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

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This is a very nice contribution that helps substantially in transferring the potential benefits of earlier work by the author team into the community. Going through the trouble of working on the coding and programming end is highly commendable (in particular if done in several languages). In reading the contribution, two questions come to mind. (1) It was not entirely clear whether these calculations were completed for seawater of standard composition. Maybe I simply overlooked this, but it might be worthwhile to provide a more specific indication of the actual composition of the seawater that these relations hold for. In sea-ice studies the importance of knowing more about source-water composition (as well as potential chemical differentiation during the growth process) is often neglected and may lead to errors in particular when predicting ice properties at very low temperatures or close to the freezing point of seawater (in fact, I myself am guilty as charged on this). (2) Along those lines, how has the precip-

itation of salts (in particular mirabilite and hydrohalite which have a significant impact on brine mixture Gibbs free energy and property evolution) been treated in the present approach? An interesting discussion of potential relevance in the present context is that by Marion and Farren (1999) who have identified alternate pathways of sea-ice brine phase evolution (and eutectic temperatures) depending on slight variations in brine composition and whether brine is allowed to reequilibrate with salt precipitates upon cooling. While these processes are not necessarily relevant in the context of equilibrium thermodynamics, they do play into application of thermodynamic models for predictions of property evolution. >Marion & Farren (1999) Mineral solubilities in the Na-K-Mg-Ca-Cl-SO4-H2O system: A re-evaluation of the sulfate chemistry in the Spencer-Moller-Weare model. Geochim. Cosmochim. Acta, 63(9):1305-1318.

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