

Interactive
Comment

Interactive comment on “Snow melting bias in microwave mapping of Antarctic snow accumulation” by O. Magand et al.

Anonymous Referee #2

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General

This paper describes the impact of (sparse) melt events on accumulation retrieval from microwave mapping in Antarctica. This is a particularly important topic. To date, no remote sensing technique exists to map absolute accumulation rate from space. That is why microwave-based interpolation of in-situ accumulation observations is used to construct accumulation compilations over the ice sheets. These accumulation compilations may then be used to assess the ice sheet mass balance, by comparing basin-integrated accumulation amounts to the solid ice fluxes from InSAR, for instance.

This paper convincingly shows that irregular melt events destroy the correlation between microwave surface emission and accumulation, leading to systematic underes-

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timates of accumulation in the coastal zones. In these regions, accumulation rates are highest. Given the significant and increasing fraction of the ice sheet that experiences occasional melting, this may lead to a systematic underestimation of basin-integrated and ice sheet-integrated accumulation.

The paper is original and significantly advances our understanding of Antarctic accumulation. It is well written, concise and the figures are of good technical quality. I have some small comments listed below and recommend publication after these have been addressed.

Specific comments

Figure 3 shows that some but not all data that lie outside the 1:1 line have been identified by the melt map. Please comment on possible reasons, e.g. were these points missed by the melt algorithm?

Recently, Antarctic accumulation maps based on regional climate models have been published, showing significantly higher accumulation rates in the coastal regions of Antarctica compared to A06 (e.g. Van de Berg and others, JGR 2006). Is this difference a manifestation of the effect described in this paper? It would be interesting to see how these maps perform in this region, when checked against the new observations. Has any attempt been made at this?

Interactive comment on The Cryosphere Discuss., 2, 255, 2008.

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