



## **The Summer Asian monsoon in the CMIP5 projections: A link between the change of extreme precipitation and the monsoon dynamics.**

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Change in extreme events in the climate projections is a major concern. If the frequency of mean precipitation is expected to become lower in a warmer climate, the heavy and extreme precipitation are expected to increase. However, due to the different model responses to radiative forcing, a lot of uncertainties remain in the forecasts.

In this study, we focus on the Asia region, separated into 3 sub-regions (East Asia Region, EAR, India Region, IR, and West North Pacific Region, WNPR) where the summer monsoon can bring seasonal heavy rainfall.

We accord particular attention on the reliability of the projection, using data from a large ensemble of 30 models from the CMIP5. The scattering of the ensemble can give a good estimate of the uncertainties. We analyze the seasonal signal of the changes in the pdf of precipitation, to point out the periods with the strongest results, and the associated changes in the atmospheric circulation.

The results show clear spatial and temporal differences in the confidence of changes, with more reliable results for EAR (while large uncertainties remain in other regions), and during the wet season, i.e. the summer monsoon. However, increase in extremes, compare to the modifications in the mean precipitation, are more confident in every region. This change in extreme events is associated with a change in the atmospheric circulation, especially in the moisture flux convergence (MFC). We analyse the correlation between the change in precipitation and the different component of the MFC (i.e. the convergence and advection parts, and the dynamical and thermodynamical contributions).

The dynamical part of the HMFC present a greater contribution than the thermodynamical part, the later being only correlated with precipitation in EAR.