

# Prediction in Ungauged Basin Using Satellite Data

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**Abstract Type:** Original Research

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**Background and Aim :** There is no doubt that Prediction in Ungauged Basin is interesting not only for hydrologist as a research field, but also for water resources manager as a tool for decision making. In recent years development of globally covered satellite-based data makes themselves suitable to be used for prediction in ungauged or poor data basins. Therefore we are going to introduce a new methodology using this kind of data. This methodology can be used for prediction of hydrological responses in an ungauged basin.

**Methods:** A parsimonious distributed hydrological model is developed for arid and semi-arid areas like Iran. All of the input data of model is obtained from satellite-based data. Therefore the method is applicable in ungauged basins.

**Results:** The method is applied in the upstream of Karaj river basin that is the most important water resources for the Tehran city, the capital of Iran. The Karaj-dam locates 63 km northwest of the Tehran at the outlet of basin. Using the Snow Water Equivalent (SWE) estimated by satellite-based data and the new models and assuming that this SWE is the main source of runoff in the non-snow period from May to October, the Correlation factor of May-October observed runoff and estimated SWE was calculated. The correlation factor of May to October observed flow volume and estimated SWE is 96%. It is found that forecast Snow Water Equivalent (SWE) correlates well with observed data.

**Discussion and Conclusions:** This high correlation suggests that a reliable SWE estimation and snowmelt runoff forecasting can be constructed using satellite-data in the absence of snow observation.

**Innovation and Importance:** This study shows the importance of satellite-based data to overcome lack of conventional ground-based snow observation in developed country like Iran and for runoff prediction in upstream of dams as well as Transboundary Rivers.

**Limitations :** Model's parameter estimation needs a certain level of observed data.