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Discussions
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Interactive comment on "Thin-ice dynamics and ice production in the Storfjorden polynya for winter-seasons 2002/2003–2013/2014 using MODIS thermal infrared imagery" *by* A. Preußer et al.

Anonymous Referee #1

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General comments

This paper describes the spatial and temporal characteristics of the Storfjorden polynya over a time period of more than 10 years using thermal infrared satellite imagery. The paper is well written and easy to follow. The method to calculate ice thickness from MODIS is well-known, and already published in other papers. However, the statistical analysis of polynya using MODIS data over such a long time period is valuable and the method could be extended to other regions with frequent polynya openings and respective ice production which are important for the ocean circulation. Therefore, the paper is worth to be published with minor revisions.

Specific comments

P. 5764, L. 11-13. It is not clear to me, if "an increasing frequency" is meant for one freeze-up period or a trend in the 12 years period here.

P. 5765, L. 11. Please add references after "model approaches".

P. 5765, L. 15-21. There are also other regions with frequent polynya openings and active ice production in the Arctic (e.g. Laptev Sea). Why is the Storfjorden region so important that you choose this region for the statistical analysis?

P. 5765, L. 26-29. How do you intend to distinguish the sea ice transported into the Storfjorden area from thermaldynamically induced ice growth? Could this be a factor of uncertainty in your estimates?

P. 5766, L. 24. "IST swath" → "Swath-based IST"

P. 5767, L. 5. Please emphasize here that only nighttime scenes are used in this study.

P. 5767, L. 11. Please add references after "previous studies".

P. 5769, L. 29. The uncertainty of the retrieved TIT caused by neglecting a snow layer should be discussed here.

P. 5772, L. 16. "SD are highest' → "SD is highest"

P. 5772, L. 1. Please define the "relative TIT-distributions".

Section 4 Discussion

Question 1: What could be the potential reason of positive trend in IP in the Storfjorden region during the last 12 winter-seasons? Fig. 8. shows an extremely high IP during the winter season of 2012/2013. Do you have any explanation?

Question 2: Does the coarse resolution of sea ice concentration derived from passive microwave sensors lead to the overestimation of IP in this region? If yes, what is the reason?

Question 3: As you mentioned, MODIS data has a strong limitation due to the cloud coverage. Please discuss in more detail how large is the uncertainty of IP estimate due to the cloud coverage.

Question 4: Only from this paper, I could not conclude that the Storfjorden polynya has special contribution to the overall ice production in the Arctic. Could you give an approximate estimation of the contribution of IP from Storfjorden to the Arctic-wide IP?

Interactive comment on The Cryosphere Discuss., 8, 5763, 2014.