

Interactive comment on “Validation of northern latitude tropospheric emission spectrometer stare ozone profiles with ARC-IONS sondes during ARCTAS” by C. S. Boxe et al.

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Review of the paper

Validation of northern latitude tropospheric emission spectrometer stare ozone profiles with ARC-IONS sondes during ARCTAS by C. S. Boxe et al.

This paper focuses on validation of the TES ozone profiles with a series of coincident ozonesonde observations. The comparison uses version 3 and 4 of the TES retrieval of ozone from spectra recorded using the stare observation mode, along with ACTIONS sondes measurements taken during the ARCTAS arctic field campaign.

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Validation of satellite observations is an important step for further use of the remote sensed data. The paper provides a careful description of how the comparison was performed, and identifies some systematic bias for the TES ozone profile, in agreement with findings reported by previous publications. Using a stringent time and space coincidence criteria, the study shows that TES ozone profiles are reliable above 60°, and that the calculated errors are consistent with the observed errors.

I found the paper well written and useful, and I recommend its publication in ACP. I only have some minor remarks that could help to improve the clarity of the manuscript :

General comments - How can you be sure that the sounded air masses are about the same? The stare mode is at nadir only?

- Results are provided both for version 3 and version 4 of the data: 1/why both? Isn't V4 supposed to be an improved version as compared to V3? 2/ the description of the improvement between the two versions is not provided, unless it is only the one step versus two steps retrieval process (page 27273) that differs? 3/ Both versions use a single a priori profile?

Detailed comments + typos

- page 27270 ligne 16: The IASI instrument also measures ozone profiles, eg A. Boynard et al, ACP 2009.

- page 27270 l29: Here it is said that the validation used 40 observations, whereas on page 27275 ligne 2 it says 55.

- page 27272 l2 Stare » stare

- page 27274 l1: The end of the sentence is weird.

- page 27274 l6-l10 check parenthesis

- page 27274 l10: It is written that the launches were timed for the early afternoon overpass and in the Table all the launch time are between 18 and 23h?

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- page 27278: check equ. (8): check the indice of S (%)
- page 27279 l4: Averaging » averaging
- page 27279 l7-8 and 27280 l10-11: twice the same is said
- page 27280 l25-26 end of sentence missing or parenthesis should be removed?
- page 27282 l24: better characterisation of the surface= better emissivity for the RT calculation?
- page 27284 l3: suggestion to put % values here, to be consistent with other values provided earlier same paragraph
- page 27284 l18: (3): previous studies did not used the global survey mode?
- page 27285 l8-l10: any explanation for the positive bias

References:

- find a way to distinguish the two Worden 2007
- Brasseur ref : tracewrs > traceurs
- Jacob ref : 2009, » 2009.
- Osterman ref: Spectrometree (remove e)
- Thomson ref 2008, > 2008.

Tables:

- Table 1 and Table 2 are very similar I would suggest to combine them
- Table 3: How are the errors obtained as compared to profiles given in the plots? summed over the vertical?
- Table 4: Caption similar to Table 3: should be V004 instead?

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Plots: the caption could be more explicit on what the subplots are.

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