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Interactive comment on "Comparing C- and L-band SAR images for sea ice motion estimation" *by* J. Lehtiranta et al.

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We thank Dr. Lang for his time, and effort in giving comments and suggestions about our paper.

1. The structure and grammar of our paper will be improved for the revised manuscript. We have received many useful suggestions from both reviewers. We will follow all suggestions and rethink the structure for the revised manuscript.

2. We agree that no strong conclusions can be drawn based on the limited data set. Our feeling is, however, that the study of large image sets is best handled by a different methodology and left for another publication. For this purpose, we're looking forward to receiving images from the ALOS-2 satellite next winter.

3. The figure sequence is adjusted such that image numbering corresponds to the order they are discussed in the paper.

4. Both the abstract and the conclusion will be expanded with a deeper discussion.

Specific comments:

Image pairs mere hours apart will be useful for our purposes. Ice drift velocities of 20 - 30 cm/s are not uncommon. We use satellite images of 100 meter resolution, thus these velocities cause 7 - 11 pixel displacements during just one hour.

The image window size 16 x 16 pixels was chosen because it is near the smallest feasible sizes to do reliable matching by maximal cross-correlation. We chose a small window to minimize problems from ice deformation and coastlines that introduce discontinuities within image windows. A larger window, say 32 x 32 pixels, might improve the matching, but as we were only interested in the difference between C- and L-band images, the absolute performance of the method wasn't critical.

The "peak margin" was calculated as a ratio of two cross-correlation coefficients, between the two highest cross-correlation peaks found in one cross-correlation. 15 % was chosen as it often seemed to be sufficient for accepting a result. The "regularity" criterion for accepting a motion vector was calculated by subtracting each motion vector from the median-filtered vector at that location. The idea was that if some motion vector differs considerably from the local median drift, it is probably erroneous. The section 2.3 will be rewritten for the revised manuscript to clarify these issues.

Incidence angle correction was not done as it was not deemed necessary for normalized cross-correlation using such a small image window. Speckle noise was not filtered out. A generic filtering would be easily done if deemed necessary. For the best result, filtering should be different for different instruments. These details will be discussed in the revised manuscript.

Page 14 line 15: "in Fig. 14" was a mistake. The reference has been removed, as

it referenced a figure that was removed from the manuscript. Line 18: MCC is now explained at the first appearance of the concept.

Section 4: the cross-correlation coefficients are small, but they suffice for the purposes of this paper. The questions regarding a powerful discussion will be addressed in the revised manuscript.

The other issues not addressed here will be addressed in the revised manuscript.

Interactive comment on The Cryosphere Discuss., 8, 2721, 2014.