

LAI mapping and scaling over the Heihe River basin using remotely-sensed data

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Abstract This paper investigates the feasibility of using remotely sensed data for the determination and spatial scaling of leaf area index (LAI). The investigation is prompted by the need to obtain spatially distributed LAI as input for distributed hydrological modelling over the Heihe River basin, northwest China. Five vegetation indices (SR, NDVI, RSR, SAVI and ARVI) were used to find the optimum LAI estimation model. As a result, credible LAI mapping of the Heihe River basin was accomplished using ETM+ data based on land cover classification. Then, 1-km ETM+ LAI aggregated from this 30-m LAI map was compared with 1-km MODIS LAI, pixel by pixel to investigate the difference stemming from spatial scaling. The MODIS LAI was verified and modified with the removal of the effect of surface heterogeneity, which was quantified as pixel purity Pi. As a result, an approach to verify and improve the coarse resolution MODIS LAI product with fine resolution ETM+ LAI map has been proposed and assessed for accuracy.

Key words Heihe River basin; LAI mapping; Landsat ETM+; MODIS; scaling
