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Discussions

Interactive comment on "Monitoring ice break-up on the Mackenzie River using MODIS data" *by* P. Muhammad et al.

Anonymous Referee #1

Received and published: 10 June 2015

This paper is an interesting and valuable study on the use of MODIS data to explore the spatial and temporal pattern of ice break-up on the Mackenzie River. The paper is well written and the results well presented and discussed.

My major concerns regard the methods:

From section 2.2, I did not fully understand how the authors sampled the river ice coverage along the reach studied. Using visual inspection of the data and manual sampling, or using intersection of the MODIS data with the river outlines and then automatic sampling? At selected points/reaches or the entire river?

The SDS data could have errors, in particular over the mixed pixels over the river, consisting of water, land, ice. The MODIS L3 algorithms might not have been designed

for this type of highly variable ground cover. Some validation study is needed, for instance as part of the method section, to characterize the success and accuracy of the SDS. For instance, classifications from coincident Landsat data could be compared to MODIS SDS.

The use of L1B data became not clear to me ("... were also used.").

How do the authors use MODIS L1B under cloud cover conditions (page 2789, line 12)?

Any idea to what extent the displacement of ice features as measured according to section 2.3 really reflects ice velocities? The apparent velocity of such features (measured manually or automatically?) is not necessary the velocity of ice debris. For instance a feature could be stable even if ice floes pass through it at higher speed by accumulating at the upstream side and release of ice debris at its downstream side.

Fig 7. To the referee, the correlation between air temperature and albedo seems not very obvious. How high is the correlation (e.g. R^2)?

Interactive comment on The Cryosphere Discuss., 9, 2783, 2015.