Towards a Hydrological Ensemble Prediction System for the Canadian Great-Lakes Basin

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Hydrological models are integral components of water management and monitoring strategies. In particular, distributed hydrological models allow for detailed description of the hydrological and energy cycle as well as provide opportunities for dealing with spatially diverse forcing variables such precipitation. These models are increasingly being implemented by hydrologists as a means of ameliorating the state of knowledge on basins of interest and provide valuable information of hydrological state variables as well as potentially important information on river flow in ungauged regions. Also, there is increasing interest in using spatially distributed meteorological data from diverse sources such as weather radar, Numerical Weather Prediction Models(NWP) and traditional gauge networks to drive these distributed models. This paper examines the feasibility of implementing a distributed hydrological model for assessment of ungauged basins and short term-forecast in the Great Lakes Basin of North America. The platform for hydrologic assessment in the Great Lakes Basin is the WATFLOOD hydrological forecasting system. The focus of this study is to provide initial testing of the model including calibration and validation of the model parameters to historic data. The meteorological forcing data sets include distributed precipitation estimates derived from gauge and radar data. Also, Numerical Weather Prediction (NWP) model input from the Canadian Global Environmental Model (GEM) ensemble system and nested high-resolution GEM runs during our initial testing phase (summer of 2003) are also and used as forcing. Initial modeling results are used to assess the applicability of a distributed hydrological model in this regime, as well as to provide the framework for testing the hydrological aspects of integrated hydrological/atmospheric model in an hydrological ensemble forecasts system.