

Interactive comment on “An explanation for the dark region in the western melt zone of the Greenland ice sheet” by I. G. M. Wientjes and J. Oerlemans

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I concur with the other two reviewers that this paper presents a valuable, detailed study of what has long been a curious feature of the western margin of the GrIS. I actually thought the conclusion of this paper, that the "dark spot" was the outcropping of old, dirty ice was well-established. But, the authors put some hard evidence to what has hitherto been just speculation.

Please cite the sources for your imagery data.

The discussion of the variations in the time series data is very unsatisfying. The 2 main sources of variance hypothesized - satellite position and surface accumulation - can be

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tested. Positioning data is distributed with the L1B metadata and surface accumulation or SMB timeseries does exist from multiple data sources, for example:

Box, J.E., D.H. Bromwich, B.A. Veenhuis, L-S Bai, J.C. Stroeve, J.C. Rogers, K. Steffen, T. Haran, S-H Wang, 2006: Greenland ice sheet surface mass balance variability (1988-2004) from calibrated Polar MM5 output, 2006: Journal of Climate, Vol. 19, No. 12, pp. 2783–2800

Burgess, E.W., R.R. Forster, J.E. Box, L.C. Smith, D.H. Bromwich, 2010: Greenland ice sheet annually-resolved accumulation rates (1958-2007), a spatially calibrated model, Journal of Geophysical Research,

Van den Broeke, M. R., J. Bamber, J. Ettema, E. Rignot, E. Schrama, W. J. van de Berg, E. van Meijgaard, I. Velicogna and B. Wouters, 2009: Partitioning recent Greenland mass loss, Science 326, 984-986.

I suggest testing these hypothesis by comparing your results with the satellite positioning and the SMB variations. If I remember correctly 2002-3 was a high accumulation year, so that would support your conclusion, but this should be referenced.

As pointed out by reviewer 1, it would be nice to see more than one aster image to establish that these waves are temporally and spatially persistent and unique to this region (i.e. as opposed to the "control" region). Clearly the fact that they bend to parallel with flow at Jakobshavn, as pointed out by M. Pelto is due to increased flow rates - this could be discussed.

Interactive comment on The Cryosphere Discuss., 4, 163, 2010.

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