

Simulations and Projections of the Extreme Precipitation Over Global Monsoon Domain In FGOALS-g2

PENG Dongdong^{1,2}, ZHOU Tianjun^{1,3}, ZOU Liwei¹, and ZHANG Lixia¹

¹ *State Key Laboratory of Numerical Modeling for Atmospheric Sciences and
Geophysical Fluid Dynamics, Institute of Atmospheric Physics, Chinese Academy of
Sciences, Beijing 100029, China*

² *University of the Chinese Academy of Sciences, Beijing 100049, China*

³ *Climate Change Research Center, Chinese Academy of Sciences, Beijing, 10029,
China*

Based on the historical simulation and future projection under RCP8.5 scenario by FGOALS-g2, the simulation of extreme climate indices and the associated potential future changes in 21st century over global monsoon domain has been analyzed. Results indicated that FGOALS-g2 can well reproduce the spatial patterns of extreme precipitation、total precipitation and maximum number of consecutive days with daily precipitation less than 1mm(hereafter, CDD), but exhibited low skills in simulating the spatial patterns of precipitation intensity and maximum one-day precipitation over Asian monsoon region. Because of the overestimated (underestimated) frequency of very heavy rain (moderate and heavy rain), the extreme precipitation (total precipitation) simulated by FGOALS-g2 was stronger (weaker) than observation. Under RCP8.5 scenario, the extreme precipitation、total precipitation and precipitation intensity tended to increase over global monsoon domain, with the most significant change being found over North America (22% and 17% for extreme precipitation and precipitation intensity, respectively) and over Australia (37% for precipitation amount). The projected increase of extreme precipitation may be attributable to an increase of precipitable water. In contrast, the projected CDD exhibited decadal variability in the future, which was the combination of the increase over global land monsoon domain and decrease over global ocean monsoon domain. To the end of 21st century (2076-95), projected CDD will decrease (increase) by 30% (40%) over South America (Australia), which is associated with the increase (decrease) of the frequency of rainfall events with daily precipitation less than 1mm.

Key words: Global Monsoon, FGOALS-g2, Extreme Precipitation, Extreme Climate