

Review of

“On the generation and evolution of internal solitary waves in the Andaman Sea

by Y. Yu, J. Wang, S. Want, Q. Li, X. Chen, J. Meng, K. Lu and G. Wang

This paper reports on two-dimensional numerical simulations of the generation of internal solitary waves by tidal currents across a ridge in the Nicobar Archipelago. The focus is on the impact of two small ridges superimposed on either side of the main ridge. Differences in the generation of ISWs during spring and neap tides and between winter and summer are also discussed. The experiments using different bathymetries are the potentially useful contribution. Comparing spring and neap tides or winter and summer stratifications not so much.

Unfortunately a horizontal resolution of only 500 m was used which seems too low to resolve ISWs. So I am unconvinced by these simulations. Are the ISWs due to numerical dispersion or physical dispersion? That numerical dispersion can result in the formation of ISWs was discussed in Vitousek and Fringer (Ocean Modelling, 2011). Evidence that the simulated ISWs are physical is required. I suggest the authors do a simulation with a resolution of, say, 50 m to check. There should be no reason that this can't be done as the MITgcm runs very efficiently on large numbers of cores. For this reason I recommend that the paper be rejected but I encourage the authors to resubmit after more careful simulations have been done as there are potentially some useful results.

It is difficult to comment on the results (e.g., the comparisons in Figure 10) without first being convinced that they are real so I will leave that to a future version of the paper. So I only have a few minor comments.

Comments:

1. Line 51. The 10° Channel is the name of a channel in this region but this is not made clear. I think the proper name may be 'Ten Degree Channel'. Also 'secondary ISWs' should be explained.
2. Line 58. 'modal' should be 'model'.
3. Line 87. Why say that S1 and S2 'may' have an affect on the generation of ISWs?
4. Line 118. 'tidal current'. When $\sigma \ll 1$ you generate higher harmonics as well.
5. Line 119. 'Lee' should not be capitalized here or elsewhere.
6. Lines 127–128. The topography always affects the flow regardless of the value of Fr_t ! How can you possibly say the the flow is not affected by the topography when $Fr_t > 1$?
7. Table 3. Explain what L and H_{R0} are. What is c_1 ? On line 131 you have c and c_i in the formula.

8. Line 157. Do the generation points coincide with critical slopes of regions of large IBF?
9. Line 184. 'rank'
10. Equation (6). This is a linear approximation for the available potential energy. Why not use a correct formula, particularly as you are using this to compute the energy of solitary waves.
11. Line 192. 'Bengal'
12. Line 200. Why 'may be related'? Is it related or not?
13. Line 218. Which direction is ebb? It would be better to use leftward and rightward as simpler to connect to the figures.
14. Line 230. Is Exp4 or Exp3 similar to the realistic topography (the way this is written is not clear although of course it is from the figures).
15. Line 264. Exp8 is not in table 2. What is Exp8?
16. Line 295. 'pycnocline'