

Investigation of soil moisture - afternoon precipitation coupling in summer over the Tibetan Plateau using satellite observations

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Coupling between soil moisture and afternoon precipitation in summer over the Tibetan Plateau (TP) was investigated using a previously implemented convective triggering potential (CTP)–humidity index (HI) framework by combining satellite observations, including the Atmospheric Infrared Sounder (AIRS), the merged active and passive soil moisture products from the European Space Agency (ESA), and the U.S. Climate Prediction Center (CPC) merged satellite rainfall product (CMORPH). We found that a main atmosphere controlled region was mainly located in the south and the north edge of the TP, and a main negative feedback of soil moisture –afternoon precipitation was in the west of the TP, where the CTP over this region is relatively larger in most time. In the central and the northeast of the TP, both positive and negative feedbacks coexist, with the main positive feedback was shown in the central TP. In addition, the coupling between soil moisture and afternoon precipitation was affected by the statement of monsoon. With the water vapor transport of the monsoon, it is benefit for the co-existence of both positive and negative feedback converting to the positive feedback predominant.

Keywords: Tibetan Plateau, Soil moisture , afternoon precipitation, Satellite observations