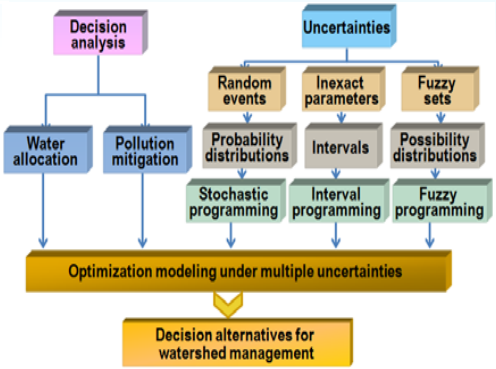
Integrated Watershed Management Under Changing Climatic Conditions

Climate change has profound implications for hydrological cycles in all watersheds. In this study, a set of integrated optimization, simulation and assessment methodologies are developed in order to support the integrated watershed management under changing Climatic Conditions. The developed methodologies can provide decision alternatives for water allocation and pollution mitigation, describe the hydrological process, and facilitate effective strategies for watersheds management and adaptation.

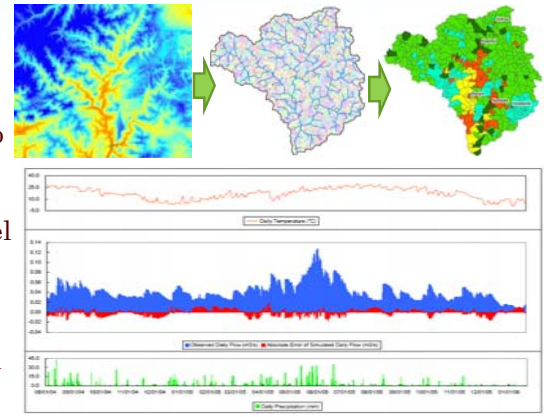
Inexact Optimization Modeling

Inexact optimization models are developed for water resources/water quality management. The developed models can effectively communicate uncertainties expressed as intervals, probabilistic and possibilistic distributions, and generate water allocation and pollution mitigation schemes with varied levels of system-failure risk. The results can provide scientific bases for watershed management planning under multiple uncertainties.

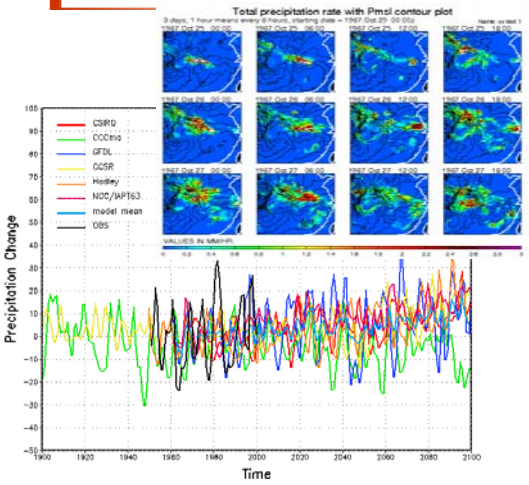


Distributed Hydrological Modeling

The objective of this study is to develop a distributed hydrologic model. The model simulates the hydrologic cycle from precipitation to runoff. It divides a watershed into hydrologically consistent subwatersheds. The watershed model can not only consider the spatial variation of the model parameters, but that of the precipitation-runoff relationships. It can provide decision support for water resources management and planning.

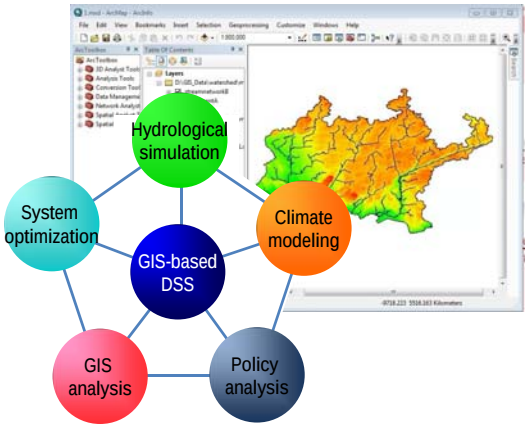


Step-wise Cluster Approach for Hydrological Prediction



This study proposes a Step-wise Cluster Approach (SCA) to tackle the precipitation-runoff relationship and support hydrological prediction. SCA can be used to predict the daily run-off based on the precipitation results of Global climate model (GCM) and climate model (RCM). The results can support the impact evaluation of global and regional climate change on water resources.

Integrated GIS-aided Decision Support System



The integrated GIS-aided decision support system (IGDSS) incorporates a variety of modules, such as inexact optimization modeling, hydrological-environmental modeling, climate modeling, climate-change impact assessment, GIS analysis and policy analysis. The IGDSS can provide decision aid for the development of effective watershed management strategies under changing climatic conditions.

University of Regina

For any questions about this poster, please contact:
Zhong Li, Institute for Energy, Environment and Sustainable Communities
Telephone: **+1-306-3373298** Email: **li395@uregina.ca**