Remote sensing-based evaluation of irrigation efficiency and crop water use efficiency over irrigation district in arid region

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Quantitative assessment of irrigation efficiency and crop water use efficiency is the base of high-efficient use of agricultural water resources.A representative irrigation district in arid region, the main region of Hetao Irrigation District in Inner Mongolia, is taken as the study region. Data from remote sensing, field experiment and on-site survery are used as input for remote sensing based evaportranspiration model and maize cover mapping and yield estimation models.Two dual source ET models (TSEB and HTEM) fed with MODIS data are applied from 2003 to 2012 to examine the spatio-temporal patterns of ET in the study region. A maize classifier is porposed based on phenology-vegetaion characteristic values space to classify the maize during the study period. At last, a yield estimation model of maize is established based on crop water production function. Results showed that HTEM model is more capable of estimating ET in the study region. The maize classifier can be used effectively for maize mapping over multiple planting years and in areas with a complex planting structure. And maize yield can be calclulated based on Jensen function with high accuracy.