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First Zenith Total Delay and Integrated Water Vapour Estimates from the Near Real-Time GNSS Data Processing Systems at the University of Luxembourg

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Since September 2011 the University of Luxembourg in collaboration with the University of Nottingham has been setting up two near real-time processing systems for ground-based GNSS data for the provision of zenith total delay (ZTD) and integrated water vapour (IWV) estimates. Both systems are based on Bernese v5.0, use the double-differenced network processing strategy and operate with a 1-hour (NRT1h) and 15-minutes (NRT15m) update cycle. Furthermore, the systems follow the approach of the E-GVAP METO and IES2 systems in that the normal equations for the latest data are combined with those from the previous four updates during the estimation of the ZTDs. NRT1h currently takes the hourly data from over 130 GNSS stations in Europe whereas NRT15m is primarily using the real-time streams of EUREF-IP. Both networks include additional GNSS stations in Luxembourg, Belgium and France. The a priori station coordinates for all of these stem from a moving average computed over the last 20 to 50 days and are based on the precise point positioning processing strategy.
In this study we present the first ZTD and IWV estimates obtained from the NRT1h and NRT15m systems in development at the University of Luxembourg. In a preliminary evaluation we compare their performance to the IES2 system at the University of Nottingham and find the IWV estimates to agree at the sub-millimetre level.