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New algorithm for simultaneous retrieval of aerosols and marine parameters in coastal waters

K. Stamnes (1), W. Li (1), Y. Fan (1), B. Hamre (2), Ø. Frette (2), A. Folkestad (3), K. Sørensen (3), and J. J. Stamnes (2)

(1) Stevens Institute of Technology, Physics and Engineering Physics, Hoboken, United States (kstamnes@stevens.edu), (2) University of Bergen, Bergen N-5000, Norway, (3) Norwegian Institute for Water Research (NIVA), Oslo N-0349, Norway

We present simultaneous retrievals of aerosol and marine parameters in coastal waters from ocean color data using a new inversion algorithm, Ocean Color: Simultaneous Marine and Aerosol Retrieval Tool (OC-SMART). The OC-SMART algorithm uses a one-step nonlinear optimal estimation/Levenberg-Marquardt method instead of the traditional two-step look-up table approach to improve 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 retrieval speed without loss of accuracy. Previous results have shown that the retrieval speed of OC-SMART was increased by a factor of about 1,500 due to the RBF-NN training. We will discuss applications of OC-SMART to analyze SeaWiFS. MERIS, and MODIS images obtained over coastal waters. Five parameters are obtained from the retrieval: aerosol optical depth, aerosol bi-modal fraction, chlorophyll concentration, CDOM absorption, and backscattering coefficient. The water leaving radiance is provided as a by-product. The retrieval results will be compared with in situ and match-up data as well as with retrieval results obtained from the standard MERIS algorithm or produced by the SeaDAS software package.