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Thursday, October 11
Oral Session 9
08:30–10:30

09:10–09:30

A REVISED MODEL FOR DERIVING THE BULK REFRACTIVE INDEX FROM THE BACKSCATTERING RATIO CONSIDERING THE DIFFERENT SUBPOPULATIONS OF MARINE PARTICLES AND THE INTERNAL STRUCTURE OF PHYTOPLANKTON CELLS

In 2001, M. Twardowski and coworkers proposed a model based on Mie theory to estimate the bulk refractive index from the backscattering ratio and the hyperbolic slope of the particle size distribution (PSD). In the present study, we propose to re-examine Twardowski et al.'s model considering the different sub-populations of marine particles and the heterogeneity of phytoplankton cells. For that purpose, the scattering is modeled considering particles from the submicrometer viruses and heterotrophic bacteria to micrometer phytoplankton species. In addition, organic non living particles (detritus) and sediments are considered. The size ranges of the different compartments are defined from literature (Stramski et al., 2001 ; Stramski et al., 2004). Concerning the internal structure of phytoplankton cells, an exhaustive review was performed by Bernard et al., 2009. They showed that a chloroplast layer surrounding the cytoplasm was an optimal morphology to simulate optical properties of algal cells. The open access radiative transfer code named ScattnLay (Yang et al., 2003) was used for computing the scattering two-layered spheres. Results show that even if the relative abundance of the phytoplankton is weak (less than 1 %), the impact of the two-layered phytoplankton cells on the bulk backscattering is significant enough to modify the analytical model between the backscattering ratio and the PSD slope.

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