The Cryosphere
Discussions

Interactive comment on "Antarctic sea ice variability and trends, 1979–2010" *by* C. L. Parkinson and D. J. Cavalieri

Anonymous Referee #2

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Journal: TC Title: Antarctic Sea Ice Variability and Trends, 1979-2010 Author(s): C. L. Parkinson and D. J. Cavalieri MS No.: tc-2012-20 MS Type: Research Article

General Comments

This study serves as an update of previous studies published by these authors on Antarctic sea ice variability and trends. The analysis and interpretation are therefore not new, but the update is (thus the scientific quality is rated as 'good'), and as such, this update will be of interest and value to the research community (thus the scientific significance is rated as 'good').

The paper is clearly written, as expected from these authors, so the presentation quality

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is rated as 'good'. However, there are a few specific statements in the Discussion (as detailed below) that may require revising to better clarify these particular points.

In general, the results and discussion are in line with the authors' previous papers on this topic; they are not necessary novel or thought-provoking but of general interest nonetheless.

Specific Comments

p940, lines 13-19, this first paragraph of the Discussion appears to repeat info already given in Intro.

p940, lines 20-26 (and continued on next page), this paragraph discussing sea ice changes within the context of regional warming/cooling should also mention large-scale wind-driven changes that coincide with these regions of warming (more warm northerly winds) and cooling (stronger westerlies that have shifted poleward). Otherwise it sounds like the sea ice response is purely thermodynamic when in contrast, much of the response is due to wind-driven dynamics, that in turn appear to be in response to climate-related changes in the atmospheric circulation.

p941, lines 18-21, why is the importance weakened? First, wasn't the point of that study to investigate why those two region in particular show the strongest sea ice changes? The observation that ENSO/SAM appear to focus strong atmospheric changes in these two regions, and not as much elsewhere, seems highly important...

p942, lines 20-23, The statement, 'are intriguing but not conclusive' is not exactly helpful; worse, it seems to undermine (maybe even belittle) the large body of research on Antarctic sea ice. In general, this ending paragraph seems to suggest that the problem should be simple and linear, when the authors surely know the climate system to be quite complex, such that climate change, or 'global warming', can induce regions of both warming and cooling, with complex nonlinear feedbacks. For example, to say that 'increases in sea ice coverage in the Antarctic are less readily tied to global warming'

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is again not very helpful but may only further perpetuate the idea that 'global warming' should mean that everywhere warms and that polar sea ice everywhere decreases, when in fact the dynamics (e.g, winds) can produce very regionally specific and complex responses. So, yes, the jury's still out on the assessment of circumpolar sea ice changes in the Antarctic, but it's not a question of whether or not the Southern Ocean is affected by global warming, since it most certainly is and perhaps drastically so (e.g., the climate related wind- and thermal-driven ocean circulation changes that are undermining the West Antarctic Ice Sheet), so really the question is not whether Antarctic sea ice is affected by global warming, but how. In short, this is just to suggest that the authors might consider rewording these few statements to avoid misinterpretation or confusion.

Interactive comment on The Cryosphere Discuss., 6, 931, 2012.

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