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ANDES: The first system for flash flood monitoring and forecasting in Peru

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Hydrological hazards related to flash floods (FF) in Peru have caused many economic and human life losses in recent years. In this context, developing complete early warning systems against FF is necessary to cope impacts. For this purpose, hydrological and hydraulic models coupled to numerical weather models (NWM) that provide forecasts are generally used.

In this sense, the National Meteorological and Hydrological Service of Peru (SENAMHI) has launched the ANDES initiative (Operational Forecasting System for Flash Floods of SENAMHI in English) to support FF events.

The pilot region is the Vilcanota basin located in the southern Andes into Cusco department. For this purpose, 4 hydrological stations will be monitoring at hourly time resolution (km 105-Intihuatana, Chilca, Pisac and Sallca). More, 3 video cameras in real time will be employed to velocimetry and water levels monitoring. An exhaustive hydrometry analysis (rating curve) will be implemented to follow discharges day by day. The forcing for the hourly hydrological modelling will be the SENAMHI's automatic stations (rainfall and temperature). For this purpose a merge spatial prediction methodology between satellite real time precipitation and gauge station precipitation will be develop: GPM (Imerg), GSMAP and Hydroestimator satellite products will be evaluated. Preliminary results of hourly hydrological model shown good results using pure satellite precipitation. In the next months an hydraulic model will be implemented in the channels with more flood vulnerability (Lisflood model) that together with an Numerical weather prediction (NWP) the WRF (The Weather Research and Forecasting) meteorological model will be implemented in the Vilcanota basin. The update will be done every six hours and to improve the output results a bias correction methodology will be use. Finally using these forecasts will be assimilated in the hydrological and hydraulic models.

This research is part of the multidisciplinary collaboration between British and Peruvian scientists (NERC, CONCYTEC).