Ocean Sci. Discuss., 6, C400–C407, 2009
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Ocean Science Discussions

Interactive comment on "Variability of scaling time series in the sea ice drift dynamics in the Arctic Ocean" *by* A. Chmel et al.

Anonymous Referee #3

Received and published: 25 August 2009

Dear Author,

Your manuscript "Variability of scaling time series in the sea ice drift dynamics in the Arctic Ocean" certainly merits publication. The presented data are very exciting and clearly allow to demonstrate the suitability of the presented method to characterize timing of sea ice drift behavior. The interesting study is presented in a very clear, concise form supported by good, helpful plots; the language could be improved in some parts. The classification of sea ice small scale motion depending on the type of forcing and dominant factor in the momentum balance is new and promising in the demonstrated case. A question remains: Can this classification be found with an automated detection routine and can it be applied to greater data sets, such as the IABP?

Before suggesting minor changes to text and figures I'd like to address a possible

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Discussion Paper

problem with your choice of journal. The EGU supports various kinds of journals. Ocean Science focuses on - Ocean Physics (i.e. ocean structure, circulation, tides and internal waves);

- Ocean Chemistry;

- Biological Oceanography;

- Air-Sea Interactions;

- Ocean Models, physical, chemical and biological and biochemical;

- Coastal and shelf edge processes;

- Paleooceanography.

(Source: Ocean Science home page)

The Cryosphere, another EGU journal similar to Ocean Science covers the following topics: - ice sheets and glaciers;

- planetary ice bodies;

- permafrost, river and lake ice;

- seasonal snow cover;

- sea ice; «<==========

- remote sensing, numerical modelling, in-situ and laboratory studies of the above and including studies of the interaction of the cryosphere with the rest of the climate system.

(Source: The Cryosphere home page)

Therefore, I wonder whether your manuscript,which entirely focuses on sea ice, would find a better community of readers in The Cryosphere. This is also the reason why I rated the scientific significance “fair” instead of “good”. Please think about this.Probably there is a possibility to simply shift a positively reviewed paper from one EGU journal

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to the other in order to match focus groups.

Now for some suggestions on text and figures: (P=page,L=line)

Title:

shorten the title to “Variability of scaling time series in Arctic sea ice drift dynamics”

Abstract:

P 1596

- L1: start with “The motion ...”, not “A motion...”

- L12: define time interval t and erase parentheses, i.e. write “The distribution function N(t>tau), where N is the number ... by the time interval t that exceeds tau, constructed . . .

Introduction:

P 1596

- L22: erase “the” after “dynamics of”

- L25: erase “the” after “distributions of”

- L25: change “the power law” to “a power law”

P 1597

- L1: Please give proof/citation for this sentence, which begins P1596,L24

- L2: Erase “the” after “invariance of”. Actually, rewrite the whole sentence, for instance “We can compare this behavior of sea ice to the filed of seismology, where the temporal invariance of geophysical processes is ...”

- L5: Rewrite sentence: “Studying of the correlation of time events that take place within the ASIC, where sea ice floes have a high similarity to tectonic formations, allows ...”

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- L18: replace “on the” with “of” and “mobility” with “motion”

- L19: replace “communication” with “study”

- L21: replace “paid for” with “paid to” and “outer” with “external”

- L22: replace “sheets” with “floes” (this holds for the entire document). Ice sheets denote big land ice masses!

- L24: remove “the” after “govern”

- L27: decide for either “by wind forcing” or “by the wind”

P1598

- L1: rewrite to “..., by ocean currents, in particular tidal currents, which transform, ...”

- L2: begin sentence with “Interactions of all ...”

- L3: replace “sheets” with “floes”

- L5: use “transmitter” instead of “transducer” (check entire document!)

- L6: replace “established and actuated simultaneously” with “placed on the same ice floe at the same time at a distance of ...”

- L8: change “a minute” to “one minute” and “when using the” to “of the”

- L8/9: replace “was characterized by the twice distance root mean square (2DRMS) value” with”is given by the Twice the Distance Root Mean Squared (2DRMS) error”

- L9/10: rewrite sentence to “The 2DRMS error refers to a horizontal distance that gives the radius of a circle/ellipse, which is centered on the true position and within which 95% of all observed positions are located. The elongation of the ellipse is a measure for the quality of the position solutions derived by the GPS instrument.”

