



Observation of glacier changes in the tropical Andes by SAR remote sensing

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The glaciers of the tropical Andes are an important water resource, but they are highly affected by climate change. The regional water supply strongly depends on the melt water and consequently on the mass balance of the glaciers. Therefore, it is important to quantify the glacier changes in this region. Remote sensing, particularly SAR remote sensing, is an ideal tool to monitor such wide regions and to obtain information of the ongoing glaciological processes.

In this study data from different SAR sensors are analyzed in combination with other remote sensing data sets. Various glaciological variables (e.g., glacier extend, surface type, equilibrium line altitude, surface velocity) and their changes are determined. Bi-static SAR data from the TanDEM-X mission (2011-2014) are interferometrically processed in order to obtain short-term and in combination with SRTM data (2000-2014) longterm elevation change information. Geodetic glacier mass balances are derived from the obtained surface elevation change information. By analyzing the computed coherence pattern of repeat pass acquisition of different SAR sensors glacier outlines are determined. The results from this novel method are compared to observations using other methods like the Normalized Differenced Snow Index (NDSI) to obtain glacier extent.

The uncertainties in the resulting products are systematically analyzed by cross validation (e.g., with field data) and considering various influencing variables.