

Distributed Modeling – A Multiple Use tool for Operational Hydrology

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The Colorado Basin River Forecast Center (CBRFC), an office of NOAA's National Weather Service (NWS), provides hydrologic forecasts for the 303,450 square miles of the Colorado and Eastern Great Basins. Forecasts range from short-term hourly and daily guidance products that support the NWS flash flood/flood warning program, to seasonal water supply outlooks and snap shots of soils moisture states. The CBRFC is experimenting with new distributed model technology using the NWS Hydrology Lab Research Distributed Hydrologic Model (HL-RDHM). Unlike traditional NWS hydrologic modeling in which river basins – usually covering large areas with gauged outlets – are the basis for modeling, distributed modeling uses a continuous network of smaller areas as the modeling basis. In the case of HL-RDHM, a 4km grid is the basis for modeling. In the Desert Southwest rainfall is intermittent and occurs at irregular intervals. Additionally, hydrologic events driven by the localized yet intense precipitation experienced during the Southwest's monsoon season are not always handled well by the traditional lumped-parameter hydrologic models. Often, simulated hydrographs are too broad resulting in dampened crests because precipitation amounts are averaged over a much larger area than where the rainfall actually occurs. CBRFC personnel perform quality controlling of precipitation data from multiple sources in real time using NWS software to derive hourly 4km spatial grids of precipitation estimates. The HL-RDHM can apply these precipitation estimates to the individual grid cells in which they fell to better simulate the results of flash flood producing storms common to the desert South West. The distributed simulations and forecasts of surface run-off and soil moisture produced by CBRFC will have useful applications including for federal, state, and local government agencies as well as the private sector.

HYDROMETEOROLOGY INTEGRATION