

## ***Interactive comment on “Technical Note: A trace gas climatology derived from the Atmospheric Chemistry Experiment Fourier Transform Spectrometer dataset” by A. Jones et al.***

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Jones et al. provide a trace gas climatology for 14 species observed by ACE-FTS. Due to the latitude coverage of the ACE-FTS observations that are determined by solar occultation geometry, data over a certain time period need to be collected to achieve a global coverage. The goal is to publish a data set, that will be used in the validation of Chemistry Transport Models and Chemistry-Climate Models.

The method is quite similar to that of the HALOE climatology Grooß and Russell (2005), besides here the climatological value was determined by a different statistical method, the median average deviation (MAD).

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The climatologies are provided both on pressure levels for both equivalent latitude and latitude bins. Basic information about the validation of the ACE-FTS observation of each of the 14 species is also given. This climatology is a very valuable addition to existing climatologies for validating and/or initializing global models.

The paper is generally well written, and it should be published after the points mentioned below are considered.

### **Major Issues**

1. The data of the climatology are available for download from the ACE-FTS website for registered users. The real value of this paper is to have these data available. Therefore it would be extremely valuable if the climatology data would be added to the ACP website as supplement to this paper. Thus I would recommend the paper only to be accepted for publication if the data are added as supplement.

It is pretty clear that there may or should be further updates of these climatologies due to updates of the retrieval algorithm or due to a possible later contribution of data for a longer time period, or due to removal of more suspicious data. These may be stored at the ACE website, at a later time, and it would also be helpful to have the location of potential updates written in the paper. But a reference to these data should be kept at ACP.

2. A further improvement would be to add the accuracy of the data derived from the validation efforts. Although this may not be an easy task to add this information, it would be helpful to have available for interpretation, e.g. if the climatology is compared with a model output. The authors of the paper are those who know best the accuracy of their data, for other users of the climatology it would be much harder to reconstruct this from what is written in the sections 2.1 to 2.14. Therefore I

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suggest to add the accuracy derived from the validation to the electroic data set, that is potentially altitude and latitude dependent.

### Minor Issues

1. page 29859, lines 17-20:  
I don't think, the information about single occultations is meaningful in this context. If the authors think, this information should accompany the data, they should include it into the data supplement. Otherwise I would leave out this comment.
2. Species with larger diurnal validation as NO and NO<sub>2</sub> etc. do typically have the largest change rates during or just after sun rise and sun sets exactly when the observations take place. This has to be considered when comparing it to model output. It should therefore be clearly emphasized, especially for the AM and PM climatologies of species with strong diurnal variation, that the obtained value does probably not correspond to a noontime value or a diurnal mean but rather to sunrise or sunset at 90 degrees solar zenith angle.
3. The NetCDF data format allows for a certain degree of self-explanation. The NetCDF data files on the data base do not confirm the common standards that would help e.g. having the data displayed by standard NetCDF viewing software. These would be
  - the coordinate variable (pressure or press instead of nlev) lower case and having the same name as the corresponding dimension
  - a meaningful recognizable variable name for the calculated fields, e.g. O<sub>3</sub>, N<sub>2</sub>O, etc instead of "species" and probably O<sub>3</sub>\_var and O<sub>3</sub>\_err, etc.

I strongly suggest also adding attributes containing description of the variables (description similar to units, long\_name) as well as well global attributes (history, C13344

title, pi info) to include ACE-FTS data version number and a citation to the ACP paper as a reference. It would also be possible to combine then all of the single species climatologies to a single file instead of having 14 individual files for all species.

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