Geophysical Research Abstracts, Vol. 7, 06552, 2005
SRef-ID: 1607-7962/gra/EGU05-A-06552

Operational evaluation of the assimilation of a network of ground-based GPS PW and ZTD into the weather forecast

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The rainfall forecast over regions with complex orography as for the Mediterranean area is still a difficult task. Difficulties arise because both the lack of data over the Mediterranean sea and the large variability of topography and the land-use. In the framework of the EU project Targeting Optimal Use of GPS Humidity Measurements in Meteorology (TOUGH) the operational testing of the assimilation of ground based GPS data is performed. Among the principal purpose of the project is to utilize the GPS data in meteorology by optimizing the assimilation of ground based GPS in numerical weather prediction. Over Europe a network of ground based GPS's receivers is operational for several years producing an estimation of Precipitable Water (PW) from the Zenith Total Delay (ZTD). Operational forecasts using different assimilation techniques are performed to test the impact of the assimilation of the PW and ZTD from the GPS network over Europe. A statistical evaluation of the impact of the assimilation of GPS is presented for the period January - December 2004. Both annual and seasonal statistical evaluation (Mean error and RMS) for temperature, water vapor and wind show a small impact of the assimilation of GPS data. On the other hand the rainfall show a positive impact if the assimilation of GPS data is performed using 3DVAR; but still the scatter plots for all the experiments does show a quite spread distribution.