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Ocean Science
Discussions

Interactive comment on "Internal tide energy flux over a ridge measured by a co-located ocean glider and moored ADCP" *by* Rob Hall et al.

Rob Hall et al.

robert.hall@uea.ac.uk

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Response to Reviewer 1

Specific comments:

1) Energy flux error analysis using the regional Princeton Ocean Model (POM) configuration [paraphrased].

Our decision to use an idealised internal tide field rather than the POM simulation was driven by a desire to calculate a representative error for the method during a typical glider deployment over an ADCP, not the error specific to this mission. We feel that this is approach is more beneficial to the wider glider community than calculating a mission-specific error. A benefit of the idealised internal wave field approach is that it allows

us to randomly change the relative phases of the baroclinic modes for each scenario and so that a wide range of phase space can be encapsulated by the Monte Carlo experiment without resorting to a large number of numerical model runs. The POM simulation was included to show that the observed internal tide energy flux and surface tidal ellipses were in agreement with previous studies – published direct observations are limited. However, due to the unusual stratification in the Wyville Thompson Basin and Faroe-Shetland Channel (namely a strong pycnocline at 500-600 m separating two low-buoyancy water masses), error calculated using the POM simulation would be too region-specific for wider use.

Minor comments:

1) Page 18. I feel that the description of the idealized internal tidal field should be moved into the main body of the text and not relegated to an Appendix.

The authors have spent some time attempting to integrate the description of the idealised internal tide field into the main text, but felt that it disrupted the flow of the paper. The methodology is relatively long and the internal tide field description is a well-defined section that can easily be separated. However, the important detail that the relative phases of the baroclinic modes are randomly changed for each scenario has been highlighted by adding a sentence to the main text, 'A different random set of baroclinic mode phases is used for each scenario.'.

2) Page 18, line 16. Do you really mean 'uniform stratification (N2 = constant)'? Figure 7 suggests that this is not the case.

Figure 7 is a uniform stratification case. The near-bottom intensification of energy flux is due to the superposition of baroclinic modes, rather than the effect of a deep pycnocline on baroclinic mode structure.

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