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Ocean Science
Discussions

Interactive comment on "Wave-turbulence scaling in the ocean mixed layer" *by* G. Sutherland et al.

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RC: As the authors rightly mention, observations of profiles of turbulent kinetic energy dissipation rate are very rare. For this reason, this paper is highly significant. I enjoyed reading the paper but failed to see how the statement made in the abstract that the depth dependence of epsilon is consistent with the purely shear-driven wall layer with what was said in section 3 and in the summary. From what I can see, both the purely shear-driven wall layer and the Stokes drift-generated shear model have merits and neither were always consistent.
AC: Point taken, and this clearly needs to be clarified. As can be seen from Fig. 9(e), the majority of the dissipation measurements scale within an order of magnitude with that predicted by the law of the wall. However, there appears to be times when dissipation profiles scale well with the Stokes shear production term and that this scaling extends beyond the mixed layer depth when the swell component of the Stokes shear

is used. We changed the text in the abstract to reflect this.

Minor comments:

RC: p 3771, line 16: Numerical wave model output are not six hour averages, they are usually instanteneous values corresponding to a model estimate of the geo-physical quantities with a scale at best of the order of the model grid size (usually coarser due to numerical smoothing).
AC: We have revised the text accordingly.

RC: p 3771, line 11: how were the observed U15 reduced U10?
AC: Observed values for the wind speed are corrected for the height of the measurements using the COARE 3.0 algorithm which assumes a logarithmic profile. Details of the wind measurements are now expanded in the manuscript.

RC: P 3778, line 15: some recent work by Peter Janssen might also be relevant: Janssen, P. A.E.M. (2012), Ocean Wave Effects on the Daily Cycle in SST, J. Geophys. Res., doi:10.1029/2012JC007943, in press.
AC: We are aware of this manuscript. It is the first diurnal-warming modelling paper that includes the effect of waves, and is therefore a significant advance on the models to date (mostly empirical). We have cited this paper in our manuscript

RC: Fig.2 legend: 17.6m $->$ -17.6m
AC: This has been changed.

RC: Fig.4 legend: the text mention ECMWF analysis but legend mentions forecast. Which one is it? The dash line connecting the model data gives a false impression of the model as they are at much coarser temporal resolution. Using symbols instead might be more appropriate.
AC: This has been revised to show that we are now using the ERA-Interim Reanalysis. We have also added symbols to the line plot.

RC: Fig. 10 legend: which three wave turbulence profiles? (the one based on partition

I and II and the full spectrum ?)
AC: It should read the sum of partitions I and II. The text has been edited to emphasize this.

Interactive comment on Ocean Sci. Discuss., 9, 3761, 2012.