



A New Mapping Function Based on GNSS-RO observations

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The coordinates of a static Global Navigation Satellite System (GNSS) station placed on the ground are estimated together with the delay suffered by the incoming satellite signals through the atmosphere. The tropospheric delay (TD) is shaped as the product of the zenith delay (ZTD) times a mapping function (MF) depending on the sine of elevation angles. In processing chain, ZTD is just estimated together with the coordinates; while the MF is modelled apart, in an independent way, by using atmospheric profiles retrieved with balloon observations (RAOB) as done for the Niell MF (1996) or provided by climate or Numerical Weather Prediction (NWP) models as in the Vienna MFs.

The several space missions devoted to GNSS-RO (e.g. COSMIC-FORMOSAT, METOP, CHAMP, GRACE and others) are providing a huge amount of data which makes worthwhile to be attempted the reconstruction of a new mapping function based on such kind of data. Thus we have built the “Matera” MF (MTMF) based just on GNSS-RO observations. The new MTMF will be applied to a network of EUREF GNSS stations in the Mediterranean area. Formal errors and repeatability of ZTD and coordinates estimated with the MTMF will be compared with those achieved applying other MF. In validation activities we plan to use the Bernese software.