



Validation of snow line estimations using MODIS images for the Elqui River basin, Chile

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Precipitation events in North-Central Chile are very important because the region has a Mediterranean climate, with a humid period, and an extensive dry one. Separation between solid and liquid precipitation (snow line) in each event is important information that allow to estimate 1) the available snow covered area for snow-melt forecasting, during the dry season (the only resource of water in this period) and 2) the area affected by rain for flood modelling and infrastructure design.

In this work, snow line was estimated with a meteorological approach, considering precipitation, temperature, relative humidity and dew point information at a daily scale from 2004 to 2010 and hourly from 2010 to 2013. In both periods, different meteorological stations are considered due to the implementation of new stations in the study area, covering from 1000 to 3000 (m.a.s.l) approximately, with snow and rain meteorological stations.

The methodology exposed in this research is based in vertical variation of dew point and temperature due to more stability variations compared to vertical relative humidity behavior. The results calculated from meteorological data are compared with MODIS images, considering three criteria: (1) the median altitude of the minimum specific fractional snow covered area (FSCA), (2) the mean elevation of pixels with a FSCA<10% and (3) the snow line estimation via snow covered area and hypsometric curve.

Historically in Chile, snow line has been studied considering few specific precipitation and temperature observations, or estimations of zero isotherms from upper air soundings. A comparison between these estimations and the results validated through MOD10A1/MYD10A1 products was made in order to identify tendencies and/or variations of the snow line at an annually scale.