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Precipitation changes from dynamic and thermodynamic processes

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The simulated precipitation datasets from CMIP5/AMIP5 model historical runs have been analysed to study the variations and responses to the surface temperature. The trend over the wet and dry areas are also calculated and compared with satellite observations from GPCP and TRMM datasets. Good agreement is found between AMIP5 and observations, particular over the land areas, demonstrates a strong control of surface temperature to the precipitation. All datasets show the wet area is becoming wetter and dry area is becoming drier. Though the detailed precipitation changes still vary from model to observations and from model to models, the general characteristics of the precipitation variation and responses to the surface temperature variation are consistent.

The precipitation changes are driven by dynamic (ENSO) and thermodynamic (temperature related) processes. A new technique has been employed to distinguish these two mechanisms.