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Assimilating research satellite data in the chemistry-climate models

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The paper presents the assimilation studies of chemical space-borne observations in WACCM-GEOS5 global chemistry-climate system. It highlights benefits and challenges of data fusion of multi-sensor observations of ozone and carbon monoxide. Among them are: identification of data-data biases, development of resolution-dependent data analysis schemes and corrections of systematic model errors. Several examples of combining the research satellite data with different vertical resolutions across the tropopause are discussed. Needs for adequate characterization of space-borne observations with restricted vertical resolutions by kernels for both nadir-and limb-viewing sensors are illustrated as one of the key requirements in the chemical data analysis. Poster discusses how the signal from the nadir-viewing satellite data can be properly accepted by models without erroneous filtering and damping of fine-scale vertical structures typical for tracer laminas and low-frequency climate variations of ozone. The resolution-sensitive revision of assimilation schemes for analysis of the multi-spectral column-based data with kernels are discussed. The potential joint use of UV, IR and MW satellite ozone CO, and temperature data for "online" evaluation and correction of the chemistry-climate model simulations such as CAM-CHEM and WACCM will be highlighted.