



A robust projected weakening of winter monsoon winds over the Arabian sea under climate change

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The response of the Indian winter monsoon to climate change has received considerably less attention than that of the summer monsoon. Here, we show that all Coupled Model Intercomparison Project Phase 5 (CMIP5) models display a consistent reduction (of 6.5% for Representative Concentration Pathways 8.5 and 3.5% for 4.5, on an average) of the winter monsoon winds over the Arabian Sea at the end of 21st century. This projected reduction weakens but remains robust when corrected for overestimated winter Arabian Sea winds in CMIP5. This weakening is driven by a reduction in the interhemispheric sea level pressure gradient resulting from enhanced warming of the dry Arabian Peninsula relative to the southern Indian Ocean. The wind weakening reduces winter oceanic heat losses to the atmosphere and deepening of convective mixed layer in the northern Arabian Sea and hence can potentially inhibit the seasonal chlorophyll bloom that contributes substantially to the Arabian Sea annual productivity.