Geophysical Research Abstracts
Vol. 21, EGU2019-12126, 2019
EGU General Assembly 2019

WRF parameterization in the Patagonian Northern Icecap (NPI) and Baker River Basin

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The use of mesoscale climate models to dynamically downscale coarse climate data allows for the capture of processes influenced by land cover and topographic features. This is useful for hydrology modeling where catchment processes happen in a spatial scale that is not represented in global climate models. However, selecting proper parameterization setting for downscaling is crucial to modeling properly the climate variables of interest. In this work, we are interested in studying the long term changes of climate in the Baker River Basin and the Patagonian Northern Icecap (NPI), but before embarking on this it is important to identify at least one combination of physics in a climate model that performs well in our area of study. To these ends, we use the WRF model that combines two microphysics (WGS and TGS), two longwave radiation physics (RRTM and CAM), two shortwave radiation physics (Dudhia and CAM), three boundary layer physics (YSU, MYJ and QNSE-EDMF) and two land surface models (5-layer thermal and NoahMP). In total, we use twenty-four combinations of physics to run the model in a nested domain of 22.5 and 4.5 km. The forcing data selected to drive WRF is the ERA-Interim, which is a global atmospheric reanalysis from 1979, continuously updated in real time, produced by The European Centre for Medium-Range Weather Forecasts (ECMWF). Similar experiments have been done for low latitudes in South America, therefore, the results of this work will allow us to generate long term downscaled climate data series with physics that work properly in this region.