Supplement of J. Micropalaeontol., 45, 763–775, 2026
https://doi.org/10.5194/jm-45-763-2026-supplement
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Journal of Micropalaeontology
Open Access

Supplement of

Reconstructing Ross Sea cryosphere–ocean variability during the Miocene Climatic Optimum using palynology

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This file includes:

Figure S1, S2, S3

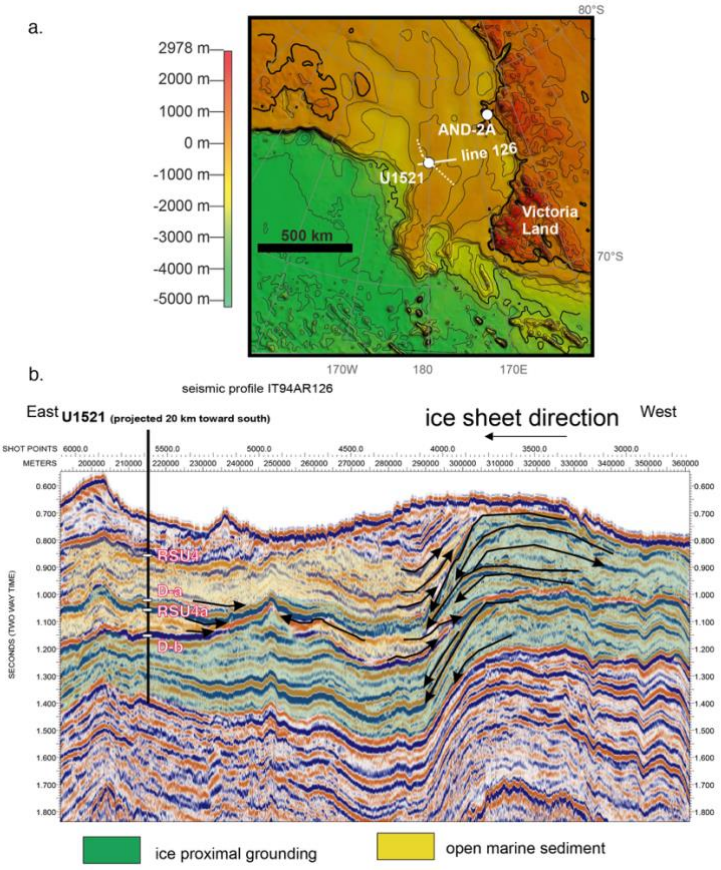

Figure S1: (a) Paleobathymetric reconstruction (5 km of resolution) of the Ross Sea at the Miocene time (ca. 14 Ma)(Paxman et al., 2019). The location of site U1521, AND-2A and of the seismic line IT94-126 is shown. The dashed white line indicates the track line of the seismic profile (Pérez et al., 2021). (b) Seismic profile IT94-126 collected by the Italian Antarctic Program in 1994. The seismic stack data are available via the Antarctic Seismic Data Library System https://sdls.ogs.trieste.it/cache/index.jsp. The seismic reflectors show a grounding zone wedge (green) formed on the ocean flank of a morphologic bank in the central Ross Sea. The progradation of the seismic reflectors indicates ice direction from the western Ross Sea. The grounding zone wedge is onlapped by seismic reflectors suggesting basin infill sediment (yellow).

