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Sensitivity of IASI Ozone Profile Retrievals to A Priori Profile : ACCLIP Case Study

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Comparisons with ozonesonde observations over East Asia indicate that the operational a priori used in IASI ozone retrievals overestimates upper troposphere and lower stratosphere (UTLS) ozone, thereby biasing the retrieved Level-2 (L2) profiles. Motivated by this issue, we assess the sensitivity of IASI ozone profile retrievals to a priori specification during the Asian Summer Monsoon Chemical & Climate Impact Project (ACCLIP), a joint NASA–NSF/NCAR field campaign conducted over the Republic of Korea in summer 2022. Using the research-mode retrieval code Atmosphit, we conduct sensitivity experiments that systematically modify the a priori. A tropopause-based (TB) ozone climatology was constructed from East Asian ozonesonde data to serve as the a priori for IASI retrievals. Validation against ACCLIP ozonesonde profiles shows considerable UTLS improvements, including reduced mean biases and variability and a more faithful representation of ozone gradients across the tropopause. The TB ozone climatology a priori also improves agreement for tropospheric ozone and total column ozone (TCO).

Keywords: Ozone, IASI ozone profile, UTLS, ACCLIP

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