Preliminary Results Of Algorithms To Derive Phase Function And Volume Scattering Function of Water From OCM-2

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Abstract

Algorithms are developed to determine the phase function and volume scattering function of water from the ocean color satellite data. The phase function, PF and volume scattering function, VSF are important marine inherent optical parameters required to understand the underwater light field and the remote sensing reflectance. PF is associated with scattering of light in water and provides information on the angular distribution of intensity or strength of scattering at any wavelength and can also be considered as a probability density function of the scattering at any direction.VSF describes the angular distribution of scattering in water and is given as VSF = PF*b, where b is the scattering coefficient. Here we determine the PF using an algorithm that depends only on the particulate backscattering fraction, B= b_{bp}/bp, where b_{bp} is the particulate back scattering and bp is the particulate scattering.(Mobley et al., 2002). The parameter b_b can be determined with better accuracy from satellite data and there are no proven algorithms to determine b from the satellite data. The b_b determined from the OCM-2 satellite data using QAA algorithm (Lee, 2002) at the wavelengths of the satellite bands and interpolated to 650nm correlated well with the in-situ measured $b_b(650)$. (R^2 =0.82), though it was overestimated. We use the measured b and bb for the coastal waters of Goa, India to develop an empirical relationship to determine b(650) using $b_b(650)$ and the same is applied to determine b(650) using the satellite derived $b_b(650)$. Hence the satellite derived B at 650 nm is used to derived the PF and VSF with the method suggested by Mobley (2002). The FF and VSF derived from the satellite were compared with the measured VSF and FF for similar water by Petzold (1972) and the results were comparable. The root-mean-squared percentage difference between the two phase functions of Petzold and those derived from OCM-2 for all stations and water types were less that 10%.

Keywords : phase function, volume scattering function, backscattering, scattering, backscattering fraction, OCM-2, ocean color