GNSS and SAR water vapor products for the enhancement of heavy rainfall prediction in Africa: planned activities and preliminary results within the H2020 TWIGA project

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The prediction of heavy rainfall is a critical issue in several countries. In Africa, the scarcity of data to support such predictions makes it fundamental to improve the monitoring of atmospheric parameters.

This is one of the objectives of the H2020 project TWIGA - Transforming Weather Water data into value-added Information services for sustainable Growth in Africa.

Among other objectives, the project will allow the development of a service for delivering atmospheric water vapor observations to meteorological agencies for the assimilation into Numerical Weather Models, NWMs.

More precisely, satellite data coming from Sentinel-1 SAR images, will be used to derive Atmospheric Phase Screens, APSs; Zenith Total Delays, ZTDs, will be obtained from GNSS observations collected by ad-hoc networks of low-cost stations. After proper calibration and validation procedures the delay maps from SAR and the delay time series from GNSS will be assimilated into NWMs to improve the prediction of heavy rainfall.

The GNSS related activities carried out during the project first year will be presented. These involve from one side the design and deployment of the network of novel GNSS low-cost receivers, from the other feasibility studies by analysing currently available observations from the existent Kivu Lake GNSS network.

The free and open source GNSS software goGPS, by Geomatics and Research Development srl, a spin-off of Politecnico di Milano, will be used for the retrieval of ZTD time series. The tests performed to validate the results obtained by the new version of the software, recently released, will be shown, including the comparisons with the SAR derived products.