Monday, October 8
Poster Session 1
16:00–18:00

Poster 228

RELIABLE RETRIEVAL OF ATMOSPHERIC AND AQUATIC PARAMETERS IN COMPLEX ENVIRONMENTS BASED ON MULTILAYER NEURAL NETWORKS AND COMPREHENSIVE RADIATIVE TRANSFER SIMULATIONS

Standard atmospheric correction (AC) algorithms work well in open ocean areas where the water inherent optical properties (IOPs) are correlated with pigmented particles, but in turbid coastal water, they often exhibit large inaccuracies that may lead to negative water-leaving radiances (Lw) or remote sensing reflectances (Rrs). We describe new algorithms for retrieval of atmospheric and water parameters based on a multilayer neural network (MLNN) machine learning method. We use a radiative transfer model for the coupled atmosphere-water system to simulate top of the atmosphere (TOA) radiances (Ltoa) and Rrs values simultaneously, and use this dataset to train a MLNN to derive the aerosol optical depth (AOD) and Rrs values directly from Ltoa radiances. The method has been validated using both synthetic data and Aerosol Robotic Network – Ocean Color (AERONET–OC) measurements. A separate algorithm has been developed to retrieve aquatic parameters from the Rrs values. Application of these algorithms to MODIS Aqua images in several coastal areas shows that they are accurate (no negative Rrs values), robust, and resilient to contamination due to sunglint or adjacency effects of land and cloud edges. The MLNN algorithms are very fast and suitable for operational use. They have been extended for application to extreme atmospheric conditions (strongly polluted continental aerosols) over turbid coastal water by including appropriate aerosol and ocean bio-optical models. Results of applying these extended MLNN algorithms to VIIRS images over areas with extreme atmospheric and marine conditions (such as the Yellow Sea and the East China Sea) will be presented.

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