



## **Troposphere mapping functions for radio techniques from numerical weather models**

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In recent years, much effort has been invested in the development of tropospheric mapping functions for radio signals (GPS, VLBI or DORIS) based on data from numerical weather models. However, chapter 9 of the IERS Conventions (2003) proposes mapping functions that either reflect standard atmospheres (Niell, 1996), or make use of meteorological data at the stations (Herring, 1996; or Ifadis, 1986), or make assumptions about the vertical profiles above the sites (Lanyi, 1984). Troposphere mapping functions from numerical weather models have been developed by Niell (2001) which utilize parameters such as the height of the 200 hPa pressure level (Isobaric Mapping Function IMF), and by Boehm and Schuh (2004) using a more rigorous approach (Vienna Mapping Function VMF). Both mapping functions, IMF and VMF, show a clear improvement in terms of precision and accuracy compared to the Niell Mapping Function NMF (Niell, 1996). At the Institute of Geodesy and Geophysics of the Vienna University of Technology, the parameters of the IMF and the VMF are routinely determined with data from the ECMWF (European Centre for Medium-Range Weather Forecasts) on a regular basis with a time delay of less than 18 hours. At present the parameters of the IMF are available on a global grid (2.5 x 2.0 deg) with six hour time intervals, and the coefficients of the VMF are provided for all geodetic VLBI stations and 213 IGS stations. An extension to more stations is possible, and the application of forecasting data for real-time analysis is planned.