

Kent

Lauritsen

Danish Meteorological Institute, Copenhagen, Denmark

Hans Gleisner, Danish Meteorological Institute, Copenhagen, Denmark

Johannes Nielsen, Danish Meteorological Institute, Copenhagen, Denmark

Stig Syndergaard, Danish Meteorological Institute, Copenhagen, Denmark

Poster

The radio occultation technique is based on measurements of phase and amplitude of radio signals emitted by GPS and in the future other GNSS satellites as they set or rise at the Earth's limb. The measurements are converted to bending angles using wave optics methods and to vertical profiles of refractivity using the Abel integral. The subsequent retrieval of temperature and humidity profiles requires additional information, e.g., knowledge of the atmospheric state from an NWP model or a climatology. A common retrieval method consists in using a variational approach and to obtain the temperature and humidity as the statistically optimal state derived from the observations and the background. Another method, known as the direct method, uses the background temperature and retrieves the humidity from the measurements in order to reduce the effect of biases in the background humidity field. One can also artificially increase or decrease the background or observation errors in order to obtain solutions for temperature and humidity profiles with desired properties.

In the present work we introduce and discuss a linear toy model inspired by the 1D-Variational method. The toy model is used to investigate the different algorithms used for moist air retrieval from radio occultation data. We characterize the relationships between different approaches. We also discuss some differences in using short-range forecasts or analyses as the background field. The toy model does not include surface pressure and correlations and we discuss these limitations.

OSTS session

Regional and Global CAL/VAL for Assembling a Climate Data Record

Meeting name

Joint COSMIC Tenth Data Users' Workshop and IROWG-6 Meeting

[Download to PDF](#)