Onboard polarization calibration and polarimetric accuracy verification method for the particulate observing scanning polarimeter (POSP)

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The Chinese GaoFen-5(02) satellite is part of the Chinese High-resolution Earth Observation Program, which was launched on September 7, 2021. Particulate observing scanning polarimeter (POSP) is one of the five sensors onboard the satellite that mainly used for atmospheric monitoring, which can achieve simultaneous observation of multispectral polarization parameters. Its onboard polarimetric accuracy is one of the main factors that effect subsequent data quantitative retrieval and application[1]. In this study, POSP data in the past two years after launch are used to conduct onboard polarization calibration and polarimetric accuracy verification research. The filtered data of Linear Polarization Calibrator (LPC) and Non-Polarization Calibrator (NPC) equipped on POSP are used to calculate the key parameters of onboard polarization calibration, and time variation characteristics of these parameters are analyzed. The polarimetric accuracy verification methods for polarization remote sensors mainly relies on natural targets[2,3], and have face the problem that the verification accuracy is limited by the simulation accuracy of target polarization parameters. The ice cloud targets have depolarization characteristics at specific scattering angles[4,5]. We use it as an unpolarized target for verification of POSP, and the changes in verification accuracy results before and after onboard calibration are analyzed. The results show that onboard polarization calibration can effectively maintain the polarimetric accuracy of POSP.

References

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