A study of planktic foraminiferal assemblages of different sections in the Tethys and North Atlantic realms allows us to revise the biostratigraphical zonations and to establish the correlation among biozones, sections and the geochronological time scale of Berggren et al. (1995). Many sections were studied in Belgium, Bay of Biscay, France, Israel, Italy, Kazakhstan, Spain and Tunisia in order to search for the Paleocene/Eocene (P/E) Boundary Stratotype. The best ten sections were studied at high resolution and their results are summarized in this synthesis. Other sections, such as the Ypresian stratotype in Belgium (Pardo et al., 1994) and the Ain Settara section in Tunisia, have low planktic foraminiferal richness and were not included in this synthesis, although their results were taken into consideration. The best studied sections are located in Spain (Alamedilla and Caravaca in the Betic Cordillera and Zumaya, Campo and Tremp in the Pyrenees), the Bay of Biscay (DSDP Site 401), Italy (Bottaccione and Possagno), Israel (Ben Gurion) and Kazakhstan (Kautakap).

The quantitative study of the planktic foraminifera in all these sections allows us to identify several datum events along the P/E transition. These events are: first occurrence (FO) of Muricoglobigerina soldadoensis, last occurrence (LO) of Luterbacheria pseudomenardii, LO of Igorina laevigata, FO of Acarinina berggreni, Acarinina sibaiyaensis and Acarinina africana apparently simultaneous. LO of Morozovella velascoensis and FO of Morozovella formosa. These events have been used to recognize the biozonal configuration of Berggren et al. (1995) that have been modified by Pardo et al. (in press) subdividing the P5 zone in two subzones: P5a of Luterbacheria pseudomenardii-Acarinina sibaiyaensis and P5b of Acarinina sibaiyaensis/Morozovella velascoensis. Some of these events have been used to establish the biozonation of Arenillas and Molina (1996) that have been slightly modified in this paper subdividing the Luterbacheria pseudomenardii in two biozones: Luterbacheria pseudomenardii Biozone and Muricoglobigerina soldadoensis Biozone. These subdivisions are useful in order to have a more detailed biostratigraphical scale for correlation between different regions and basins.

The planktic foraminiferal faunal turnover across the P/E boundary is quite gradual except at the benthic foraminiferal extinction event (BFEE) horizon. This extinction of the bathyal and abyssal small benthic foraminifera has been found in all deep sea sections just below a dissolution clay interval. This relevant extinction event and the concomitant lithological change from marls to clay constitutes an apparently very isochronous datum, which would be very suitable for the definition of the P/E Boundary Stratotype (Molina, 1996). The BFEE coincides with the LO of Igorina laevigata and the beginning of the increase of acarininids. In this interval, coincident with the BFEE, an acarininid extratropical excursion is observed in middle and high latitudes. This excursion indicates increased sea waters temperatures coincident with the dissolution interval. The FO of the new acarininids (A. africana, A. berggreni and A. sibaiyaensis) is found just above the dissolution clay. An increase of the chilguembelinid population has been found also above the dissolution clay, indicating hypoxic conditions in intermediate waters.

The Caravaca section consists of marls at the P/E transition and it is not well exposed. Its foraminiferal assemblages were first studied by Von Hillebrandt (1974) establishing the correlation between planktic and large benthic. Later on, this section was evaluated as a potential P/E boundary stratotype by Molina et al. (1994) based on a high resolution and integrated stratigraphical study. Planktic foraminifera are very abundant and quite well preserved but this section is not optimal as potential stratotype for the P/E boundary, mainly because the likely presence of a short hiatus 2.5 m below the BFEE.
The Alamedilla section is probably the best exposed and most continuous section in Spain. The preservation is not as good as in Caravaca, but planktic foraminifera are abundant (Arenillas and Molina, 1996) and have been correlated with the isotopic and sediment compositional changes (Arenillas et al., 1996; Lu et al., 1996). All the biozones from M. soldadoensis to M. formosa are present and there is no evidence of hiatuses in the P/E transition. A very distinctive red clay interval marks the BFEE at the bottom and the extra-tropical excursion at the top. Nannofossils and magnetostratigraphy are currently under study.

