Geophysical Research Abstracts
Vol. 20, EGU2018-2667-5, 2018
EGU General Assembly 2018

Tropospheric jet response to Antarctic ozone depletion: An update with Chemistry-Climate Model Initiative (CCMI) models

Seok-Woo Son (1), Bo-Reum Han (2), Chaim I. Garfinkel (3), Seo-Yeon Kim (4), and Rokjin Park (5)

(1) Seoul National University, School of Earth and Environmental Sciences, Seoul, Korea, Republic Of (seokwooson@snu.ac.kr), (2) Seoul National University, School of Earth and Environmental Sciences, Seoul, Korea, Republic Of (hbreum11@snu.ac.kr), (3) The Fredy and Nadine Herrmann Institute of Earth Sciences, Hebrew University of Jerusalem, Jerusalem, Israel, (4) Seoul National University, School of Earth and Environmental Sciences, Seoul, Korea, Republic Of (koko2389@snu.ac.kr), (5) Seoul National University, School of Earth and Environmental Sciences, Seoul, Korea, Republic Of (rjpark@snu.ac.kr)

The Southern Hemisphere (SH) zonal-mean circulation change in response to Antarctic ozone depletion is revisited by examining a set of the latest model simulations archived for the Chemistry-Climate Model Initiative (CCMI) project. All models successfully reproduce the Antarctic ozone depletion in the late 20th century. The related SH-summer circulation changes, such as a poleward intensification of westerly jet and a poleward expansion of the Hadley cell, are also well captured. Both the models with a coupled ocean and those with a prescribed ocean exhibit quantitatively the same multi-model mean trends. Results are also quantitatively similar to those derived from the Coupled Model Intercomparison Project phase 5 (CMIP5) high-top model simulations in which the ozone depletion is mostly prescribed with monthly- and zonally-averaged values. These results suggest that the ozone-hole-induced SH-summer circulation changes are quite robust across the models irrespective of the specific chemistry-atmosphere-ocean coupling.