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A high resolution marine record of late Holocene climate variability from the East Antarctic Margin: core JPC17B (Adé

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Piston core JPC17B is 26 meters long and was collected from the Adélie Drift at 140ºE along the Pacific sector of the Antarctic continental shelf. Sediment accumulation rates at the Adélie Drift are on the order of 20 m kyr^{-1} based on radiocarbon evidence. Seismic data suggests the presence of up to 230 m of Holocene sediments overlying the last glacial diamict. JPC17B sediments are laminated at 2 cm intervals and serve as an ultra-high resolution latest Holocene marine reference section for the Pacific sector of the Antarctica margin. To the best of our knowledge, this is the highest sedimentation rate sequence yet discovered on the Antarctic margin, making it ideal for the development of “ice-core equivalent” climate records of Holocene variability.

Opal (biogenic Si) content in JPC17B ranges from 45 to 70% by weight, based on discrete wet chemical analyses (every 2 cm for the first 210 cm and every 10 cm [$\sim$5 yrs resolution] for the remainder of the core). $^{13}C/^{12}C$ measurements of bulk sedimentary organic matter show an overall downcore enrichment resulting from either early diagnetic loss of ^{12}C or long-term changes in primary production/phytoplankton community structure. Higher frequency variability in the $^{13}C/^{12}C$ ratio is generally in phase with peaks and troughs in organic C and biogenic Si, suggesting forcing by primary production.

We compare opal content as determined by wet chemical extraction and spectrophotometry versus measurements by core-scanner X-ray Fluorescence (XRF) and demonstrate strong correlation. Al, Ti, and Fe content measured by core-scanner XRF are used as proxies of clay mineral versus organic matter content. Strong decadal to century-scale variability is present in all tracers. The biogenic Si time series shows strong variance at periods of 11 and 90 years, periods which suggestive of solar forcing as has previously been suggested for Holocene sediment sequences from the Antarctic Peninsula.

Key questions to be addressed using high resolution sediment records from east Antarctic include: How does East Antarctica respond to Holocene warming and cooling. What is the role of sea ice in responding to and recording climate change? Is solar variability a factor in East Antarctica as appears to be the case in the Antarctic Peninsula? Is Adelie Land continental ice more responsive to Holocene variability because of the deep inland basement topography (similar to much of West Antarctica)?