Paleogene and Neogene Time Scale of GTS 2012

Paleogene

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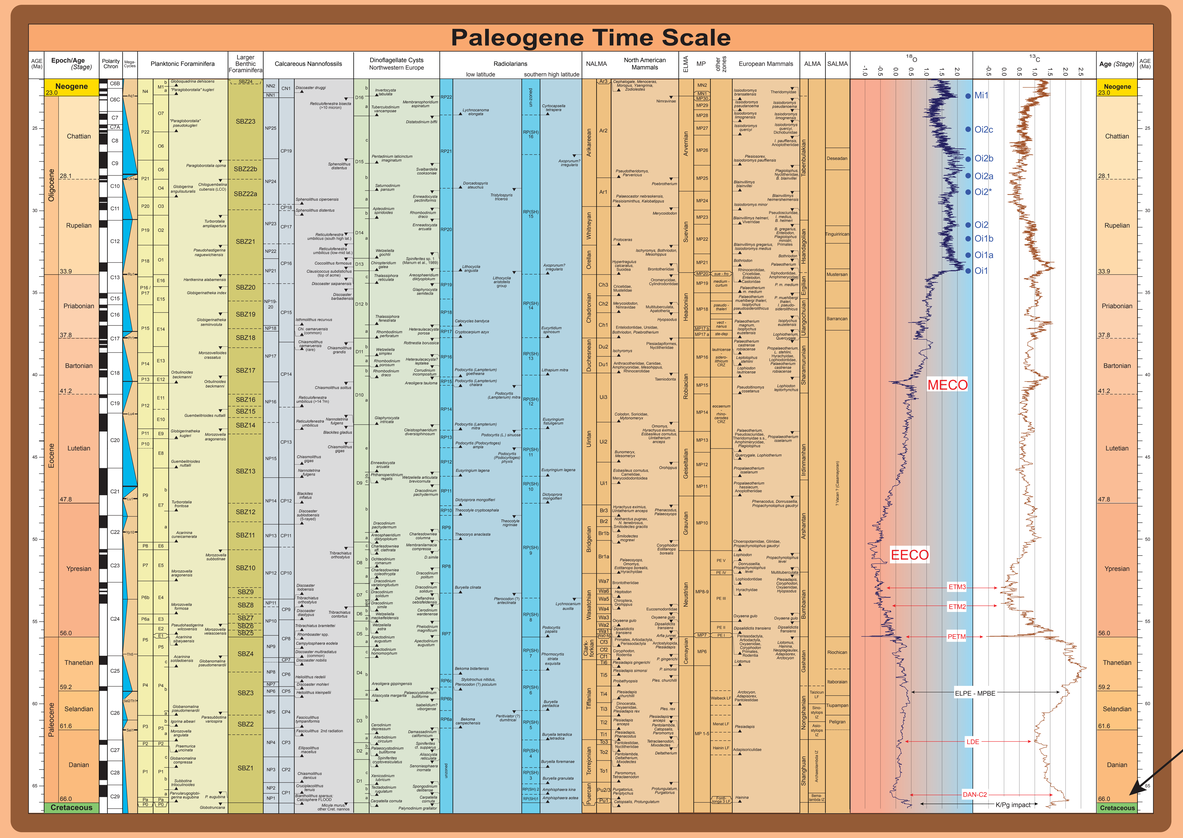
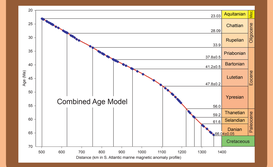


Of the 9 Paleogene stages, only 3 remain to be formally defined: the Bartonian and Priabonian stages of upper Eocene and the Chattian (base of upper Oligocene).

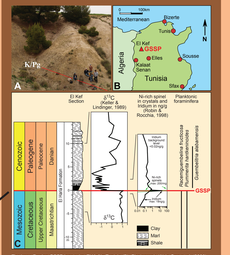
During the Paleogene, the global climate, being warm until the late Eocene, shows a significant cooling trend culminating in a sustained cool Oligocene. Superposed on this general climatic trend are several short-lived oxygen- and carbon-isotope events that are useful for global correlation.

