



Evidence for an extensive Antarctic Ice Sheet by 37 Ma

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We present observational evidence that both the East and West Antarctic ice sheets had expanded to the coast by 37 Ma, predating, by at least 3 Myr, a major drop in atmospheric CO₂ at the Eocene-Oligocene boundary widely considered responsible for Antarctic Ice Sheet expansion. Our evidence comes from the provenance (geochronology, thermochronometry, mineralogy) of iceberg-rafted debris identified in Late Eocene marine sediments from (ODP) Leg 113 Site 696 in the NW Weddell Sea. The existence of an significant Antarctic Ice Sheet in a Late Eocene high pCO₂ world calls into question the role of atmospheric CO₂ concentrations as the dominant mechanism for ice sheet expansion and whether topography and ocean circulation only play a secondary role.