**Improving GPS RO Stratospheric Retrieval for Climate Benchmarking**

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GPS Radio Occultation (RO) measurements can be an effective climate benchmark due to the SI-traceability of these measurements. Theoretical analysis and numerous validation studies have demonstrated that the retrieved refractivity profiles are most accurate over the "sweet spot" of 5-20 km altitude. Above 20 km, the retrieval is subject to multiple sources of uncertainty. The two most serious problems, especially from a climate benchmark point of view, are errors arising from residual ionospheric effect and Abel upper boundary condition. The first is due to uncorrected ionospheric effect on the bending of the signal from the Vorobev-Krasilnikova dual-frequency combination. The second refers to the standard methods in replacing noisy measurements with some kind of model or climatology for the bending angles at higher altitudes. Such algorithms will reduce the noise at the expense of possibly introducing a systematic bias in the retrieved refractivity, a tradeoff which is not desirable for a climate dataset. In this talk, we discuss a new robust and model-independent approach to the Abel upper boundary. Our approach will be applied specifically to the computation monthly zonal averages. In addition, we will also discuss whether the existence of a third GNSS frequency in future navigation systems can be utilized in reducing the ionospheric residual errors.