

SPECTRAL SIMULATION ON REMOTE SENSING REFLECTANCE OF MIXED WATER WITH PETROLEUM AND SANDS USING HYDROLIGHT

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Abstract: In the water with petroleum pollution, some oil substances will adsorb on the surface of suspended matter, which will change the scattering coefficient of suspended particles, and then affect the remote sensing reflectance (R_{rs}). R_{rs} is one of the critical parameters of remote sensing inversion model for water component concentration. Understanding the contribution of suspended sediment and petroleum substance to R_{rs} can improve the accuracy of remote sensing inversion model for petroleum pollution concentration. Petroleum concentration, the specific absorption coefficient and the specific scattering coefficient measured at sites near Dalian Port, Liaoning Province, China, August 25-27th, 2018 were used as the inputs of the USER-DEFINED IOP MODEL integrated in the radiation transmission model Hydrolight to simulate R_{rs} of mixed water with petroleum and sands in the visible wavelength range (400-700 nm). With the results, a theoretical discuss was made on the influence of petroleum substance and sands on the remote sensing reflectance respectively. The results showed that: (1) R_{rs} of mixed water with petroleum and sands monotonically increases in the wavelength range 400-490 nm and its overall trend is downwards in the range of 490-600 nm, the values are close to 0 between 600 to 700 nm.(2) The presence of petroleum substances does not change the shape of the spectral curve of suspended sediment. (3) Suspended sediment mainly affects the R_{rs} between cyan band (450-500 nm) and yellow band (560-600 nm), and the peak shifts towards the long wave.

Keywords: remote sensing reflectance, Hydrolight, mixed water with petroleum and sands, inherent optical properties