



## **Combined ice core and climate-model evidence for the collapse of the West Antarctic Ice Sheet during Marine Isotope Stage 5e.**

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It has been speculated that collapse of the West Antarctic Ice Sheet explains the very high eustatic sea level rise during the last interglacial period, marine isotope stage (MIS) 5e, but the evidence remains equivocal. Changes in atmospheric circulation resulting from a collapse of the West Antarctic Ice Sheet (WAIS) would have significant regional impacts that should be detectable in ice core records. We conducted simulations using general circulation models (GCMs) at varying levels of complexity: a gray-radiation aquaplanet moist GCM (GRaM), the slab ocean version of GFDL-AM2 (also as an aquaplanet), and the fully-coupled version of NCAR's CESM with realistic topography. In all the experiments, decreased elevation from the removal of the WAIS leads to greater cyclonic circulation over the West Antarctic region. This creates increased advection of relatively warm marine air from the Amundsen-Bellinghousen Seas towards the South Pole, and increased cold-air advection from the East Antarctic plateau towards the Ross Sea and coastal Marie Byrd Land. The result is anomalous warming in some areas of the East Antarctic interior, and significant cooling in Marie Byrd Land. Comparison of ice core records shows good agreement with the model predictions. In particular, isotope-paleotemperature records from ice cores in East Antarctica warmed more between the previous glacial period (MIS 6) and MIS 5e than coastal Marie Byrd Land. These results add substantial support to other evidence for WAIS collapse during the last interglacial period.