Formaldehyde (HCHO) column measurements from airborne instruments: Comparison with airborne in-situ measurements, model, and satellites

Hyeong-Ahn Kwon (1), Rokjin Park (1), Caroline Nowlan (2), Gonzalo González Abad (2), Kelly Chance (2), and Scott Janz (3)

(1) Seoul National University, Seoul, Republic of Korea (khhed07@snu.ac.kr), (2) Center for Astrophysics, Cambridge, MA, The United States, (3) NASA Goddard Space Flight Center, Greenbelt, MD, the United States

Trace gas measurements from airborne instruments are useful to evaluate and improve a retrieval algorithm developed for the Geostationary Environment Monitoring Spectrometer (GEMS). We used radiances measured from two airborne 2D array sensors, the GeoCAPE Airborne Simulator (GCAS) and the Geostationary Trace gas and Aerosol Sensor Optimization (GeoTASO) for DISCOVER-AQ Texas in 2013 and for KORUS-AQ in 2016 to retrieve formaldehyde (HCHO) columns and to evaluate the GEMS retrieval algorithm. In addition, we used simulated aerosol concentrations constrained by airborne LIDAR observations for AMF calculation to convert slant columns to vertical columns. We compared retrieved HCHO columns with vertical columns obtained from in-situ airborne HCHO measurements. Optical properties and distributions of aerosols are found to be important factors, affecting HCHO retrievals. Finally, additional comparisons of retrieved results with model simulations and low-orbiting satellites provides quantitative information for improving bottom-up emission estimates of volatile organic carbon emissions.