The Cryosphere Discussions

The Cryosphere Discuss., referee comment RC2
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Comment on tc-2020-324

Anonymous Referee #2

Referee comment on "Multiscale variations in Arctic sea ice motion and links to atmospheric and oceanic conditions" by Dongyang Fu et al., The Cryosphere Discuss., https://doi.org/10.5194/tc-2020-324-RC2, 2021

This study investigates the Arctic sea ice motion variations in multi temporal scales. EOF anlaysis is conducted to obtian the temporalspatil changes of Arctic sea ice drfit. Moreover the connection between these variations and atmospheric and oceanic factors are examined. This is interesting. Different factors may play a role on different time scales of Arctic ice drift changes. I recommond a moderate revsion before the publication of this study on TC. To be noted, the writing of this manuscript should be revised by native counterparts carefully, since lots of grammar or expressions are uncommon and weired.The writing is hard to be understood.

Major comments:

- The correlaiton is estimated to assess the linkage of sea ice drift to atmosphere and ocean dynamics. As we all know, correlation does not necessarily means a causal relationship. How would you expalin the validity of just using the corrlation.
- A discussion about the relationship between Arctic sea ice drift and large-scale atmosphere circulation, such as Arctic Oscillation, North Atlantic Oscillation should be given.

3 The discussion shoud be reivsed and clearly illustrate the main finding of this study. The current version is not easy to follow by the readers.

Minor comments:

L1 ‘global material balance’ -> global ice mass balance And the Abstract should be revised

for a clear expression of the key points of this study

L23 ‘global material balance’ -> global ice mass balance

L41 the formate of the citation of the reference is incorrect.

L42-45 The sentence is lengthy and should be revised. For example: The Arctic Ocean system is characterized by a unique anticyclonic circulation pattern associated with atmospheirc and oceanic forcing. These forcing are related to the climate change of Arctic and beyond.

L55 ‘possess’ -> ‘shows’ or ‘exerts’

L56 ‘over the 25-year period’ which period ?

L57 ‘ its patterns’ -> ‘temproalspatial patterns’

L58 ‘whereas it overall influences the ...’ -> ‘Moreover, ice drift infleunces...’

L60 ‘multiscale variation’-> multiscale temporal variations’

L60 ‘the determining factors of the ...’ As I have suggested, the correlaiton obtained in this study does not means a causual relationship, and this stence should be rewritten.

L63 ‘ aims to understand..’ -> ‘aim to outline...’

L67 ‘exceeds’ -> ‘dominates over...’

L68-69 ‘The resuls can provide...’ this sentence is unnesscessary.

Figure 1. Caption. ‘the colors ...’ Normally, it should be ‘the shading...’

L75 ‘by combining...’ -> ‘ by combining the data observed from...’

L79 ‘Physical environmental factors...’ -> ‘geophysical variables’. Some similar usgae should be revised throughout the paper.

L83. SIC data should be correcely referenced.

L111 ‘makes...’ -> ‘with..’

L114 ‘solving the problem of pattern confusion’ -> ‘reducing the uncertainty due to confusion’

L119 ‘confidence line’ -> ‘confidence level’

L121 ‘ contains a true signal’-> ‘includes useful signal’

L130 remove ‘safely’

L132 ‘considered’ -> ‘considered as...’

Figure 3. caption. ‘colors’ -> ‘shading’. This kind of woring error should be revised throughout the paper.

‘the arrows represent the direction and magnitude of ice drift.’

L143 explain why divide the Arctic annual to winter and summer for the period of May-Oct and Nov-Apr, respectively.

- ‘the main form’-> ‘the main pattern’
- L147-148. the sentence should be revised by native English counterparts.
- L154 shold be ‘the sea ice motion and its zonal and meridional components are available for the peirod from 1979 to 2018.
- Figure 4 caption. ‘sea ice drfit velocity’is a weird usage. You should say ‘ sea ice motion or sea ice drift’ is enough. ‘red filled vaules’ ‘blud filled values’ why just say ‘red shading’ or ‘bule shading’
- Figure 4 caption. The significance tests was carried out by using...
- ‘which could have a detrimental effect on ...’-> which is associated with a reuced data quality.
- L186 ‘periods’-> ‘a 30-day period’
- L190 ‘this phenomenon’ -> ‘ this pattern of ice drift’
- L190 ‘’-> ‘manifests itself as..
- L193 ‘cyclonic circulation weak anticyclonic circulation’ I don’t get the idea you want to tell

L201. ‘three pattern’s variation...’ -> ‘the variations of the patterns of Arctic sea ice drift retrived by applying the EOF analysis for the period ...’

L209 should be ‘ we explored the relationship between the sea ice drift pattern and atmospheric and oceanic forcing on different temporal scales.

TABLE 1 the middle column ‘PC2’ , and the third column should be ‘ PC3’

L239. ‘For the trend variation...’ should be removed.

L256 the reference is used incorrectly.

Table 2. You mentioned in the text that the correlaiton exceeding 0.6 is marked by sterisk, while it is not always. Please check out.Besdies, the mark is not star.

L285 ‘apperaed to be the strongest in around 2013 and 2017’

Table 3 the first column should be ‘PC2 IMF’. Also is the Table 4, where it should be ‘PC3 IMF’.

L298. ‘the chang curve of ....’ just the ‘temporal curve...’

L 303 DON’T use ‘ makes...have...’ this kind of use is so weird in a scentific report. You can use altenative expression in other a lot of ways. For instance, ‘allows a significant sea ice motiont’. Why adopt a compplexe and ambiguous expression to describe such a simple idea. I hope this kind of problem should be fixed throughout the manuscript in the revision.

L317-319 Rewritten the sentence to express your idea simply and correctly.

L352. ‘Generally....’ this scentence is a well-knwon information and not your conclusion.