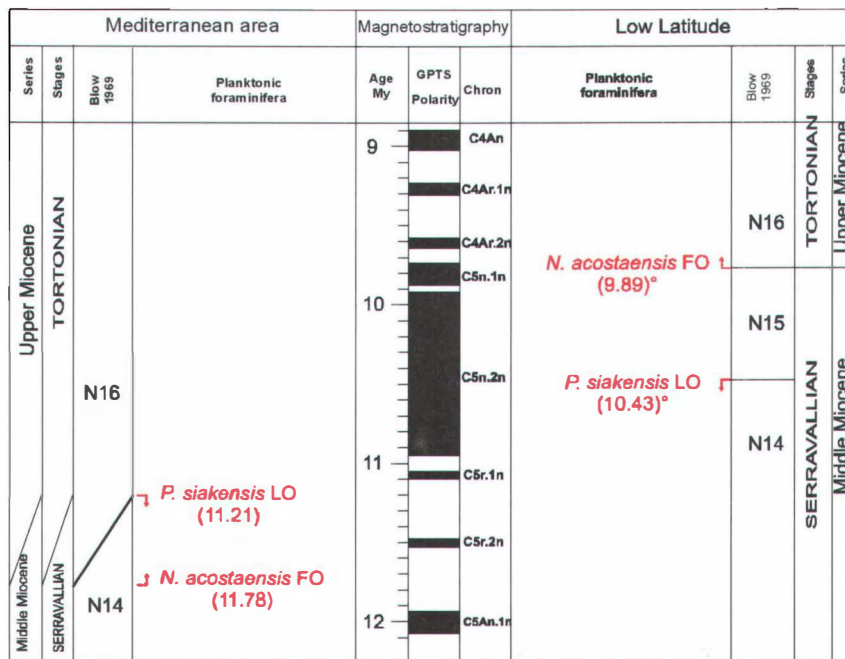


Fig. 2: Datings of LO of *P. siakensis* and FO of *N. acostaensis* in Mediterranean and low latitudes.

HRI 2

EVENTS

ASTRONOMICAL AGE

planktonic foraminifera

	MEDITERRANEAN	ATLANTIC
<i>N. acostaensis</i> (d/s)	9.54	-
<i>N. acostaensis</i> FRO	10.55	-
<i>N. atlantica</i> TLO	10.85	-
<i>N. atlantica</i> FO	11.12	-
<i>G. nephentes</i> FO	-	11.64*
<i>P. siakensis</i> LO	11.21	10.43*
<i>G. decoraperta</i> FRO	-	11.19*
<i>G. foshi</i> (s.l.)	-	11.91*
<i>Gs. subquadratus</i> LCO	11.54	11.55*
<i>Gs. o. obliquus</i> FRO	11.54	11.17
<i>N. acostaensis</i> FO	11.80	9.89*
<i>P. partimlabiata</i> LO	11.8	-

calcareous nannoplankton

<i>D. neohamatus</i> / <i>D. hamatus</i> X	-	9.77
<i>D. neohamatus</i> FO	9.83	10.45
<i>D. hamatus</i> FO	10.15	10.48
<i>H. stalis</i> FCO	10.72	-
<i>C. coalitus</i> FO	10.74	10.79
<i>H. walberdorsfensis</i> LCO	10.74	-
<i>C. miopelagicus</i> LRO	10.98	10.94
<i>D. kugeri</i> LCO	11.60	11.60
<i>D. kugeri</i> FCO	11.89	11.88

Tab. 1: Astronomical ages of bioevents.

