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Suppression of south Asian summer monsoon precipitation in the 21st century

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We used a high-resolution nested climate modeling system to investigate the response of South Asian summer monsoon dynamics to anthropogenic increases in greenhouse gas concentrations. The simulated dynamical features of the summer monsoon compared well with reanalysis data and observations. Further, we found that enhanced greenhouse forcing resulted in overall suppression of summer precipitation, a delay in monsoon onset, and an increase in the occurrence of monsoon break periods. Weakening of the large-scale monsoon flow and suppression of the dominant intraseasonal oscillatory modes were instrumental in the overall weakening of the South Asian summer monsoon. Such changes in monsoon dynamics could have substantial impacts by decreasing summer precipitation in key areas of South Asia.