Improving Land-Surface Modeling of Evapotranspiration Processes in Tropical Forests

Tony Cahill (tcahill@civil.tamu.edu) - Texas A&M University, Gretchen Miller (PI); Georgianne Moore (Co-PIs).

The humid tropics remain a region of difficulty for land surface models (LSMs). Multiple factors contribute to this problem. In moist tropical regions high humidity, leaf wetness, and cloud cover can combine to suppress forest water use below the potential amount indicated by larger-scale models. Mountainous tropical areas pose additional difficulties, as standard modeling and measurement techniques are not readily applied in rough terrain. In a recently-inaugurated project, a combined program of field measurements and regional-scale modeling of the mountainous tropical rain forest of Costa Rica has been undertaken to provide improved methods of handling these regions in LSMs. Specifically, the project will: 1) collect in-canopy and above-canopy hydrometeorological measurements at the Texas A&M Soltis Center in Costa Rica; 2) develop a new conceptual framework for modeling wet canopy processes based on this new dataset; and 3) appropriately revise the Community Land Model to improve its estimates of evapotranspiration in/from tropical forests. Initial work has included partial installation of instrumentation on a 130 ft tower in the canopy, and development of a system for real-time transmission of the collected data over the internet.