Review

On the Shelf Resonances of the Gulf of Carpentaria and the Arafura Sea

by D.J. Webb

In this study the response of a complex coastal system to tidal forces is analysed by a novel model approach. The paper is well written and the method opens up a new method to improve our understanding of coastal resonances. However, there are two major shortcomings within the model approach; (1) the model is linear and (2) the boundary to the open ocean is held constant in the response analysis. The author briefly discusses these issues, but it would greatly increase the value of the results, if the author could give the reader confidence that these simplifications are appropriate for the tides in the Gulf of Carpentaria and the Arafura Sea. Further, what I missed is a conclusion of the paper which describes what we can learn from the great effort the author has made with the development of this modelling approach. Where do we see an improvement in our understanding of coastal tidal resonance systems?

More specific comments:

- The introduction lacks of a detailed description of the works on tidal resonances of recent years. For example there have been several studies on coastal resonances Cummins et al. 2010 (Atmosphere-Ocean), Arbic and Garrett 2010 (Cont. Shelf Res.), Sutherland et al 2009, (J. Phys. Oceanogr.) and on global tidal resonances Müller 2007, (Geophys. Res. Let.) /2008 (Ocean Modell.), Griffiths and Peltier 2008 (Geophys. Res. Let.) .....
- A validation of the model could be performed as in Garrett (1972, Nature) or Sutherland et al (2009, JPO), where the response function is determined from tide gauge locations outside the resonant system divided by inside tide gauges. This can be done for several semi-diurnal and diurnal tidal constituents and should give us an approximate understanding of the coastal resonance and whether it is appropriate to neglect the coastal - deep ocean resonance coupling described by Arbic and Garrett (2011). Further, this 'observational' response function should be consistent with the theoretically obtained results and could greatly enhance the impact of this approach.

In general, I suggest a major review, in order to address the above mentioned points.