Ensemble probabilistic streamflow generation using long-term MODIS snow product

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Alternative techniques to generate streamflow provides more robust model sets for mountainous basins where there is data and model uncertainty due to harsh topography and atmospheric conditions. Dedicated satellite data have extensively increasing potential in water resources and using them in short and long term analysis will provide better understanding of accumulation and melting processes of snow. Snow covered area (SCA) is governed by various climatic and topographic parameters, besides it can be detected by optic satellites due to high reflectance in visible band. Snow probability can be calculated in each pixel from past records by assuming occurrence of snow within selected period. Probabilistic snow depletions curves (P-SDCs) can be derived using snow probability maps. In this study, Moderate Resolution Imaging Spectroradiometer (MODIS) with visible/near-IR satellite daily P-SDCs are generated for melting period using daily cloud-free snow cover MOD10A images of 2001 – 2012 data. Study mainly aims to identify long term snow potential of the basin based on P-SDCs and the performances of probabilistic snow maps in snowmelt/runoff. Karasu (Upper Euphrates) Basin is one of the pilot basins having large snow covered areas contributing to high snowmelt during spring and large reservoirs located in the downstream indicate the need for an operational studies system in the region. Snowmelt Runoff Model (SRM) is calibrated and validated for the water years of 2002 – 2012 and ensemble streamflow estimations are generated for 2013-2015 melting periods. Ensemble forecasts are compared with observed discharges and each year shows high correlation with one of the cumulative probability ranges.