



Mesoscale GPS data network for improving Mediterranean heavy precipitation forecasting

K. Boniface (1), F. Masson (2), J. Chery (1), V. Ducrocq (3), E. Doerflinger (1), P. Vernant (1), P. Collard (1)

(1) Géosciences Montpellier, UMII/CNRS – UMR 5243, France
(karen.boniface@gm.univ-montp2.fr)

(2) Institut de Physique du Globe de Strasbourg, ULP/CNRS – UMR 7516, France

(3) GAME-CNRM, 42 Ave Coriolis, 31 057 TOULOUSE Cedex 01, France

Southern France and more generally the Western Mediterranean regions are frequently affected by heavy rainfall. Societal impacts are non negligible in these highly populated areas. Forecasting precipitation in these regions remains inaccurate because of the complex interaction between dynamical forcing, orography influence and moisture advection from the Mediterranean Sea. In addition, there is a lack of knowledge about the humidity field due to a shortage of current meteorological observations. Partly due to this lack of mesoscale moisture observations, current Numerical Weather Prediction (NWP) systems have difficulties to predict precise location and intensity of such events. On the other hand, recent studies have shown some positive impact of assimilating GPS (Global Positioning System) data for heavy precipitation forecasts.

Based on these results and to further develop the use of GPS data in NWP we have contributed to install a regional mesoscale network of 30 continuous GPS. With a station spacing of ~ 30 km, this tightened network located between $N42^\circ - N45^\circ$ and $E2^\circ - E6^\circ$ is one of the first dense permanent GPS networks specifically installed to improve NWP. Most of the processing will be performed in near real-time.

We will show results of various methodologies tested to compute the Zenith Tropospheric Delay using the GPS data processing software GAMIT 10.32. We will also present a detailed comparison of IWV (Integrated Water Vapor) for different meteorological scenarios and especially for heavy precipitation using GPS tropospheric

delays, radio sounding observations and ALADIN weather prediction Meteo France model. Therefore, this study will allow to evaluate the potential impact of a dense GPS network on weather forecasting.