

Interactive comment on “Exceptional retreat of Novaya Zemlya’s marine-terminating outlet glaciers between 2000 and 2013” by J. Rachel Carr et al.

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Summary

The authors have presented a record of glacier front positions for glaciers on Novaya Zemlya for the period covering 1975 - 2015. They have compared these changes with changes in air temperature, sea ice concentration, and climatological oscillations, analyzing the results with robust statistical methods. They conclude based on these results that the period 2000-2013 was significantly different for the marine-terminating glaciers, while other terminus types do not show significant changes throughout the time period.

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The methods are well-described, the results well-presented and discussed, and the conclusions appear to be robust. As such, I have only a few minor comments, and I recommend the paper for acceptance pending these few comments.

Specific

line 15: delete “the” before “1973/76”

lines 120-122: These sentences are a little confusing to me. Consider emphasizing that these three glaciers were previously unknown to surge, if that is the case.

lines 131-132: What about orthorectification? It should not be much of a problem for tidewater glaciers, but land-based glacier termini significantly above sea level could be misplaced if the images are not orthorectified.

lines 179-181: How good an approximation is this to conditions near the glaciers?

line 309, elsewhere: I think there should be commas between R2 and p values.

line 316: If RHO is an acronym, it should be defined. If it is the Greek letter rho, use ρ instead.

line 432: 18 years is an incredibly long time for an active phase!

line 503: linear relationship with latitude

line 643: Check the names here. It looks like MAS advances for 18 years (cf. also l. 432), SER advances for 15 years, and ANU begins surging in 2008.

line 651: Specify that the three glaciers you reference here are MAS, SER, and ANU, and not Tunabreen, Basin 3, and Variegated Glacier.

lines 659,663: I think you mean Fig. 10, and not Fig. 9. The large sediment plume is rather hard to see in Fig. 10c - you might consider enhancing this somehow. You could also make these into a separate figure, and include other images, say from 1985 and 1995, if they are available.

Figure 5: Fix the y-axis tick labels, as they should not go from 2 to -4 to 2 to -4 km.

Figure 10a: Relative frontal position in m, not km.

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