

Interactive comment on “Development of thermodynamic potentials for fluid water, ice and seawater: a new standard for oceanography” by R. Feistel et al.

Anonymous Referee #2

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In this paper the authors discuss the thermodynamic potentials recently introduced to define a new seawater equation of state. The three new potentials (one for pure liquid water, one for pure ice, and one for the salinity component) have been independently defined on the basis of different experimental datasets. When used in combination, they provide a complete description of the thermodynamic properties of seawater, in any combination of phases and in transition.

However, no test on their consistency has been performed before, and this is indeed the novel contribution of this manuscript. The authors follow different approaches to numerically calculate the triple point of pure water, using the above mentioned potentials.

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Although the different estimates are all consistent with the experimental value, there are small differences among them, that indicate a lack of consistency in the framework. To correct for this, new values for some parameters in the potential functions are derived.

Finally, the authors report that the potentials for pure water behave well in the metastable regimes of relevance for seawater (i.e. where pure liquid water is not stable but salty liquid water is stable).

The paper is well written, and presents novel and important work.

I have a few minor questions / curiosities that the authors might want to address:

1) In section 4 the authors report that the potentials behave well in the metastable regimes. How was this tested? There is no mention to what datasets were used and how strict the test was.

2) The authors comment on the fact that different isotopic compositions affect the triple point temperature, and that isotopic fractionation in phase transition can actually lead to an ambiguous triple point. How is this physical problem translated in the mathematical model? Under what circumstances and for what type of applications does the different isotopic composition of seawater associated with different climates make a difference for its thermodynamic properties?

Interactive comment on Ocean Sci. Discuss., 5, 375, 2008.

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