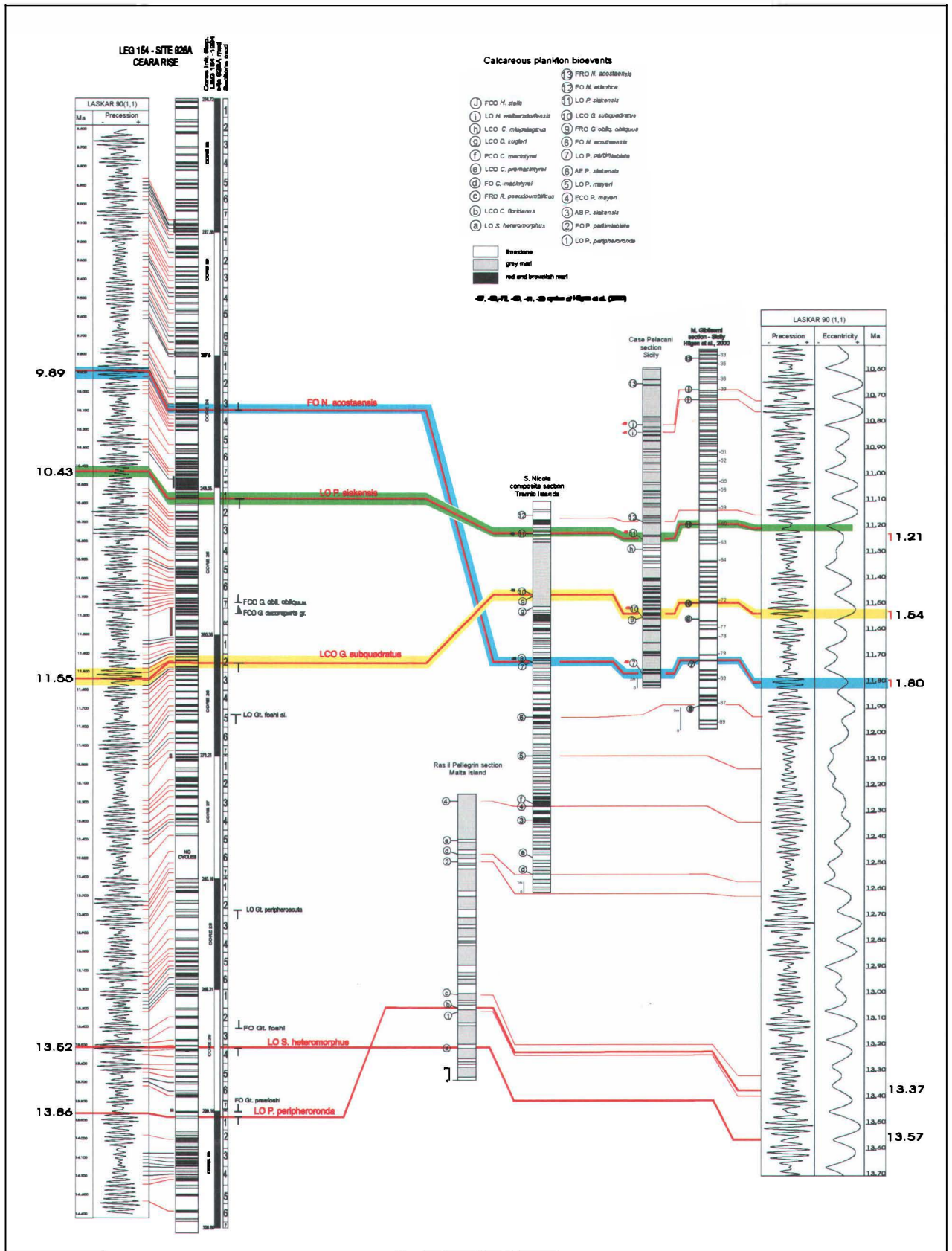


Fig. 3: Correlation of Leg 154 Ceara Rise (TURCO et al. 2001, IACCARINO et al. submitted) with Mediterranean sections focussing on HRI 2.

Correlation problems of HRI 3:

The *Globorotalia peripheroronda* LO and *Sphenolithus heteromorphus* LO are the two events proposed to define the Langhian/Serravallian boundary (RIO et al. 1997) (Fig. 4).

