Assessing ground deformation in the Central Andes (NW Argentina) with Interferometric Synthetic Aperture Radar analyses: First results of SAOCOM data and Sentinel-1 data

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The region of the Argentine Central Andes located between 21° S and 25° S is characterized by multiple morphotectonic provinces that strongly control structural and geomorphologic surface deformation. This work focuses on the Puna Plateau and the Eastern Cordillera. The Puna is part of the orogenic Central Andean Plateau and is hydrologically dissected into internally drained catchments with mostly hyper-arid climatic conditions. The Puna's eastern edge is bordered by the fold-and-thrust belt of the Eastern Cordillera with peaks up to ~6000 m. Both areas are repeatedly affected by earthquakes with surface deformation but seldom surface ruptures.

This research focuses on the first assessment of the L-band SAOCOM 1A data for estimating surface deformation rates. The SAOCOM 1A satellite, launched in 2018, integrates the SAOCOM mission managed by the Argentinean Space Agency (Comisión Nacional de Actividades Espaciales, CONAE). These interferometric analyses are combined with results from C-band Sentinel-1 data. Examples are shown from the surface deformation associated with the magnitude 6.3 earthquake on 30 November 2020, with an epicenter located around 70 km W of San Antonio de los Cobres village in the Southeastern portion of the Puna Plateau (~24.332° S, ~67.005° W; United States Geological Survey). Additional examples are shown for slow-moving landslide velocity estimation in the Calchaquíes range (Eastern Cordillera). Our research highlights the capabilities of the new SAOCOM satellite mission for estimating surface deformation and exploits the strength of L-band SAR in vegetated terrain.