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Modelling spatial evapotranspiration with BROOK90, MODIS surface temperature and leaf area index for managed grasslands in Inner Mongolia, China

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Precipitation (P) and evapotranspiration (ET) of semi arid grasslands are highly variable in both time and space. They can be measured by micrometeorology for a certain point at the surface, but their estimation at individual sites in larger areas is still facing difficulties.
We present a simple method to derive spatial ET in 1km resolution for the typical steppe of the Xilin river catchment, Inner Mongolia, China: The hydrological model BROOK90 was parameterised from eddy covariance measurements; necessary daily model input data (P, minimum and maximum air temperature) was modelled from manipulation of MODIS leaf area index (LAI) and surface temperature data. The results indicate the potential of estimating spatial P (1km, 8-day resolution) in semi arid temperate grasslands from MODIS LAI gain and allow studying the processes of ET in the 2.600 km^2 of typical steppe in the study area without the need of auxiliary ground-based measurements besides initial model parameterisation. We conclude that this method could be applied in other semi arid grasslands where most P occurs in the growing season. It could be a useful tool to adjust unsustainable land management practices towards a better adapted livestock management.