Exploring apparent calcareous nannofossil biozone diachroneity at the southern high-latitudes during the early Eocene

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The earliest Eocene (~ 56 to 52 Ma) is generally considered to be a reasonable geologic analog for modern climatic change, albeit with the important caveat that current carbon dioxide emissions are increasing at unprecedentedly high rates. In addition, the series of carbon cycle perturbations (also known as hyperthermals) that characterize the early Eocene, present an ideal opportunity to explore how ancient marine ecosystems responded to different magnitudes of warming in the past. However, before such paleoecological analyses can be conducted, reliable age models with robust biostratigraphic frameworks are required.

Currently, high-resolution orbital age models for the early Eocene are predominantly based on low- or mid-latitude sites (e.g., Walvis Ridge, Shatsky Rise and Demerara Rise). In comparison, high-latitude early Eocene age models are usually only based on shipboard biostratigraphic and/or low-resolution chemostratigraphic data. Furthermore, correlation of the calcareous nannofossil biostratigraphic events at Walvis Ridge and Demerara Rise to southern high-latitude site International Ocean Discovery Program (IODP) Site U1553 (Campbell Plateau, South Pacific Ocean), reveals ~1 Myr discrepancies for many of the commonly-used biohorizons (Niederbockstruck et al., in review). However, it is uncertain whether this apparent latitudinal diachroneity is unique to Site U1553, or whether it is a typical feature of all early Eocene high-latitude sites.

This presentation introduces a new Deutsche Forschungsgemeinschaft (DFG)-funded project that aims to further explore this apparent latitudinal diachroneity. The project will generate new high-resolution bulk stable isotope records and biostratigraphic frameworks for several high-latitude, legacy Ocean Drilling Program (ODP) and IODP sites. These data will then be correlated to existing low- and mid-latitude orbital age models to determine whether early Eocene nannofossil biozones are truly latitudinally diachronous.