

## ***Interactive comment on “Numerical implementation and oceanographic application of the Gibbs potential of ice” by R. Feistel et al.***

### **Anonymous Referee #2**

Received and published: 17 March 2005

The overview of the Gibbs thermodynamic potential function and its partial derivatives, the subject of this paper, is strong on the numerical implementation front but weak regarding the oceanographic application. I am in agreement with the other anonymous referee that the paper deserves publication, mainly because the sea ice and physical oceanographic communities will potentially benefit from the availability of the source codes for calculating the Gibbs function and its partial derivatives.

However, reviewing this manuscript from the perspective of somebody modelling sea ice dynamics and thermodynamics I find this paper too specialised. It would help if the authors related their results to the requirements of modellers such as me. For example, please review previous methods of determining the freezing point of seawater and show me (a table of values) how much better (22) is! Similar comments apply to the brine salinity of sea ice (expression (23)) and the mass fraction of brine (expression (24)).

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Interactive Discussion

Discussion Paper

How would your results assist me in the following problem? Given that I can calculate the rate at which frazil ice is produced in an Arctic shelf sea, how can I determine the salt flux from the ice into the ambient water.

In summary the paper fails to engage the physical oceanographic community because the authors do not relate their thermodynamic formulae to the tried and tested (but less accurate?) methods adopted by the physical oceanographers.

I would like the authors to introduce a "Summary and Discussion" section. In this section they could relate their work to the requirements of polar oceanographers as well as collecting together their results.

Typographical changes

Introduction. Line 2 replace "actually" with "the"

Introduction. Replace Hagen and Feistel with a published paper

Page 39 Line 2 Replace "None of both" with "Neither"

Page 417 lines after (2) "...compact writing and easy determination of the partial derivatives". In (17) "for n"

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Interactive comment on Ocean Science Discussions, 2, 37, 2005.

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