Geophysical Research Abstracts
Vol. 13, EGU2011-4093-1, 2011
EGU General Assembly 2011

Improvement of Snowmelt Runoff Short-term forecast Using Kalman Filtering

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Remote sensing observations are particularly useful for providing spatially detailed input data for snow melt runoff modeling due to the high spatial and temporal variability of snow cover. Runoff forecasts in both short-term and long-term are very important in making decision by authorities. For instance short-term runoff forecast is helpful in flood potential risk assessments in snow melt season and long-term runoff forecast can provide effective information in water resource management of produced water from snow melt in the next season.

The only widely applied model optimized for input of remotely sensed snow cover data is the Snow melt Runoff Model (SRM) of Martinec et al. (1998), in which snow melt is calculated from snow covered area (SCA) derived by means of remote sensing. SRM uses SCA extrapolation method in short term forecast which does not always produce good results.

In this research remote sensing snow cover products and meteorological and geological data have been utilized in snow melt runoff modeling. Snow melt runoff modeled during 6 years in Hablerud basin located in Semnan province of Iran. Kalman filtering has been utilized to forecast SCA with respect to SCA depletion curves of sub basins instead of SCA extrapolation method in SRM model. SRM weekly forecast accuracy has been improved using Kalman filtering of SCA data.
KEYWORDS: Remote Sensing, Snow melt Runoff Modeling, SCA, Kalman filtering