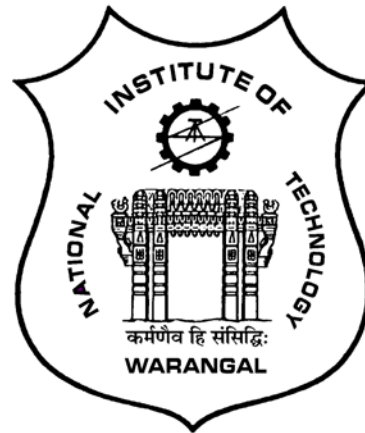


Application of SWAT Model in Runoff Simulation of DMIP 2 Watersheds

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INTRODUCTION

- SWAT model
 - Prediction of impacts on hydrologic regime
 - ArcSWAT model with sub-hourly time step
- Distributed Model Intercomparison Project Phase –2 (DMIP2)
 - Hydrology Laboratory (HL) of NOAA's National Weather Service (NWS), USA
 - <http://www.nws.noaa.gov/oh/hrl/dmip/2/>
 - Comparison of distributed models applied to test data sets in two vastly different geographic regions of USA

OBJECTIVES

- Simulation of hourly runoff using ArcSWAT model
- Model application to experimental watersheds of DMIP-2
- Analysis of simulation results

METHODOLOGY

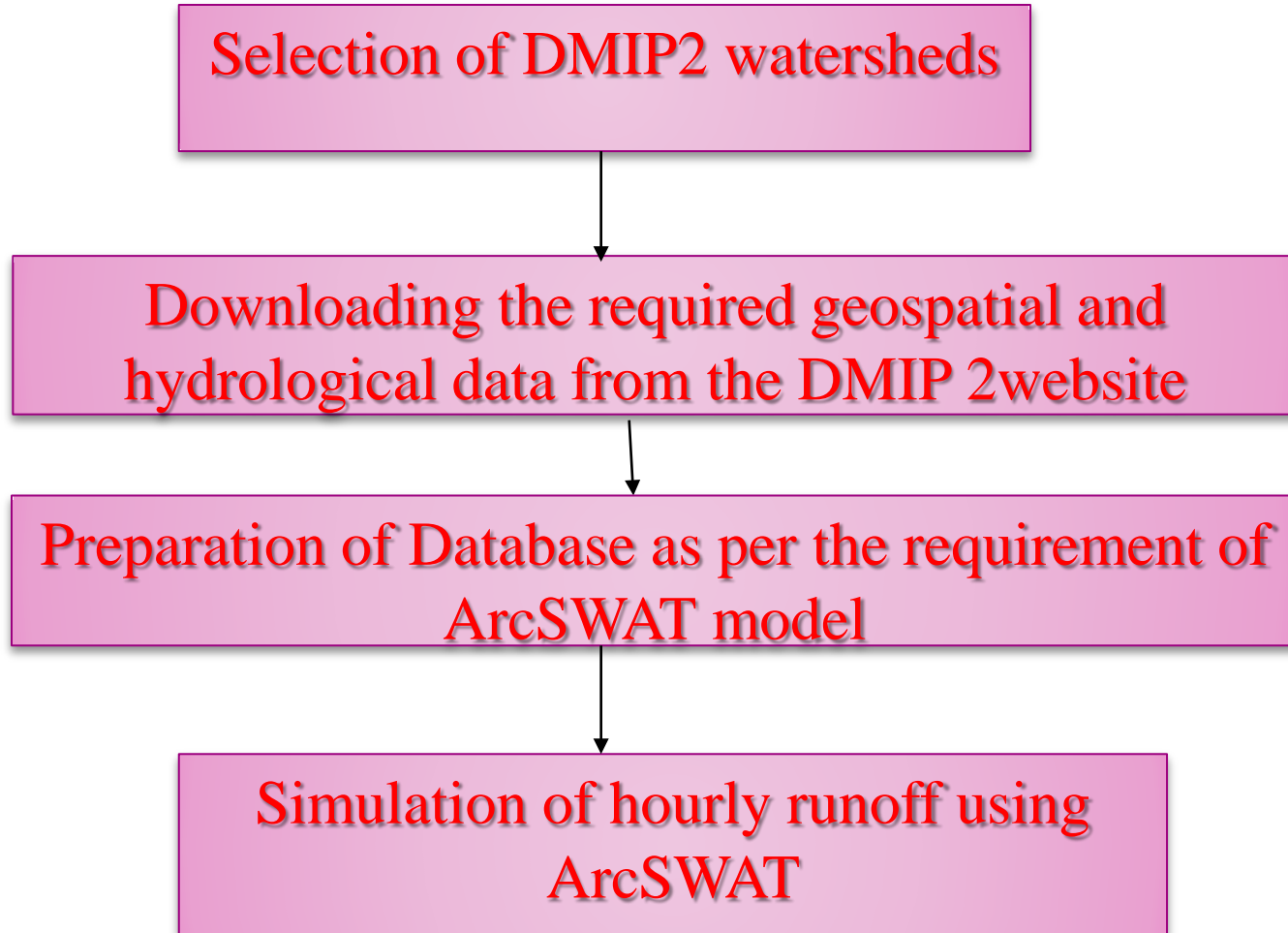


Fig 1. Flow chart showing the methodology

SWAT MODEL APPLICATION

- The model setup involves the following five steps:
 - Watershed delineation
 - HRU definition
 - Weather data definition
 - Edit SWAT input
 - Run SWAT

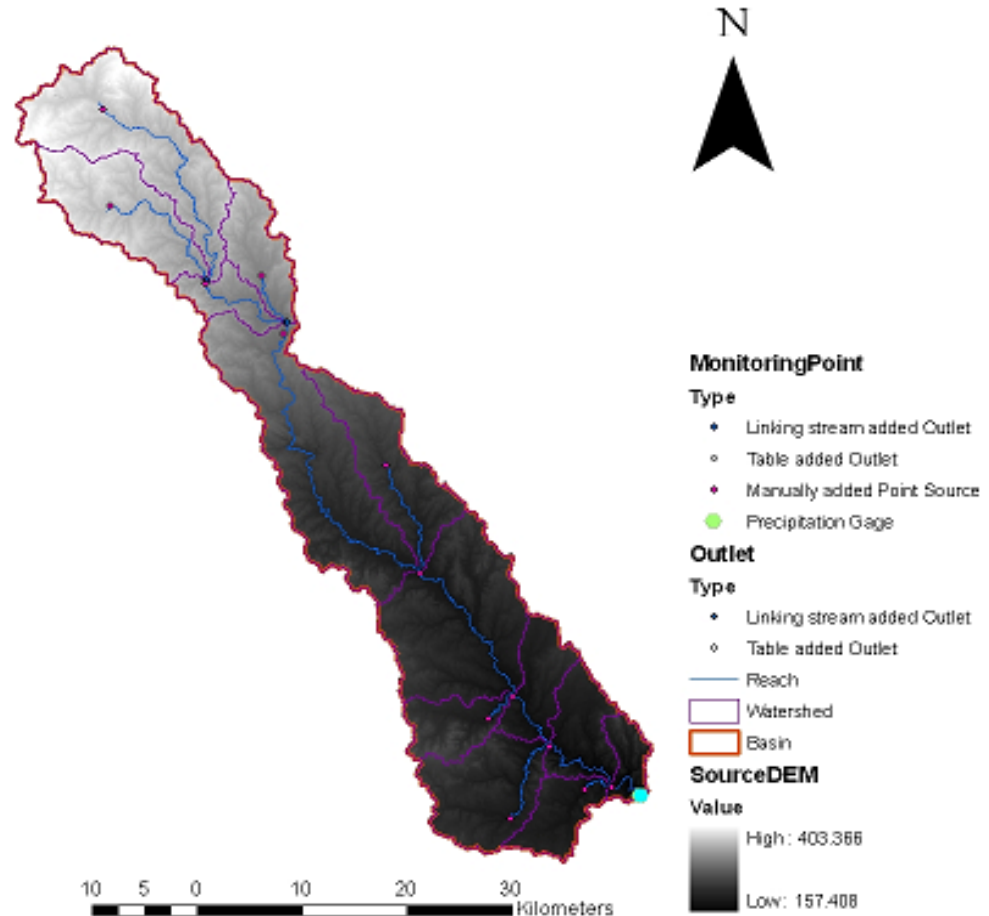
STUDY AREA

- The model has been applied to the Blue river basin, USA.
- It is one of the experimental watersheds of DMIP-2.
- It has an area of 1233 sq km.



