**Ocean Science
Discussions**

Interactive comment on "On the Shelf Resonances of the Gulf of Carpentaria and the Arafura Sea" by D. J. Webb

Anonymous Referee #1

Received and published: 28 March 2012

Review, os-2011-86

This paper investigates the resonant properties of the Gulf of Carpenteria and Arafura Sea using a numerical (tidal) model forced by idealized open boundary conditions. The author analyses the results in terms of resonances and draws some conclusions regarding the resonant behavior of the area.

At first I must admit I struggled to see the purpose of the paper, and in scientific terms I still find it relatively weak. Do we learn a lot more about tidal resonance? Possibly, or as the author states in the discussion, "The primary aim of this work has been to learn a little. . .". That said, the analysis methods used are sound, novel, and can easily be used by other scientists doing similar investigations in other areas. I therefore feel that the paper is a valid contribution to science and suitable for Ocean Science after

revision. I would have like a "medium review" button, but since that does not exist I felt I had to go with "major" revision for reason given below.

General Comments Overall, the paper is poorly referenced. There has been quite a bit of work related to tidal resonance, albeit on larger scales, (see Arbic et al., 2008; Arbic and Garrett, 2010 – this paper most definitively must be included; Griffiths and Peltier, 2008, 2009; Egbert et al., 2004 and others). Furthermore, I assume it is Green (2010) which is referenced?

On p1, second column, penultimate section, there is a statement about the abyssal dissipating less energy than the shelf seas which I don't understand. Yes, 1/3 of the tidal energy is in the abyssal ocean, but the shelf seas still dampen tides, don't they? That is the reasoning behind the mega tides during the glacial periods: smaller shelf seas lead to large tides. I suggest this part is expanded or rephrased. This section also lacks some references apart from the author's own work nearly 40 years ago.

How well does the model perform against newer data sets? Using TPXO data or (preferably) the ATLAS data from the very region under investigation I would like to see a better model validation (see http://volkov.oce.orst.edu/tides/NAust.html). Yes, it looks like it fits well enough to the tide gauges, but how does it behave in the interior? What is the actual rms error?

In figures 4-7 I would like to see the M2 and K1 periods marked for ease of interpretation. I would also like to see cotidal charts here for forcing near M2 and K1 (similar panels appear later), so one can interpret the difference between real and idealized forcing in the very dynamics of the area.

The discussion on p5 about the progressive wave being too simple: is this because we assume a constant c? What is the error in assuming this? Later there is a discussion on the changes in water depth, this will of course change the speed of a long wave so is this a possible mechanism for the analysis not getting all the details?

The first part of section 6 is an enigma to me. I don't really understand it or figures 10-12, and I really don't see what it adds to the paper. Can it be scrapped altogether so this section starts with the present 6.1?

The discussion is more a summary in my opinion, and I suggest a change of section heading to just "Summary" or "Summary and conclusions".

Figures: 27 figures in a paper of this length is a bit over the top in my opinion. Why not merge similar figures to multipanel displays instead? For example, 4-5 could be one (with panels a-b), as could 6-7, 8-9 etc. They can of course span both columns in the finished paper.