Paleogene Age Model



The age-distance model for C-sequence marine magnetic anomalies in the South Atlantic incorporates astronomical tuning for Chrons C6C through C13n, a bridging polynomial for Chron C15n, a spline-fit to radioisotope dates for Chrons C15r-C23r, and astronomical tuning for Chrons C24n-C29r. *Beginning of each anomaly/chron is shown as a blue dot.*

GSSP of the Danian Stage of the Paleogene System at El Kef, Tunisia



The base Danian GSSP located at El Kef in Tunisia (B). Photograph (A) in Ogg et al. (2008) and stratigraphic data (C) from Molina et al. (2006).

Neogene

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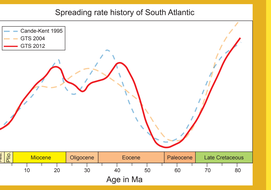
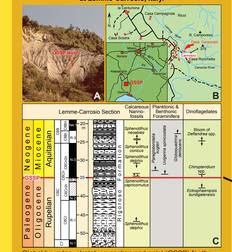
Spreading rate history of South Atlantic



The astronomical tuning of the Cenozoic geomagnetic time scale implies a considerable variation in spreading rates for the South Atlantic reference scale of marine magnetic anomalies. Following a slowing in the latest Cretaceous through Paleogene, spreading rates rose to a plateau for late Eocene through early Miocene, then have slowed to the present day. A similar general conclusion was apparent from previous time scales, but with slighly shifted peaks.

GSSP of the Aquitanian Stage of the Miocene Series at Lemme-Carrosio, Italy.

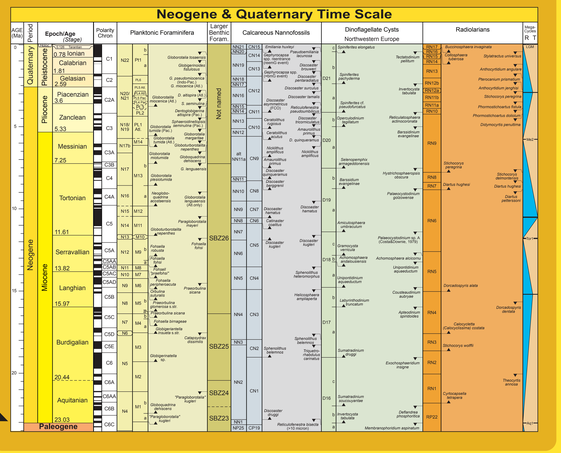


Global boundary stratotype section and point (GSSP) for the Aquitanian Stage and Paleogene/Neogene boundary at Lemme-Carrosio, Italy, showing section (A), location (B) and log and magnetobiostratigraphic data (C).

Of the 8 Neogene stages, only 2 remain to be formally defined: the Burdigalian and Langhian stages of lower and middle Miocene.

The biostratigraphy of Cenozoic marine successions is well established using several microfossil groups. Calcareous nannofossils and planktonic foraminifera are the most widely used groups for biostratigraphy in open marine deposits, especially in low- and mid-latitude settings. The reversal history of the Earth's magnetic field has been the backbone of the Cenozoic correlations, especially between marine and terrestrial settings.

The Neogene age model has astronomical tuning "downward" relative to the Present of magnetic polarity chrons and major microfossil and nannofossil datums. Ages for other marine biostratigraphic datums, terrestrial mammal zones, stable isotope events and sea-level trends are mainly derived from correlations to this astronomically tuned bio-magnetostratigraphic scale



For details see:

"The Geologic Time Scale 2012" by F. M. Gradstein, J. G. Ogg, M. D.Schmitz and G. M.Ogg (2012, published by Elsevier).

Poster prepared by Gabi Ogg.