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Interactive comment on "Technical Note: A simple procedure for removing temporal discontinuities in ERA-Interim upper stratospheric temperatures for use in nudged chemistry-climate model simulations" *by* C. McLandress et al.

Anonymous Referee #1

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The authors propose an add-hoc correction method for an obvious inconsistency in the ECMWF ERA-Interim reanalysis data, namely two unphysical temporal discontinuities in upper stratospheric temperatures. They further show the impact of this correction on the results of their CCM, which uses the data for Newtonian relaxation ("nudging"). With this, the authors underline the fact that reanalysis data sets are not necessarily representing the truth.

This technical note therefore provides an important information for the chemistry-

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climate model community, since application of the uncorrected ECMWF ERA-Interim data in simulations with "specified dynamics" might yield wrong results. The manuscript should be published after one major issue has been discussed and some minor improvements, as suggested below, have been considered.

1. One **major** question arises: If only the temperature is corrected, it becomes inconsistent to the other reanalyzed meteorological fields, which are also used for Newtonian relaxation, like for instance the flow field in form of divergence and vorticity. Can it simply be assumed that a temperature bias correction (though time dependent) leaves the flow patterns untouched? This should be discussed.

2. The authors should mention somewhere that the proposed correction is only required, if the global mean temperature is nudged and if the upper stratosphere is nudged. Some model setups might nudge only up to a certain level below the region of inconsistent temperature fields, and / or only the temperature patterns but not the global mean temperature. These techniques might provide alternatives to overcome the issue presented here.

3. The term "nudging", though in the meantime well-known to modelers, is still very imprecise. I suggest to mention the "Newtonian relaxation" at least once in the manuscript.

4. page 25805, line 8: The authors compute the anomalies based on the full time series mean including the inconsistent periods? Isn't this a systematic error? How does this affect the results?

5. The authors might consider providing their data (time series of bias correction for different levels) as supplementary material to the final manuscript (ASCII-table or, better, time series in netCDF).

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6. Last, but not least, I wonder, if the authors could provide a corrected data set (or the bias time series) also on the original ECMWF ERA-Interim model levels, since I guess some modeling groups use the raw data on model levels to prepare their input data for nudging, instead of the data interpolated on pressure levels. (Of course, this last item is just a "nice to have", but no prerequisite for the final publication of this manuscript.)

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 25801, 2013.