Summary of Comments on Puglini et al bg-2019-264-manuscript-version1.pdf

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Author: VolkerB Subject: Comment on Text Date: 8/31/2019 2:56:19 PM

This is a crude overgeneralization. The authors must provide more references on the physical oceanography of the Laptev Sea and its sediment distribution and bathymetry to justify this comparison. The Norwegian setting has much higher primary productivity, is up to 8 times deeper and has substantially less ice cover over the year. If anything, the Vesterålen site shares very few similarities with the Laptev Sea or the East Siberian Shelf Sea.

Author: VolkerB Subject: Comment on Text Date: 8/31/2019 3:22:22 PM
please correct, not for methane

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Author: VolkerB Subject: Comment on Text Date: 8/31/2019 3:35:13 PM

It is not correct to make reference to the ESAS, since the range of the environmental conditions applied here is sufficiently broad to be applied to a wide range of shelf and slope margin settings with possible AOM. One condition worthwhile exploring and not done here is whether at low OM reactivities, the consumption of sulfate may not be completed for the time span of Holocene sediment accumulation on the ESAS (i.e., since ca 7000 years ago).

Author: VolkerB Subject: Comment on Text Date: 8/31/2019 9:05:19 PM

Please correct to : 'to the SWI'

The model does not provide any constraint on the SWI flux, i.e., the benthic flux itself, because here other processes play an important that are modelled here.

Author: VolkerB Subject: Comment on Text Date: 8/31/2019 9:42:52 PM

Referencing this study to other studies that show a range of 5 orders of magnitude in methane fluxes to justify its applicability seems odd. Please clarify how exactly each of the referenced studies supports the model findings in your simulations.

Author: VolkerB Subject: Comment on Text Date: 8/31/2019 9:23:47 PM

which value was that? Not clear from the text. Apart from that, I deeply object to the use of one value to the whole of the ESAS. What is the purpose of this upscaled value? The original model value desn't gain any more legitimacy from upscaling and the fact that the upscaled value may be in the range of expected values neither. Please delete this section.

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Author: VolkerB Subject: Comment on Text Date: 8/31/2019 9:28:45 PM

This is an interesting conclusion. How can one reconcile the observation that methane concentrations in the methanogenic zone generally tend to increase with depth, i.e., their transport away from the zone of formation is too slow relative to the methanogenesis rate?

Author: VolkerB Subject: Comment on Text Date: 8/31/2019 8:49:59 PM

This is a curious assertion for the Siberian shelf system. It is wellknown that the sediments of the Siberian shelf are not reactive enough to yield significant methane. It is instead supposed that externally introduced methane from the thawing permafrost that serves as the methane source. The current model does not take external sources into account and this is the major flaw of this paper. It is actually not suited in the current version to model the processes on the Siberian shelf.

Author: VolkerB Subject: Comment on Text Date: 8/31/2019 9:56:14 PM

This introduction paragraph is rather wordy and doesn't say much. Can it be shortened?

Author: VolkerB Subject: Comment on Text Date: 8/31/2019 9:02:52 PM

Please provide a reference to the 'traditional views'. The view proposed here is not new.

Author: VolkerB Subject: Comment on Text Date: 8/31/2019 10:13:04 PM
what is meant by 'margin'?

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Author: VolkerB Subject: Comment on Text Date: 9/18/2019 12:23:03 PM
The authors should avoid trivial sentences such as this one.

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Author: VolkerB Subject: Comment on Text Date: 9/18/2019 12:28:24 PM
I wonder whether the reactivity of organic matter in large parts of the SIberierian Shelf isn't even lower than 100 years. More 1000 years.

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Author: VolkerB Subject: Comment on Text Date: 9/18/2019 5:09:58 PM
The authors are conflating to independent processes into one.

Author: VolkerB Subject: Comment on Text Date: 9/18/2019 5:19:26 PM
These calculated actuve and passive fluxes are so low that they are empirically not verifiable with currently available measurement techniques.

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Author: VolkerB Subject: Comment on Text Date: 9/18/2019 5:26:11 PM

The question is more, whether biogenic methane ever forms in these sediments, as the authors likeöly overestimate the reactivity of the organic matter. Altogether I think that the authors arrive at the right conclusion for the wrong reasons.

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Author: VolkerB Subject: Comment on Text Date: 9/19/2019 9:50:28 AM

From this section on the manuscript becomes distinctly less well written, more typographic errors and less succinct writing. At the same time, the discussion of transient conditions is most relevant to the Siberian shelf system. This section needs to be carefully revised and improved in its writing.

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Author: VolkerB Subject: Comment on Text Date: 9/19/2019 10:31:44 AM

A better way of explaining the discrepancy between the two methane fluxes at steady state and the transient condition would be to show the AOM rate for the two rate laws.

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Author: VolkerB Subject: Comment on Text Date: 9/19/2019 10:34:45 AM
This is hard to understand. It should be possible to extract the instantaneous apparent kAOM value throughout the simulation. Ultimately of relevance is not what the kAOM is at the end of the simulation, but its time-integrated AOM rate throughout the modelled transient run.

Author: VolkerB Subject: Comment on Text Date: 9/19/2019 10:09:29 AM
Improve English. What do you mean here?

Author: VolkerB Subject: Comment on Text Date: 9/19/2019 10:11:39 AM
Poor English makes this paragraph hard to understand, most importantly it is not clear how the authors arrive at their conclusion with this argument.

Author: VolkerB Subject: Comment on Text Date: 9/19/2019 11:11:37 AM
thermodynamic

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Author: VolkerB Subject: Comment on Text Date: 9/19/2019 11:14:08 AM
19 years

Author: VolkerB Subject: Comment on Text Date: 9/19/2019 11:16:29 AM
The role of sulfide was not mentioned previously. Is sulfide generally an important player for thermodynamic calculations done here?

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Author: VolkerB Subject: Comment on Text Date: 9/19/2019 11:20:50 AM
The wording should be reversed. An AOM biomass accounts for an AOM filter, not the other way round.

Author: VolkerB Subject: Comment on Text Date: 9/19/2019 11:48:34 AM
Overall, this is irrelevant. The supply from below is what counts for the Siberian shelf, not the in-situ production, which is negligible in almost all settings except for the Eastern East Siberian Sea and the Chukchi Sea. In addition, the statement is also irrelevant in a general sense. As the supply from below is increased, so must the proportional contribution of in-situ produced methane decrease. This is not worth mentioning.

Author: VolkerB Subject: Comment on Text Date: 9/19/2019 11:57:04 AM
typo here: from ... to..

Author: VolkerB Subject: Comment on Text Date: 9/19/2019 11:34:59 AM
I am getting lost with the abbreviations

Author: VolkerB Subject: Comment on Text Date: 9/19/2019 12:03:07 PM
As stated this is not true and must be corrected. Never did you investigate ESAS shelf sediments in this study. Modelling scenarios were investigated, of which some conditions may apply to selected environmental setting on the ESAS. The passive/active terminology strictly applies to theoretical scenarios of system behavior.

Author: VolkerB Subject: Comment on Text Date: 9/19/2019 12:04:09 PM
Seriously, the authors have not investigated these sediments directly at all and should not make a claim to have investigate them.

Author: VolkerB Subject: Comment on Text Date: 9/19/2019 12:04:50 PM
first or first-order?