



Disaggregating SEBS medium resolution evapotranspiration to crop scale

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Accurate irrigation and water management is of vital importance in semi-arid regions for improving crop production. Management practices can be improved by precisely assessing the spatial and temporal distribution of evapotranspiration. Accurate estimates of evapotranspiration (ET) contribute towards efficient crop management tasks from local to regional scales which include irrigation water management for large irrigated areas. Remote sensing is perhaps the only tool for estimating spatial distribution of ET over large landscapes at a high spatial and temporal resolution.

The use of several existing ET algorithms exist that use remotely sensed images for their calculation, but still the issue of quantification of uncertainties remains. Recent advances in remote sensing tools and the increase in computational power coupled with the availability of open source remotely sensed data is encouraging researchers to develop methodologies to quantify uncertainties while efforts are made to enhance its resolution and accuracy. The aim of this research is to upscale evapotranspiration to crop scale, and evaluate the disaggregation with a detailed process model. The daily ET is calculated by the Surface Energy Balance System (SEBS), using medium resolution MODIS data along with meteorological information. This ET is disaggregated to high resolution on basis of crop coefficients for the different land cover types inside individual pixels. Parallel to SEBS calculations, the Soil Canopy Observation of Photochemistry and Energy model (SCOPE) model is also used to generate high resolution crop ET for the same area. The research has been performed for wheat, grown on an irrigated area in the northern plains of India. The results are compared for both the crop growing seasons for the years 2010-11 and 2011-12.

Preliminary results show that the methodology used to enhance resolution and accuracy, increases the correlation between SEBS and SCOPE estimates from 0.34 to 0.49 for the year 2010-11 while for 2011-12 the correlation between them remains low due a large number of cloudy days for which ET cannot be calculated.