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The role of surface air temperature over the east Asia on the early and late Indian Summer Monsoon Onset over Kerala

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We investigated the physical mechanism for late Indian Summer Monsoon onset over Kerala (MOK). 14 early and 9 late onset years are selected based on the criteria when the onset is 5 days or

more prior and after normal onset date (i.e 1st June according to India Meteorological Department)

respectively. Then, we perform composite analyses of mean May monthly and daily evolution during

early and late onset years to examine the differences in monsoon circulation features prior to the MOK.

We find that advection of Surface Air Temperature (SAT) from the northern to the southern China and

the eastern Tibetan Plateau (TP) plays an important role to modulate the MOK processes. In the late

onset years, more low-level jet (LLJ) from the Bay of Bengal (BOB) divert towards the east Asia before

the onset, which is due to an extension of the low sea level pressure and high SAT over the east Asia

(eastern TP, east-central China). This strengthens the low-level convergence and upper level divergence

over the eastern TP and southern China. As a result, a significant amount of moisture from the BOB

is transported towards the eastern TP and southern China. Thereby, a comparatively weaker LLJ and

deficit low-level moisture supply over the eastern BOB maintain the key roles in modulating the MOK

processes.