

Interactive comment on “Brief communication: Impacts of ocean-wave-induced breakup of Antarctic sea ice via thermodynamics in a standalone version of the CICE sea-ice model” by Luke G. Bennetts et al.

Anonymous Referee #1

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General comments This paper is clearly written and figures are a clear representation of the results. The paper is a useful pilot study highlighting the potential benefits of inclusion of waves in a sea ice model. More work would be required to make any stronger statements.

Specific comments 1. Does the paper address relevant scientific questions within the scope of TC? Yes, the topic is currently relevant and will interest a significant number of research groups world wide. 2. Does the paper present novel concepts, ideas, tools, or data? Yes, actively including waves within CICE with a focus on Antarctica is novel.

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3. Are substantial conclusions reached? This work further highlights the potential for waves to be an important component in CICE in the southern hemisphere. It however does not show that it is. The modelling work would need to be fully coupled and compared against observations to show an improvement over CICE. 4. Are the scientific methods and assumptions valid and clearly outlined? The methods and assumptions are well articulated and appear to be valid. 5. Are the results sufficient to support the interpretations and conclusions? This paper does not overstate the results and highlights that this paper is a pilot study to motivate further research. The results sufficiently show that the modified model, given the assumptions and initial conditions, has the capacity to have an impact on sea ice in summer. 6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? The code used in this study is available and the paper is described in such a way that the study should be able to be reproduced. 7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? The authors give appropriate credit to related work and articulate the new contribution they are making. 8. Does the title clearly reflect the contents of the paper? The title is appropriate. 9. Does the abstract provide a concise and complete summary? yes 10. Is the overall presentation well structured and clear? yes 11. Is the language fluent and precise? yes 12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? yes 13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? no 14. Are the number and quality of references appropriate? yes 15. Is the amount and quality of supplementary material appropriate? yes

Technical corrections

None spotted

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