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Ocean Science Discussions

Interactive comment on "Unpredictability of internal M_2" *by* H. van Haren

Anonymous Referee #1

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The paper is in an area that is a bit outside of my expertise, so let me review it as a student, rather than an expert. I find it interesting as a report on internal wave phenomenology.

Concentration of the energy at M2 and shear at f is familiar. The appearance of shear at S2 is a bit of a surprise, but the data presented do not seem to be very supportive that there is any more shear at S2 than at M2 or at 2.08 cpd. In Fig. 3 I don't see even a spectral bump at S2 for the baroclinic current at 16 m. In Fig. 4b the difference (in log coordinates) between the current and the 400-m current difference seems about the same at both M2 and S2. In Fig. 5 and 6b we see a peak at large separations at 2.08 cpd, which is about as far from S2 as S2 is from M2. I agree that it is intriguing that there is a peak in shear at 2.08 cpd in Fig. 5, which is more pronounced at larger separations. I also agree that the data support the idea, expressed somewhat vaguely by the title of the paper, that the M2 energy is predominantly barotropic or very

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low mode. I'm not sure, though, in what sense this makes the higher mode any less "predictable" than if the energy at higher modes were greater. Is a peak in the energy spectrum and "predictability" the same thing?

I don't understand the last sentence of the abstract - either the physics or the logic of the sentence. I'm a bit confused by the concept that f and S2 are "short wave inertio-gravity wave bounds in the limit of very weak stratification". If N = 0, isn't the lower frequency limit at zero frequency rather than at f? For gyroscopic waves, it seems that the frequency is independent of wavenumber (I'm looking at LeBlond and Mysak, 1978). No doubt there is some phenomenology of which I am ignorant here, but the paper seems a bit too brief on these points.

Overall, I think the paper should be gone over carefully for clarity. There are a few places where words are left out as well. But I think the phenomenology highlighted is ultimately of interest.

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