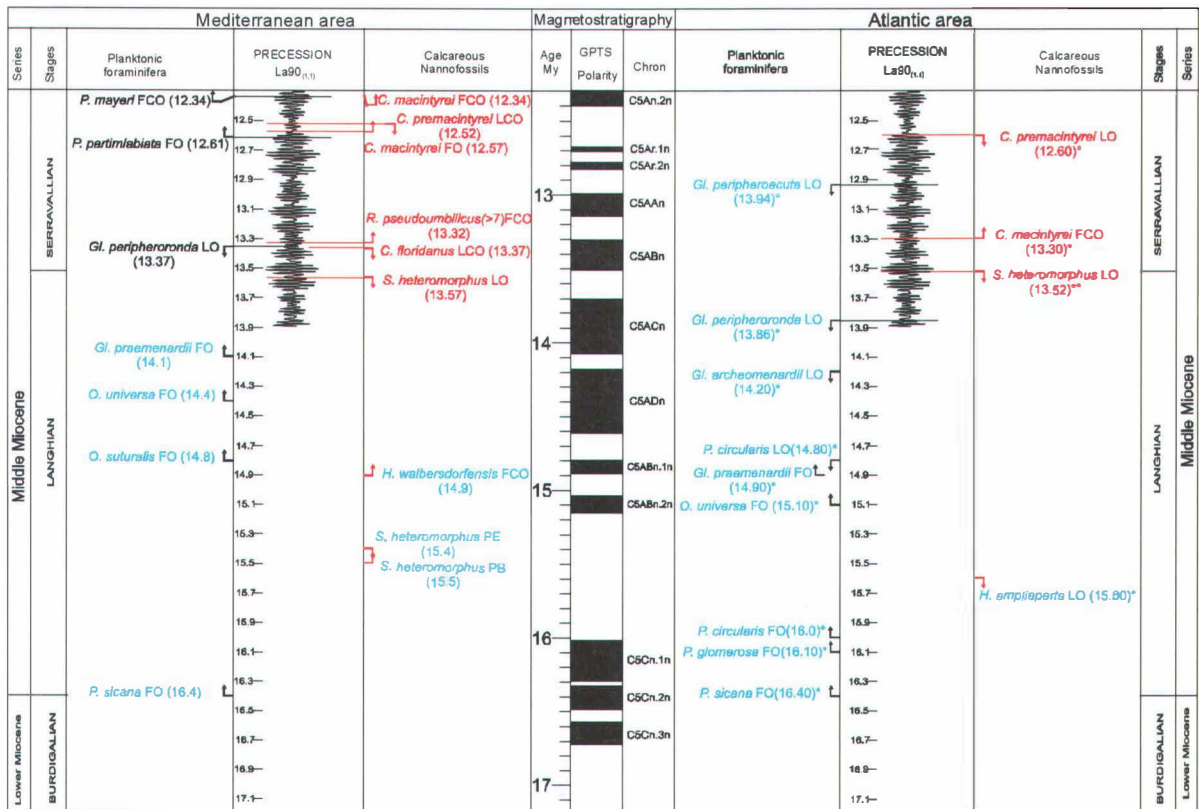


Fig. 4: Comparison of the Mediterranean with the Atlantic area of planktonic foraminifera and calcareous nannofossil events in HRI 3.

Lack of high-resolution integrated stratigraphy (cyclostratigraphy, magnetostratigraphy and calcareous plankton biostratigraphy) in good marine successions encompassing the Langhian/Serravallian and Burdigalian/Langhian boundaries

Conclusions:

The problems are far from being solved.

The LO of *G. peripheroronda* is diachronous between the Mediterranean and extra-Mediterranean area; on the contrary, the LO of *S. heteromorphus* (13.57 / 13.52 Ma) is up to now an almost synchronous event (Fig. 5).

High-resolution integrated stratigraphy (cyclostratigraphy, magnetostratigraphy and plankton biostratigraphy) is fundamental to solve the correlation problems of this time interval.

