

## ***Interactive comment on “Strong modification of stratospheric ozone forcing by cloud and sea ice adjustments” by Y. Xia et al.***

**Anonymous Referee #2**

Received and published: 14 April 2016

Strong modification of stratospheric ozone forcing by cloud and sea ice adjustments  
by Xia, Hu and Huang

The effect of stratospheric ozone recovery on simulated climate is examined using a global climate model (CAM3) coupled to a slab ocean model. In particular, the paper focuses on the result that the radiative forcing due to recovery is expected to warm the near-surface temperature but the simulated temperature change found to be reduced. This is attributed to the response of high clouds and sea-ice.

The paper presents a useful analysis of the response to changes in the stratospheric ozone in the simulations with this particular configuration. I suggest the paper be accepted with minor revisions. Below are comments and suggestions mainly related to the experiment design.

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### Major Comments

1. To examine the effect of sea-ice and clouds on the model response to stratospheric ozone recovery two simulations are performed, the control and one with no sea-ice and clouds that are invisible to radiation (NCNSI). While it may not substantially change the results of the analysis it seems that one would like to make incremental changes to isolate the effects of clouds and of sea-ice. For example, a set of with invisible clouds and a set with no sea-ice or perhaps with sea-ice invisible to radiation.

2. As noted in the Introduction work by McLandress et al, 2012 suggests that stratospheric ozone recovery may lead to surface cooling. Would it be possible to generalize and support the results found with CAM3 and comments made in the text by analyzing historical CMIP5 simulations that only vary ozone? For example, the list of models in Table 2 of Sigmond and Fyfe, 2013.

Sigmond, M. and Fyfe, J. C. The Antarctic Sea Ice Response to the Ozone Hole in Climate Models *Journal of Climate*, 2014, 27, 1336-1342

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Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-175, 2016.

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