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## ***Interactive comment on “First images and orientation of internal waves from a 3-D seismic oceanography data set” by T. M. Blacic and W. S. Holbrook***

**Anonymous Referee #2**

Received and published: 14 December 2009

I have read the manuscript 'First images and orientation of internal waves from a 3d Seismic oceanography data set' by Blacic and Holbrook and think that it could (and should) be published after major revision.

While I think that the data set is really very nice and that even this first preliminary processing shows promising images, I have to say that the interpretation by the authors goes too far. I suspect that an oceanographer as a co-author would have been helpful. I could, however, imagine a very fine manuscript after major revision that is restricted to the strengths of the data set.

In particular I think that without corroborating oceanographic data the interpretation of

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the spatial depth variations of a reflector as 'one' internal wave is far fetched. Typically the internal wave field in the open ocean is described by continuous wavenumber spectra. Meaning that you have internal waves of different wave lengths all at the same time. And if it is really the open ocean then the spectrum would be isotropic, i.e. no preferred direction. To give a bad example that might explain my problem: Imagine a bathtub in which you create waves and then take a snapshot with a camera. You will of course see wave crests and, if you had the right tool, you might be able to create a map of the surface height which would look like your data. But from that map you can not tell the direction of 'a' wave. Waves in different directions are superimposed and only at that instant look like the 'one' wave. A moment later it might look quite different with a different 'direction' as a result. This reasoning does of course not mean that you might not be right. You might indeed be seeing 'one' internal wave that has the direction you deduce. You are just not giving any corroborating evidence. You could for example have worked together with an oceanographer modelling internal tides in the Gulf. Or at least correlated your direction with the coast/shelfline or given and checked a presumed location where 'the' wave could have come from. So to summarize my concern: For just a quick paper on the first results of 3d seismic oceanography you went too far in your interpretation.

And here comes my suggestion what you could do: Assuming that you want to present a little bit more than just the simple map of your reflector, track reflectors at different depths but at the same location. For the oceanographer this would be an intriguing information. From that you could for example extract the vertical coherence of the spatial patterns you see. Is the crest that you interpreted as 'one' internal wave also a crest at the next reflector or do you see something with a different shape? I understand that there might not be many locations where you get sufficient reflector strength to map several on top of each other, but then the region you concentrated on isn't very large either. Such results do not involve any interpretation and extend a bit beyond the simple showing of the first 3d reflector map.

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There is also the recent GRL paper by Klaeschen et al. on the moving reflectors. I am really curious whether you could extract such information from a 3d data set. Can you show that your internal wave crest is moving ?

Apart from all this I found the manuscript quite well written and will happily comment on details after the revision.

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