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Radiocarbon dating of Holocene deglaciation and relative sea-level change on Antarctic Peninsula islands from lake sediments

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Terrestrial constraints on the rates and spatial patterns of deglaciation and relative sea-level (RSL) change on the Antarctic Peninsula are important, but relatively sparse, components of models that use palaeo-data to predict future glacial and sea level change scenarios. Here, we present new chronological information from key island localities on the east and west coasts of the Antarctic Peninsula which constrain, firstly, the timing and rate of early Holocene to present day deglaciation, and, secondly, changes in RSL. We undertook multi-proxy analysis of lake sediments extracted from Horseshoe Island and Pourquoi-pas (PQP) Island in Marguerite Bay, on the west coast of the Antarctic Peninsula, and from two lakes and one shallow pond at different altitudes on Beak Island, a partially submerged caldera situated in Prince Gustav Channel, on the north-eastern tip of the Antarctic Peninsula. Age-depth models were constructed by radiocarbon dating of macrofossils, paired macrofossil-bulk sediment samples, and, when necessary, bulk sediment samples. These place reliable temporal constraints on cross-Peninsula deglaciation, as well as early Holocene transitions from shallow marine to fully terrestrial conditions in isolation basins on PQP Island and Beak Island, improving regional ice sheet history and relative sea level change models.