Geophysical Research Abstracts
Vol. 17, EGU2015-3421, 2015
EGU General Assembly 2015

Forecasting reservoir inflows using remotely sensed precipitation estimates: A pilot study for the River Naryn, Kyrgyzstan

Samuel G. Dixon and Robert L. Wilby
Department of Geography, Loughborough University, United Kingdom (s.g.dixon@lboro.ac.uk)

Management of large, transboundary river systems can be politically and strategically problematic. However, accurate flow forecasting based on public domain data holds scope for more informed resource and infrastructure management. Moreover, remotely sensed, near real time precipitation estimates offer the potential to forecast rainfall-runoff in regions where ground based data are sparse. This study investigates the potential for river flow forecasting using satellite precipitation estimates for a sub-basin in Central Asia, a spatial scale and region that has received relatively little attention to date. Basin to sub basin scale flow forecasting allows the use of higher resolution input data, as well as possibility for greater physical realism of modelling through more detailed understanding of local runoff mechanisms.

Correlation analysis of observed precipitation and Tropical Rainfall Measuring Mission (TRMM) precipitation estimates show less skill for daily (r = 0.25) than monthly (r = 0.93) totals. Using a parsimonious multiple linear regression model skill levels were found to be superior to the Zero Order Forecast (i.e. long-term mean flow) for lead times up to three months. Over 80% of the variance in monthly inflows is explained at three month lead, and up to 65% for summer half-year average. The analysis also reveals zones in the river basin that are delivering highest predictability and hence candidate areas for surface network expansion. These findings open promising avenues for exploration including the use of non-linear algorithms to improve forecasting skill or use of satellite based precipitation estimates to forecast natural hazards, such as rainfall triggered landslides and mudflows.