



Past and Future Change of the Warm Season Eastward Propagating Rainfall Episodes Over the Yangtze River Valley

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The rainfall formed at the eastern Tibetan Plateau often propagates eastward along the Yangtze River Valley (YRV; 27-33N, 100-120E) in summer. Using NCEP R1 reanalysis, CMIP5 global climate simulations and WRF regional simulations, this study examines the characteristics and causes of past change of eastward propagating rainfall over the YRV and projects the future change of this phenomenon. The analyses show that during 1960-2010 the eastward propagating rainfall over the YRV was decreasing. This was related to the weakening of low-level jet from south/southwest and the weakening of upper-level westerly wind. While comparing the CMIP5 historical run (1985-2005) with the RCP8.5 run (2081-2100), the analyses show that both the strengthening of low-level jet and the upper-level westerly wind in the future help the increases of rainfall over the YRV. Furthermore, by examining the WRF simulations for May to July of 2009, We find that when the climate differences in the past (i.e. both the weakening of low-level jet and upper-level westerly) are added to the model, the characteristics of rainfall episodes show fewer frequency and shorter propagation distance.