

GSA Connects 2022 meeting in Denver, Colorado

Paper No. 1-7

Presentation Time: 9:50 AM

IMPACT OF EOCENE-OLIGOCENE ANTARCTIC GLACIATION ON THE PALEOCEANOGRAPHY OF THE WEDDELL SEA

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The Eocene-Oligocene Transition (EOT) at ~34 Ma marked a shift from greenhouse to icehouse conditions, towards long-lasting lower global temperatures and a continental ice sheet in Antarctica. Carbonate preservation is poor at high latitudes. To overcome this challenge, we employ sedimentological and bulk inorganic geochemical proxies. Analyses of the detrital, authigenic and biogenic marine sediment components at Ocean Drilling Program (ODP) Site 696 in the Weddell Sea demonstrate the impact of ice growth on high latitude water masses within the Antarctic limb of the Atlantic circulation. Sortable silt grain size and Zr/Rb ratios attest to a period of vigorous circulation at ~36.2-35.8 Ma, coincident with a known warm interval in the Southern Ocean. Across the EOT, detrital mud provenance suggests that regional ice growth in the western Weddell Sea was stepwise, first expanding in the Antarctic Peninsula, followed by parts of West Antarctica. In conjunction

with regional ice growth, high uranium enrichment factors (U EF) in sediments spanning the EOT interval indicate anoxic conditions in the sediment with evidence of carbonate dissolution. These dissolution events are approximately coeval with dissolution events in the South Atlantic and elsewhere. Following glacial expansion and sea-ice formation at ~33.6 Ma, a return to oxic conditions and carbonate preservation is observed with excess barium and phosphorous indicative of an increase in productivity, and potentially carbon export. Our results highlight the important connections between ice growth and the changing properties of high-latitude water masses at the EOT with impacts on the global ocean circulation.

Session No. 1

[D18. Recent Advances in Paleoclimatology/Paleoceanography](#)

[Sunday, 9 October 2022: 8:00 AM-12:00 PM](#)

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