# Late Eocene to Oligocene preservation history and biochronology of calcareous nannofossils from paleoequatorial Pacific Ocean sediments

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A high resolution biochronologic study of late Eocene and Oligocene calcareous nannofossils from a continuous carbonate sequence recovered at Ocean Drilling Program (ODP) Leg 199 Site 1218 in the paleoequatorial Pacific Ocean led to the recognition of the following biohorizons: the highest occurrences (HO) of *Discoaster barbadiensis* (34.773 Ma), *D. saipanensis* (34.448 Ma), *Ericsonia formosa* (32.923 Ma), *Reticulofenestra umbilicus* (32.019 Ma), *Sphenolithus predistentus* (26.930 Ma), *S. distentus* (26.908 Ma) and *S. ciperoensis* (24.432 Ma), and the lowest occurrences (LO) of *S. distentus* (29.992 Ma) and *S. ciperoensis* (27.093 Ma). In addition, the HO of *S. predistentus* was identified at 26.930 Ma, and the first consistent appearance of *Triquetrorhabdulus carinatus* occurs at 26.555 Ma, while the onset of the peak interval of *T. carinatus* was determined at 24.436 Ma. The stratigraphic

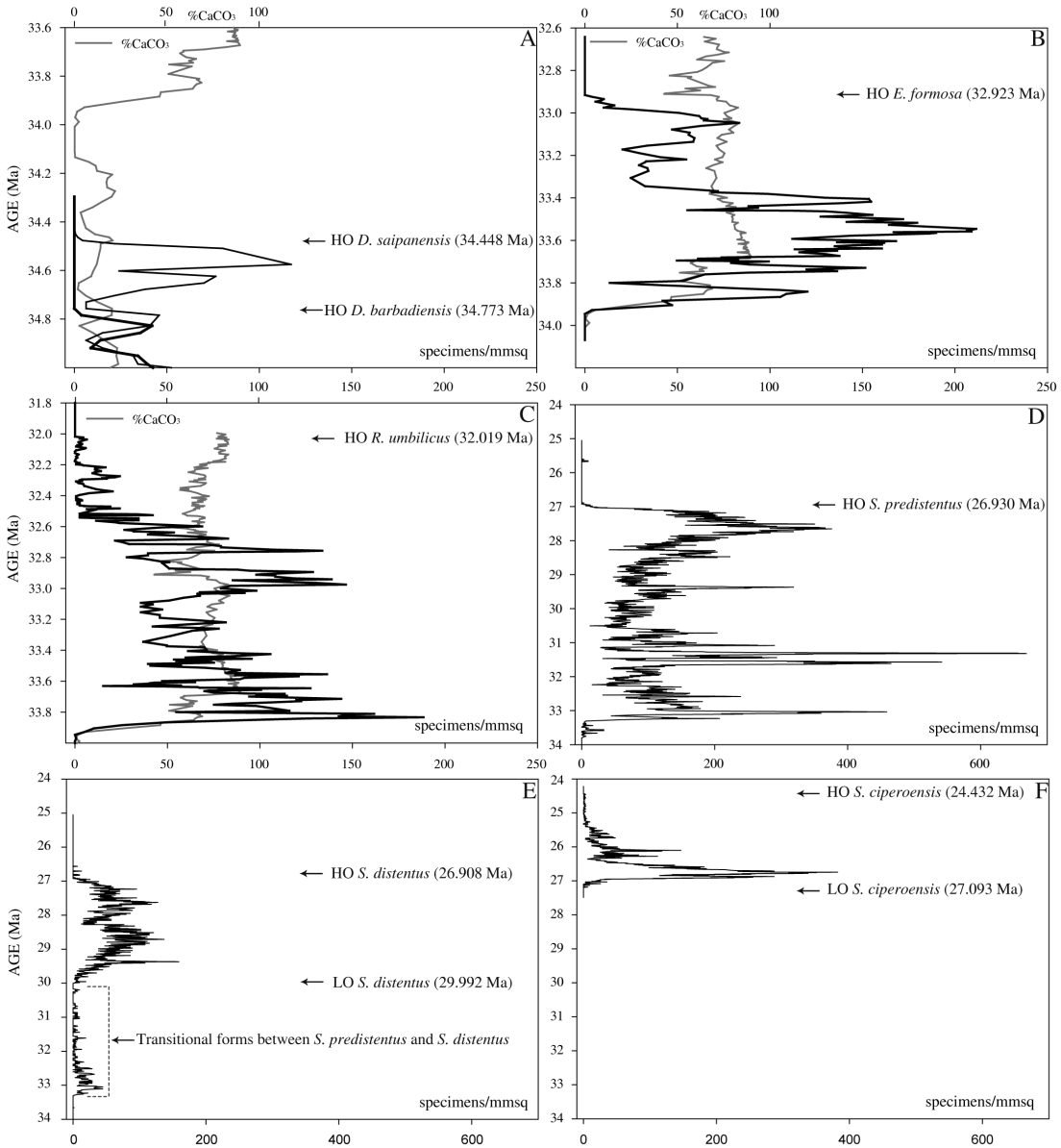


**Figure 1**: Plots of the range pattern of **A**) *D. barbadiensis* (thicker black line) and *D. saipanensis* (thinner black line), **B**) *E. formosa*, **C**) *R. umbilicus*. Gray line represents carbonate content (weight %) in the panels. **D**) *S. predistentus*, **E**) *S. distentus* and the transitional form between *S. predistentus* and *S. distentus*, **F**) *S. ciperoensis* and **G**) *T. carinatus s.s.* (black line) and *T.* aff. *T. carinatus* (gray line)

