

## Annual water balance and runoff characteristics of a glacier-covered drainage basin under maritime climate in Chilean Patagonia

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Temperate glaciers under maritime climate are particularly sensitive to climatic change due to their large annual mass exchange rates. Thus, water and sediment discharges from drainage basins which are widely covered by such glaciers would strongly be affected by climatic change. This study aims to determine annual water balance of a glacier-covered drainage basin under maritime climate in Chilean Patagonia, and to clarify the runoff characteristics of this basin with a hydrological model which consists of combined linear reservoirs.

Field observations for this study were carried out at a drainage basin (192 km<sup>2</sup>) including Glaciar Exploradores (92 km<sup>2</sup>) which is located at the northeast corner of Northern Patagonia Icefield, Chile. Since December 2004, hydrological and meteorological elements have been measured and recorded automatically near the terminus of the glacier. Water balance components of this basin were calculated for the 2005/06 water year using the results of these field measurements.

Under a maritime climate, about 3200 mm of rainwater entered the drainage basin during the 2005/06 water year, while the specific volume of meltwater produced within the basin was about 3100 mm. Due to warm air temperature in the lower part of the basin, rainfall and glacier melting were frequently observed even in wintertime, thus, runoff from this basin continued throughout the water year. Dominant contribution of rainwater to the total water input should have made diurnal discharge variation indistinct. Result of the modeling implies the occurrence of seasonal changes in hydraulic features of the glacier drainage system, although there was little change in the position of the transient snowline and there was continuous water supply into the glacier throughout the year.