Uncertainty and decision-making in integrated hydrological models

Hydrological models are widely used as the basis for decision-making in water resources however they are subject to uncertainties that affect the quality of any subsequent decisions. The goal of this study is to investigate the trade-off between model simplicity and complexity for making water-resource management decisions, subject to uncertainty.

The starting point for this project is the investigation of using the MIKE SHE modelling framework to investigate the impact on model structure and calibration on a streamflow depletion problem in the Canterbury region of New Zealand. The study will build on already existing models. Proposed changes in water allocation, irrigation practice and land use may result in unacceptable flow reductions in an extensive coastal spring system. The aim is to explore different facets of risk calculation to determine whether the proposed changes lead to unacceptable flow reductions. The challenge is to evaluate decisions on how to allocate water, meet environmental requirements and manage land use under different scenarios and evaluating the results for a set of criteria considered critical for the stakeholders.