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The use of remote sensing data for water balance modelling

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One essential component of the catchment water balance is the spatial distribution of soil water storage and actual evapotranspiration. Optical Remote Sensing data obtained from satellite sensors like Landsat-TM5 or Spot were used to evaluate in-put data such as the spatial distribution of land cover and of vegetation parameters such as the NDVI or surface temperatures, which can be used for the estimation of actual evapotranspiration rates. For longer term monitoring, the estimation of the spatial distributions of evapotranspiration rates with satellites like Landsat and Spot have to be combined with the use of spatial distributed simulation models. However, new satellite sensors such as the Moderate Resolution Imaging Sensor (MODIS) provide now a temporal resolution of one day and a spatial resolution between 250 m x 250 m and 1000 m x 1000 m per pixel. In our study, a hydrological catchment model using Landsat-TM5 data and a SVAT-Model using MODIS-data were com-pared and analyzed. The catchment model uses actual landuse, NDVI and surface temperatures with a high spatial resolution, but low time resolution obtained from Landsat-TM5. The SVAT-model uses LAI and NDVI-grids obtained from MODIS-data as a direct calculation input with a high time resolution in contrast to a very low spatial resolution. Model runs were performed using a spatial data set from a mesoscale catchment located at North-East Germany. At local scale, both ap-proaches were tested by comparing measured and simulated model outputs using different field experimental data sets. At regional scale, measured and simulated discharges were compared. Furthermore, the NDVI obtained from the Landsat-TM5-data and the MODIS-data were used for the estimation of Leaf Area Index (LAI) and evapotranspiration rates for a regional test of both modelling approaches.