- L12: change “point” to “points”. What does “supposed” mean here? Do you mean”assumed”?

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- L15/16: rewrite to “In the following, we will denote the GPS transmitters as “master” and “slave” referring to their respective operational setting.”

- L17/18: rewrite to”Figure 1 shows the positions measured with the slave transmitter in orthogonal coordinates centered at the position of the master transmitter and the respective 2DRMS ellipse.”

P1599

- L18: correct as in the Abstract: “... obtain the distribution function N(t>tau). Here, N is the number . . . by the time interval t that exceeds tau.”

Results

P1599

- L21: replace “velocity” with “drift speed” and delete “in the period of time”. Please, use velocity only when you refer to direction AND magnitude. Use speed when talking about the absolute value of the velocity vector only. Check entire document.

- L24: replace “on” with “of”

P1600

- L7: change “sheets” to “floes” and begin new paragraph before “Second, ...”

- L10: rewrite “... could expect for sea ice floes, which are only weakly attached to each other.”

- L12: your assumption is also supported by the two strong wind events on March 6 and 9 (figure 3b). Insert such a remark here and continue with “This assumption was confirmed by...”

- L14: “... reveals a highly fragmented ...”

- L17-20: rewrite five times similar to “... (A) from 16 to 20 February: “stationary” wind driven drift; (B) 21 to 23 February: highly excited ...” Don’t put your important

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classification in parentheses!

- L20: “... a cycle of sea ice fragmentation;...”

- L23: “N(t>tau)”

P1601

- L3: “... in window E (white squares in Figure 5b).”

- L5: change “scale” to “scales”

- L6: delete “the” after “fractal” and after “that is in”

- L7: change “interacting” to “interaction”

- L9/10: delete “Really, once can see that”, just begin sentence with “The largest absolute value ...”

- L10/11: delete”that is”

- L18: delete “the” after “motion of” and replace “formations” with “floes”

- L19/20 rewrite end of sentence: ”... in terms of the classification by Overland et al. (1995).”

P1602

- L3: replace “field” by “floe”

- L4: add “, the floe filed,” after “its environment”

- L6: replace”pieces” with “floes”

- L8: change “of a number of” to “in a number of”

- L11: replace “obtained” with “ concluded”

- L12: change “depends” to “depend”

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- L13: add “the” after “the smaller”

- L14: change “covers” to “cover”

- L16: add “the” before “conservative properties” and “is” after “lesser pronounced”

- L17: change “as-free” to “free”

Conclusions

P1602

- L20: what do you mean by “(as defined)”? Clarify!

- L25: change “becomes” to “become” and “non-scaling” to “non-scalable” or write “... the waiting-time statistics are no longer following a scale because ...”

Figures

- Fig. 1: increase line thickness of the normal approximation in the histogram plots plot, it’s very hard to see

- Fig.2: add the sampling interval, which is 1 minute I presume, to the caption. In the y-axis label it should read “min” instead of “mibn” and the stnd.err. Should have unit m/min

- Fig.3: replace “velocity” with “speed” in caption and y-labels and switch (a) and (b) reference in caption (a is sea ice, b wind). Furthermore, please mark the time intervals A, B, C, D and E mentioned in the main text for better orientation by for instance vertical gray lines or an additional time line above or below both panels.

- Fig.4: Please give the spatial resolution of the images, probably add a legend/distance bar to the images. Probably show a smaller fraction of the image or an image with higher resolution highlighting the NP35 region because I think the left image shows already a strong fragmentation of the ice cover west and south of the camp. This makes me feel little uncomfortable to accept these images as proof for your theory.

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Unfortunately the area north of the camp in the left, first image is cloud covered and one cannot clearly see if there are many leads or not. However, this would be important as fractures continue north of the camp in the second image. Also, a map plot with sea ice drift vectors derived from satellite data (NSIDC or CERSAT product) could add to the understanding of the general picture, at least add the drift vector for the camp site based on your observations.

- Fig.5: explain white squares in panel b in the caption

Interactive comment on Ocean Sci. Discuss., 6, 1595, 2009.