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The evolution of the Patagonian Ice Sheet from 35 ka to the Present Day (PATICE)

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We present PATICE, a GIS database of Patagonian glacial geomorphology and recalibrated chronostratigraphic data. PATICE includes 58,823 landforms and 1,669 ages, and extends from 38°S to 55°S in southern South America. We use these data to generate new empirical reconstructions of the Patagonian Ice Sheet (PIS) and subsequent ice masses and ice-dammed palaeolakes at 35 ka, 30 ka, 25 ka, 20 ka, 15 ka, 13 ka (synchronous with the Antarctic Cold Reversal), 10 ka, 5 ka, 0.2 ka (synchronous with the “Little Ice Age”) and 2011 AD. At 35 ka, the PIS covered of $492.6 \times 10^3 \text{ km}^2$, had a sea level equivalent of $\sim 1,496 \text{ mm}$, was 350 km wide and 2090 km long, and was grounded on the Pacific continental shelf edge. Outlet glacier lobes remained topographically confined and the largest generated the suites of subglacial streamlined bedforms characteristic of ice streams. The PIS reached its maximum extent at 33 – 28 ka from 38°S to 48°S, and earlier, around 47 ka from 48°S southwards. Net retreat from maximum positions began by 25 ka, with ice-marginal stabilisation at 21 – 18 ka, followed by rapid deglaciation. By 15 ka, the PIS had separated into disparate ice masses, draining into large ice-dammed lakes along the eastern margin, which strongly influenced rates of recession. Glacial readvances or stabilisations occurred at 14 – 13 ka, 11 ka, 5 – 6 ka, 1 – 2 ka, and 0.2 ka. We suggest that 20th century glacial recession is occurring faster than at any time documented during the Holocene.

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