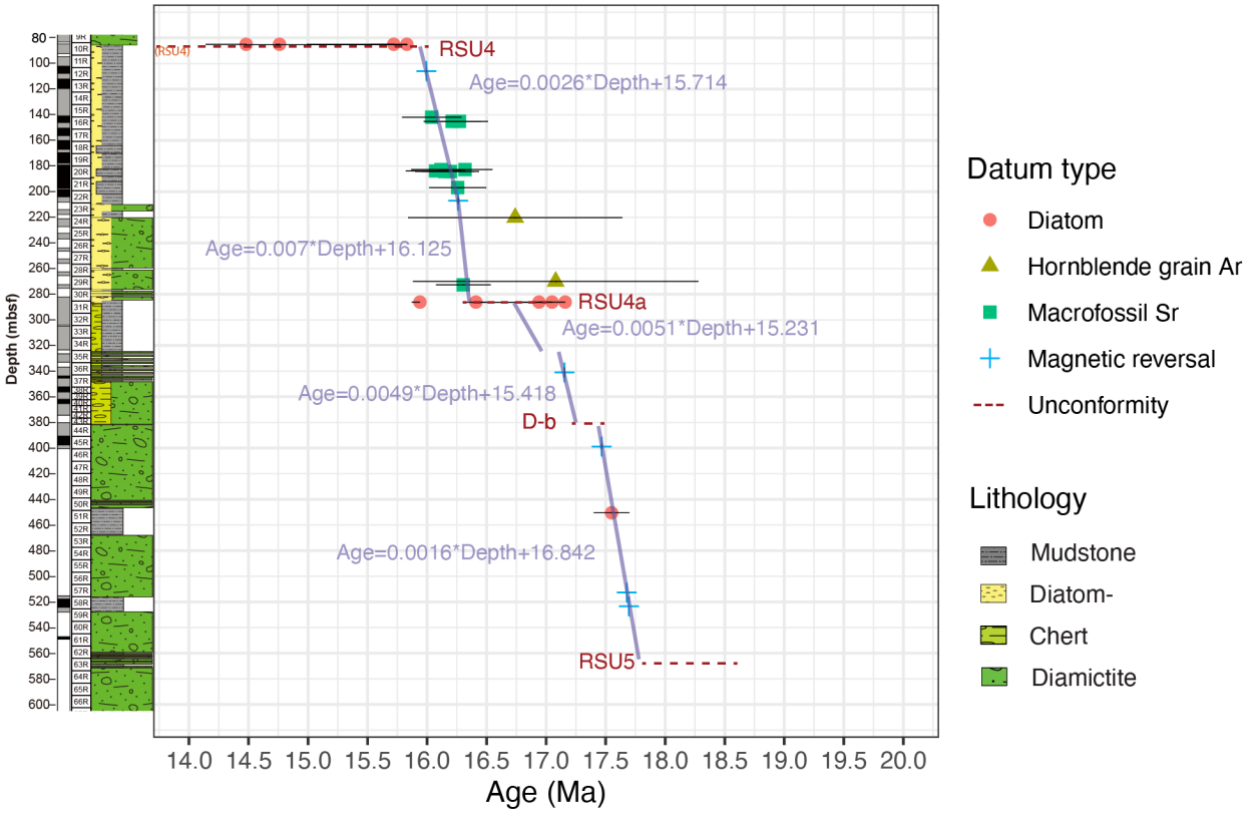

Figure S2: Age model of Site U1521. Datums in symbols follow Marschalek et al. (2021), with black lines indicating errors in depth and/or age. Dashed red lines indicate regional unconformities. Purple transparent lines indicate regressions for different intervals guided by the tie lines in McKay et al. (2024), with age-depth equations denoted.

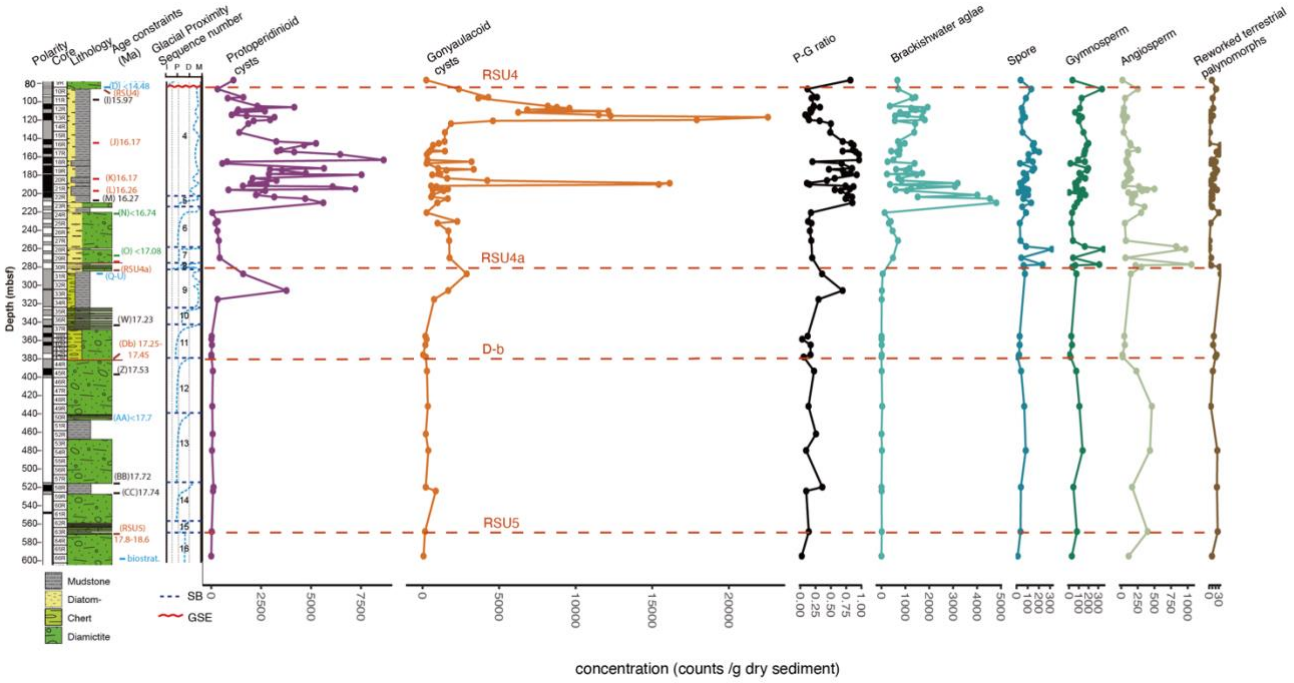

Figure S3: An overview of absolute concentrations of major palynomorph groups from core U1521A. From left to right are: Depth (meters below sea floor); Magnetostratigraphy (black = normal polarity; white = reverse polarity; grey = uncertain polarity or no recovery); Core number; Lithology; Age constraints (McKay et al., 2024); Glacial proximity sequences, (blue line; I—ice contact, P—ice proximal, D—ice distal, M—open marine), with non-glacially eroded sequence boundaries (SB; dark blue dotted line) and glacial surface of erosion sequence boundaries (GSE; red wavy line) (McKay et al., 2024); Palynomorph concentrations including Protoperidinioid cysts, Gonyaulacoid cysts, P-G ratio, brackish water algae (*Cymatiosphaera* and *Pediastrum*), spores, gymnosperm pollen, angiosperm pollen and reworked terrestrial palynomorphs. Red dashed lines denote Ross Sea Unconformities (RSU, Pérez et al., 2021).