# Hydrology Seminar

# Hydrologic Tools and Products for Advancing Operational Forecast Systems

Terri S. Hogue[1] and Kristie J. Franz[2]

[1]*Department of Civil and Environmental Engineering*
*University of California, Los Angeles*

[2]*Department of Geological and Atmospheric Sciences*
*Iowa State University*

The hydrologic research community has invested extensive resources into the development and application of increasingly complex models and related configurations (optimization, data assimilation, etc). The key to integration of research advances is an understanding of operational systems and needs, as well as close collaboration with users and system developers. Previous work conducted by the authors, in consultation with NWS personnel, has led to incremental advances in model calibration and forecast verification approaches. Dr. Hogue has developed and integrated automated optimization routines into both the SAC-SMA and SNOW17 operational forecast models. This work evolved from extensive collaborations with several River Forecasting Centers (RFCs) and resulted in a step-wise calibration system (MACS) designed to assist operational calibration efforts. Research by Dr. Franz has included development and application of forecast verification methods for NWS ensemble streamflow predictions (ESP). The current presentation will overview recent work that has been explicitly tied to NWS hydrologic models and the development of methods and products aimed at improving operational river forecasts. Dr. Hogue has developed a remotely-sensed potential evaporation (PE) product designed to be an alternative to the traditional PE inputs used in the SAC-SMA. The product allows for high resolution (daily) spatial estimates which incorporate current land-cover and climate conditions. Dr. Franz undertook an extensive comparison of the SNOW17 and an energy balance snow model, both off-line and coupled to the SAC-SMA model. While the more complex energy balance model did not show a marked improvement over the simpler snow model currently used in operational streamflow prediction, hindcast analysis revealed that, on average, the two models have similar ensemble forecast skill. Follow-on research includes the development of a combined model that contains both SNOW17 and energy balance routines for multi-model ensemble prediction and support of remotely sensed data applications. Additional work by the authors involves development of parsimonious methods for regionalization of SAC-SMA parameters for operational forecast basins in the southeastern United States. The authors will also overview a recently funded project which focuses on coupling data assimilation algorithms with the SAC-SMA and SNOW-17 models for assimilation of both remotely-sensed and ground-based observations.

**Date:** Monday, March 3, 2008
**Time:** 1:00 P.M.
**Location:** NWS Headquarters
1325 East West Highway, SSMC#2, Room 8246
Silver Spring, Maryland
**Contact:** Pedro Restrepo
Pedro.Restrepo@noaa.gov