Hydrologic Modeling at the Watershed Scale Under Climate Scenarios with Dynamic Forest Growth and Competition using Remote Sensing and Field Data

PI: Marco P. Maneta, University of Montana
Awarded for 2009

Evaluating the impacts of climate change on the land phase of the hydrologic cycle is essential to forecast water availability in the future at the regional and local scale so managers and stakeholders can make better informed decisions.

Water and energy transfers at the watershed scale are tightly connected to vegetation dynamics since transpiration largely drives the soil moisture content in the vadose zone, which in turn is a key reservoir that determines recharge rates to the groundwater system, runoff production and hence the response of the entire basin. Vegetation is also a large energy consumer and any energy not dissipated through evapotranspiration will manifest as sensible heat heating the air or the soil and increasing snowmelt rates.

Since vegetation is sensitive to climatic conditions and may be affected by climate change, an evaluation of the impacts of changing atmospheric forcing on the hydrologic system should account for feedbacks with the biotic component. However, hydrologic models currently in use include vegetation in the system as a prescribed boundary condition.

In this document we propose the development of a spatially distributed model that couples a description of the hydrologic system with a forest growth model, an energy balance scheme and a climate model so the feedback between the climate, vegetation and hydrologic system can be investigated.

A research watershed will be instrumented to ground truth remotely sensed information. The model will be constrained, parameterized and tested using remotely sensed information and field-based measurements.

Contact Info

Mail	Marco P. Maneta Geosciences Department University of Montana Missoula, MT 59812	**E-mail:**	marco.maneta@mso.umt.edu
		Phone:	(406) 243-2454
		Fax:	(406) 243-4028
		Website:	None