The Cryosphere Discuss., 6, C1357–C1359, 2012
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The Cryosphere Discussions

Interactive comment on "The impact of heterogeneous surface temperatures on the 2-m air temperature over the Arctic Ocean in spring" *by* A. Tetzlaff et al.

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Received and published: 3 September 2012

Major comments:

This paper discusses the role of variability of surface temperature in near surface air temperature by using atmospheric reanalyses and other available satellite data sets. Three backward trajectory methods were applied to confirm above issues. It was found that cumulative sensible heat along trajectories explained a large amount of the observed 2-m air temperature variability at each station. Some sensitivities related to reanalyses and surface data sets were also assessed. The paper was well written, and discussed some uncertainties resulting from data sets and methods. Although

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Interactive Discussion

Discussion Paper

some modification are needed, this paper might be acceptable for the journal after revision.

My concern is that the analysis period is different between Alert/Barrow stations (4 or 6 years) and Tara station (1 year). Although I understand that Tara provided invaluable data, the statistics (variances, biases, RMSE, and frequencies) shown in Figs. 5-10 might be difficult to compare with those from Alert/Barrow stations. Please discuss and mention the limitation in Tara data set.

Minor comments:

P3013 Line 11: It should be noted that ice concentration during summer is worse than winter due to melt ponds (Inoue et al. 2008).

Inoue, J., J. A. Curry, and J. A. Maslanik, 2008: Application of Aerosondes to melt-pond observation over Arctic sea ice, J. Atmos. Ocean. Tech., 25, 327-334.

P3015 line 10: Please specify the height of surface wind in JRA-25. It should be the same height as ERA-Interim 10-m wind; otherwise it is difficult to compare the results. This links to the conclusion part as 'problems of ERA with the wind field in the Central Arctic.' (P3031 line15)

P3022 line 22: Ice concentration in JRA-25 is only used for judgment to allocate an ice-covered or ice-free grid (i.e., 100 % or 0%) by using cut-off threshold of 55% ice concentration. Therefore, leads and polynas do not exist in ice-covered grid in JRA-25. The authors cited Inoue et al. (2011) and should have already known this problems.

P3023 line 17: Please mention the value of correlation coefficient quantitatively.

P3026 line 19: ist largest -> is the largest

P3028 line 2: I can not understand why JRA-25 reproduced the surface wind direction relatively well.

TCD

6, C1357–C1359, 2012

Interactive comment on The Cryosphere Discuss., 6, 3011, 2012.

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6, C1357–C1359, 2012

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