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## Variability of boreal spring Hadley circulation over the Asian monsoon domain and its relationship with tropical SST

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The variability of boreal spring Hadley circulation (HC) over the Asian monsoon domain over the last four decades is explored. The climatological distribution of the regional HC is symmetric of the equator, with the ascending branch around the equator and sinking branch around the subtropics in each hemisphere. The first dominant mode (EOF1) of the regional HC is equatorial asymmetric, with the main body in the Southern Hemisphere (SH) and the ascending branch to the north of the equator. This mode is mainly characterized by interannual variation and is related to El Niño–Southern Oscillation (ENSO). Significant negative sea surface temperature (SST) anomalies are observed over the tropical Indian Ocean (TIO) along with the development of La Niña events; however, the magnitude of SST anomalies in the southern Indian Ocean is greater than that in the northern counterpart, contributing to EOF1 formation. The spatial distribution of the second dominant mode (EOF2) is with the main body lying in the Northern Hemisphere (NH) and the ascending branch located to the south of the equator. The temporal variation of this mode is connected to the warming of the TIO. The warming rate of the southern TIO SST is faster than that in the northern counterpart, resulting in the southward migration of the rising branch. The above result indicates the critical role of the meridional distribution of SST on the variability of the regional HC.