

Atmospheric response during annular solar eclipse of 15 January 2010

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A solar eclipse is a rare, natural, global and unique perturbation experiment. The rapid changes in light intensity provide us with an excellent opportunity to probe atmospheric photochemistry, dynamic processes and the other academic fields. The longest solar eclipse of this millennium occurred on 15 January 2010, and we first grasped the variations of vertical profiles of the middle atmospheric trace gases using high sensitivity measurements of the Superconducting Submillimeter-Wave Limb-Emission Sounder (SMILES). The observation data shows the day-night transition. Also, we simulated the event using the MIROC3.2-CTM which is one of the chemistry and transport models (CTM) developed from the chemical module of the Center for Climate System Research/National Institute for Environmental Studies(CCSR/NIES) CCM. In this presentation, we will show the impact on the atmospheric response to the abrupt change in solar forcing during the event and the inter-comparisons between the SMILES measurements and the CTM results. The study provides a striking demonstration of the dynamics of photochemical processes in the middle-atmosphere.

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