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Remote sensing and GIS based hydrological modeling using SWAT (Soil and Water Assessment Tool)

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Abstract

A distributed parameter model, ArcSWAT (ArcGIS Soil and Water Assessment Tool), has been used to estimate the monthly and annual evapotranspritaion, potential evapotranspritaion, precipitation, surface runoff, groundwater flow and water yield variation in a part of Bandu river Basin , India. Hydrological and meteorological data of 12 years time span (1997 -2008) has been used to delineate run the model. The soil series and texture map are generated using ArcGIS interface. Unsupervised classification method, ISODATA Clustering, is used for land cover classification from Resourcesat 1 IRS 1D LISS- III satellite image. Most of the input data of the model are extracted from various maps and satellite images using GIS technique. The output result of SWAT interface provides and predicts the relation between precipitation, surface runoff, flow variation and sediment yield. It also provide monthly or daily basis total amount of precipitation, runoff, groundwater flow and sediment yield at the outlet of the watershed. However, a representative sensitivity analysis has been performed to identify the dominant factors of this basin. Thereafter it can be seen that Curve number and evapotranspiration are the key factors for predicting surface runoff and flow. These limited evaluation studies can be utilized for a more rigorous analysis framework.