

## **Brewer-Dobson Circulation Diagnosed From Reanalysis Datasets**

Chiaki KOBAYASHI<sup>1\*</sup>, Toshiki IWASAKI<sup>2</sup>

<sup>1</sup>*Meteorological Research Institute, Japan*, <sup>2</sup>*Tohoku University, Japan*

We examine the Brewer-Dobson circulation (BDC) in the lower stratosphere diagnosed from the Japanese 55 year Reanalysis (JRA-55) data set and compare it with the BDCs diagnosed from the other reanalyses (i.e., ERA-Interim, JRA-25, etc), and JRA-55-related data sets (i.e., JRA-55C, created by assimilating only in situ observations, and JRA-55AMIP, a simulation by a prediction model). The climatological mean seasonal change of the BDC in JRA-55 is similar to that in ERA-Interim but considerably different from that in JRA-25. Dynamical and thermodynamical consistencies among the variables are greatly improved in the JRA-55 data set. In JRA-55, the annual mean tropical upwelling shows a significant increasing trend in the lower stratosphere during recent decades. We also clarify that the BDC has significant phase dependencies of the quasi-biennial oscillation (QBO). The interannual variations of the annual mean tropical upwellings in JRA-55 are almost coincident with those in JRA-55C. It suggests that the weakly increasing trend of the BDC found in JRA-55 does not have anything to do with changes in the satellite observing system. The climatological mean tropical upwelling diagnosed from JRA-55 is stronger than that from JRA-55AMIP. This difference is presumed to partly link to the model's inability to simulate the QBO, because the JRA-55AMIP data set, a simple simulation performed without data assimilation, does not simulate the QBO.