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## ***Interactive comment on “HAMP – the microwave package on the High Altitude and LOng range research aircraft HALO” by M. Mech et al.***

### **Anonymous Referee #2**

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#### General Comments:

The HAMP package provides a very useful suite of instruments for validating microwave passive and active radar algorithms both for science studies, and for satellite validation and algorithm development. The HAMP 3 radiometers have in particular a broad range of frequencies that is unique. The paper provides a good description of the radar and radiometers, however it would have been useful to focus more on the data collected. Most of the discussion focuses on simulations that are not especially new. There is almost no discussion of the data collected. Nevertheless, HAMP seems as though it will be very tool for future science experiments.

#### Specific Comments:

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P4626, line 9: Change this statement since GPM has already launched.

P4626, lines 15-25: NASA has assembled instrument suites such as HAMP although not with as many millimeter frequencies. Examples are CoSSIR instrument in TC4 described in Toon et al. in JGR July 2010, or HAMSR instrument and radars in TCSP (<http://journals.ametsoc.org/doi/abs/10.1175/BAMS-88-6-867>). Might want to reference these for completeness.

P4627, line 10-12: Another reference is Wang et al., TGRS-2011-0175.R1 that deals with the CoSMIR instrument on the NASA ER-2. HAMP has a more comprehensive number of channels but is not scanning like CoSMIR.

P4629, lines 18-25: The discussion on estimating contributions to Doppler from aircraft motion is somewhat lacking. Are you using estimation/correction equations such as in Lee, W.-C., P. Dodge, F. D. Marks, and P. H. Hildebrand, 1994: Mapping of airborne Doppler radar data. J. Atmos. Oceanic Technol., 11, 572–578.?

P4629-4630, radar discussion: Can you provide some discussion on calibration of the radar? Some of the airborne radars use the ocean for calibration.

Page 2631, Line 21 to 2632/Line 5: The radiometer calibration approach is non-standard for airborne radiometers. Usually scanning radiometers have hot and cold calibration targets that they use for continuous calibration during flight. Did you assess that the radiometers have stable physical temperatures during the entire flight so that you are confident that the calibration itself during flight?

P4649: The radar/radiometer beams are not matched. Are you concerned about the impact of this in retrieval algorithms?

P4639, section 5: The example is very nice but it doesn't provide much information on accuracies and other aspects of HAMP. Unfortunately, the example is over land. You really need to fly over water to help understand the alignment of the radiometer and radar pointing angles, radiometer dynamic range, radar calibration, etc. Do you plan to

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do this type of flight in the future? I'm very skeptical of the radar calibration in particular without using the NRCS (normalized radar cross section) over a water body. Even though the radar is nadir pointing, you can bank the plane to get incidence angles in the 10 degree range and then compare these with other Ka-band airborne radars and the new GPM DPR Ka-band radar.

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Interactive comment on Atmos. Meas. Tech. Discuss., 7, 4623, 2014.

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