THE ABSOLUTE CALIBRATION OF GPSRO AND ITS APPLICATION IN NWP

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We present the basis for a traceable determination of the calibration of GPS refractivity, based on first principles and several high accuracy measurements of gas properties. The target of this work is to achieve a relative absolute accuracy whose systematic error does not exceed 0.3 parts per 1000, which is known to be detectable in NWP applications.
A solid trustable determination opens a wide range of applications, helping in the determination of other measurements which are known to be biased. The anchoring of radiance measurements through some form of adapting bias correction is one example, already in use.
Beyond this, it is also known that inconsistency between measurements harms the performance of assimilation systems. We present some applications in the identification of inconsistencies between GPSRO and radiosondes, which in general point to issues that deserve further attention. Among them, we present applications to the identification and estimation of radiative biases in radiosondes.