

***Interactive comment on* “Measurement of the
tropical UTLS composition in presence of clouds
using millimetre-wave heterodyne spectroscopy”
by B. M. Dinelli et al.**

Anonymous Referee #2

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This paper describes new remote sounding instrumentation operating near 320 GHz for measuring temperature, ozone, water vapor and nitric acid. I believe the results shown here represent the first use of this instrument in the field (SCOUT-O3). Due to a number of factors both operational and instrumental, only 15 data profiles were retrieved from the 5 Dec. 2005 flight. Only results from one of its three spectral regions were available due to instrumental difficulties. This enabled the measurement of T, H₂O, O₃, and HNO₃. The analysis of the measurements and results achieved appear technically sound and the authors have demonstrated that MARSCHALS can make reasonable if not accurate measurements in the presence of clouds. I say reasonable because the only validation presented was a comparison with a single MIPAS-STR

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profile obtained in clear sky.

The main problem I have with this paper is that it reads like a proposal or a grant renewal report rather than a journal paper. For example, much of the introduction is spent highlighting the inadequacies of existing measurement systems. There is considerable discussion about operational challenges, retrieval details and measurement science capabilities. In the present form I don't feel this paper is suitable for publication in ACPD because I don't see how it contributes toward atmospheric science or even provide substantial amount of new data with an assessment of its the accuracy (ie validation) which may later be used in scientific investigations.

To be more suitable for publication, the paper needs to be considerably shortened. I would eliminate the discussion of inadaquacies of existing instrumentation. I would also abbreviate the discussion about flight operations and issues that prevented the instrument from working (these are issues that instrument teams and program managers care about but not the more broad readership of ACP). I would considerably shorten the discussions on retrieval details and measurement science characteristics and consolidate the measurement presentation into three figures. One figure could contain four panels (T, H₂O, O₃, HNO₃) showing the measurements with two black lines showing the vertical range where the instrument contributes (eliminate the error and information content panels). I would also crop the vertical axis so as to mostly show the high information content region. Another figure shows the averaging kernel(ie fig 16 which also shows the measurement uncertainty) and the MIPAS comparison on figure 17. I would probably consider eliminating figures 1-3, 7-9, and 15. Much of this technical material (basically this manuscript) can be made available on the web.

It would be interesting to see more comparisons with other instruments. I know that UARS HALOE, Odin, Aura MLS, ACE-FTS, MIPAS (envisat) SAGE, and probably others were operating. There are usually balloon based ozone sondes, frostpoint hygrometers and standard radiosondes supporting the campaign. On the science front, presenting the relative humidity of the measurements would be interesting because

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there is uncertainty as to the extent of supersaturation that coexists in clouds in the TTL.

Minor Issues:

I would give a listing of all the atmospheric constituents that MARSCHALS can be expected to measure when all its spectrometers are operational.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 14169, 2008.

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