

Interactive comment on “Modeling of wave-induced irradiance variability in the upper ocean mixed layer” by M. Hieronymi et al.

Anonymous Referee #2

Received and published: 1 January 2012

This is an interesting and well written paper which provides a useful review of previous work and extends its scope to include more complex wave profiles. In my opinion, it makes a useful contribution to the field and is well worthy of publication. It might be useful, however, if the authors give consideration to the following points:

1. Could they state clearly at an early point in the paper which results were derived from ray tracing, which from Monte Carlo modelling, and which from a combination of the two techniques?
2. Flash amplitudes are given as the fractional enhancement above the average E_d at a given depth, with significance being attributed to results above a threshold value. However the authors state that E_d calculated from their Monte Carlo code is increasingly underestimated in comparison with Hydrolight results as depth increases. Is it

C859

possible that the intensity and frequency of deep flashes (relative to background) is over-estimated due to discrepancies between the methods of calculating background and flash intensities?

3. The significance of the results for underwater visibility and photosynthesis are mentioned but not discussed in this paper. Flashes are calculated as irradiance enhancements at a single wavelength (489 nm), but a more significant factor for photosynthesis is likely to be the enhancement of wavelength-integrated PAR. Are the authors able to comment on the degree to which their single-waveband calculations can be used as an indicator of broadband wave-focussed enhancements of the underwater light field?

4. The scope of the present paper is limited to very clear oceanic waters. Are there any plans to carry out similar studies for shelf seas?

Interactive comment on Ocean Sci. Discuss., 8, 2101, 2011.