Integration of MODIS Satellite Image into Snowmelt Runoff Model to Estimate Daily Runoff

Mohamadsadegh Sadeghian and Kambiz Borna (Iran)

SUMMARY
The output of a modeling method, such as a rainfall-runoff models on a Mountainous catchment, could be reliable if it is formulated based on the effective variations, like snow-covered, and the different aspects of a modeled phenomenon, for instance time. The main purpose of this paper is to present the capabilities of an integrated application of remote sensing data and Snowmelt Runoff Model (SRM) to forecasting scheme of stream flow in a snow-dominated catchment, located in the North-East region of Iran. For this purpose, firstly, a digital elevation model (DEM) is provided based on the elevation points extracted of a map with the scale 1:5000. After that, the boundaries of the desired catchment along with its hypsometric curves are drawn in terms of the extracted DEM by the Automated Geospatial Watershed Assessment (AGWA) tool in ArcGIS. The changes of snow- cover, as a spatio-temporal data, which is one of the effective variables of the SRM, is obtained from 500 m resolution of MODIS images for the period of the winter of 2010–2011, in the next stage. Then, input parameters to the model including runoff coefficient, degree–days factor, temperature laps rate, critical temperature, recession coefficient and lag time; are measured and calculated for the above mentioned period. So, when a desired domain of data is provided, the run-off of the catchment is calculated by SRM and then compared with the observed daily stream flow recorded in the catchment's outlet. The detailed results, like 78% coefficient of determination R^2, illustrate that the proposed method has the potential to estimate run-off, accurately.

Mohamadsadegh Sadeghian and Kambiz Borna (Iran)
Integration of MODIS Satellite Image into Snowmelt Runoff Model to Estimate Daily Runoff

FIG Congress 2014
Engaging the Challenges – Enhancing the Relevance
Kuala Lumpur, Malaysia 16-21 June 2014