

## ***Interactive comment on “A spurious jump in the satellite record: is Antarctic sea ice really expanding?” by I. Eisenman et al.***

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We appreciate this comment.

First, we largely agree with the point raised in this comment that the evidence considered here suggests that a statistically significant positive trend in Antarctic sea ice extent is most likely - see our response to Grant Foster.

Second, the comment raises what appears to be a source of confusion regarding Fig. S5. The rest of this response will address this second point. The comment accurately states that all 6 trends plotted in Fig. S5 are significant when including data until December 2012; indeed, they are all significant above the 90% level even using data only until December 2004 (which is when the V1 dataset that we analyzed ends). One

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may immediately realize that this will likely raise a conflict with the IPCC AR4, where it was found that the Antarctic sea ice was not expanding at a significant rate during 1979-2005 (see Fig. 1B).

The source of this discrepancy is first that the IPCC AR4 authors made a decision to focus on Bootstrap sea ice extent as the measure of sea ice expansion, rather than any of the other quantities plotted in Fig. S5, and second that they decided to use annual-mean rather than monthly-mean data (with error bars representing the 90% regression confidence interval). This may possibly have been justified by the argument that Bootstrap data would generate a more robust long-term trend estimate than NASA Team, ice extent observations would be less vulnerable to systematic errors than ice area, and nuances associated with how best to represent the uncertainty from natural variability. But although one could certainly endeavor to question this choice, it is not the purpose of this paper to judge it. Rather, we aim to explain the change between the trend reported in the AR4 and that reported in the AR5.

This comment brings up that Fig. S5 invited confusion, and we have attempted to clarify this point in the revised manuscript. First, we changed the plotted confidence intervals in Fig. S5 to 68%, 90%, and 99%, echoing error bars used in the IPCC reports and commonly in the literature, rather than 68%, 95%, and 99.7%, which represent standard deviations of a normal distribution. Second, we added a new Fig. S6 with trends from annual data, which allows comparison for example with the IPCC AR4. Third, we added a new Table S1, which lists trends in the datasets using both monthly and annual time series as well as the trends reported in the IPCC reports.

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Interactive comment on The Cryosphere Discuss., 8, 273, 2014.

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