Intraseasonal variation of the South Asian high and its role in connecting the Indian and East Asian summer monsoons

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The South Asian high (SAH) is the most intense and persistent upper-level circulation system in the Asian monsoon region during boreal summer. It plays a crucial role in the onset and variation of the Asian summer monsoon. Ample evidence shows that the monsoon onset and activities are closely related to the intraseasonal oscillation (ISO). Previous studies have found that the ISO in the East Asian summer monsoon (EASM) is impacted by the northward or northwestward propagation of the ISO in the South China Sea and the western North Pacific, and the northeastward propagation of the ISO in the tropical Indian Ocean. However, seldom research mentioned the effect of the ISO in the SAH. Our previous studies have shown that the SAH plays an important role in connecting the Indian summer monsoon (ISM) and the EASM on the interannual time scale. However, the effect of the SAH on the connection of the ISM and the EASM on the intraseasonal time scale is still not clear. Actually, the ISO in the SAH is significant in its zonal variation. In this study, we firstly figured out the intraseasonal variation feature of the SAH. And then, we explored the upper-level signal which will lead to the onset, advance and retreat of the EASM. Considering significant ISO in the ISM, we investigated the ISO feature in the ISM and its effect on the ISO in the SAH. Finally, we addressed a new physical process that the ISO in the ISM will impact the ISO in the SAH, and further influence the advance and retreat of the EASM on the intraseasonal time scale. We try to learn about the intraseasonal variation of the EASM in a new view, and propose a new way to improve the short-term climate prediction and the extended-range weather forecast.

