Uncertainties of future regional precipitation changes over East Asia

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The Multi-model Combinatorics Approach (MMCA) is used to assess the uncertainties in climate change signals under enhanced greenhouse gas concentrations. By deriving the means of all possible sub-ensembles within CMIP5 and including information about model performance, MMCA aims to estimate robust climate change signals as well as their uncertainties for extreme precipitation over East Asia. Information about model performance is used to select sub-ensembles of good and poor performing CMIP5 models. Metrics representing model performance include the representation of Tropical Cyclones (TC) and the Mei-yu/Changma/Baiu front, as these are two of the major contributors to extreme precipitation over East Asia.

Preliminary results suggest that extreme precipitation is projected to increase over most parts of East Asia under future climate conditions, however, the climate change signal is most distinguishable from the current climate over northern East Asia. For southern East Asia, good performing models with respect to TCs show a smaller increase in relative extreme precipitation compared to poor performing models. This is potentially related to a stronger decrease of TCs in the good performing models compared to the poor ones as a stronger decrease in numbers of TCs leads to less TC induced extreme precipitation and overall reduces the extreme precipitation increase over this region. Further analyses are carried out to fully understand the discrepancy between climate change signals of extreme precipitation in good and poor performing models.