



## **Detection of Large Slope Instabilities using Spaceborne Radar Interferometry along the National Road 7, Mendoza Province, Argentina.**

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The National Road 7 crosses Argentina from East to West, linking Buenos Aires to Santiago de Chile. This extremely important corridor, crossing the Andes Cordillera, is exposed to numerous natural hazards, such as snow avalanches, rockfalls and debris flows. About 2230 vehicles pass through this corridor every day. Thus, the international pass Cristo Redentor located at 3'164 m.a.s.l. is the most important land pass between Argentina and Chile, in spite of remaining closed by snow and landslides several days per year.

The area of interest is located in the Mendoza Province, along the National Road 7 between the villages Potrerillos and Las Cuevas near the Chilean border. Initiated 6 years ago (Baumann et al., 2005), the goal of the project is to develop a risk strategy along the N7 from modern remote sensing and numerical approaches with field checking. It will help authorities to manage the risk along this highway and also to provide guidelines.

The road crosses the Río Mendoza Valley which flows through three geological units: Precordillera, Frontal Cordillera and Principal Cordillera. The diversity of soil and rock conditions, the active geomorphological processes associated to post-glacial decompression, seasonal freeze and thaw and severe storms along the road corridor, increase the risk to natural hazard.

First preliminary results were already shown last year regarding snow avalanches, debris-flows (Wick et al., 2010a) and rockfalls (Wick et al., 2010b). More recently, with the support of the European Space Agency (ESA Category-1 Project 7154), the study lay out ERS SAR and Envisat ASAR scenes; with a high number of Radar images from 1995 to 2010, Advanced Differential Radar Interferometry (A-DInSAR) techniques are applied. Indeed, the Small Baseline Subset (SBAS) approach is well indicated in this kind of wild and rocky areas to detect distributed scatterers. Processing ESA's datasets with the software GSAR, the authors identified large slope instabilities and deep-seated gravitational slope deformations (DSGSD). Actually, it is very important to detect these landslides because they relate to more intense superficial hazardous processes, such as rockfall and shallow landslides that can expose the National Road 7.

Completed with the local knowledge of the authors, inventory maps for large instabilities are created for the whole area at a scale of 1:100'000. Then hotspots are identified in order to suggest some priority and realistic mitigation measures along the endangered road sectors identified.

Baumann, V., Coppolecchia, M., González, M.A., Fauqué, L.E., Rosas, M., Altobelli, S., Wilson C., Hermanns, R.L.: Landslide Processes in the Puente del Inca region, Mendoza, Argentina. Proceedings of the International Conference on Landslide Risk Management. Hungr, Fell, Couture & Eberhardt (Eds.), Vancouver, Canada, 2005.

Wick, E., Baumann, V., Michoud, C., Derron, M.-H., Jaboyedoff, M., Lauknes, T.R., Marengo, H. and Rosas, M.: Multirisk analysis along the Road 7, Mendoza Province, Argentina. Proceedings of the EGU General Assembly 2010, EGU2010-4747-1, 2010a.

Wick, E., Baumann, V. and Jaboyedoff, M.: Report on the impact of the 27 February 2010 earthquake (Chile, Mw 8.8) on rockfalls in the Las Cuevas valley, Argentina. Nat. Hazards Earth Syst. Sci., 10, 1989–1993, 2010b.