

Interactive comment on “Natural variability of bio-optical properties in Case 1 waters: attenuation and reflectance within the visible and near-UV spectral domains, as observed in South Pacific and Mediterranean waters” by A. Morel et al.

A. Morel et al.

Received and published: 10 October 2007

Thank you for the thorough examination of our manuscript, and your comments. Answers to your questions/comments follow the same order you have used in your review.

1. The references to the papers by C. Mobley et al. (Oceanography), and by Z-P Lee-C.Hu (RSE) are duly introduced, together with short discussions about the usefulness of having both an adequate and updated knowledge of the bio-optical relationships in Case 1 waters, as well as a correct appraisal of the possible natural variabil-

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ity around these empirical relationships. These 'ecological' relationships are no more than statistically significant trends, with their own uncertainties. As such, they are not rigorous relationships as those prevailing in Physics; therefore, it is important to know the amplitude of the variability, the object of the present study.

2. Use of downward irradiance E_d instead of scalar irradiance when defining PAR, and the 1%PAR (providing Zeu). Actually, the underestimate when using E_d is less than suggested by the referee. A complete study of this problem can be found in Morel-Gentili, 2004, (Radiation transport within oceanic Case 1 waters, J. Geophys. Res., 109, C06008, doi:10.1029/2003JC002259), particularly in their Table 1, where the variously defined and computed Zeu are presented as a function of the solar angle.
3. Now, about the use of the Zeu depth defined as that one where PAR falls to 1% of the surface value: It is the commonly adopted definition (references given), even if somewhat arbitrary (Ryther, 1956). The pitfall you mention (number of photons does matter, not the percentage of photons) is well known (e.g. discussion in Banse, 2004), by the modellers in particular. The present paper, however, does in no way deal with photosynthesis or algal physiology. As you point out, Zeu is here simply used as a convenient global index for characterizing a water body and its trophic status.
4. Tabulated values of the absorption coefficient by pure seawater are given in the L&O-2007 paper.
5. Missing references are re-introduced; thank you for your scrutiny.

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