MAPPING KEY HYDROLOGICAL VARIABLES USING REMOTELY SENSED IMAGES INTEGRATED IN A DISTRIBUTED WATER BALANCE MODEL

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ABSTRACT:

A cartographic application of remotely sensed images integrated in a distributed water balance is presented. The imagery consisted in an annual series of Landsat 7 ETM+, from where the NDVI (Normalized Difference Vegetation Index) and the land uses/land cover (lu/lc) map were extracted. The soil database came from a permanent experimental network of 23 stations for continuous measurement of soil moisture (REMEDHUS, Soil Moisture Measurement Stations Network) at the Duero Basin (Spain). The theoretical basis of the water balance application derives from FAO56, which is improved with a spatial frame implemented in the computerized tool HIDROMORE. In addition to the image inputs, climatic and soil properties databases were also integrated. Maps of Actual Evapotranspiration (AET), Deep Percolation (DP), and Irrigation rates (I) were extracted. Soil moisture series were simulated for each REMEDHUS station, and the validation of the simulation was performed comparing simulated soil moisture against field-measured. The results for the area-average soil moisture are: RMSE (Root Mean Square Error)=0.02 cm3cm-3, AI (Agreement Index)=0.90 and R (correlation coefficient)=0.82. It was found that the parameters which showed the most influence in the maps appearance were the soil characteristics (water content at field capacity and at wilting point), precisely the parameters that most spatially vary and are the most difficult to acquire.

TOPIC: Remote sensing applications
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