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Fjord sediment record of Holocene climate change in the Antarctic Peninsula

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High-resolution paleoclimate records were generated from long sediment cores collected in five fjords of drastically different settings in the Antarctic Peninsula (AP), including Maxwell Bay, Firth of Tay, Herbert Sound, Lapeyrère Bay, and Neny Fjord. These results are augmented by published records from open marine settings of the Palmer Deep and Bransfield Basin and from terrestrial studies to obtain sufficient spatial sampling for regional analysis of Holocene climate events and local forcing mechanisms. These records include SHALDRIL cores acquired through some of the thicker (up to 108 meters) Holocene sections in fjords of the northern AP region. Robust radiocarbon chronology has been established for each site, and several paleoclimate proxies have been applied to identify and characterize climate events. These include magnetic susceptibility, sedimentation rates, grain size, pebble content, TOC, stable isotopes, biogenic silica content, and foraminifera and diatom assemblages. Current data analysis, including application of additional proxies and analysis of additional cores, refines our understanding of the nature and timing of climatic events expressed in each site. Five previously recognized climate intervals are recorded throughout the AP: an early Holocene deglacial interval, the Mid-Holocene Climate Optimum, a minor cooling event in the mid-Holocene followed by a minor warming event, and the late Holocene Neoglacial. The magnitude and timing of these events varies widely–up to a few thousand years–across the AP region and reflects differences in factors such as orographic effects, drainage basin size and altitude, wind patterns, oceanography, and sea-ice coverage. These results suggest that the rapid regional warming and widespread glacial retreat observed during the last century is unprecedented in breadth and synchronicity.