Azimuth dependent mapping functions for GNSS data processing

E. J. Orliac, A. H. Dodson, R. M. Bingley and F. N. Teferle

Institute of Engineering Surveying and Space Geodesy (IESSG), University of Nottingham, UK.

By direct ray-tracing through the UK mesoscale numerical weather prediction model run by the UK Met Office, we derive a set of azimuth and location dependent mapping functions. The aim of the paper is to assess the impact of such mapping functions on GNSS data processing with emphasis put on the fact that (a) they eliminate the assumption of an azimuthally symmetric atmosphere and (b) do not rely on any global meteorological models.

Using data from a subset of the 100+ station UK CGPS network, results based on both precise point positioning and double-difference processing techniques will be presented. The impact of using the derived azimuth dependent mapping functions instead of traditional mapping functions is assessed through an analysis of position and baseline length repeatability. A comparison between using the derived azimuth dependent mapping functions and estimating atmospheric gradients is also given.