

## ***Interactive comment on “Refractivity and temperature climate records from multiple radio occultation satellites consistent within 0.05%” by U. Foelsche et al.***

**Anonymous Referee #2**

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This paper seeks to show consistency between climatologies of RO products assembled by individual RO satellites. It finds that the climatologies are consistent to  $< 0.05\%$  in refractivity after ECMWF analyses have been used to correct for sampling error. From this the authors conclude that RO satellites are spectacularly consistent and that ECMWF analyses are very useful for correcting for sampling error. This is already an excellent paper and deserves publication. I only have the most minor of quibbles before publication.

(1) Rather than "instationarity", consider the expression "temporal inhomogeneity" instead. (Line 16 on page 1594; line 5 on page 1604)

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(2) One cannot resolve the semidiurnal cycle with four-times daily sampling, because the semidiurnal coefficients are at the Nyquist frequency for four-times daily sampling. (Lines 23-25 on page 1601)

(3) The folks who introduced double-differencing for RO calibration are Hardy, Hajj, and Kursinski, 1994: Int. J. Sat. Comm., 12, 463-473; not Hajj et al., 2002. (Line 14 of page 1595)

That's all I have of substance. The following points are for consideration scientifically:

(1) What are the consequences for this analysis of that fact that ECMWF has assimilated much of the satellite data that is being inter-compared?

(2) Sampling error seems to be consequential only for high latitudes. Why is the sampling error so large there?

(3) Are there really no temporal biases in RO data due to sampling? Doesn't mutual precession of LEO and GPS satellites give rise to tropical biases?

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Interactive comment on Atmos. Meas. Tech. Discuss., 4, 1593, 2011.

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