

CLIMATE DATA AND GRAS/METOP RESULTS

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The GNSS (Global Navigation Satellite System) radio occultation (RO) technique utilizes the refraction of radio waves to probe the Earth's atmosphere through satellite-to-satellite limb sounding. The phase delays as a function of time - which is the fundamental observable - can be converted to refractivity, pressure, temperature, and humidity as a function of height. Many of the characteristics of RO data suggest them as a near-ideal resource for climate studies, particularly the global coverage, the all-weather capability, and the self-calibrated nature of the data. The latter property should in principle allow for relatively easy inter-comparison of data from different satellites and RO instruments, which is required to construct long time series covering many years and even decades.

The GRAS RO instrument onboard EUMETSAT's polar orbiting meteorological satellite MetOp now provides an opportunity to create RO based climatologies of high quality, adding to data from other RO missions. We are currently undertaking studies on how to best exploit the GRAS RO data for climate purposes.

The usefulness of the RO climate data requires that any systematic errors, or biases, are small and do not change over time. These requirements are more important for the construction of climate data than for meteorological data, due to the higher sensitivity of climate data to small, but long-term and consistent, variations in observational biases. Even small biases which are unimportant for NWP purposes may have severe consequences for some climate applications. Higher-level data - refractivity, temperature, etc. - are the result of a complex processing chain involving quality control and data selection procedures, and the introduction of small biases could not be ruled out. Biases could also arise from the fact that the EPS/MetOp observational platform consists of a single satellite in a near-polar, Sun-synchronous orbit at a low height, resulting in a temporal under-sampling.

We present the first GRAS/MetOp data and analyse climate data derived from GRAS/MetOp measurements. In addition, we present plans for how to study biases in the climate data, and discuss the expected error characteristics - random observational/sampling errors and systematic biases - of the GRAS RO data and their consequences for the construction of accurate climatologies.