# Submitted Abstract

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## Abstract

The glaciated valleys of the Andes provide vital freshwater to the arid west coast of South America. The Cordillera Blanca is the largest glacierized region in the tropics, containing 70% of the world's tropical glaciers with a total glaciated area of 631 km2. The warming climate is causing major changes to the Cordillera Blanca; glacial coverage in this region has decreased by 40% since the 1970's.

Physically based models are useful in comprehending the hydrological processes of remote regions with sparse meteorological data. The Cold Regions Hydrological Model (CRHM) is a flexible, physically based model developed at the Centre for Hydrology, University of Saskatchewan, for improving the understanding of cold regions hydrological processes in poorly gauged or ungauged basins. CRHM includes phenomena specific to cold environments, including snow and ice accumulation, interception, transport and melt, and infiltration through frozen soils.

We use CRHM to simulate the hydrology of the Quilcayhuanca valley, a pampa valley on the western side of the Cordillera Blanca, from July 2014 to July 2018. The model uses a variety of data sources, including satellite imagery, digital elevation models, and weather stations (precipitation, temperature, relative humidity, and wind speed) from the valley floor (Casa de Agua, 3905 m.a.s.l.) and at Cuchillacocha Lake (4625 m.a.s.l.).

The model, divided into 17 hydrologic response units, accurately simulates the discharge recorded at the catchment outflow. Now that the model is able to simulate the bulk hydrology, parameters such as the degree of glaciation, temperature/ precipitation trends, or vegetation type and density can easily be modified to inspect how these catchments may respond to a changing climate. Initial results and comparisons are proving to be successful; there is potential for numerous insights regarding the hydrological responses of glaciated catchments to a dynamic and warming climate.