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Geomorphological evolution of a paraglacial coastal system: Moat Sector, Beagle Channel, Tierra de Fuego, Argentina

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The morphodynamics of paraglacial coastal systems is controlled by a number of factors, including rock basement structure, sediment disposal, changes in the relative sea-level and wave regime. Of great importance is the thickness and the particle size composition of the glacial deposits because they are not only the main source of material, but also a major element in the coast plan form and in the processes of sediment redistribution.
The Moat sector in the Beagle Channel (Tierra del Fuego, Argentina), is a shallow embayment opened in a previously glaciated landscape, in which the Beagle glacier left several drumlins and moraines. After deglaciation the rising sea-level led to the erosion of the till sediments at least until 2550 yr BP, exposing the rock substrate in which up to three narrow shore platforms were modelled. The erosion of the till produced cliffs up to 18 m high, capped with Holocene sediments. After 2550 yr BP a fall in the relative sea-level enhanced wave dissipation on the rocky areas and forced the diffraction of the incoming waves. The limits of the sedimentary cell were then set and a shadow zone developed in the east section of the beach, where the cliff became stabilized meanwhile erosion persisted on the west section. The coarser till of the west cliff was then the main source of sediments, and the retreat of the cliff left a boulder pavement that created a secondary limit of the cell. The clasts were redistributed by a dominant west to east transport that still dominates today.
The 14C dates obtained in the sedimentary deposit developed on top of the cliff suggest that, when the bluff retreat stopped at the east end, a phase of stabilization began and the talus was covered by a layer of organic-rich sediments. Later, an environmental change to drier conditions, occurred after 1310-1180 cal. yr BP, led to the desiccation and degradation of the organic-sediments of the talus, which started to be eroded exposing the till again.

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