

Progress on development of aerosol and cloud products from DPC and POSP onboard GF-5(02), DQ-1 and DQ-2 satellites

Cheng Chen¹, Zhenhai Liu¹, Zhihui Wang¹, Xuefeng Lei^{1, 2}, Donggen Luo¹, Yujia Cao¹,
Haixiao Yu¹, Oleg, Dubovik³, Zhengqiang Li⁴, and Jin Hong¹

¹ *Anhui Institute of Optics and Fine Mechanics, Hefei Institutes of Physical Science, Chinese Academy of Sciences, Hefei 230031, China*

² *GRASP-SAS, Satellite Remote Sensing Development, Lille 59000, France*

³ *Univ. Lille, CNRS, UMR 8518 - LOA - Laboratoire d'Optique Atmosphérique, F-59000 Lille, France*

⁴ *State Environment Protection Key Laboratory of Satellite Remote Sensing, Aerospace Information Research Institute, Chinese Academy of Sciences, Beijing 100101, China*

**Presenting author: Cheng Chen (cheng.chen@aiofm.ac.cn)*

Accurate retrieval of aerosol and cloud properties is critical for advancing our understanding of air quality and climate forcing. The Directional Polarimetric Camera (DPC) and the Particulate Observing Scanning Polarimeter (POSP) onboard GF-5(02), DQ-1, and the recently launched DQ-2 satellite provide multi-angle and polarimetric observations that enable improved atmospheric characterization. This study presents recent progress in the development of aerosol and cloud products from these instruments, combining physical retrieval algorithms with AI-based approaches for near-real-time (NRT) processing. Aerosol retrievals exploit intensity and polarization measurements to derive aerosol optical depth (AOD), Ångström exponent (AE), size and absorption related properties. For clouds, we retrieve cloud optical thickness (COT), effective radius (CER), and effective variance (CEV). In addition, AI-based methods are developed to detect cloud top and base heights (CTH and CBH), providing improved characterization of cloud vertical structure. Polarimetric observations further constrain cloud microphysics and help reduce uncertainties associated with three-dimensional radiative effects. These results highlight the potential of combining polarimetric observations with AI techniques to advance aerosol and cloud remote sensing and support timely atmospheric monitoring.