USING OCCULTATION DATA IN OPERATIONAL METEOROLOGY: A REVIEW, SPECIFIC REQUIREMENTS AND PROSPECTS

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In observational meteorology observations are mainly used to analyse the initial state of numerical weather forecast models. Modern (variational) data assimilation methods are capable to use various kinds of observations. Studies to assimilate GPS RO data performed so far are reviewed. Specific requirements for the data assimilation system on the one hand and the observation processing on the other hand are pointed out:
Data must be available in (near) real time. A careful assessment of the errors of observations and forecasts is a key requirement for a successful usage of radio occultation data. Outliers must be detected and removed before assimilation. In the upper troposphere and stratosphere, errors mainly result from an incomplete correction of ionospheric effects. In the lower troposphere, a better understanding of the signal and its relation to the small-scale structure of the atmosphere is required. A better knowledge of the statistical correlations of forecast errors, especially those of moisture is needed to better resolve the ambiguities in the data.
On the premises that the observation density is sufficiently high, GPS radio occultations will provide valuable information, complementary to radiosoundings and radiance observations.