



Evaluation of a new method to detrend stratospheric tracer mixing ratios

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Several Modelling studies have suggested long term changes in the Brewer-Dobson circulation (BDC) of the stratosphere. Observations of mean age tracers in the stratosphere over the past three decades could not confirm such changes within the uncertainty of the analysis (Engel et al., 2009). As mean age is affected by both mixing and residual transport in the stratosphere, changes in one of these two might mask changes in the other (e.g. Li and Waugh, 1999) when using mean age as a proxy for the strength of the BDC. The temporal evolution of long-lived tracers with chemical decay in the stratosphere like N₂O or CFC-11 and the analysis of their mutual correlations might help to disentangle this ambiguity. However, possibly changes in these correlations are superimposed by the long term change of tracer mixing ratios.

When comparing correlations of several long-lived tracers at different times, it is thus necessary to detrend the tracer mixing ratios in order to account for the changes in the tropospheric abundances of the species involved (Plumb et al., 1999). We present a new method to detrend tracer mixing ratios in the stratosphere based on the concept of mean age of air. This method is applied to model and observational data and its performance is evaluated.