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Retrieval of Aerosol and Marine Parameters in Coastal Waters from MERIS Data: The OC-SMART Algorithm

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A new algorithm for the inversion of ocean color data, Ocean Color: Simultaneous Marine and Aerosol Retrieval Tool (OC-SMART), will be used for simultaneous retrieval of aerosol and marine parameters in coastal waters from MERIS data. The OC-SMART algorithm uses the nonlinear optimal estimation, Levenberg-Marquardt (OE/LM) method instead of the traditional look-up table method to improve the retrieval accuracy, and a radial basis function neural network (RBF-NN) to replace the forward radiative transfer model for the coupled atmosphere-water system and thereby increase the retrieval speed without loss of accuracy. Previous results have shown that OC-SMART results are consistent with OE/LM results generated without the fast RBF-NN forward model, but that the retrieval speed of OC-SMART was increased by a factor of about 1,500 due to the RBF-NN training. Here we will show applications of OC-SMART to analyze MERIS images obtained over high-latitude coastal waters. Five parameters will be obtained from the retrieval: aerosol optical depth, aerosol bi-modal fraction, chlorophyll concentration, CDOM absorption at 443 nm, and backscattering coefficient at 443 nm. The water leaving radiance will be provided as a by-product. The results will be compared with those obtained from the standard MERIS algorithm as well as those produced by the SeaDAS software package.