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Structure of the Brewer-Dobson circulation change in CCMI and relationship with changes in the wave forcing

Petr Sacha (1,2), Juan Añel (2), Laura de la Torre (2), Roland Eichinger (3), and Petr Pisoft (1)

(1) Charles University in Prague, Faculty of Mathematics and Physics, Department of Atmospheric Physics, Prague, Czech Republic, (2) Faculty of Sciences, Universidade de Vigo, Ourense, Spain, (3) Deutsches Zentrum für Luft- und Raumfahrt (DLR) Institut für Physik der Atmosphäre, Germany

The mean age of stratospheric air (AoA) is a useful transport diagnostic and one of the best tools for accessing the Brewer-Dobson circulation (BDC) change. Analyzing AoA output from CCMI REFC2 model simulations we found that models do not agree on the structure (broadness and shape) of AoA distribution, on the AoA value nor on the value of AoA trend with changing climate. But, they agree very well on the structure of this change, especially in the extratropical lower stratosphere (LS). All the analyzed models reach agreement in giving the maximal AoA trend in a localized LS region on both hemispheres (approximately between 200000 and 250000gpm and 20°-40°N and 20°-40°S). In our study we analyze in detail the kinematic and dynamic changes that correspond with the regions of maximum AoA trend. It is shown that the change of the spatial structure of the LS AoA distribution (i.e. of the shallow BDC branch) is connected with an interplay (not only compensation) between spatial structures and magnitudes of orographic and nonorographic gravity and resolved wave drag.