Interdependent Dynamics of LAI-ET across Roofing Landscapes: the Mongolian and Tibetan Plateaus

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The Mongolian and Tibetan Plateaus have experienced higher-than-global average warming in recent decades, resulting in many significant changes in ecosystem structure and function. Among them are Leaf area index (LAI) and evapotranspiration (ET) that play a fundamental role in shaping many causes and consequences of land surface processes and climate. Here, we focused on the spatiotemporal changes of the LAI, ET and their relationships on these two roofing landscapes. Based on the MODIS products from 2000 through 2014. We found that there existed a general positive relationship between LAI and ET on the Mongolia Plateau (MP), while there was not synergy on the Tibetan Plateau (TP).

Overall, 49.38% (50.62%) of land areas on the TP experienced significant increased (decreased) in LAI, while 94.92% (5.09%) on the MP. For the ET, the increased land area was 21.70% (124.10×10^3 km^2) on the TP and 88.01% (341.60×10^3 km^2) on the MP. More importantly, the relationships varied substantially across the space and over time, with mismatches found in some parts of the landscapes. Substantial additional efforts with observational and/or experimental investigations are need to explore the relationships, including the influences of vegetation characteristics and disturbances.

Keywords: ET, LAI, Eurasian continent, alpine, land surface process

