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Study on Aerosol Retrieval with DPC Sensors and the GRASP Method

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Polarized and multi-angle satellite sensors can effectively provide a series of different observations for a position simultaneously, beneficial for retrieval of complex aerosol properties [1]. Directional Polarimetric Camera (DPC) is a Polarized and multi-angle sensor developed by China [2]. Similar to the POLDER-3/PARASOL, it has three polarized channels at 490, 670, and 865 nm and can scan Earth from multi-angle (9-17). The Generalized Retrieval of Atmosphere and Surface Properties (GRASP) is an open-source algorithm for calculating various optical and microphysical properties of aerosol and surface, based on a statistically optimized strategy [3]. Through a variety of great mathematical and physical methods, the GRASP can optimally handle observations from various sensors and fully consider their uncertainties in measurements. In our pervious study [4], the aerosol optical depth (AOD) has been successfully obtained from DPC/Gaofen-5 satellite and Models/GRASP implementation, with the R of ~0.9 and the RMSE of ~0.066. Scattering angle, number of averaged pixels of retrieval units, and intensity and polarized fitting residuals show obviously impacts on the result in the retrieval. In the future plan of development, multiple DPC sensors will be launched, and expected to be an important part in earth observation system of China for atmospheric parameter monitoring. Here, we will continue to focus on the satellite aerosol retrieval issues, and try to find a best solution for the DPC/GRASP.

Keywords: DPC sensors, GRASP method, aerosol parameter retrievals

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