The Cryosphere

Discussions

Open Access

EGU

Interactive comment on "How much should we believe correlations between Arctic cyclones and sea ice extent?" *by* Jamie G. L. Rae e al.

Jamie G. L. Rae e al.

jamie.rae@metoffice.gov.uk

Received and published: 7 November 2017

We thank the reviewer for his/her comments, and give our responses in blue text below.

This paper investigates correlative relationships between Arctic cyclones and September sea ice extent using two different cyclone tracking variables from three different sources (output from two climate model runs and from one reanalysis dataset) . The results show that different tracking variables, model resolution and space/time comparisons can show contrasting cyclone/ice relationships, thereby emphasizing that caution is required when analyzing and interpreting such comparisons (e.g., as previously presented in the literature). This caution is noteworthy and helpful. Thus, this paper is

deemed appropriate for TC after considering a few minor suggested revisions as listed below.

P2, L9, Suggest changing 'main ice pack' to 'main pack ice'.

- Changed.

P3, L3, Consider starting a new paragraph here.

- Done.

P3, L12, Consider rephrasing the following: 'aim of studying correlations between cyclones and Arctic sea ice extent' given Reviewer 1's comment. In other words, specifically state the overall aim of this paper, which is to show how correlations (between cyclones and sea ice extent) depend on sea ice extent, tracking variable, model resolution, and time/space windows used to make the comparison (i.e., what is then stated further down on L15-16).

- We have changed this, so that it now reads: "aim of investigating the dependence of cyclone-ice correlations on spatial resolution, tracking variable, and spatial and temporal sampling".

P5, after L4, Consider adding another short paragraph here describing the statistics used to test differences and compute correlations.

- We have now added such a paragraph, in new a section (Section 2.4).

P5, L15, Since the first reference to a figure is here, consider moving Fig 5 to Fig 1 and adjust the others accordingly.

- Figs 1 to 4 are actually mentioned in the previous sentence ("...track densities and mean intensities (Figs. 1 to 4), as well as the frequency distributions..."), so the figures are already in the correct order.

P5, L30-31, This seems like a general statement summarizing all model/reanalysis comparisons, but then it differs from the last two statements in that paragraph. Reword the first statement to clearly distinguish it from the other points being made (and/or create a table listing these results).

- We agree that the description of the results of the Kolmogorov-Smirnov test in the original paper was confusing. We have therefore included a table summarising the results, as suggested by the reviewer, and re-worded the text to try to make it clearer. We have also simplified the discussion by removing the distinction between the 95%, 99% and 99.9% confidence levels, and now simply state whether the frequency distributions can be said to be different with at least 95% confidence.

P6, L14, Consider starting new paragraph here.

- Done.

P8, L4, fix typo: 'thesefindings'

- Corrected.

Figs 1-4, it would be helpful and of interest to see the difference maps between GC2-N96 and GC2-N216. (This would also be helpful for interpreting the contrasting results between the 2 model runs as presented in Fig 7.)

C3

- We have added an extra panel in each of Figs 1-4, and updated the captions accordingly. We have also taken this opportunity to select more-appropriate ranges for the colour scales on the difference plots in those figures. We have added a couple of sentences in Section 3.1 describing what is seen in the new difference maps. Also, because the new maps show GC2-N216 minus GC2-N96, rather than GC2-N96 minus GC2-N216, we have changed the sentence "The track densities and mean intensities in GC2-N96 are significantly lower than those in GC2-N216..." in Section 4.2 to "The track densities and mean intensities in GC2-N216 are significantly higher than those in GC2-N96...".