



## **Improvement of Surface skin temperature simulation over the Tibetan Plateau from an energy balance perspective**

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There has a big cold bias of temperature about reanalysis and simulations over Tibetan Plateau comparing with observations. In order to solve this problem, for the land—atmosphere interaction in arid and semi-arid region is mainly dominated by heat transfer process, a latest revision of surface sensible heat parameterization introduced by Zeng et al is then used for bare soil in WRFV3 (CLM4) model. Results show that the annual surface skin temperature has approximately up to 2.0 degree improvement on average over Tibetan Plateau. Firstly, the revised scheme changes the energy balance over and around Tibetan Plateau. It significantly reduces the overestimate of surface sensible heat and improves the surface skin temperature simulation, which tends more close to the observation. Secondly, the revised scheme weakens the sensible heat air pump effect of Tibetan Plateau. The diabatic heating reduce and the updraft airflow weaken especially over the southern slope of plateau, meanwhile the clouds thin, the incident solar radiation increases, eventually led to the increase of surface skin temperature in North India in dry season.