

Interactive comment on “Arctic sea ice cover data from spaceborne SAR by deep learning” by Yi-Ran Wang and Xiao-Ming Li

Anonymous Referee #2

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This paper presents a method U-Net to classify Sentinel-1 SAR data into sea ice and open water (originally 40 m but changed to 400 m due to denoised operation) and validates their results based on lower resolution data (AMSR-2 of 6km and IMS of 1km) and provides the 2019 classification results for people to use. the overall intension of the paper seems good, but I have problem with their logical. First, in remote sensing field, nobody should use lower resolution data/results to validate results from high resolution data. I believe you should use similar or higher resolution images such as Sentinel-2 or other optical image to validate your results. Second, the paper used 251 images for labeling and for developing their methods, but there is no result about how good or bad of these exercises (usually you expect results about training accuracy and testing accuracy); the paper said used 5 classifiers but no mention about of what are

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these five classifiers and which is better or best. The paper indeed mentioned about accuracy but it is about comparing with the entire year of AMSR data or IMS data, not from the labeling data (of 251 images). anyway, this is very confusing and it is misleading. Third, in terms of the five classifiers, the methods 2,3,5 (even 1 and 4), clearly have problems to separate windy water from ice, why you need to stacking them into your method; it also seems all the five methods have kind of problems to do so, but why once you stacking them together would result in a good separation of windy water from ice, overall? It seems questionable. Fourth, beside the windy water problem (confused with sea ice), it is a relatively easy task to classify sea ice and water from SAR images, I do not know why it is a big deal for this paper to develop such complex machine learning method to do so, while the validation of using low resolution data seems useless and illogical in my view. Fifth, the paper reduced the original 40 m pixel to 400 m pixel due to denoising, while the results are not that obvious from the figure 3, except for the HV data, one of the big line (separation) in the left portion of the image is gone. However, it seems very questionable, since, if this big line (separation) can be removed, why other small ones are still there? Sixth, the big problem for classification of sea ice in SAR imagery is the type of sea ice, such as thin ice, thick ice, even melt ponds and open water in summer. I hope their machine learning method would really help to resolve these problems. Seventh, I would think their resulted sea ice concertation dataset of 2019 would be quite good but just do not see why this method would be better than any other regular image classification method.

Figure 4, not sure about which parts in (a) (b) are water or ice. Should label them.

Figure 5, why need to convert dbz to 0-255? Why for HH-HV, HH/HV, need to twice for such conversions?

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