ABSTRACT

In this thesis, a method for the retrieval of oceanic constituents from ocean colour in Case I and Case II waters is reported. The method is derived from radiative transfer simulations and subsequent application of Artificial Neural Network (ANN) techniques. Three applications of this method are presented in this thesis. Firstly, an ANN-based algorithm is developed for the retrieval of the pigment concentration in Case I waters from the remote sensing reflectance just above sea surface. The performance of the algorithm is assessed by comparing it to the *in-situ* measurement data sets SeaBAM and COASTLOOC. The results show that the performance of the ANN-based retrieval scheme is comparable to the most successful empirical algorithms such as OC4. Secondly, an ANN-based algorithms is developed for the retrieval of oceanic constituents concentrations (CHL, SPM and CDOM) in Case II waters from the hemispherical reflectance just below sea surface. The performance of the algorithm is assessed by comparing it to the *in situ* measurement data sets COASTLOOC, PMNS. The results show that the performance of the ANN-based retrieval scheme is better than that of the empirical algorithms developed by PMNS. Thirdly, an ANN-based algorithm is developed for the retrieval of oceanic constituents concentrations (CHL, SPM and CDOM) in Case II waters from MERIS imagery. This algorithm has the capability to deal with various atmospheres from weakly to strongly absorbing aerosols. Applying this algorithm to MERIS images taken over the North Sea and the China Seas, reasonable results were obtained except for the highly turbid areas in the China Seas.