

Interactive comment on “Variability and trends in total and vertically resolved stratospheric ozone” by D. Brunner et al.

D. Brunner et al.

Received and published: 6 October 2006

The solar cycle response in stratospheric parameters such as wind, temperature and ozone is a lively debated topic and there still seems to be little consensus. We are very grateful to the referee for clarifying a number of points addressed in our study and for providing references to additional relevant studies on this subject.

We have added a new figure (Fig. 1) showing ozone anomaly time series from CATO at different levels compared with SAGE and other data sets as suggested by the other referees. We think that this nicely shows the capability of CATO to reproduce interannual and decadal variability. In addition, the new figure 3 presents Rsquare values of the regression model providing some indication on how well CATO can represent interannual variability. We agree that an additional figure showing CATO and model fits at select altitudes would be useful, but given the two new figures this would really stretch

out the paper too much.

It is true that the analysis of Lee and Smith (2003) is based on an idealized model QBO. However, only the forcing of the QBO had a fixed 27 month period while the resulting temperature and zonal wind anomalies could interact with other effects including solar cycle, volcanic eruptions and the annual cycle. Thus, the QBO period was not strictly fixed and their model QBO actually does not look that different from a real QBO. The westerly phase (see solid line in their Figure 1) was indeed weaker than the easterly phase in agreement with observations (see proxy time series figure in our manuscript). Thus, we don't see any problem with that. In our view the paper of Lee and Smith (2003) nicely demonstrates how delicate the analysis of solar cycle effects is and how the much larger signals of the QBO or volcanic eruptions can easily corrupt the regression analysis. We changed the phrasing as suggested to reflect the fact that the Lee and Smith (2003) study is based on a model and not the real QBO.

We do not have enough expertise to answer the last question in J. McCormack's comment whether "medium-energy electron variations might be capable of producing such a response". The Langematz et al. (2005) paper showed that there are probably more factors related to solar variability in addition to UV variations or solar proton events that could affect stratospheric ozone. There will be certainly more studies on this interesting subject to follow.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 6317, 2006.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper