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Ocean Science Discussions

Interactive comment on "Assessment of the spectral downward irradiance at the surface of the Mediterranean Sea using the OASIM ocean-atmosphere radiative model" *by* Paolo Lazzari et al.

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This paper quantifies the skill of the OASIM radiative transfer model in the Mediterranean Sea region. Although there is no (cited) comparison of the skill of other atmospheric optical models, the OASIM performance is impressive, and would be both good news and useful information for the groups using, or considering using, OASIM. Another interesting feature of the manuscript is the use of the Bio-Argo array for model assessment. As this will no doubt become the primary means of assessing large-scale marine atmospheric models in the future, the technique developed in the manuscript

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Discussion paper

will be interesting to others.

While there are lots of excellent figures, the manuscript itself is quite short and does not make as much of the analysis as it could – leaving some room for additions, which would help to make the manuscript more useful and citable. A couple of ideas for strengthening the manuscript:

1. The OASIM is assess primarily based on Ed(0-), the downwelling planar irradiance. It is mentioned that the BOUSSOLE observations have above water observations. Analysis of skill of Ed(0+) would help to distinguish between OASIM errors in the atmosphere and in the transmission across the sea-surface interface. This distinction would be useful for both improving OASIM, and also for those using OASIM.

2. Following on from 1., the article distinguishes between errors in cloud-free and cloudy days. I wonder whether a somewhat similar, but more diagnostically-useful distinction might be the fractions of direct and diffuse radiation. As per point 1 this might be more useful for OASIM developers and also for those attempting to apply these results outside the Mediterranean where lower sun angles might change the balance of direct vs diffuse for the same cloud.

3. The extrapolation of the Bio-Argo data to the surface sounds like a critical step. Can you give more details? For example, do you assume an exponential decay with depth?

Minor comments. 1. L23 “daily variability” – this is somewhat ambiguous. Do you mean between days or within days?

2. L24 replace ‘high’ with a number.

3. ‘cloud dynamics and seasonality” – the former is a process, the later a timescale. They don’t quite fit together within one phrase.

4. L30 remove “notably”

5. L47 -51. Confusing. Tried to say too much in one sentence.

6. L83 ‘while’ – this is not a ‘while’

7. L84 – remove ‘the’ before ‘aerosol’.

8. L107 “resolve the diurnal variability” – this is within a day right?

9. L108 ‘properly’ is a subjective, rather than objective, adjective.

10. L115 remove ‘totally’

11. L134. At this point I didn’t know how you were defining regions.

12. L166. Would it be more accurate to say “W m-2 per waveband”?

13. L167 “to W m-2”

14. L202 – 15’ and 1-degree – most people would write 15 minutes and 1o!

15. L257 – stick with bias = model – observation. Don’t say a negative bias, but a bias of -20%. Otherwise it can get confusing.

16. L264, L265 – subscript of d different to elsewhere.

17. L294 ‘float cluster” is new wording that is unnecessary.

18. L354. More details on the wavelength discretisation. For example, Does 412 sit in a 400 to 425 nm band?

19. L373 “The OASIM model . . . this information” – Conclusions need tighter sentence than this.

20. L386-387 – this manuscript could be more helpful for motivating this sentiment as per main point 2.

21. Fig 4. Wind speed at what height?

22. Fig 12-Fig 13 – It took me a moment to work out what ‘B’ and ‘F’ meant, especially since you them both BioArgos and floats. In figure BOUSSOLE and BioArgo would be

quicker for interpretation.

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