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The Cryosphere Discussions

Interactive comment on "Variability and changes of Arctic sea ice thickness distribution under different AO/DA states" *by* A. Oikkonen and J. Haapala

Anonymous Referee #3

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R E V I E W of the manuscript (tc-2010-109) entitled ""Variability and changes of Arctic sea ice thickness distribution under different AO/DA states" by A. Oikkonen and J. Haapala

The manuscript presents an analysis of ice thickness distribution based on submarine data. The topic is very important and deserves publication. Particularly interesting and important is the analysis of long-term tendencies in regional ice thickness distribution. My major concerns are related to 1) better positioning of the authors' analysis among the existing publications on the topic and 2) the authors' interpretation of their results based on the notion of AO/DA: I found this piece speculative and not very convincing.

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Based on this, I think the manuscript deserves publication subject to major revision.

Major comments:

1) I have little to add to suggestions provided by another reviewer: the authors should define better what is really new in their analysis using more thorough literature review. 2) I found that the most valuable piece of the authors' analysis is related to evolution in time of regional ice thickness PDFs. Much less convincing is the authors' attempt to interpret these results using AO/DA indices. I suggest re-focusing the manuscript on the major authors' finding (i.e. time evolution of PDFs) leaving relationship between the PDFs and AO/DA aside, as a secondary branch of their analysis. This should be easy to do because the major body of the paper (from page 5, which is the beginning of Section Results through page 12) is not related to AO/DA.

Minor comments:

1. Line 64: this is the first mentioning of open water. It should be discussed earlier, when categories are defined. 2. Page 4, top. Definition of AO years and DA years, including Figure 2, is vey confusing. From this figure it is impossible to deduce whether a certain year is dominated by AO or by DA. This is also true for the two time periods used by the authors in the text. 3. Page 9: References to Rothrock et al. 2003 and Kwok and Rothrock 2009 would be appropriate in Section 4.1. 4. Sections 4.3 and 4.4 look like a speculation. The authors presented no solid proof that changes in PDFs are really related to the factors described in these sections. 5. Figure 1. It would be nice to see time series of PDFs (if possible) and AO/DA indices. 6. Figure 2. Please describe what inhomogeneous colors within each region mean. 7. Figure 6. Please describe categories in figure caption.

Interactive comment on The Cryosphere Discuss., 5, 131, 2011.