

A Holocene aquatic palynomorph and TEX₈₆-based temperature record from the Adélie coastal margin, Antarctica (IODP Site U1357)

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Abstract

During Integrated Ocean Drilling Program (IODP) Expedition 318, about 170 meters of Holocene core was retrieved at Site U1357, near the Adélie Coast, East-Antarctica. This core displays distinct alternating light and dark laminae of organic-rich diatom ooze, interpreted to reflect seasonal cycles. The expanded core provides an ultra high-resolution record of Holocene climate variability close to the Antarctic margin and has great potential to give insight into ecological/environmental changes in a polynya-influenced environment. Due to extremely high sedimentation rates, organic material, including aquatic palynomorphs and lipid biomarkers, are well-preserved. The aquatic palynomorph assemblages are characterized by large amounts of tintinnid loricae, copepod remains, prasinophytes, dinoflagellate cysts and various undescribed acritarchs. Typical sea-ice related dinoflagellate cysts are common, among which cysts of the sea-ice dwelling suessoid *Polarella glacialis*, never before described from a sediment core, and pointing at the near ideal preservation of organic matter. Both the composition of the palynomorph assemblage as well as the TEX₈₆ values show a high degree of variability, but without a clear pattern between the closely-spaced samples from the dark and light laminae. However, long-term average trends in TEX₈₆ and the dinoflagellate cyst assemblages indicate warmer spring/summer temperatures and shorter sea-ice seasons during the early Holocene.

Keywords: Holocene, Adélie Land, TEX₈₆, aquatic palynomorphs