Review for “Impact of the aerosol type on HICO atmospheric correction in coastal waters” by Bassani et al.

General comment:

The atmospheric correction algorithm 6SV is used over land for MODIS. Since the ocean has a much lower reflectance, this algorithm is probably not accurate enough for ocean retrievals. The current operational atmospheric correction over ocean for MODIS, SeaWiFS, etc is described in Gordon and Wang (1994), which uses NIR bands for atmospheric correction based on black pixel assumptions. The authors seem to ignore over 30 years ocean color community efforts for satellite ocean color remote sensing. There are many references for ocean color remote sensing, coastal and inland water quality monitoring, and various science studies using satellite ocean color data. There are very rich documents in the IOCCG report series at website: http://www.ioccg.org/reports_ioccg.html, in particular, report #10 about atmospheric correction and many references therein. In fact, it is already well known that different aerosol optical thickness and aerosol type will result in different water-leaving radiance retrievals, and its impact is significant for atmospheric correction over ocean due to the ocean's weak reflectance. Furthermore, the HICO@CRI algorithm proposed by the authors has not really been validated. The authors should at least do some validation work by comparing their water-leaving radiance retrieved with in-situ water-leaving radiance data.

1. The objective for the paper has been done long time ago. In fact, the CZCS atmospheric correction algorithm did not use aerosol models, while SeaWiFS, OCTS, POLDER, MODIS, MERIS, VIIRS, et al. algorithms use aerosol models due to importance of aerosol models for accurate atmospheric correction (see Gordon and Wang (1994) and many references thereafter).

2. The land atmospheric correction approach has some serious limitations for applying it to ocean/water cases, and should be used with cautions (again, see many references in IOCCG reports). In general, such approach will not provide good water results. For example, ocean surface BRDF should be accounted for, and one should not use isotropy surface (at least one should account for the Fresnel reflecting surface). The authors should at least address the issue, see Morel and Gentili (1991, 1993, 1996), Morel et al. (1995), Gordon (2005), Wang (2006), etc.

3. For equation 1, I don’t understand why the sensor-measured TOA reflectance is less than that from atmosphere. Is t_g*rho_atm - rho_TOA > 0? Rho_TOA should include reflectance contributions from atmosphere, ocean surface, and ocean waters.

4. The paper also uses Urban aerosols, which are strongly absorbing. For strongly absorbing aerosols, aerosol vertical profile is necessary for deriving accurate water signals (see IOCCG report #10). Otherwise, results from Urban aerosols are questionable. The authors should at least discuss this issue.

5. It is important to have some validation results (e.g., from in situ measurements) to evaluate HICO-derived water products.

Some references:

IOCCG Reports (http://www.ioccg.org/reports_ioccg.html) and particularly Report #10 and references therein.

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