



Influences of elevated heating effect by the Himalaya on the changes in Asian summer monsoon

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Based on a series of topographical and thermal sensitivity experiments, the physical processes on the changes of Asian summer monsoon caused by the Himalaya elevated heating were investigated. Six different Himalaya-Iranian Plateau mountain heights were used: 0%, 20%, 40%, 60%, 80%, and 100% in the first group (called HIM). The no sensible heating experiments (called HIM_NS) were also performed with the same six mountain heights but the surface sensible heating was not allowed to heat the atmosphere.

The results indicate that the elevated heating effect of Himalaya gradually intensified when Himalaya uplift. The establishment of SASM over South Asian land which is characterized by the strong precipitation over South slope of Tibetan Plateau and the huge warm anticyclone in the upper troposphere are in proportion to the elevated heating effect of Himalaya. Further analysis suggests that the surface heat fluxes over Himalaya keep almost unchanged during the uplifting, but the lifted condensation level reduces gradually over the regions where the mountain uplift. The condensation moisturing increases correspondingly and leads to the increase of latent heating in the upper troposphere. Therefore, the positive feedback between the moist convection over south slope of Himalaya and monsoon circulation over Indian sub-continent forms and the successive precipitation over South Asian land is maintained.