

## ***Interactive comment on “The emergence of surface-based Arctic amplification” by M. C. Serreze et al.***

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This is an excellent paper that makes a compelling case for open water in the late summer and early autumn being a positive feedback to surface air temperature (SAT). 604- Line 17-20 Four potential reasons are given for the substantial sea ice extent reductions. 1) Spring cloud cover change. 2) Wind driven alterations in sea ice circulation and ice age associated with NAO mode. 3) Altered ocean heat transport. 4) Enhanced sea ice sensitivity to greenhouse gas loading. Further the paper focuses on SAT noting that the change has been attributed to increased energy transport into the Arctic as opposed to surface based amplification from open water and GHG. The focus is on demonstrating that the observed temperature anomalies from NCEP reanalysis are consistent with an enhanced warming due to increased open water and enhanced

GHG response, and this is well done. It would be useful to concisely review prior to the discussion section what the temperature anomalies would be if SAT were resulting from either changes in the NAO mode, or increased energy transport into the Arctic. In either the results or discussion section how consistent or inconsistent these other potential SAT determining factors are with the NCEP records needs to be reviewed in one section of text and detailed a bit better.

609 10-20: This contrasts SLP changes to SAT and heat fluxes. This section should be brought together with the following area, in addressing the aforementioned issue.

611-21-25: This task is also partially done here, however, the imprints of atmospheric circulation referred to are not detailed. Further in what respects if any do the observed SAT not fit with atmospheric circulation.

Other comments:

607-09: How are spurious coastal grid cells defined, are there many?

608-22: With respect to the assumed 2 m sea ice thickness it is mentioned that allowing the sea ice thickness to change increases the warming but not by much. Allowing the sea ice to change how, with time, to have a lower mean thickness?

610-21: The negative temperature anomalies from 1983-1992 are during a period of modest sea ice recession. Briefly mention what is the expected cause of the sea ice decline during this interval, modest as it is in comparison to recent years.

612-6- and increases from the lower troposphere to the surface. Seems to be missing what is increasing.

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Interactive comment on The Cryosphere Discuss., 2, 601, 2008.

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