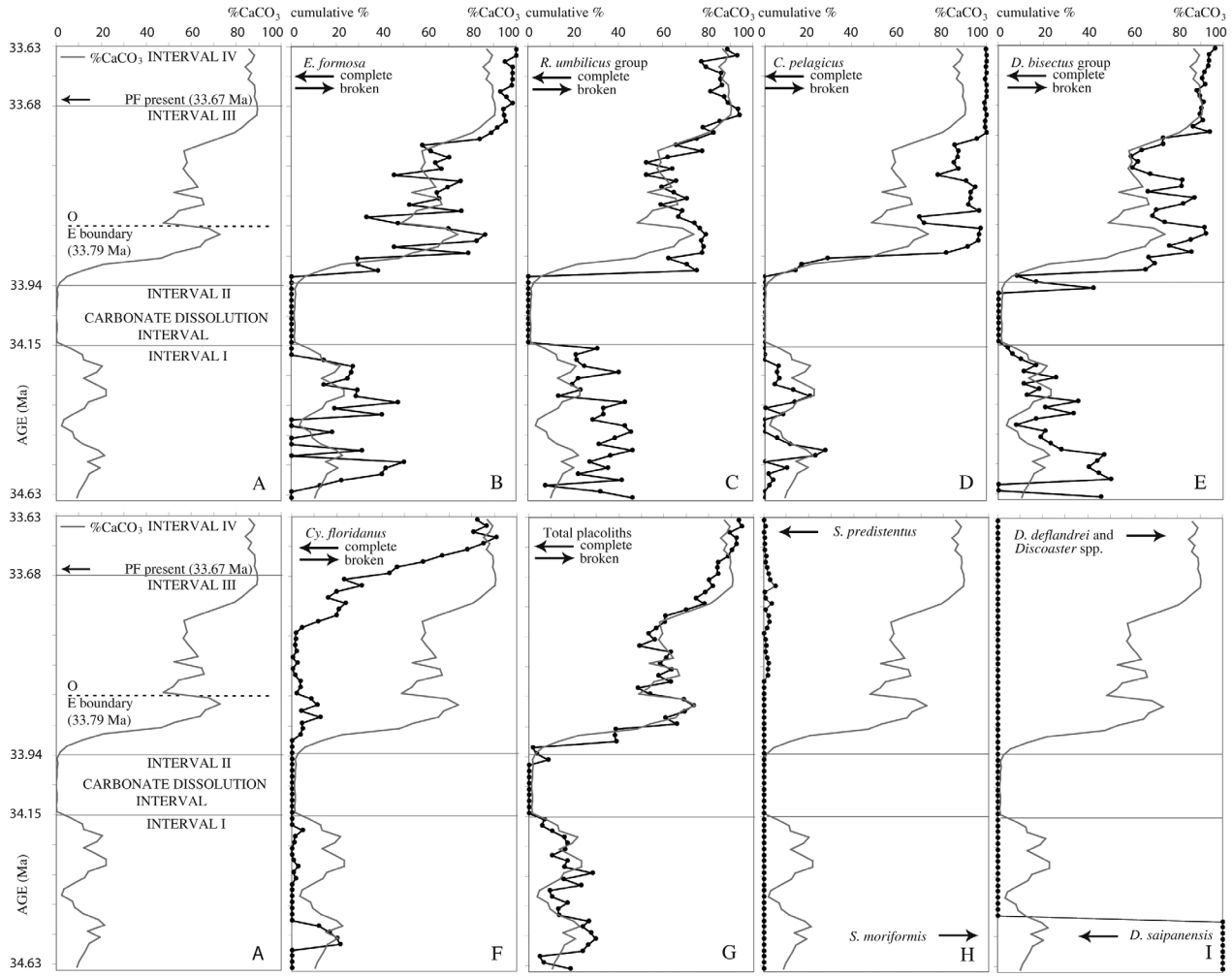


**Figure 2**: The carbonate dissolution Intervals I – IV (34.63 Ma to 33.63 Ma): **A**) $CaCO_3$%, the position of the E/O boundary and the time of the re-appearance of planktonic foraminifers (PF). Cumulative frequencies (in %) of complete (area left of heavy black line, with filled circles) *versus* broken (area right of heavy black line, with filled circles) specimens: **B**) *E. formosa*, **C**) *R. umbilicus* group, **D**) *C. pelagicus*, **E**) *D. bisectus* group, **F**) *C. floridanus*, **G**) total placoliths. **H**) Abundance (as cumulative %) of *S. moriformis versus S. predistentus*. **I**) Abundance of *D. saipanensis versus D. deflandrei* and *Discoaster* spp. (0% *D. saipanensis* implies 100% of the *D. deflandrei* and the *Discoaster* spp. group, and *vice versa*)

range of *Triquetrorhabdulus* aff. *T. carinatus* has a duration of 3.3 Myr, representing the first complete range ever documented for this morphotype. Information about the preservation history of the selected species across the Eocene/Oligocene boundary was achieved by investigating selected specimens and by studying the cumulative percentages of the complete *versus* broken specimens in the interval between 34.63 and 33.63 Ma. Placolith preservation in this interval is controlled by the variation in the carbonate content values.