



## **Comparisons of precipitation measurement methods in landslide instrumentation in the Alpes-Maritimes (France)**

Raphaël Chochon, Yoann Drouillas, Thomas Lebourg, Maurin Vidal, and Romain Besso

Université Côte d'Azur, Observatoire de la Côte d'Azur, CNRS, IRD, Géoazur, Valbonne (06), France  
(raphael.chochon@geoazur.unice.fr)

The Geoazur laboratory, as part of its scientific objectives for monitoring landslides, is setting up natural observatories mainly located in the Alpes-Maritimes department (France). These natural demonstrators allow the implementation of multi-parameter measurements on slopes sensitive to landslides. Since precipitation is one of the main factors triggering gravity instabilities, we have initiated a reflection within the laboratory on the spatial variability of precipitation and on the methods of measuring this rainfall within the observatories set up.

Thus, since mid-2018, two different weather stations have been installed side by side on two different sites. The objective is to compare two technologies for measuring rainfall in concrete situations. The first station is a model measuring precipitation by a tipping bucket system, very well known in the semi-professional environment of weather stations. Its limits and drift are quite well known, unlike the second station we wanted to test. For the latter, it is a more advanced model, without mechanical elements, and measuring rainfall with a 24 GHz radar sampling the air column over a radius of 5 meters. At one of the two measurement sites, a direct reading rain gauge is added to confirm the totals manually. This comparison reveals sometimes significant differences depending on the types of precipitation and intensities encountered.

In parallel and as part of a European project (AD-VITAM), we were able to carry out another type of comparison. This involves comparing punctual data (rain gauge) with spatialized data (radar) over a daily time step. For the radar data, we were able to use those produced by the X-band and polarimetric Doppler radar, operated by Novimet in the Alpes-Maritimes department (Mont-Vial - France). These spatialized data were compared with automatic rainfall data from the "Radome" network of the National Meteorological Institute Météo-France. Data from several rainfall events were acquired and compared. They highlighted the difficulty of estimating precipitation over a territory with a highly contrasted relief and intense rainfall events.

The measurement of this precipitation is essential, but can be complicated to establish precisely in a "hostile" territory. It is important to have an estimate of the uncertainties and limitations of these different measurement methods. The objective is to better understand the phenomena governing gravity hazards, while taking into account the increase in rainfall variability in Mediterranean regions that are highly exposed to climate change.