

The Patagonian Ice Sheet from the last glacial cycle to the Present Day

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The Patagonian Icefields are among the highest latitude and most sensitive icefields in the Southern Hemisphere, and are responding rapidly to climate. Their response to climate changes during the Last Termination and during Holocene palaeoclimatic fluctuations has the potential to elucidate changes in large scale atmospheric circulation as well as aid better predictions of their future response to climate change. We present a new state-of-the art compilation of published Patagonian glacial and glaciolacustrine geomorphology and recalculated, recalibrated, compilation of published chronostratigraphy. These data are used to generate a new, updated reconstruction of the Patagonian Ice Sheet extent, volume and dynamics at the Last Glacial Maximum and at 5 ka timeslices to the present day, illustrating changes in the dynamics of the ice mass and ice-dammed proglacial lakes through time.

We compile published geomorphological mapping and combine this with our own new remotely sensed mapping to create a detailed GIS database of the geomorphological imprint of past Patagonian ice-sheet fluctuations. We also compiled published ages from the literature that give insights into the lateral and vertical extents of the Patagonian Ice Sheet and later ice fields. The literature was scoured for data pertaining to the geographical position of the ages, which was checked in ArcGIS using the maps and datasets provided in the published literature. The final ages were mapped in ArcGIS as ESRI point shapefiles (*.shp). Each age contains attribute information including the publication reference, location (latitude, longitude, description), altitude (m asl), sample site, dating method, comments regarding sample characteristics, material dated, stratigraphical context or setting, reliability assessment of the age and any other applicable information. Each sample has a unique ID which varies according to the type of age applied. This census includes 1317 ages, as of August 2017, with datasets from 121 peer-reviewed publications.

These data are used to generate isochrones of ice extent at 5 ka timeslices across the ice sheet. Using these isochrones, we generate palaeo ice-sheet reconstructions from 30 ka until the present day. The data will be presented as a downloadable geodatabase to further research into Patagonian palaeo ice dynamics.