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Geoscientific Model Development Discussions

Interactive comment on "Finite-Element Sea Ice Model (FESIM), version 2" *by* S. Danilov et al.

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We are indebted for the comments. Below we present the answers and description of the changes made (if necessary).

Comment: -Throughout the text, I found equations presented outside paragraphs without numbering. Is this a decision by authors, the technical editor or a software glitch? p.872-873 seem the worse. My personal preference is to use the numbering extensively whether the equation is referenced or not in the text, but I leave the final decision to the technical editor.

Answer: The absence of numbers with some equations was our intention – we numbered only those that are referenced in the text. I think it is a matter of personal preference, or the standard accepted by the journal. We are ready to change this if it is required by the journal, but otherwise we do not see an immediate need in numbering

equations that are only used as auxiliary.

Comment: -p.864, line 18, is it possible to add a reference for the FE Taylor-Galerkin method?

Answer: We added the reference. The method is explained in many places, so we cite the classical book of Zienkiewicz and Taylor where it is discussed in detail.

Zienkiewicz, O.C., Taylor, R. L., 2000. The Finite Element Method, Fifth Edition, V. 3: Fluid Dynamics, Oxford: Butterworth-Heinemann (p. 47)

Comment: -p.876, lines 13-14. The statement "variable resolution serves only to illustrate that FESIM works on unstructured meshes" undervalues the discussion on resolution on p.873 lines 19-25 and p.877 at lines 7-12. Would it be possible to modify this statement?

Answer: We edited the text accordingly. It was meant that the issues of specific issues in a systematic way. The text in the revised manuscript is as follows: "...and the resolution is varied from approximately 40 to 10 km from the south to the north, as shown in Fig. 1. It will be seen below that noise, if excited, appears at the fine mesh part, as could be anticipated. Apart from this, no other implications of mesh unstructuredness will be mentioned here to keep discussion concise and concentrated on the algorithm performance issues."

Comment: -p.877, line 3, I am not clear what the authors means by "additional Picard iterations". Is it Np=2+10 when 10 additional iterations are done?

Answer: Yes, 2 are done always, and "additional" are 10 (N_p=12). We modified the text to clarify it by just adding the expressions for N_p.

Comment: -p.878, line 5, is "VPb" is equivalent "VP2p" of p.877? If so, can a more homogeneous notation be chosen? Same comment at line 6 about "additional" as previous point.

Answer: In Vpb "b" is for basic, it is just N_p=2 of the standard scheme. "VP2p" means N_p=4.

Comment: -p.880, line 24: "it looks like" may be to colloquium...

Answer: The text is modified as "We therefore conclude that it is the difference in the damping rates in the equations for stresses (Eqs. 4-6_ in the standard EVP which is the main factor ..."

Comment: -The plots in Figures 7 and 8 are inverted!

Answer: Many thanks, they were OK in the original pdf file. The problem occurred when it was converted to the Discussion format by the journal, and it escaped our attention.

Interactive comment on Geosci. Model Dev. Discuss., 8, 855, 2015.