

## ***Interactive comment on “Sensitivity of the southern hemisphere tropospheric jet response to Antarctic ozone depletion: prescribed versus interactive chemistry” by Sabine Haase et al.***

### **Anonymous Referee #4**

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Review of “Sensitivity of the southern hemisphere tropospheric jet response to Antarctic ozone depletion: prescribed versus interactive chemistry” by Haase et al.

This paper investigates how Antarctic stratosphere and troposphere mean climate and climate change is affected by the model representation of Antarctic ozone. Three ensembles were performed for the 1955–2013 period using CESM with different ozone approach: interactive ozone, prescribed zonal-mean daily ozone, and prescribed 3D daily ozone. The results are consistent with previous studies that interactive ozone causes stronger Antarctic lower stratospheric cooling and stronger stratospheric jet response in austral summer.

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This paper advances the understanding of the effects of interactive ozone on Antarctic climate change. Specifically, it emphasizes the role of reduced dynamical heating in causing Antarctic lower stratospheric cooling with interactive ozone. It also quantifies the impact of ozone-dynamics feedbacks and ozone zonal asymmetry on simulated temperature and jet trends. However, I think the authors’ interpretation of how interactive ozone affects tropospheric jet trends needs to be clarified.

#### Major Comments:

I don’t think the results presented in Figure 9 support the conclusion that interactive ozone leads to stronger poleward shift of the tropospheric jet. Figure 9 shows that interactive ozone does not significantly influence the tropospheric jet trends poleward of 40S. Significantly different tropospheric jet trends are only found between 20S and 40S (Fig. 9c), where the westerly trends are weaker in the interactive ozone simulations than in the prescribed ozone simulations. It would be useful to find out why interactive and prescribed ozone simulate different tropospheric subtropical jet trends. However, the major point is that the large stratospheric circumpolar jet differences between interactive and prescribed ozone simulations do not propagate downward into the troposphere.

#### Minor Comments:

The title should be changed because most of the paper is about the impact of interactive ozone on the SH stratosphere.

Lines 251–252: Why interactive ozone causes a weaker shallow BDC branch?

In some occasions, PNJ should be replaced with circumpolar jet.

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