Changes in the Brewer-Dobson Circulation in JRA-55

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Future projections by many climate models suggest that the Brewer-Dobson circulation (BDC) will be intensified as a result of rising greenhouse gas concentrations. However, observations show a diversity of the BDC strength changes. In this study, we investigate the changes in the BDC using JRA-55 reanalysis data compared with JRA-55-related products. In JRA-55, the annual mean tropical upwelling shows a significant increasing trend in the lower stratosphere from 1979 to 2012. The difference of the wave activity pattern between the first and second 15-year periods of last 30 years in JRA-55 do not consist with the greenhouse gas-induced change shown in previous studies (e.g. Shepherd and McLandress, 2011). This suggests that the increasing trend of the tropical upwelling in JRA-55 is caused by the different mechanism from greenhouse gas-induced climate change. The comparison among the JRA-55-related products (i.e., JRA-55C, reanalysis created by assimilating only conventional observations, and JRA-55AMIP, a simulation by a prediction model), is discussed in the presentation.

Key words: Brewer-Dobson circulation, JRA-55 reanalysis, trend

References

Shepherd and McLandress, 2011: *Journal of the Atmospheric Sciences*, **68** 784-797.