

Interactive comment on “Unpredictability of internal M_2 ” by H. van Haren

Anonymous Referee #2

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General comments: The paper is a stimulating examination of variability at M_2 , S_2 (particularly interesting) and inertial frequencies in the ocean, although several readings were necessary to appreciate all the arguments.

Specific comments: I am not sure that just because the spatial variability at M_2 is low it follows that 'M2-motions are not directly important in generating shear and internal wave induced mixing in the ocean' since packets of high frequency internal waves can be generated on each tidal cycle, for instance at the Celtic Sea shelf break. This will not have an impact on the analysed M_2 signal. I also wondered if some of the variability at 2 cpd (S_2) might have contributions from non tidal sources, for instance from meteorological forcing.

Since the results presented are all based on spectral analysis an outline of the methods used should be included in order to assess the confidence to be placed on the

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conclusions both in terms whether the spectral peaks are significant (confidence limits are shown on the plots, but their value is not stated anywhere) and also whether the small frequency shifts detected are real. Two of the principal data sets are relatively short in duration - 8 days for the central North Sea, Fig 3, and 13 days for the Faroe-Shetland Channel, Figs 5 and 6. The impression is that the data analysis is being pushed to its limits but this may be the only option given that oceanic current measurements are sparse in space (horizontally and vertically) and in time. It is not clear how representative the three sites presented are of shelf seas, continental slopes and abyssal plains.

Technical corrections: Interpretation would be helped if the pycnocline height and extent was given for each site. As written shouldn't the right hand side of equation 1 be divided by $(z_1 - z_2)$ for dimensional consistency and with equation 2. The units on plots are all for shear, yet some of the spectra are of currents.

Interactive comment on Ocean Sci. Discuss., 4, 303, 2007.

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