**Ocean Science
Discussions**

Interactive comment on "Comparison of SeaWiFS and MODIS time series of inherent optical properties for the Adriatic Sea" *by* F. Mélin

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In the framework of ECOOP, time series of ocean colour products have been developed and analyzed for the Adriatic Sea. The subject of the present manuscript is to characterize the available IOP series for the basin from the point of view of their consistency. This type of study has so far been very rare (actually, there are just a few for chlorophyll, while I'm not aware of a detailed work published on IOPs for any specific region).

In the last Section, the possible sources of discrepancies have been discussed. In the context of the present inter-comparison, these should be only three, as listed and discussed in the manuscript: differences in the set of satellite spectral bands that might introduce differences between the QAA outputs (even though the algorithm is assumed

to take that into account), environmental variability (slight mismatch in pixel positions in the re-mapping process, difference in time of overpass), and differences in the satellite-derived remote sensing reflectances R_{RS} due to the atmospheric correction (i.e., in addition to those due to environmental variability). The latter is likely the largest factor (to be fully correct, I have not commited saying that differences in R_{RS} are unable to explain the observed biases – this should be properly investigated in a dedicated work). Quantifying the differences between the SeaWiFS and MODIS IOPs obtained from the QAA tells us something about the product uncertainties, but at best they provide a conservative estimates (2 satellite products can perfectly match but their uncertainties may still be very high). The actual uncertainty associated with satellite IOP products also depends on additional factors, mostly the algorithm formulations and parameters. The topic of algorithm uncertainties has indeed been touched upon by the IOCCG working group on algorithms (IOCCG, 2006) but again the context is here somewhat different: the algorithm is fixed and should not contribute to differences between satellite products (with the exception of residuals that could still result from a different set of bands). To state it simply, the outputs are different because the inputs are different. These points will be expressed more clearly in a revised Discussion Section.

This being said, elements of a more complete assessment strategy for IOP products, complementary to inter-comparison, can be discussed. Keeping aside the specific aspects strictly associated with the atmospheric correction, a systematic inter-comparison conducted on R_{RS} series is required (and is actually on-going for the European waters), as a complement to regular validation of R_{RS} products. This inter-comparison is to be conducted on daily re-mapped R_{RS} corrected for band shift. Subsequently the QAA shall be applied to these R_{RS} fields, so that resulting differences are due only to differences in R_{RS} (if we can assume that the band shift correction is error-free). It is however underlined that the resulting QAA-derived products would not be those distributed to users by NASA or obtainable with a direct application of SeaDAS. These differences in IOPs could finally be compared with those documented here, to check their consistency. An alternative is to investigate error propagation using

R_{RS} spectra derived from radiative transfer simulations, but the first avenue has the advantage of being close to the satellite products. Another investigation would rely on the availability of a data set with a significant number of SeaWiFS and MODIS match-ups with satellite R_{RS} as well as concurrent field data of R_{RS} and IOPs. Having together remote sensing and field data of R_{RS} and IOPs enables one to partition the part of uncertainty on satellite IOPs due to the algorithm itself and to the remote sensing context. Such a data set has recently been compiled for European waters (see Zibordi et al., Remote Sens. Environ., in press, 2011), and will serve for such a work. These elements shall be introduced in the Conclusion of a revised manuscript.

Interactive comment on Ocean Sci. Discuss., 8, 85, 2011.

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