Ocean Sci. Discuss.,
doi:10.5194/os-2016-36-RC1, 2016

Ocean Science Discussions
Open Access
EGU

Interactive comment on "Seasonal resonance of diurnal coastal trapped waves in the southern Weddell Sea, Antarctica" *by* Stefanie Semper and Elin Darelius

Anonymous Referee #1

Received and published: 23 June 2016

Review of "Seasonal resonance of diurnal coastal trapped waves in the southern Weddell Sea, Antarctica" By S. Semper and E. Darelius

The authors provide observational evidence for large amplitude diurnal tides on the Weddell Sea slope, and then they seek to rationalize this finding in terms of resonant (zero group velocity) coastal-trapped waves. They go on to demonstrate the conditions (notably mean flow and stratification) that can make the resonant frequency vary from time to time. Overall, this is a credible piece of work, although there are perhaps some places where a bit more could be done.

The main extension I see would be to look at records from the same (or nearly so) isobath, but separated alongshore. These pairs can then be used to estimate along-

Printer-friendly version

Discussion paper

shore wavelengths. This makes the most sense when moorings are simultaneous, but even if they are not, differences in Greenwich phase could be used to see if the estimated wavelength is at least the right magnitude. Also, the model results provide other information, such as direction of current vector rotation and amplitude of current components, that could also be used to compare with observations. Maybe all we will learn is that things have the right magnitude, but it could be more rewarding.

I recall reading somewhere that a PhD thesis by M. Spillane (Oregon State, 1980) showed that the wave dispersion curves can do strange things when inviscid group velocity vanishes. However, I do not know of anything quite like this is the normal literature. It would be interesting to know more about this but it would be asking too much to have this effect covered in this submission.

Some specific points - Line 37: Given the mooring notation, it is particularly important here to use the correct (subscripted) tidal notation consistently, e.g., is this M_2 or M2? (Yes, it IS clearly done right in other places). - 95: Please say more about the CATS tidal model. Is it barotropic? Does it include non-tidal currents? Is it nonlinear? Etc. - 121: Say here how thick the boundary layer is. - Page 5: Why normalize tidal KE? You are throwing out useful information (actual amplitude), and I do not see any advantage for normalizing. - 170: The evidence here on ambient currents vis a vis waves is pretty weak. True, you can say that the “mean” alongshore currents vary with time, but, evidently useful local information about the time dependence and the spatial structure is lacking. There is nothing you can do about this, of course, but it would be well to advise the reader that the main thing you can glean here is the magnitude of the “mean” flow, and that it (probably) does vary from time to time. - 243-244: This sentence does not make sense to me. - 264: I am not sure what is meant by a dispersion curve showing the waves to be barotropic. There must be a missing step in the argument here. Maybe they mean the modal structure (Fig 11) is barotropic? Also, give a representative range of Bu. It is probably a wording issue, but the last sentence of this paragraph seems to contradict the preceding text. - 270: Enhanced relative to

Printer-friendly version

Discussion paper

what? - 272: What asymmetry is that? - Figure 7: Label axes.

Again, I believe that this contribution is sound overall, but that improvements ought to be made.

Interactive comment on Ocean Sci. Discuss., doi:10.5194/os-2016-36, 2016.

Printer-friendly version

Discussion paper