CE 597D Water Resources Seminar

Friday April 16, 2004

Stavely Conference Room—231 Sackett Building

12:00-12:15 REFRESHMENTS

12:15-1:15 SEMINAR PRESENTATION

Geodatabase Development in Support of Integrated Hydrologic Forecasting for an Ungaged Ephemeral Channel: Rio Salado, New Mexico

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ABSTRACT: This research is constructing an integrated, multi-process model for estimating long-term streamflow in an ephemeral, ungaged basin, the Rio Salado in central New Mexico. The semi-arid basin drains 3575 km^2 and with seasonal channel flow from summer thunderstorms and winter precipitation. The basin is presently ungaged although streamflow records near the outlet with the Rio Grande are available for 1948-1984. The research will test the hypothesis that integrated models incorporating land surface, soil moisture, groundwater and streamflow processes can be used to forecast ungaged basin response.

The focus of this paper is to develop a strategy for supporting the physical model with an appropriate space-time data for geometry, physical parameters and forcing for the model. The creation of an integrated database, instead of a collection of data layers, provides a stronger foundation for building water resources applications in Geographic Information Systems. We use the ArcHydro Data Model with the geodatabase environment for geospatial and time series data for water resources. The results of this research demonstrate the process of collecting geospatial data in its many forms and populating a geodatabase for support of the integrated hydrologic model. Here we use MODHMS (developed by HydroGeologic Inc.), which is a fully integrated and comprehensive hydrologic model that is physically-based, spatially-distributed framework that includes 3-D variably saturated subsurface flow, 2-D areal overland flow, and flow through a network of 1-D channels. Layers required include vector data like polygons (geology and soils), lines (stream networks with cross-sections), points (monitoring points including bore holes), and raster data which includes gridded digital elevation model and satellites (ie ASTER for determining reaches that are perennial or ephemeral). A variety of interfaces exist for accessing the geodatabase, including ESRI ArcMap, Microsoft Access, Microsoft Excel, and direct interface programming language with Visual Basic, which allows for better management of data, easier extraction of parameters, with visualization of both input and output from the hydrologic model.

Moderator: Yizhong Qu
Refreshments: Josh Toepfer

Suggested reading is available on the ANGEL seminar site.