



Future changes in the boreal summer intraseasonal oscillation projected by the CNRM-CM5 model under the RCP 8.5 scenario

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The 30–60-day boreal summer intraseasonal oscillation (BSISO) is the predominant intraseasonal variability in the Asian summer monsoon (ASM) region, representing the canonical northward and northwestward propagating convective components over South Asia (SA) and East Asia/western North Pacific (EA/WNP) sectors in conjunction with eastward propagating convective anomalies. The objective of this study is to assess possible changes of the 30–60-day BSISO in future global warming condition by comparing the twentieth century simulation with the twenty-first century projection produced by the CNRM-CM5 model under the representative concentration pathway 8.5 (RCP 8.5) scenario.

In response to the increase of sea surface temperature in the tropical and subtropical Indian and Pacific Oceans, the saturation specific humidity in the planetary boundary layer (PBL) increases by about 16%, providing more moisture and moist static energy for tropical convection. Thus, the BSISO will be intensified, with large-amplitude events prevailing in a broader range of the Indo-Pacific region. The convective signal will initiate over more westward parts of the Indian Ocean and decay over the more eastward tropical Pacific. As the strengthening of northward propagations over the SA and EA/WNP sectors is intimately related to equatorial enhanced convective anomalies, the enhanced convective anomalies are accompanied by stronger ascents on the top of the PBL, together with the wetter seasonal-mean PBL background, resulting in stronger northward propagation through moisture mechanisms. Moreover, due to the increased moisture-holding capacity of the low-level atmosphere, the phase speeds of SASM and EA/WNP northward propagation will decrease.