



Influence of ENSO on the atmospheric circulation over the complex topography of Cordillera Blanca, Peru

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Glaciers in the Cordillera Blanca, Peru, are exposed to the globally strongest signal of interannual variability, El Niño/Southern Oscillation (ENSO). But the glacier only records the local atmospheric conditions, which are strongly influenced by the surrounding mountain topography. Here we investigate the interaction of atmospheric flow during El Niño and La Niña events with the local topography, in order to identify the mechanisms by which the ENSO signal is transferred to the glacier.

We drive the atmospheric limited area model WRF by providing composite boundary conditions of El Niño events, La Niña events, and a climatology, derived from global reanalysis data. Employing several model nests, we downscale the atmospheric circulation to a scale where the most important features of topography are resolved (i. e., a few kilometers). The model results are validated using time series from a network of automatic weather stations, and glacier mass balance measurements. We then analyze how ENSO interacts with the topography to create the local signals recorded by the glaciers.