Reply to comment by A. von Engeln et al. on "Monitoring the atmospheric boundary layer by GPS radio occultation signals recorded in the open-loop mode"

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[1] We thank von Engeln et al. for their comment [*von Engeln et al.*, 2007] (hereinafter referred to as VE07) on our paper [*Sokolovskiy et al.*, 2006] (referred to as S06 in the comment). VE07 said that S06 used five definitions of the PBL top height without addressing their difference. By performing additional study, VE07 demonstrated that different definitions result in different heights. We believe this is to be expected. In addition, we would like to clarify several points made by VE07.

[2] (1) S06 did not use five definitions of the PBL top altitude (also, see next paragraph). (2) The goal of S06 was not studying different definitions of the PBL height, but demonstration that the break (or elbow) point in refractivity profile, associated with the top of PBL (as shown in Figure 1 of S06), is a robust estimator that can be obtained with the use of the open-loop (OL) radio occultation (RO) signals because the OL tracking allows penetration of the retrieved profiles to the surface. It is emphasized by S06 that the break point in refractivity does not necessarily correspond to the point of the maximum refractivity gradient (section 2).

[3] Association of the top of PBL with fading of the amplitude of RO signals transformed to impact parameter representation by radio-holographic (RH) methods may not be considered as definition because it has no physical justification. It was used by S06 for only discussion of the results [*von Engeln et al.*, 2005] (referred to as E05 by VE07). It is known that fading of the transformed amplitude denotes the surface or any other height if the signal is lost by receiver at earlier time. E05 write: ''Software updates to the tracking algorithm will modify the relation of the PBL top altitude to the 50% FSI amplitude one'' (p. 3). This means that the method proposed by E05, which relies on the loss of lock by receiver at the top of PBL, requires calibration, and therefore the results are statistically dependent on the ancillary data used for the calibration. VE07 say that E05 validated their results with about 142,000 occultations. We believe this statement is misleading. Without physical justification of 50% (also, see next paragraph), this is not a validation, but a calibration with the use of ECMWF analysis. We believe this is a very important conclusion, but it was never stated explicitly.

[4] By performing additional study, VE07 demonstrated that cut-off heights of the profiles retrieved at different processing centers are different. This is not surprising since different centers may use different algorithms. E05 write: ''Processing stops when the smoothed occultation FSI amplitude is reduced by 50%'' (p. 2). This raises questions: (1) What smoothing method (window) was applied? (2) Reduced by 50% compared to what? It is known that RH amplitude undergoes strong scintillation in the troposphere, especially in the tropics and, for some occultations, is not stable at higher altitudes. Answers to these questions are necessary for interested readers to reproduce the results of E05.

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