



Simulations of the Cordilleran ice sheet through the last glacial cycle

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Despite more than a century of geological observations, the Cordilleran ice sheet of North America remains poorly understood in terms of its former extent, volume and dynamics. Although geomorphological and stratigraphical evidence is abundant, its complexity is such that whole ice-sheet reconstructions of advance and retreat patterns are lacking. Here we use a numerical ice sheet model calibrated against field-based evidence to attempt a quantitative reconstruction of the Cordilleran ice sheet history through the last glacial cycle. Climate forcing is derived using the North American Regional Reanalysis and time-dependent temperature offsets from six proxy records located around the globe. Our simulations produce two major glaciation events during marine oxygen isotope stages 4 (61.9–55.4 ka) and 2 (29.5–16.9 ka). During most of the last glacial cycle, the modelled ice cover is discontinuous and restricted to high mountain areas, most importantly to the Skeena Mountains, where an ice cap remains throughout the glacial cycle. This ice cap acts as a nucleation centre before the last glacial maximum and hosts the last remains of the Cordilleran ice sheet during the early Holocene (10.9–9.5 ka).