The Cryosphere

Discussions

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Interactive comment on "Estimating statistical errors in retrievals of ice velocity and deformation parameters from satellite images and buoy arrays" *by* Wolfgang Dierking et al.

Anonymous Referee #1

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This paper presents a consistent framework for estimating statistical errors of sea ice drift and ice deformation parameters derived from a set of GPS on-ice buoys or from sequential satellite SAR images. Throughout the case studies, the authors carefully examined various sources of errors and their estimates relevant to the both main types of sea ice drift observations. This paper will serve as a good reference for the future studies dealing with deriving kinematic parameters of sea ice and the corresponding statistical errors. The paper is well structured and written. I recommend it to publication, once the following comments are addressed:

In Section 3.4 the authors discuss deformation parameters retrieval for square grid

cells in SAR images. However, many of the recent algorithms for retrieval of ice drift information from SAR images (e.g., Demchev et. al., 2017; Muckenhuber et al., 2016; Komarov and Barber, 2014) compute ice motion on a non-square grid, as usually the grid points are associated with distinctive ice features in SAR images. Could the authors extend their analysis (Section 3.4) from the "square" grid cells to "non-square" grid cells in SAR images? What is the most accurate approach to computing ice deformation parameters and associated errors from the SAR-derived ice velocities provided on non-square grid cells?

Technical corrections:

Line 39-40. I suggest modifying:

"This means that drift and deformation errors do not only depend on the geolocation accuracy of satellite images but also on the reliability and robustness of the drift retrieval algorithm."

to

"This means that drift and deformation errors do not only depend on the geolocation accuracy and spatial resolution of satellite images but also on the reliability and robustness of the drift retrieval algorithm."

Line 76-77. "x" and "y" should not be in bold as they are scalars.

Line 141. "10km" –> "10 km"

Line 457-467. Same as previous. Add spaces between numbers and units.

Equation (31). N should not be in bold.

Line 725. "RADARSAR" –> "RADARSAT"

Interactive comment on The Cryosphere Discuss., https://doi.org/10.5194/tc-2020-8, 2020.