Fog Case Studies Using the GNSS Tropospheric Products in Bulgaria

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SUMMARY

Fog forecasting is an old problem which is still a challenge despite the continuous improvement of weather prediction. In this work, we use the GNSS tropospheric product to derive Integrated Water Vapour (IWV). GNSS – IWV is combined with surface observations of temperature, mixing ratio, visibility, and pressure to study the fog dynamics in Bulgaria for three cases in 2012. The results showed a high value of the mixing ratio and relative minimum in the GNSS - IWV before the fog formation. During fog the changes of GNSS - IWV can be linked to change of visibility. Detection of advected warm humid air at 850 hPa can explain the behavior of GNSS - IWV during prolonged fog periods. Concerning the fog dissipation, our results show a minimum of mixing ratio followed by increase of temperature and rapid increase GNSS – IWV. This confirms the studies of Lee and al. (2010) in South Korea. Usually, this is linked with the inflow of new air mass with higher humidity, lower temperature. This new air mass destroys the inversion layer formed during the fog episode.

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