

PERIGLACIAL AND ASSOCIATED DEPOSITS OF TASMANIA: A REVIEW

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Tasmania, at latitude 42–44°S, together with New Zealand and South America, are the only mid-latitude southern hemisphere land masses to have experienced glaciation in the Late Pleistocene: during their maximum extent ice caps covered about 1000 km² of Tasmania. Glaciers did not extend below about 800 m altitude and outside the Central Plateau most were restricted to high-altitude cirques during the last glacial maximum (LGM) and had maximum extent at 17–20 ka. Periglacial deposits produced by freeze-thaw processes are extensive and include block fields, block streams, rock glaciers, bouldery colluvium, layered fine screes and landslides. Associated with these deposits are non-periglacial sediments formed in cold-climate conditions: inland dunes, silty loess-like deposits and fan alluvium.

An evaluation of previously published ages, and new dating, has thrown light on the timing of the main periglacial events and the processes involved. Extensive block streams, block fields and rock glaciers developed between the highest peaks (1600 m) and c.650 m altitude: within dated deposits at >1000 m altitude the age range within the same deposit is large (22–500 ka) and much greater than found in moraines. We conclude that the blocky deposits moved only slowly down-slope, and rocks eroded during widely different periods were mixed in the process. Bouldery colluvium (including much of the deposit mapped in Tasmania as dolerite ‘talus’) is distinguished from the blocky deposits by its fine-grained matrix and is deduced to be a solifluction deposit. Rare buried soils containing charcoal allow some colluvium to be dated to between the LGM and c.54 ka. Undated red-weathered doleritic colluvium may have accumulated before the Last Interglacial. An ancient low-angle debris flow was ³⁶Cl dated c.96 ka. Aeolian deposits are common, but local, below 250 m altitude. Although some dune sands are dated 74 ka and >88ka, most ages obtained for aeolian deposits cluster around 15–35 ka (33 ages) and some around 45–60 ka (6 ages), indicating extensive dust and sand movement immediately before and during the LGM. The peak in the occurrence of dated fan alluvium at 30–35 ka and the peak of dated aeolian deposits at 25–30 ka, combined with the small extent of glaciers during the LGM, suggests that after 40 ka depleted vegetation cover led to erosion and alluvial fan formation, and that a drier climate restricted glacier extent and favoured aeolian accumulations. However, this explanation, while plausible, is complicated by the arrival of humans in Tasmania at c.40 ka, an event that is likely to have increased fire frequency, decreased vegetation cover and accelerated erosion.

The classification and dating of periglacial and associated deposits are used to assess the risks involved with forest harvest, particularly on hilly and steep slopes.