Geophysical Research Abstracts,
Vol. 11, EGU2009-1922, 2009
EGU General Assembly 2009

Disentangling uncertainties in model inputs, model parameters and model structure

H. McMillan (1), M. Clark (1), D. Kavetski (2), B. Jackson (3), and R. Woods (1)

(1) National Institute of Water and Atmospheric Research, Christchurch, New Zealand (h.mcmillan@niwa.co.nz), (2) School of Engineering, University of Newcastle, Australia , (3) School of Geography, Environment and Earth Sciences, Victoria University of Wellington, New Zealand

In order to provide a rigorous assessment of the different sources of uncertainty in hydrological models, and to provide unbiased model predictions, it is important to separate the role of uncertainty in model inputs (rainfall observation uncertainty) from uncertainty in model structure/parameterisation. However, separating these two uncertainty sources can be problematic because the structure of a hydrological model (and its parameters) can compensate for uncertainties in model inputs.

This presentation demonstrates how the BATEA method (Bayesian Total Error Analysis) can be used to quantify input uncertainty through analysis of total hydrological modelling error. In order to disentangle errors from model structure in addition to model parameters, BATEA is for the first time linked to multiple hydrological models, and differences between BATEA input uncertainty estimates obtained with different model structures are evaluated.

Our analysis is carried out in the Mahurangi catchment, a 50 km2 experimental watershed in North Island, New Zealand, with a network of 13 rain gauges. This data allows a comprehensive analysis of true rainfall observation uncertainty; both for individual storm events and through parameterisation of rainfall error distributions. The BATEA input uncertainty estimates can therefore be evaluated against these reliable estimates of true precipitation uncertainty.