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Interactive comment on "On the tides and resonances of Hudson Bay and Hudson Strait" *by* D. J. Webb

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Review of: "On the Tides and resonances of Hudson Bay and Hudson Strait" by D.J.Webb (review by D.G. Bowers)

This very interesting and well-written paper describes a clever numerical model of the tides of Hudson Bay and adjacent waters where some of the highest (if not the highest) tidal dissipation in the world occurs. The model is used to explore resonances in the system. It appears that there are a number of resonances occurring in the Bay and Strait and it is these, acting together, which make the region such a great dissipator of tidal energy.

The model used is of a type which I have not come across before. As I understand it,

the model solves for the amplitude of the tide without concerning itself with the variation of the tide with time. This makes the model computationally efficient. I think I get the idea of how this can be done, but the concept of 'complex angular velocity' escapes me and is not explained in this paper (I imagine it is in the first paper on this subject by the author). A brief explanation of complex angular velocity in this context would be useful.

The model results agree with observations of tidal elevations in some places (Churchill, for example), but not others. In Repulse Bay, the modelled tide is nearly in antiphase with the observations. The reason offered for this is that the depths are not well known in this area because of ice cover. I can understand that but wonder about the direct effect of ice cover on the tides. Ice cover will affect both the vertical tide (by suppressing it) and the tidal streams by adding an extra boundary layer at the surface. Surely that is important and I'm not sure how it is included in the model. A second thing that worries me is that, when I look at a chart of the northern part of the study area, I see a channel connecting it to the open sea. I'm not sure this channel exists in the model and it is likely to have a big effect on the phase of the tide in that area. I'd be interested to hear the author's comment on these points. Incidentally, in the paper this region is sometimes called Fox Basin and sometimes Foxe Basin. The latter is correct, I think.

Notwithstanding these details, there is no doubt that this is an excellent contribution to the study of global tidal energy dissipation. The paper is a good blend of tidal physics and clever numerical simulations.

Interactive comment on Ocean Sci. Discuss., 10, 2053, 2013.