Geophysical Research Abstracts
Vol. 19, EGU2017-1782-1, 2017
EGU General Assembly 2017

Stochastic parameterization for deep convection in NCAR CAM5

Yong Wang (1), Guangjun Zhang (2), and George Craig (3)

(1) Department of Earth System Science, Tsinghua University, Beijing, China (yongw@mail.tsinghua.edu.cn), (2) Scripps Institution of Oceanography, La Jolla, USA (gzhang@ucsd.edu), (3) Ludwig-Maximilians-Universität, München, Germany (George.Craig@lmu.de)

Most convective parameterization schemes in current global climate models are deterministic. As the model resolution increases, the stochastic behavior of convection becomes important. In this study, the Plant-Craig (PC) stochastic convective parameterization scheme is implemented into the NCAR Community Atmosphere Model CAM5 to couple with the Zhang-McFarlane (ZM) deterministic convection scheme. To evaluate its effect, simulations were conducted to compare with the standard ZM deterministic convection scheme. Results show that the PC stochastic parameterization alleviates many of the common biases in the climate simulation in CAM5, such as double intertropical convergence zone (ITCZ), too-much-drizzle and weak intraseasonal variability of precipitation. The stochastic scheme also increases the large-scale precipitation because of more detrained water from convection, making it in better agreement with TRMM observations. Low cloud fraction simulated by the stochastic scheme is reduced, resulting in an improvement of shortwave cloud forcing (SWCF). Other climate mean states such as liquid water path (LWP) and precipitable water are also improved.