

# Ceratolithaceae biostratigraphy of ODP Hole 999A, Caribbean Sea

## Carlos Lancis

University of Alicante, Department of Earth and Environmental Sciences, 03080 San Vicente del Raspeig, Alicante, Spain; carlos.lancis@ua.es

## José Enrique Tent-Manclús

University of Alicante, Department of Earth and Environmental Sciences, 03080 San Vicente del Raspeig, Alicante, Spain; je.tent@ua.es

## José-Abel Flores

Universidad de Salamanca, Department of Geology, 37008, Salamanca, Spain; flores@usal.es

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Ocean Drilling Program (ODP) Hole 999A was drilled during Leg 165 and is located on a promontory nearly 1000 m above the relatively flat Colombian Plain (Caribbean Sea) at 2828 m water depth. A total of 102 smear slides were studied from this hole between 224.58 meters composite depth below seafloor (mcd) and 180.59 mcd. To determine the fine details of the nannofossil structures, 46 samples were prepared for scanning electron microscopy (SEM) using a technique of centrifugation/filtration. The focus of our work is from the lowest occurrence of *Amaurolithus primus* at 211.12 mcd in sample 999B-24X-1, 90 cm, to the highest occurrence of *Ceratolithus atlanticus* at 158.22 mcd in sample 999B-17H-6, 90 cm.

*Amaurolithus delicatus*, which evolved from *A. primus*, first appears at 209.06 mcd, followed by *Nicklithus amplificus*, which evolved from *Orthorhabdus rugosus* and appears at about 204.02 mcd. At 189.41 mcd, *A. primus* is no longer present, and at 181.93 mcd, *N. amplificus* is also absent. In the latest Messinian, a new ceratolith branch evolved from *O. rugosus*. The first species present is *Ceratolithus finifer* at 165.99 mcd. This sample also contains *A. delicatus*, the only species left from the previous ceratolith branch. Above the first appearance of *C. finifer*, the following species rapidly appear: *C. acutus* (165.56 mcd), *C.? atlanticus* (161.76 mcd), *C. larrymayeri* and *C.? tricorniculatus* (both at 160.91 mcd), *C. armatus* (160.50 mcd), and *C. cristatus* (159.65 mcd). The highest occurrences of *C. finifer* and *C.? atlanticus* are at 158.22 mcd. *Ceratolithus? atlanticus* is abundant, and it has a short range between 5.322 and 5.173 Ma (Lancis et al., 2024). *Ceratolithus? tricorniculatus* is scarce in the studied samples.

## References:

Lancis, C., Tent-Manclús, J.E. & Flores, J.-A. 2024. Origin and evolution of the Neogene calcareous nannofossil *Ceratolithus*. *Marine Micropaleontology*, **186**: 102310. <https://doi.org/10.1016/j.marmicro.2023.102310>