Impacts of Remotely-Sensed Vegetation dynamics on Ecohydrological Response in Redondo Creek Watershed

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Abstract

The remote sensing of dynamic vegetation and its hydrological response are important components to energy and mass balances of catchment hydrological systems. For example, the seasonal dynamics of plant albedo and leaf area index over deciduous forests are a strong forcing function on the water balance of the catchment through the production of a delayed high discharge. This study attempts to capture the seasonal responses of vegetation dynamics, including its albedo and, catchment, from remotely sensed data to investigate their effects on hydrological processes through the production of a delayed high flow. This paper focuses on investigating the benefits of an integrated approach that includes the use of shortwave albedo estimates from Landsat 5 TM in order to calibrate the vegetation fraction across the catchment. This approach is expected to improve the estimates of soil evaporation, and improve the estimation of runoff in the watersheds. The impacts of Remotely-Sensed Vegetation dynamics on the surface hydrological response and its ability to calibrate the vegetation fraction are presented in this study.

Watershed Structure

1. Stream network and flood plain extraction

2. TIN (Triangulated Irregular Network) extraction

Remote sensed datasets

3. Shortwave albedo estimates from MODIS reflectance at seven spectral bands

Vegetation Dynamics

1. Shortwave albedo estimates from Landsat 5 TM imagery

2. Vegetation fraction estimates from Landsat 5 TM imagery

3. Shortwave albedo estimates from 8 Day composites of MODIS

Study Region

Redondo watershed in North Central New Mexico

Watershed Modeling

1. Uncalibrated model results with saturated initial condition

Ongoing works and Future Efforts

- Parameterizations of soil and vegetation maps.
- Calibrating the soil and vegetation parameters.
- Further works: 1. Ongoing: parameterization of soil and vegetation. 2. Planned: conducting field work on the study area.

References
