



Variational validation of CHAMP radio occultation data

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New satellite instruments often produce information which is complementary to the existing observation network. One example are GPS based radio occultation limb soundings, which, in their least processed form, provide vertical profiles of bending angles as function of (impact) altitude. Further processing steps are required to retrieve the refractive index of air at radio frequencies, and eventually vertical profiles of temperatures and (in the troposphere) humidity.

In the absence of other direct measurement of bending angles, we have developed a validation strategy for level 1 products (including bending angles) of radio occultation data. A core component of the approach is a statistically optimal (1D-Var) retrieval and the exploitation of diagnostics provided by the variational retrieval methodology. In this presentation, we describe results of applying our strategy to data obtained from the German CHAMP satellite. Strengths and weaknesses of the approach will be discussed.

The described methodologies will be implemented as part of EUMETSAT's routine calibration and validation activities for the GRAS radio occultation instrument on-board the upcoming METOP satellite. Operational monitoring and quality control systems for radio occultation soundings at the Met Office and ECMWF will use a similar approach.