

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

Anonymous Referee #2

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This submission describes an investigation of the natural modes of response of a shelf-sea area to forcing in a frequency band from zero to more than quarter-diurnal, so covering the major tides. I like this approach as natural for investigating physical systems if they are near-linear as holds for tides in most regions. The advance made here is an extension to complex frequencies (allowing for growth or decay of the response) which provides much clarification of the regional response.

The presentation is reasonably straightforward and well written. With attention to some details (below) I am in favour of publication.

Details

The given observed Port Langdon K1 phase in figure 2 looks unlikely relative to the

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general pattern and adjacent phases. (M2 in figure 3 is more consistent).

Page 449 lines 1-5. Torres Strait boundary condition. Figure 2 shows K1 having maximum amplitude here, and so do resonances D, E, F. With the Strait closed, these forms look locally like a standing wave and so half the amplitude is in an outgoing wave form, half in an incoming form. Is it true that, despite these maximal amplitudes, those wave forms carry little energy (because the Strait is narrow and shallow) relative to the forcing (for example)?

Page 450 line 14. The third way of showing the response is actually in figure 8.

Page 455 line 21, and figure 10 caption. Not exactly between the origin and $30-10i$ (which suggests just a line) but over the rectangle defined by $0, 0-10i, 30-10i, 30$. NB I think it is more conventional to write $30-10i$ than $30-i10$.

Page 455 line 24, should refer to Figure 4 (not 6).

Page 455 lines 26-27. I can easily agree that there should be no poles off the real axis in the positive imaginary direction, but if the runs were only with negative imaginary part (as implied) then this statement is too strong.

Page 456 lines 21-25. This is broadly but not strictly true: there is one (Kelvin) gravity-type wave that extends across both frequency bands, i.e. can have very low frequencies. The statement is OK for the limited area studied because of the very long wavelength of a low frequency Kelvin wave, but should perhaps be so qualified.

Page 460 line 12. “The reason for this is unclear”. This seems a bit weak. The structure of the modes as found here is clearly affected by earth’s rotation, one obvious factor for the non-correspondence.

Page 460 line 23: “subjective”. This is apparent in the complexity of some of the resulting figures! Was there a criterion for “small” and or “smooth” residual, e.g. small meaning less than any resonance contribution used?

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Page 463 line 3. I think this should be “D” and “K”.

Page 465 last sentence. I am unclear what is the point being made here. The sentence appears tautological to me.

Figure 22 caption. Is the blue line after subtracting the contribution of resonance B AND its c.c.?

Interactive comment on Ocean Sci. Discuss., 9, 443, 2012.