

OCEAN OPTICS XXIV

Valamar Lacroma Dubrovnik Hotel | Dubrovnik, Croatia | October 7–12, 2018

<https://oceanopticsconference.org>

Tuesday, October 9

Plenary Session 2

14:00–14:40

14:00–14:40

EXPLORING A NEW ANALYTICAL RELATIONSHIP FOR OCEAN COLOR

Radiative transfer (RT) approximations relating remote sensing reflectance to $bb/(a + bb)$ have been tremendously useful to the ocean color community for decades. Current algorithms to account for bidirectional reflectance distribution function (BRDF) effects in the proportionality (e.g., Morel et al. 2002; Lee et al. 2011) have relied on assumptions about angular scattering by particle fields because measurements of oceanic particle volume scattering functions (VSFs) have been historically lacking. Such assumptions are impactful, as the BRDF is effectively controlled by the VSF. We now have an increasing database of VSF measurements over the last 10 years with which we can assess other algorithm approaches where the VSF is explicitly represented. Related work has culminated in a fully analytical algorithm based on the RT approximation of Zaneveld (1995) with performance effectively equivalent to full RT simulations with Hydrolight when a constant VSF shape derived from our extensive measurements is assumed in the backward direction. The unknown inputs are absorption and backscattering, as with the conventional $bb/(a + bb)$ relationship, so similar approaches to inversion can be directly applied. The algorithm shows improved performance relative to current state-of-the-art look-up table (LUT) based BRDF algorithms, i.e. Morel et al. (2002) and Lee et al. (2011). As a result, the algorithm shows good potential for future ocean color inversion with low bias, well-constrained uncertainties (including the VSF), and explicit terms that can be readily tuned.

Mike Twardowski, Harbor Branch Oceanographic Institute, mtwardo.alt@gmail.com