In the Langhian stratotype (Cessole section - Piedmont Tertiary Basin) all steps from *G. praeorbulina* to *G. orbulina* occur, raising correlation problems with Paratethys sections.

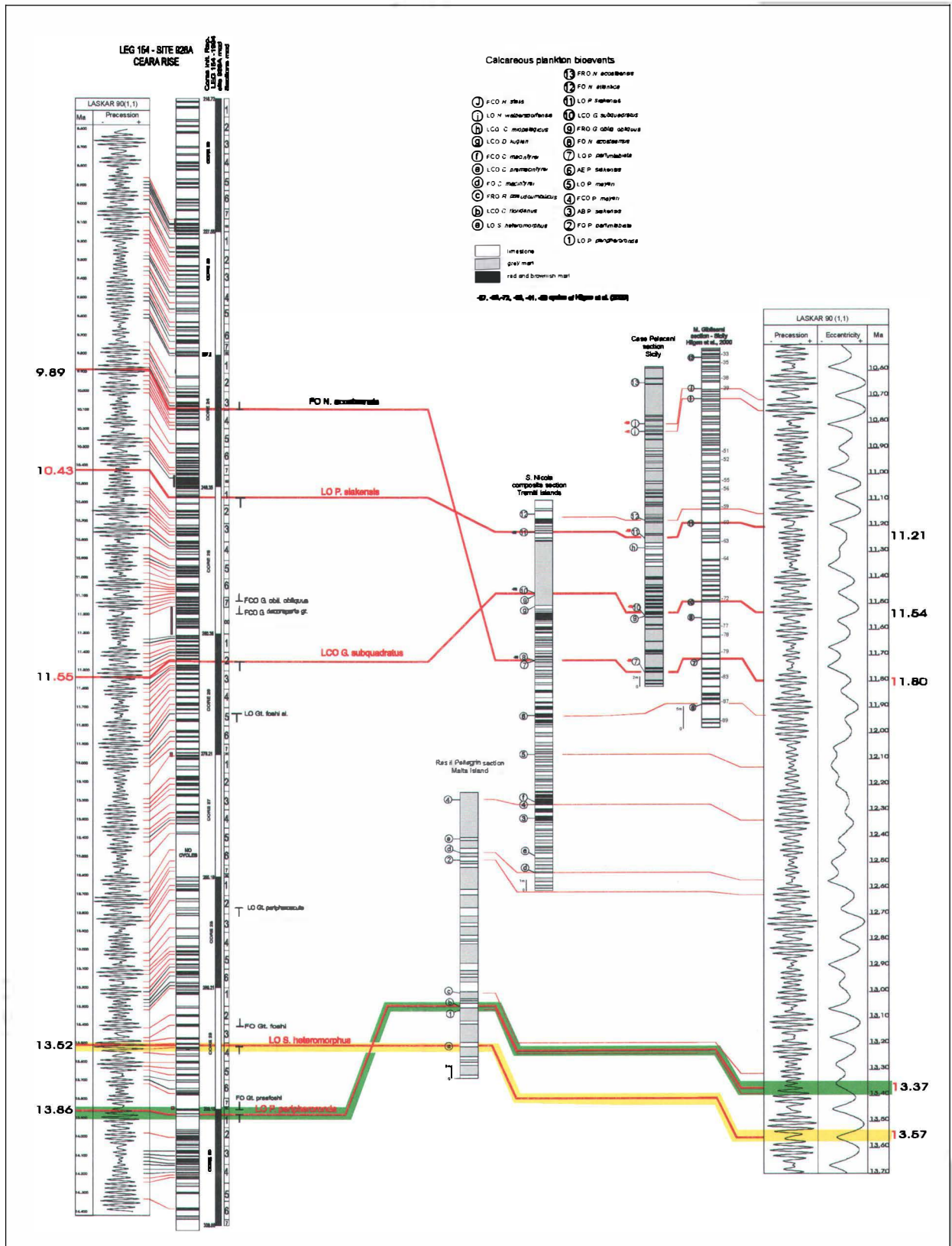


Fig. 5: Correlation of Leg 154 Ceara Rise with Mediterranean sections focussing on HRI 3.

