



## **Tropical Circulations In A Changing Climate**

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According to the IPCC AR5 report (2013), understanding the impact of climate change on the intensity and physical configuration of the tropical overturning circulations represents a key step in the assessment of changes at global and regional level. At the same time, there is a large degree of uncertainty in these projections, such as the inability of the models to consistently simulate the recent strengthening in the Walker circulation. This study aims at comparatively investigating the features of the Walker and Hadley circulations as derived from the CMIP5 model outputs and the existing satellite humidity long data record. For this purpose, we are looking for a correlation between the dynamical features of the tropical circulations and the upper tropospheric humidity (UTH). Buehler and John's (2005) method of relating microwave radiances to UTH will be used to obtain the observation data set from the microwave retrievals. The same method will be applied to the CMIP5 model outputs in order to derive a corresponding modelled radiance data set. The comparison of the observed radiances to the ones simulated from the CMIP5 outputs would constitute a tool in determining the performance of the models in correctly describing the circulations, as well as in pointing out possible biases and expected uncertainties. These results will further be used for the evaluation of the climate model projections for the tropical circulations and identification of features with various confidence levels.

### References:

Buehler, S.A., and John, V.O. (2005), A simple method to relate microwave radiances to upper tropospheric humidity, *J. Geophys. Res.*, 110, D02110

IPCC, 2013: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp