Simultaneous retrieval of aerosol optical thickness and chlorophyll concentration using multi-wavelength and multi-pixel method

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This study proposes an algorithm for the simultaneous retrieval of aerosol optical thickness(AOT) and chlorophyll concentration using multi-wavelength and multi-pixel method over ocean. In our algorithm, the forward radiation calculation is performed by a coupled atmosphere-ocean model(Ota et al., 2010; Nakajima and Tanaka, 1986) with an improved bio-optical ocean module(Shi et al., 2015) for CASE 1 water, which is different to the traditional ocean color algorithms which decouple the atmosphere and ocean surface(Gordon and Wang, 1994) using atmospheric correction procedures; then the Maximum a posterior method(Rodger, 2000) but considering the spatial constrain incorporated with the multi-pixel optimization algorithm(Hashimoto, 2014) is used to retrieval aerosol optical thickness and chlorophyll concentration. For the AOT retrieval, a global aerosol transport-radiation model named SPRINTARS(Takemura et al,. 2000) is used as the priori constrain; Finally, the inversion results are achieved from HIMAWARI-8 and GOSAT-TCAI satellite observation data through comparison to AERONET products and other aerosol retrieval algorithm which is widely used in satellite remote sensing.

Keywords: Aerosol, Ocean color, Remote sensing, Radiative transfer