**Geoscientific
Model Development
Discussions**

Interactive comment on "PORT, a CESM tool for the diagnosis of radiative forcing" *by* A. J. Conley et al.

Anonymous Referee #1

This manuscript presents an offline radiative transfer model that has been created by isolating the radiation code from CAM4. The model is briefly outlined, the implementation of radiative forcing is discussed and an application to preindustrial-to-present-day ozone radiative forcing is presented.

GENERAL COMMENTS: The paper fits well into the scope of GMD(D). It is well written, with a clear structure and it has a clear focus that is retained throughout the entire manuscript. Figures and Tables are appropriate and very informative. The paper is brief and this is where it falls down to some extend. I think the authors have been a bit too concise in some parts of the manuscript.

This is particularly felt in the abstract which is limited to just three sentences. I would like to see this section extended a bit. Why not include some results. The numbers

presented for the ozone radiative forcing study would fit in well here.

I also miss a model description. I appreciate that some aspects of the model have been described in the literature before but I think it would do the paper good if the authors would include a paragraph or two outlining just the key features of the radiation model that is the basis of PORT. Could you discuss, for example, wave length bands, calculation method (two-stream etc.) and some of the key assumptions and simplifications. Also, later in the text the model resolution is mentioned. This could be added at this point, too. Futhermore, some discussion of the motivation to isolate the code would be interesting. Why do you want to work with an offline model? What are the benefits and drawbacks?

Thirdly, a comparison to some other work would make the paper more robust. A comparison to results from TAR and AR4, for example, or the paper by Gauss et al., 2006, in ACP or the recent extensive study on radiative forcing of ozone in the ACCMIP framework. In the latter, two other offline radiation transfer models have been applied, the Edwards and Slingo offline model and the Oslo radiation transfer code. This does not need to be extensive. Only a couple of paragraphs or so would be sufficient to put PORT into the perspective with other models.

All in all, this is a good, solid paper and a minor extra effort seems definitely worthwhile. Therefore, I recommend acceptance of the paper with minor revisions along the lines I have just outlined. There are only very few minor specific comments which I will discuss now.

SPECIFIC COMMENTS:

P2690L6: insert "of" after "calculation" to read "The calculation of radiative forcing is..."

P2690L19: I suggest using a capital C to denote concentrations in order to avoid confusion with heat capacity (especially when using c_p)

P2690L19: insert "the" after "Q(T,c) is" to read "Q(T,c) is the total of the shortwave..."

P2691L5: Use "equations 3 and 4" instead of "the previous equations" to reduce ambiguity.

P2695L1-6: This paragraph would make a nice addition to the abstract. Why not add these findings.

P2695L17: In a previous paragraph the pre-industrial was defined as "1850"; here it is "1870". I think it would be good to consolidate those two definitions.

P1700Table2: Can you put these numbers in perspective with other studies (e.g., Gauss et al., ACP, 2006 or recent ACCMIP studies)?

P2702Fig2: Would it be possible to include the tropopause line in this figuer?

References:

In case of multiple entries for one first author could you please sort the refences according to publication date listing the oldest paper first

---