



Use of remote sensing to model ungauged Chilean basins

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Calibration of hydrological models is usually performed in gauged basins with streamflow data, which is the result of the hydrological cycle processes, due to a poor monitoring system of other processes like melting, infiltration, evapotranspiration or sublimation. This approach can generate several parameters combinations with similar streamflow results and choosing a reliable set of parameters can be challenging, especially in ungauged basins. Remote sensing can be useful because is an additional source of ungauged variables, and is distributed in space and time. This is valuable information related to the processes of hydrological cycle, and it helps to represent the basin with physically based models where the focus is on the processes, such as the Cold Regional Hydrological Model (CRHM). There are several satellites products related to the hydrological cycle such as snow covered area, albedo, evapotranspiration or surface temperature, in the case of MODIS, rain rate from TRMM, Soil moisture from SMOS or snow water equivalent (SWE) from AMSR, and these can be used to improve the representation of the processes in a basin or, in the case of this work, to estimate stream flow using remote sensing only. The study area is Elqui River, in northern Chile, with a semi-arid mediterranean climate and a snow driven regime due to the Andes, where snow accumulation and snowmelt control water availability and the maximum snow covered area reach 50% of the total basin. Several satellite products related principally to snow are considered to represent the variation of the snowpack in space and time as inputs to the model or as state variables.