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Function Field Methodology for Estimating Spectral Marine Reflectance from ADEOS-II Global Imager Data

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Abstract

A general function field methodology for estimating ocean color variability is applied to the retrieval of spectral marine reflectance from Global Imager top-of-atmosphere reflectance vectors, after correction for multiple scattering. This problem is considered as explanatory variables conditioned by the angular geometry of the problem, therefore, is viewed as a collection of similar inverse problems indexed by the angular variables. The solution is in the form of a field of models over the set of permitted values for the angular variables. The

reasons of approximation theory, are fields of shifted ridge functions: on synthetic GLI data for Case 1 waters are robust to noise, they handle weakly and strongly absorbing aerosols, and the retrievals are accurate and productive waters. In the presence of 1% noise, the RMS error is 0.0003 (2.8%) at 380 nm, 0.0003 (2.8%) at 460nm, and 0.0001 (1.5%) at 545nm, i.e. within acceptable limits for quantitative biology applications. The theoretical and possible extensions, show the potential of the function field method for the estimation of marine reflectance from GLI data, even in the near ultraviolet.

Keywords: [ocean color](#), [marine reflectance](#), [remote sensing](#), [function field method](#), [inverse problems](#)

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