

Interactive comment on “Combining ground-based microwave radiometer and the AROME convective scale model through 1DVAR retrievals in complex terrain: an Alpine Valley case study” by Pauline Martinet et al.

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Dear Authors,

thank you very much for your reply. I think the question of how to use scanning MWR observations in a complex terrain is an important one and hence I think it is worth to discuss this issue thoroughly. Whether the MWR observations are then used to retrieve temperature, liquid water or water vapor does in my opinion not play a big role for this consideration.

C1

You are right that we didn't look at the oxygen channels for T-profiles in the 2009 study but the overall problem is that one could hit some terrain at low elevation angles and this might contaminate your atmospheric signal. I don't think the steepness of the valley really matters for that. In fact, the Murg valley was only 1 km wide, so more narrow than the Alpine valley you measured in. When working with the K-Band channels for water vapor the problem is even bigger due to the wider beam width of the antenna at low frequencies. So even if at some elevation angle one should not hit the terrain, one still has to carefully consider the beam width and whether side lobes of the antenna could receive some surface emission from the terrain.

In Kneifel et al., 2009 we did not only use the 30° elevation observations as you write but also used elevation angles down to 5.4° in the north direction for the comparison with the aircraft measurements: "The HATPRO measurements from the lowest elevation angle could only be used in the north direction, because in the other directions, they were blocked by orography."

I mentioned the papers with data originating from the UFS because they confirm that high quality TB observations can be obtained in close proximity of complex terrain. The DPR and Hatpro were run in a synchronous way which is the reason why we could use LWP from Hatpro in the scan direction to study its effect on snow scattering. The Hatpro at UFS also performs regular boundary layer scans including the lowest elevation angles for more than 10 years to derive T- and q-profiles but you are right that they weren't investigated in the studies I mentioned.

Kind regards, S. Kneifel

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C2