

Interactive comment on “Investigating the Local Scale Influence of Sea Ice on Greenland Surface Melt” by Julienne C. Stroeve et al.

Anonymous Referee #2

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General comments

The study documents a statistical investigation and possible dynamical explanations of the covariance between sea ice concentration and the surface melt of Greenland Ice Sheet. The purpose is to demonstrate the impact of local changes of sea ice around Greenland on the ice sheet surface mass balance. The manuscript is well structured and the conclusions are clear based on the results of the analyses. The topic is interesting and relevant within the scope of The Cryosphere, and thus, with the changes suggested below, it should be acceptable for publication.

Specific comments

L254: you stated that the leading SVD mode explains 62% covariance between SIC

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and GrIS melt water production in June. This number might be misleading if there is only a very small amount of covariance between these two fields. In this case, the ‘normalized squared covariance’ (NSC) should be included as well (see details in Wallace et al., 1993 Journal of Climate).

L262: Figure 3(i) does not show any significant HC values, so it should not be included in this sentence.

L482-492: after you remove the impact of Greenland Blocking, the Baffin Bay SIC influence becomes much smaller. This may be because the overall coupling between the SIC and GrIS surface melt is not significant. Thus, the additional calculation of NSC mentioned above will probably help you to interpret the results.

L543-552: you wanted to show that during the early MO years over the sic ice, the wind is blowing from the open water areas onto the GrIS, but the plots in Figure 12 are exactly the opposite. For example the figures in upper panel, the winds are offshore along the west coast of Greenland in all three cases.

Figure4: can you please tell more details of how you calculated the linear trends? Which method you used to do the significant test? In the legend, you should also specify which confidence level you used.

Figure5: maybe you can indicate the weeks with significant trends on different lines?

Figure6: please specify the confidence level you used. Maybe use ‘a, b and c’ to mark the figures in order to be consistent with other figures? Or, it should be ‘left, middle and right’, but not ‘top, middle and bottom’.

Figure 12: please specify what is the parameter shown with blue and red colors. I guess it’s SIC, and if so, you should give a separated color bar as well. Please make the color bars and the wind vectors bigger and clearer. The readers can hardly see them.

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