Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

AAS22-02 Room:201B Time:May 21 09:15-09:30

Ozone distribution related to the QBO and the SAO — Observation by the SMILES and estimation by a nudging CTM

NAITO, Yoko[1*], AKIYOSHI, Hideharu[3], SHIOTANI, Masato[2]

[1]Graduate School of Science, Kyoto University, [2]Research Institute for Sustainable Humanosphere, [3]National Institute for Environmental Studies

An attempt is made to estimate dynamical and chemical effects on the variation of the ozone distribution in the equatorial stratosphere according to the phases of the QBO (quasi-biennial oscillation) and the SAO (semiannual oscillation). Both of the data from the observation by the SMILES and the data from the simulation by a nudging CTM based on the MIROC CCM are analyzed.

The distribution of ozone mixing ratio in the equatorial stratosphere has a maximum in the mid-stratosphere (about 30 km), and the value decreases with height in the upper stratosphere. The latitudinal distribution in the upper stratosphere basically shows a single-peak structure with a maximum around the equator, while sometimes exhibits a double-peak structure with two maxima according to the phases of the QBO and the SAO.

Such a double-peak structure, called as ”rabbit ears” by Randel and Wu (1996), is clearly displayed in the daily mapped data from the SMILES observation. The SMILES observation also showed that the double-peak structure appears and disappears according to the phase of the SAO.

Furthermore in the present talk, a quantitative estimation will be made on contributions of both dynamical effects such as the advection and the chemical effects such as the production/destruction of ozone to form the double-peak structure.

Keywords: stratosphere, QBO, SAO, ozone, dynamics, chemistry