The Zumaya section is a quite expanded section especially from the M. subbotinae Biozone which consists of about 120 m of marl and calcarenitic sediments. Nevertheless, the P/E transition is not so calcarenitic and expanded. Von Hillebrandt (1965) first published the biostratigraphy of the whole section based on planktic foraminifera. Planktic foraminiferal faunal turnovers and biochronostratigraphy of the P/E transition were studied by Canudo and Molina (1992) and Canudo et al. (1994). The high-resolution iridium, isotopic, nannofossil and foraminifera correlations have been establish by Schmitz et al. (1997).

The Campo section constitutes the parastratotype of the Illerian stage and consists of platform facies at the base. The section is extremely expanded with a 70 m thick M. velascoensis Biozone (Arenillas and Molina, 1995). Although planktic foraminifera are scarce their assemblages were studied by several authors (Von Hillebrandt, 1965; Molina et al., 1989; Canudo et al., 1989). Many other microfossil groups are abundant (e.g., alveolinids, nummulitids, ostracodes, dinoflagellates, etc.) and the integrated stratigraphy across the P/I boundary have been revised and refined by Molina et al. (1992).

The Tremp section is the stratotype of the Illerian stage and consists of a shallow marine transgressive-regressive megasequence intercalated within terrestrial facies. Scarce planktic foraminifera are only present just in the middle part of the section, which represents the P/E transition. Planktic foraminiferal assemblages were studied by Gartner and Hay (1962), von Hillebrandt (1965), Blow (1979) and Molina et al. (1992; 1995). The Tremp and Campo are very good reference sections for correlation between shallow environments and the deep sea sections.

The DSDP Site 401 is located in the western abyssal plain of the Bay of Biscay. The P/E transition ranges from Zone P5 to P8, with some artificial hiatuses due to core recovery. Planktic foraminiferal assemblages show good preservation and diagenetic alteration is low. $\delta^{13}$C analysis shows a shift coincident with a $\delta^{18}$O shift, the BFEE and an increase in relative abundance of warm water acarininids and morozovellids. After the BFEE and the isotopic shift, chiloguembelinid population shows an increase, suggesting the onset of hypoxic conditions in intermediate waters (Pardo et al., 1997).

The Possagno section micropaleontological studies were summarized in a monograph edited by Bolli (1975). This classical Italian section is located in a quarry, which is a major problem to consider it as a good candidate for the P/E boundary stratotype. Furthermore, the section is very condensed with a 4 cm thick red clay and a 57 cm thick Morozovella velascoensis Biozone. Nevertheless, we have identified the acarininids extra-tropical excursion in coincidence with the $\delta^{13}$C shift.

The Bottaccione section, located in Gubbio, is another classical Italian section. Planktic foraminiferal assemblages from the Paleocene and lower Eocene were first studied by Luterbacher (1964). Preservation of planktic foraminifera is poor since the lithology is very calcareous, but nevertheless this section allows correlation between biostratigraphy and magnetostratigraphy.

The Ben Gurion is one of the best Israeli sections. Planktic foraminifera are frequent and were first studied by Benjamini (1980). Several dissolution levels are present across the P/E transition and two hiatuses have been recognized. Nevertheless, all the biozones from the M. soldadoensis to M. formosa Biozone have been identified.

The Kaartakapy section, located in the boreal Paratethys, is a composite of two outcrops which are correlated by means of a 10 cm thick clay layer with marcasite nodules. Planktic foraminiferal assemblages are well preserved and characterized by a sharp increase in relative abundance and species richness of tropical acarininids, morozovellids and igerinids during the P/E transition. The maximum diversity of subtropical species, and the FO of Acarinina sibaiyaensis and A. africana coincides with a $\delta^{13}$C shift and the onset of the clay layer. Prior to the main $\delta^{13}$C shift a long term gradual decrease characterizes the upper Paleocene (Pardo et al., in press). The P5b Zone is only 0.4 m thick and suggests the presence of a hiatus.
|                | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 |
|----------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| **Not studied**| 66 | 31 | 04 | 47 | 5v |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
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| **Terrestrial**|    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
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| **Inner platform**|    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
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| **PALEOCENE**  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| **EOCENE**     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| **EPOCH**      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
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| **MAGNETIC POLARITY** |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| **DATUM EVENTS** |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| **Arenisca**   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| **modified in this paper** |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
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