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Humidity quantification over the Mediterranean Sea by GPS on board a ship : methodology and validation

K. Boniface (1), C. Rocken (2), C. Champollion (1), J. Chery (1), P. Collard (1), E. Doerflinger (1), V. Ducrocq (3), G. Jaubert (3), and F. Masson (4)

(1) Géosciences Montpellier, UMII / CNRS – UMR 5243, Montpellier Cedex 5, France (karen.boniface@gm.univ-montp2.fr), (2) GPS Solutions Inc., Boulder CO, USA, (3) GAME-CNRM, 42 Ave Coriolis, 31 057 Toulouse Cedex 01, France, (4) Institut de Physique du Globe de Strasbourg, ULP/CNRS – UMR 7516, France

Mesoscale moisture fields are highly variable in space and time. Several studies have demonstrated the benefit brought by the ground GPS technique to provide tropospheric water vapour observations that cope with that high variability. In southeastern France precipitating systems are mainly fed by low-level moist plumes over the Mediterranean Sea and cause high precipitating events especially during the autumn season. Moreover, humidity quantification over sea is still insufficiently resolved spatially and temporally.
We propose here to present the feasibility of processing tropospheric delays from GPS on board ship. To do that, high accuracy positioning is needed to estimate a new position at every measurement epoch and estimate the tropospheric delay between the GPS transmitter and the antenna.
A four-month campaign using a GPS on board a ferry between Marseille and Ajaccio in Corsica have been set up during autumn 2008. When the ship has docked, ground station nearly-collocated are used as a reference. A first part will present the experiment and data processing. Then a comparison between GPS tropospheric delays (ZTD) and the equivalent ZTD computed using the AROME (2.5 km resolution) analyses will be shown on four cases : two occurring during severe precipitation events and two others cases during dryer conditions (Autumn 2008). Other comparisons with SSMI data and tropospheric delays computed with standard data processing on land will be presented for the entire campaign period. These validations will be decisive to evaluate the possibility of assimilating such data especially in the framework of the Hymex field campaign.