Geophysical Research Abstracts
Vol. 12, EGU2010-13738, 2010
EGU General Assembly 2010

Evaluation of ensemble flow forecasts generated through a distributed hydrological model and data assimilation

Pablo Mendoza (1), James McPhee (2), and Ximena Vargas (3)
(1) (pamendoz@ing.uchile.cl), (2) (jmcphee@ing.uchile.cl), (3) (xvargas@ing.uchile.cl)

This paper focuses on the application of Topnet, a physically based distributed hydrological model, for real – time flood forecasting purposes. The area of interest is the Cautin River basin, located in Southern Chile (38º 29' S and 72º 00' W). The catchment area is 2688 km^2 and the annual mean rainfall is 2346 mm. After calibration, the model is able to reproduce hourly streamflow at the basin outlet successfully. However, it is impossible to get reliable simulations for all flood events analyzed using the same set of parameters. In order to reduce model uncertainty, an ensemble Kalman filter implementation was calibrated and applied, demonstrating that model simulations can improve significantly. Furthermore, Talagrand histograms and Q-Q plots indicate that it is possible to get good ensemble properties in a rainy period. Model calibration and assimilation results suggest that lack of information about the spatial variability of model parameters hinders our ability to obtain a reliable propagation of information from the outlet to a gauged upstream point, in opposition to results obtained assimilating streamflows only at an interior location. Finally, we combine the hydrological model with a 5-day weather forecast based on the WRF model, and show the skill of the proposed framework in forecasting maximum flows in a basin with limited basic information.