

## ***Interactive comment on “Sea Ice Drift and Arch Formation in the Robeson Channel Using Daily Coverage of Sentinel-1 SAR Data During the 2016–2017 Freezing Season” by Mohammed E. Shokr et al.***

**Anonymous Referee #2**

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This study investigates the formation structure of the ice arch at the north end of Nares Strait and sea ice floe drift characteristics in Robeson Channel using a time series of sequential S1 A/B SAR images. While the presentation quality of the figures is generally quite good, I find that the analysis is mostly descriptive and qualitative and as such only really documents some observations and prepares some statistics as opposed to generating any new scientific information on the processes and their relative importance/contribution in comparison to previous studies or the larger sea ice environment of the region. I also strongly agree with Reviewer#1 in that the tidal influence on ice

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floe movement is largely ignored, thus generating considerable uncertainty in the relative contribution of the other factors cited as being significant (ie. wind speed, ocean current estimates, ice consolidation/concentration, etc). I also found the manuscript to be overly long with perhaps 3-5 too many figures. Multiple grammatical issues (listed below) made for an onerous read. While the research is likely publishable somewhere, I feel that the manuscript might be better suited for another journal, perhaps Remote Sensing, since it largely fails to generate any new process understanding.

### **Minor Comments**

L5 – ‘Meteorological’ is spelled incorrectly

L29 – You say RC is about 80km in length, but your scale bar and associated ‘box’ indicating RC in Fig 1 suggests that RC is more on the order of 150 km long. Either the ‘box’ in Fig 1 must be shortened or adjust the length in the text (L29).

L31 – “... that increased ...”

L34 – fluctuation of 0.43? ... what does fluctuation mean? Standard deviation? Range? Pls use statistical terminology

L35 – instead of ‘structure in south of RC depended on the existing of landfast ice’ .. how about ‘structure south of RC depended on the presence of landfast ice’?

L40 – instead of ‘crossing the RC’ .. how about ‘transiting RC’?

L44 – leading? ... how about ‘caused’?

L46 – ocean currents

L47 – reduces

L48 – what do you mean by ‘based on’? .. it is not clear what point you are trying to make here regarding spatial and temporal scales. Do you mean ‘is assessed at a variety’ of spatial and temporal scales?

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L53 – it is unclear what ‘redistribution’ means here. Do you mean the floes collide, fracture and then produce a smaller floe size distribution? ... or they drift and redistribute (causing re-orientation) themselves spatially? Pls clarify.

L59 - there is a period where I think you meant a comma

L74 - Begin the sentence with ‘In this study, ...’

L75 – ‘The study includes a detailed ...’

L78 – How about saying ‘process mechanisms’ instead of ‘features’ .. since ice drift is not really a “feature”.

L82 – Its unclear where ‘10 days’ comes from? Why not just say ‘development until maturity’ ... and save the ‘10 days’ for either the Results or Discussion section.

L109 – this phrasing is odd ... how about “This location is reasonably close in proximity and thus is the best available automated weather station to characterise the wind general wind field at a temporal resolution of one hour”.

L137 – ‘Sample maps’ ? ... do you mean ‘Simple maps’?

L145 – “... into a polynya-like ...”

L182 – is it not possible to find any other study to support the observation that large-scale motion of the pack ice .. other than an Arctic Council, 2001 report?

L188 – not why you are starting now to write out large numbers (ie. thirty-nine). Pls stay consistent here.

L200 Figure 4 caption – ‘slow motion upstream of the channel’

L204 – “Upstream of the RC ... “

L210 – “The situation is difference for the floes that drifted within ...” Figure 5 caption ... do not say ‘floated’ .. say ‘drifted’ instead.

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L251 – “Ocean current is remarkably weak ...” .. or “Ocean currents are remarkably weak” .. your choice.

Table 2 caption – “... two successive daily Sentinel-1 SAR images” ... also, there is no space in Floe#2 in table ... that is there in Floe #3

L479 – “In two occasions, ...”

L512 – how about use the word concave ... instead of dome shape

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Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2020-44>, 2020.

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