

Interactive comment on “Inter-hemispheric asymmetry in the sea-ice response to volcanic forcing simulated by MPI-ESM (COSMOS-Mill)” by D. Zanchettin et al.

Anonymous Referee #1

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This is an interesting paper, and I recommend publication subject to addressing the following concerns and all the comments in the attached annotated manuscript. The main points are:

1. It seems to me that there is no mystery about the Antarctic sea ice response to volcanic eruptions. The response found here is the same asymmetry we now observe in response to global warming. So what is so interesting about the negative of a phenomenon we already understand? I thought there was general agreement in climate model simulations that Arctic sea ice decreasing and the lack thereof for the SH was a robust result of climate models simulating recent global warming, and it has to do with ocean circulation feedbacks in the SH. You would expect the same with forcing in the

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opposite direction. It seems obvious to me. There is a negative feedback in the ocean that explains this and the lack of SH response to global warming. Only if you hit it hard will the radiative forcing overcome the internal stabilizing feedbacks. I think this needs a better discussion in the introduction and framing of the paper.

2. Before any climate model is used, it has to be evaluated. Has the model used in this paper (with this exact configuration) been tested in CMIP3 or CMIP5? How does it compare to other GCMs and how well does it simulate reality? And why was it used? Without this evaluation and discussion, how can we trust and evaluate the results?

Please also note the supplement to this comment:

<http://www.earth-syst-dynam-discuss.net/5/C8/2014/esdd-5-C8-2014-supplement.pdf>

Interactive comment on Earth Syst. Dynam. Discuss., 5, 121, 2014.