

## ***Interactive comment on “The influence of the signal-to-noise ratio upon radio occultation inversion quality” by Michael Gorbunov et al.***

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The main results of this paper are that (1) the effect of the internal receiver noise (approximated by white noise) has a threshold character: the influence of the noise is very low up to some threshold (i.e.,  $\sim 34$  dB-Hz or 10 V/V), but when the threshold is exceeded, the influence increases dramatically; (2) given RO observations of fair quality, the enhancement of the SNR cannot be expected to provide significant improvement in retrieval quality.

These main results cannot be supported by the results shown in the paper.

The comparisons between WOP and ECMWF shown in Figs. 1-3 and between COSMIC and ECMWF in Figs. 4-5&8 do not show the impact of the noise, but the com-

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bined impact of the noise AND the differences between WOP/COSMIC before adding superimposed noise and ECMWF "references". We just cannot draw a conclusion on the impact of superimposed noise by comparing WOP/COSMIC (with superimposed noise) and ECMWF "references"!

The threshold character of the noise effect claimed in this paper is an artifact of the differences between WOP/COSMIC before adding the noise and ECMWF data: When the noise is smaller than this difference (e.g., when the S/N ratio is better than  $\sim 10$  V/V), it does not matter anymore since the difference between WOP/COSMIC (before adding superimposed noise) and ECMWF data becomes dominant.

The impact of the noise can be seen by comparing the WOP with and without superimposed noise (see "WN-W" in Fig.3) and by comparing the COSMIC data with and without superimposed noise (see Figs. 6-7 and "CN-C" in Fig.8), where we DO NOT see a threshold character of the noise effect!

The results of WN-W and CN-C should also be shown for an altitude of 1 km in addition to 5 and 20 km.

What is the spectral distribution of the internal receiver noise? Is the white noise with a flat spectral distribution a reasonable approximation? What is the sensitivity of the results to this assumption?

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