

## ***Interactive comment on “Spatio-temporal variations in High-Salinity Shelf Water production in Terra Nova Bay polynya, Antarctica” by Seung-Tae Yoon et al.***

### **Anonymous Referee #3**

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The authors present three years of mooring data 2015-2017 and four years of hydrographic data from the Terra Nova Bay and use the data to discuss the temporal and spatial variability in HSSW-formation. They find that the salinity of the HSSW has increased during the investigation period and suggest that the increase is caused by stronger winds and increased polynya activity. I completely agree with the comments made by Anonymous Referee #1 – the data are interesting and deserves publication, but the presentation and the analysis needs to be (much) improved. The language is often unclear and mis-leading; I recognize that the first author is a non-native English speaker, but there appears to be native English speaker in the author list who ought to have read/corrected the article prior to submission. I will not repeat the critic/points

made by reviewer #1, but add a few points.

General comments - New findings and old results are often mixed, and it is often unclear what is what. - Discussions of what could or should be done, should be omitted - or at least kept to a minimum and placed in the end of the article.

L. 140 Why not give salinity increase in psu/month or the increase over the period? (a number that the reader can immediately relate to?) L 154-159 Can the absence of TISW in the first two surveys be explained by differences in the spatial distribution of the CTD-stations? There appears to be no stations close to the ice shelves those years? L209 Ekman currents? L 244 Cyclic argument  $\hat{A}$  L. 247 210 events? This is not supported by Fig 10. L 250 three years? L 317 For a reader not familiar with the region it would have helped to see some of these CTD-sections! L 320 Do you expect the summer-time LADCP data to show seasonality? L 324 Here and elsewhere – you need to somehow distinguish between HSSW formed locally and HSSW that's being advected L. 329 – 334 Unclear where these numbers come from and how appropriate they are L 348 What/ how did you correlate here? L. 367 as far as I understand, (A) you don't investigate the area near NIS and (B) mixing is not what cause the increase in salinity L 379 not an absolute salinity?

Fig 1: Include bathymetry under DIT, currents from D? Fig2: indicate bottom depth - or put information in a table? Fig 3: Include Freezing line at surface, more than one isopycnal Fig 4: Air temperature is not discussed in the paper? Fig 5: The same data are shown in Fig 8 Fig 7: Show surface freezing point rather than -1.95C. How come data from 2016 is warmer?? Fig 8: Why don't you show density difference between 75 & 660 m to make your point that the HSSW at the bottom isn't formed locally? Fig 9: Data shown again in Fig 10? Fig 10: In the text you state that there are 210 events of catabatic winds - this is not supported by fig. 10c Fig 11: Include mean velocity from moorings for the summer period. Include some measure of uncertainty/variability. How strong are the tides and how good is the tidal model?

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