



Daily actual evapotranspiration estimation of different land use types based on SEBAL model in agro-pastoral ecotone of northwest China

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Introduction

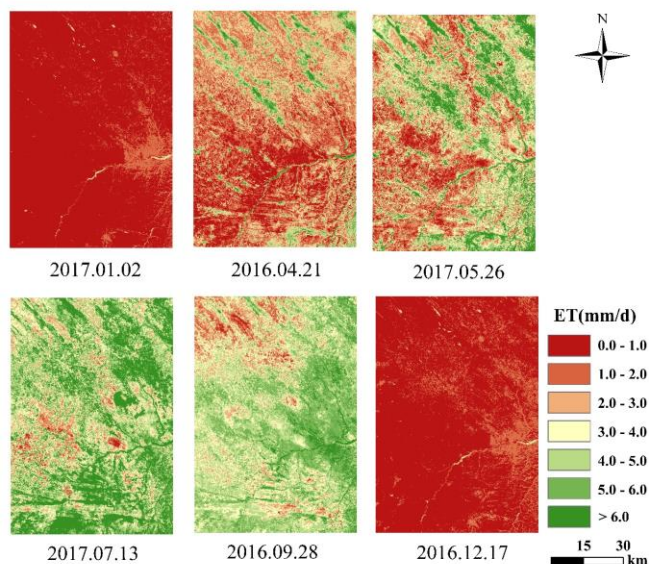
Evapotranspiration (ET) is an important part of the global water cycle. It is the transformation channel of surface water and atmospheric water, which directly affects the spatial distribution of global precipitation and vegetation

Methodology

In 1995, Bastiaanssen proposed the SEBAL inversion model, which was verified and optimized in 1998. The research foundation of the SEBAL model is the energy balance equation, which is composed of four parts: net radiant flux, soil heat flux, sensible heat flux and latent heat flux, forming a closed-loop energy transmission.

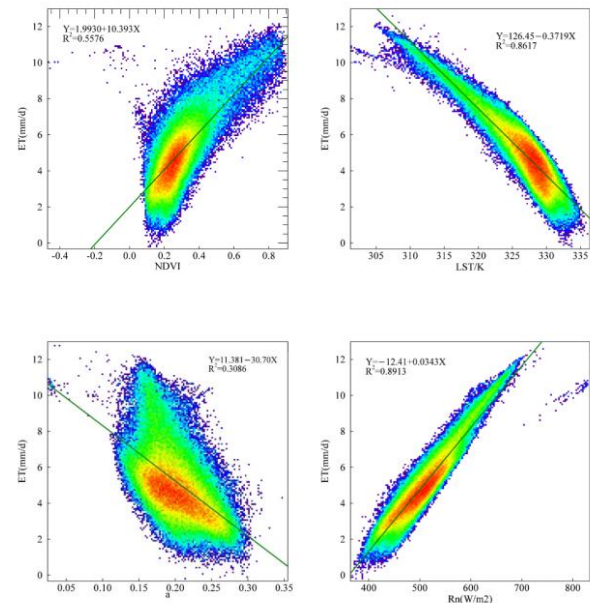
Results

The daily ET in the agro-pastoral ecotone shows a pattern of July (5.17 mm/d)>May (3.51 mm/d)>September (3.31 mm/d)>April (2.02 mm/d)>December (0.72 mm/d)>January (0.56 mm/d).

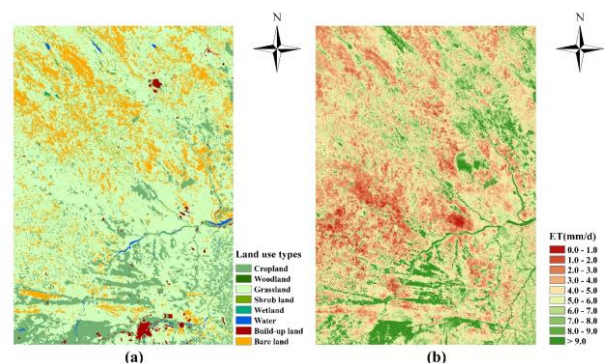


The correlation coefficients between NDVI, LST, surface albedo and net radiant flux and daily ET are 0.5830, 0.8425, 0.3428, and 0.9111, respectively. Among them, NDVI and net radiant flux are positively correlated with daily ET. LST and the surface albedo is negatively correlated with the daily ET. On the whole, the correlation between daily ET and underlying surface parameters from strong to weak is net radiant

flux>LST>NDVI>surface albedo.



the daily ET of Water and Woodland are highest in the study area, with average daily ET of 9.90 mm/d and 8.69 mm/d, respectively, which is due to the fact that Water provides sufficient water resources. The daily ET of Build-up land, Shrub land, Grassland, Bare land is 6.39 mm/d, 5.74 mm/d, 4.92 mm/d and 3.78 mm/d, respectively.



Conclusion

The amount of daily ET varies greatly in terms of spatial distribution, the daily ET of Water is the highest, followed by Woodland, Wetland, Cropland, Build-up land, Shrub land. The area of Grassland and Bare land are the two most dominant land use types in the study area, but their daily evapotranspiration is the lowest. The inversion of daily ET of Build-up land based on the SEBAL model is overestimated.