

## ***Interactive comment on* “Bias determination and precision validation of ozone profiles from MIPAS-Envisat retrieved with the IMK-IAA processor” by T. Steck et al.**

### **Anonymous Referee #3**

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#### General comments:

The paper by Steck et al. presents a validation study of the MIPAS/Envisat instrument. Ozone data from MIPAS are compared to data from several ground-based and other satellite instruments. The relative biases are determined and discussed. In addition, the estimated errors of MIPAS are validated.

The paper is interesting, well written, and the scientific methods used in the detailed analysis are generally sound. The extensive set of comparison data, from various types of instruments, gives a strong confidence in the conclusions and the MIPAS ozone data in general.

However, there are several issues that I believe the authors should address before the paper is published. Details of these issues are given below.

Specific comments:

1) The IMK-IAA data are compared to various other instruments. However, no comparison to the ESA official MIPAS product is made. This comparison would be very useful and should have been the first step of validation. Because there are several MIPAS processors around, an average user of MIPAS data is likely puzzled: which data to use? The authors briefly touch this topic in the text, so I would urge them to expand this discussion and to include the IMK-IAA/ESA comparison in the paper.

2) In principle, the averaging kernels (AK) should be applied both ways, e.g. MIPAS AK to POAM data and POAM AK to MIPAS. In MIPAS/HALOE comparison, no AK were applied although they should have because the MIPAS resolution in the mesosphere, 8 km, is considerably worse than HALOE's 2-3 km. In addition, the form of MIPAS AK should be discussed and an example figure should be presented. It is important to see how the different altitudes are weighted inside the relatively poor 8-km resolution.

3) Mesospheric comparisons with HALOE look a bit fortuitous, because the diurnal variation of ozone is known to be substantial. It is not reasonable to compare twilight ozone (HALOE) with day or night ozone (MIPAS). Whenever twilight observations are used, then difference in solar zenith angle should be considered as an additional coincidence criterion because the rapid ozone changes at twilight are controlled by solar light. Have MIPAS twilight measurements been used in the comparison?

4) Despite the coincidence criteria applied, in some cases the natural differences in ozone between the measurement locations can be important. Especially, have the authors considered the possible differences in the vicinity of polar vortex edges? I think that for some of the ground stations this might be an issue at certain times of year.

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