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Mid-Miocene nannoplankton correlation in the Paratethys

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Nannoplankton correlations between Central and Eastern Paratethys were focussing on the two older HRI's, starting with NN4. Up to NN6 the Central Paratethys had marine conditions. As seen in Figs. 1 and 2 correlation problems between Central and Eastern Paratethys occur in NN5 up to NN8. One main problem is the correlation of NN7, Badenian or Sarmatian in the Central Paratethys. In the presented scheme NN4 represents Karpatian, NN5 Early Badenian, NN6 Late Badenian, NN7 and NN8 are placed into the Sarmatian, and NN9 into Pannonian A.

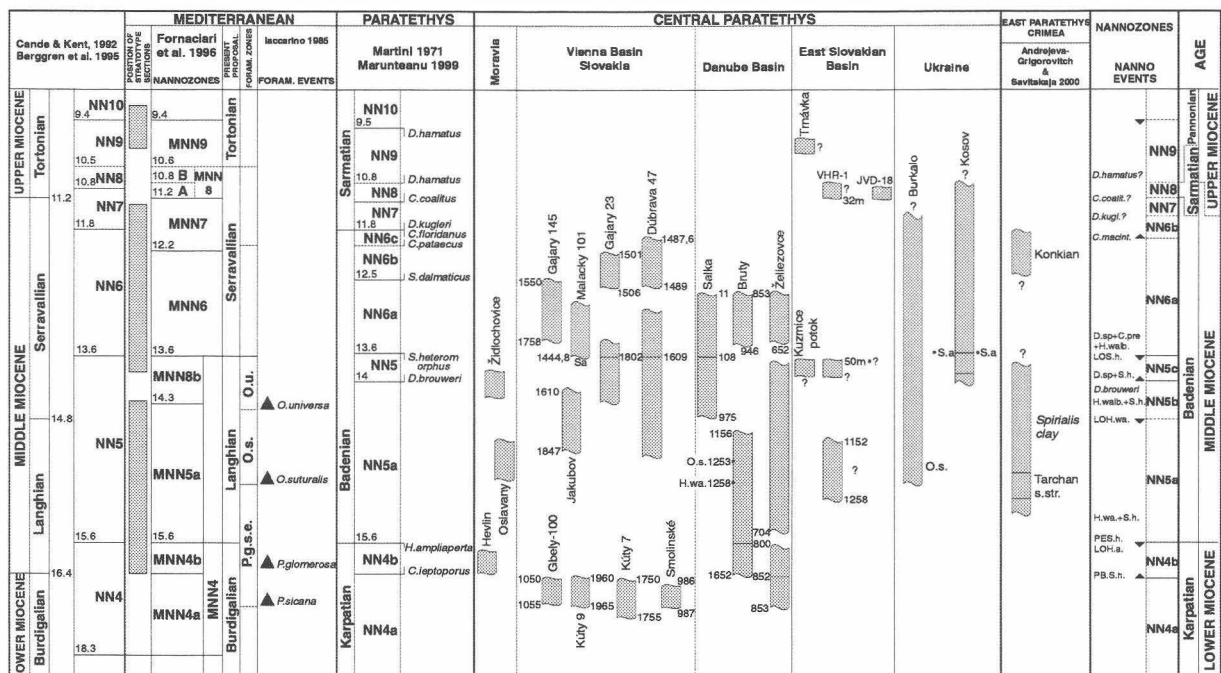


Fig. 1: Compilation of nannofossil zonations of the Mediterranean, Paratethys, Central Paratethys and Eastern Paratethys (after KOVÁČ et al. 2000, HUDÁČKOVÁ 1995, HUDÁČKOVÁ & SLAMKOVÁ 2000, ANDREJEVA-GRIGOROVICH & HALÁSOVÁ 2000).

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