**Biogeosciences
Discussions**

Interactive comment on "Detection of wetland dynamics with ENVISAT ASAR in support of methane modelling at high latitudes" *by* A. Bartsch et al.

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We would like to thank the reviewer for the very useful comments. Below we provide a reply to all general comments and technical comments which do not relate to grammer or spelling. The latter suggestions will be followed and the paper carefully revised for language.

Reply to general comments

- length of model explanation:
We agree that the model parameterization was explained in too much detail. We will

reduce it to a few sentences and refer to the publication of Gedney et al. for details

- prospects of large scale application
Large scale applications would require the use of additional datasets for a complete description of dynamics. C-Band SAR could be used in combination with coarse resolution products which do not differentiate between flooded vegetation or open water. Our suggestion for the extension of the conclusion is: 'Coarse scale products (such as Prigent et al. 2007) do not distinguish between flooded vegetation or open water. C-band SAR data can be utilized to separate these inundation types. This suggests that in future the combined use of such complementary data types might offer the best characterisation of wetlands and inundation. Parameters such as wetland structure (e.g. fragmentation, tundra pond density, Bartsch et al. 2008), which are of interest for ecological applications are also retrievable.'

- relevance of scale mismatch
We agree with the reviewer. The following sentence could be added to the discussion: 'These measurements could however indicate possible biases from under/overestimation of the wetland extent.'

- use of other ASAR swaths?
The data availability in 'normal' (other) swath is much worse then for wide swath. Complementary in terms of coverage would be 'global mode' with 1km resolution. This is however too coarse for tundra ponds.

- data not collocated with SAR data (also related to technical comment 8250, line 26)
In order to collocate with WMO data additional data at the site of a meteorological station has been processed. This unclear explanation probably led to the misunder-

standing. The text could be rephrased as follows: ... data have been additionally processed for the corresponding 0.5 degree cell outside of the bounding box of the actual study area.

Reply to technical comments

- abstract - why ten day intervals
10 intervals are frequently used for regional to global products, specifically the latest version of the wetland product by Prigent et al. 2007. A comparative study is planned at a later step. The sentence may be rephrased:
Old: a minimum update interval of 10 days is suggested for the Northern Eurasian test case. New: update intervals of 10 days could be achieved for the Northern Eurasian test case

- 8247, line 22 - Why?
Oversampling needs to be avoided to reduce storage needs. Therefore all data are geocoded to a polar stereographic projection.

- 8248, line 19 - a reference could help
The reference at the beginning of the sentence applies, for better understanding is could be moved to the end of the sentence.

- 8248, line 24: "within 3 sigma" means "between 0 and 3 sigma". I cannot imagine that this is what is meant.
Thanks for pointing this out. The subscript dm (labels this as standard deviation) was missing.

- 8249, line 21: Does this assume that all cells get inundated at least once?
No. It refers to the backscatter distribution within the final model cell and not the pixel.

- 8250, line 7: how do you distinguish ice from water?
with the current approach we don't. That's also later pointed out in the discussion.

- 8250, line 20: if there is no bimodal distribution, then how do you know that the inundation fraction is > 5 percent
We assume that in this environment very low backscatter only occurs in case of smooth water (all other reasons for low backscatter are excluded as explained in the methods part). In case that there are only very few water bodies, there is still a 'tail' in the histogram but no distinctive peak.

- 8250, line 20: It is unclear how these numbers (20-30 scenes) related to the previous sentence .
we aggree, it should be a new paragraph

- 8250, line 26: "the covering 0.5 degree cell?" I did not understand this sentence.
In order to collocate with WMO data, additional data at the site of a station has been processed. This unclear explanation probably also led to the misunderstanding in the last point of the general comments.

- 8251, line 3: "times with drop" What is meant here?
times with decrease in water fraction

- 8251, line 22: how can you conclude that the weather impact is significant on the

basis of no data?
See comment on misunderstanding in '8250, line 26'

- Figure 5: seasonal change between which dates (I mean what minus what
Thanks for pointing this out, it should be July instead of September in the caption. It is
July – August as written in the figure

- Figure 9: "10 day" instead of "decadal" (a decade is 10 years). I don't understand
what is shown here. It says ">10It refers to the overall maximum. If it is never reaching
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