

Interactive comment on “Laboratory experiments on the influence of stratification and a bottom sill on seiche damping” by Karim Medjdoub et al.

Anonymous Referee #1

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In this paper the authors set out to investigate, through a suite of lab experiment, the decay of internal wave motions generated at a topographic bump. The set up is interesting, and the introduction is very thorough in terms of geophysical importance and background for the work. A combination of theory and image analysis is used to quantify the wave properties and decay scales. The main conclusion of the paper is then that you get two IWs in the experiments set up here: one with the frequency of the forcing and one seiche, e.g., depending on the geometry of the basin. This is not quite a new result – it is how the ocean works. A quantification of the seiche period should be possible just from the stratification and tank geometry, but that is not done. Adding this would make the paper stronger and confirm that this is the mechanism. Also, is there a delay in the seiche generation compared to the immediate IW? That would shed light

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Discussion paper



on how the seiche is generated, e.g., if it draws from the surface motion or is set up by the IW. It is also shown that with an obstacle, there is a faster decay than with a flat bottom. The problem I'm having here is that there are not enough quantifications of a lot of the results mentioned in the text, and the physical mechanisms are only described briefly. More details are needed throughout on what is happening for a physical point. The main concern I have, however, is if this paper fits in Ocean Science. The exploration is very lab-based and theoretical, and while I really don't mind that, there are very few links to the real ocean. The concerns above requires substantial revisions linking the results to a geophysical setting to make the paper publishable in OS, but I actually think it may be better housed in a more theoretical fluid mechanics journal.

Minor comments L10: "in the bulk" -> rephrase; do you mean "water column"? L25: "...natural enclosed lakes, seas, fjords..." -> "...enclosed water bodies, e.g., lakes or fjords..." L91: "significantly different" -> this implies statistics have been done to show that they are indeed statistically different. Either show the stats, or rephrase so you don't use significant to mean large or substantial. Please do this throughout the manuscript. L94: "Whereas..." -> rewrite, this is an incomplete sentence. L100: I'm not sure what is novel about the result here: we know that we must have horizontal velocities over the obstacle to generate the internal waves – it is the pull and relaxation of the pycnocline over the obstacle that generates the waves. A description outlining this could be added to the text, and I think it explains the observations of IW propagation related to mode number discussed in the following paragraph as well? L116: "Such exemplary records..." -> "Examples of such records..." L128: "good agreement" – how good is good? Please quantify. L135: please comment further on the surprising result: why doesn't damping matter? Figure 2 has no legend relating the lines to the experiments. Figure 4: Please add panel labels (a, b, c...) and refer to them in the caption and the text.

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