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Modeling diurnal cycle of land surface temperature in the Central Tibetan Plateau based on satellite products

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Changes in the frozen soil in the Tibetan Plateau (TP) exert significant influences on regional hydrology and terrestrial ecosystems. Temporal and spatial knowledge of land surface temperature (LST) is essential for investigating the ecohydrological processes related to soil freeze/thaw (F/T) dynamics. Thin active layer of the TP is sensitive to the large diurnal temperature fluctuation amplitude. Therefore, the diurnal temperature cycle (DTC) is very important in investigating near-surface soil F/T cycle and thus the regional hydrological cycle during the transition period. In this study, multi-satellite observations will be used to construct DTC in the Central TP where in-situ observations are extremely sparse due to harsh climate conditions. The spatial resolution strength of Moderate Resolution Imaging Spectroradiometer (MODIS, 1 km) and temporal strength of geostationary satellites (8 times per day) will be integrated to derive DTC dataset with high spatial and temporal resolution (1 km with 3-hour interval) in the TP. The 3 hour LST from Multi-functional Transport Satellite (MTSAT) will be used to provide high frequent information. The least square support vector machines (LSSVMs) will be taken to downscale of MTSAT LST. The result will be validated with in-situ observed ground surface temperature with the scale discrepancy accounted. With the derived DTC dataset, the diurnal F/T dynamics in the Central TP will be investigated in terms of F/T onsets and the F/T transmission.