Testing Eocene climate variability in North Atlantic drift sediments

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Much of our understanding of Earth's climate and its variability throughout the Cenozoic is based on detailed marine proxy records. Crucial in this approach is the assumption that observations faithfully reflect the climate state and its dynamics. For the recent past, marine records provide highly resolved datasets, yet the temporal resolution is drastically reduced further back in time. In addition, secondary processes such as dissolution and bioturbation attenuate climate records and filter out orbital frequencies and thus impose many uncertainties on the greenhouse world of the early Paleogene. Cores recovered from North Atlantic drift sediments during Expedition 342 provide a first opportunity into highly resolved Eocene datasets, effectively eliminating aforementioned problems. We generated a high-resolution (~2 kyr) benthic and bulk stable isotope ($\delta^{13}C/\delta^{18}O$) record of a ~2 Myr middle Eocene interval (C20n). We find that despite the highly variable and orbital nature of the deep-sea sediments and excellent carbonate preservation, isotopic variability is extremely low in surface and benthic records (both at ~0.1‰), contrasting with existing isotope records for the Neogene and Paleogene (>0.25‰). These findings imply that our current understanding of greenhouse world climate variability may not necessarily be impeded by low-resolution studies.