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Influence of oil dispersed in seawater on the bi-directional reflectance distribution function (BRDF)

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Keywords

oil, seawater, phase function, inherent optical properties (IOP), radiance, bidirectional reflectance distribution function (BRDF), modelling

Abstract

The bidirectional reflectance distribution function (BRDF) of the sea areas polluted by oil-in-water emulsion has been studied at the ends and in the centre of the visible light spectrum. The Monte Carlo code was applied to model water leaving radiance for the entire upper hemisphere. Solar irradiance was represented by 1 billion virtual photons which reach the sea surface at an angle of 40 deg. The results are displayed as the BRDF vs. two variables: zenith and azimuth angles. The strong impact of wavelength on the BRDF has been revealed while, the size distribution of oil droplets has an insignificant impact. The presence of oil emulsion modifies the shape of the BRDF significantly, and the latter depends on the oil type. Irradiance reflectances and radiance reflectances derived from BRDFs obtained are also presented.



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