

Interactive comment on “Stratospheric water vapour and high climate sensitivity in a version of the HadSM3 climate model” by M. M. Joshi et al.

TJR Reichler (Referee)

thomas.reichler@utah.edu

Received and published: 27 April 2010

This short paper investigates the high climate sensitivity (ca. 7 K) found in the “low entrainment parameter” integration of the MetOffice Hadley Centre perturbed physics ensemble. Understanding this issue is important since such a high climate sensitivity would lead to profound impacts on climate. The paper demonstrates convincingly that this high sensitivity is due to large and unrealistic increases in stratospheric water vapor in the control and in the doubling CO₂ integration. This finding represents a significant advancement over a previous paper on a similar topic by Sanderson et al. (2008), who claimed that increases in high clouds are responsible. The paper is very well written, clear, and concise. Therefore, I have only a few minor comments and I recommend the paper for publication in ACP.

C2136

Minor comments:

6245/7: reference to “grey dashed line” is probably a typo

6243/11: that > than

6248: There is a very recent paper by Salomon et al. (Nature, Nature Geoscience, Science?) on past changes in stratospheric water vapor and its implication for radiative forcing. This paper should probably be included as a reference. The claim of the current paper that “the (water vapor) trend has actually been zero since the year 2000 (Randel et al. 2006)” should be revised accordingly.

Fig. 1: is of poor quality. I can't read the contour labels. A color bar would be nice. What about one panel showing the observed water vapor, or at least the control run's distribution? What season is shown in the Figure (same comment applies to all other Figures).

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 6241, 2010.

C2137