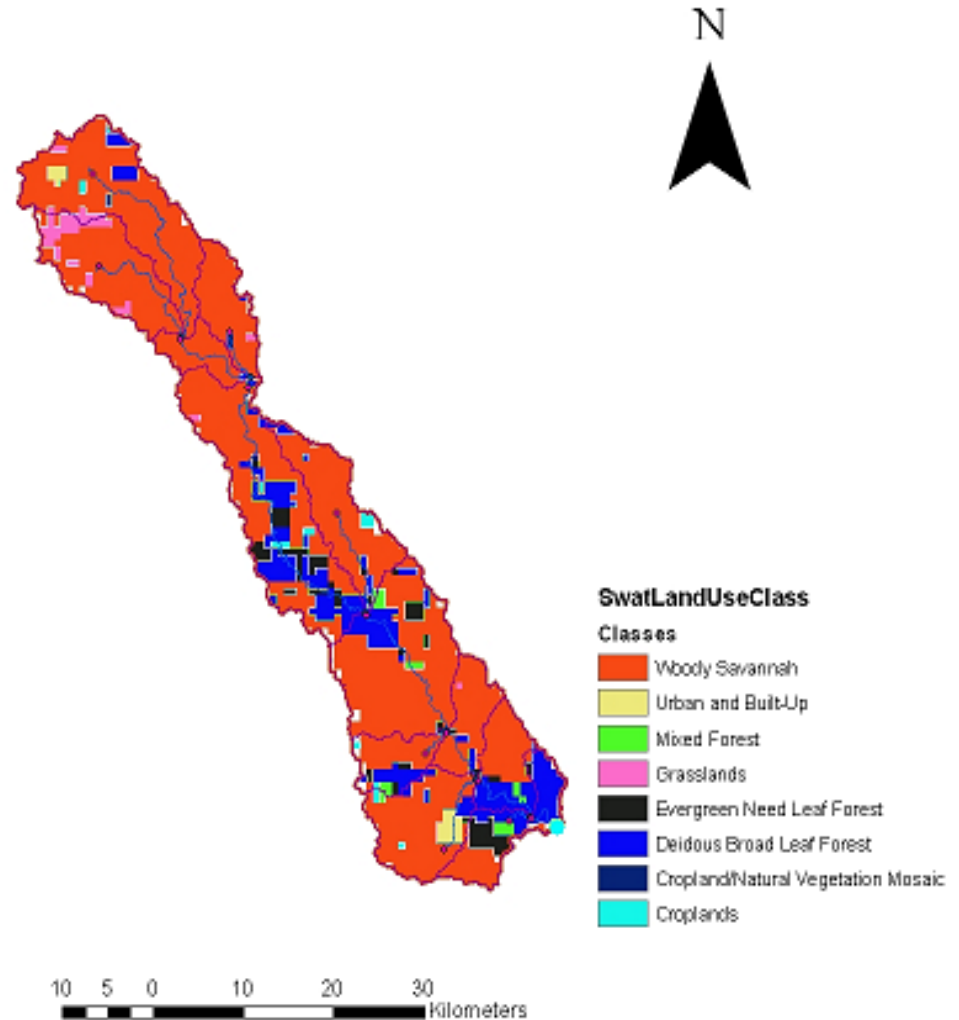
DATA PROCESSING

- DEM-provided in zipped .asc format
- Unzipped to .asc format
- Converted from .asc to grid format
- Re-projected to UTM 14 N
- Clipped to basin area

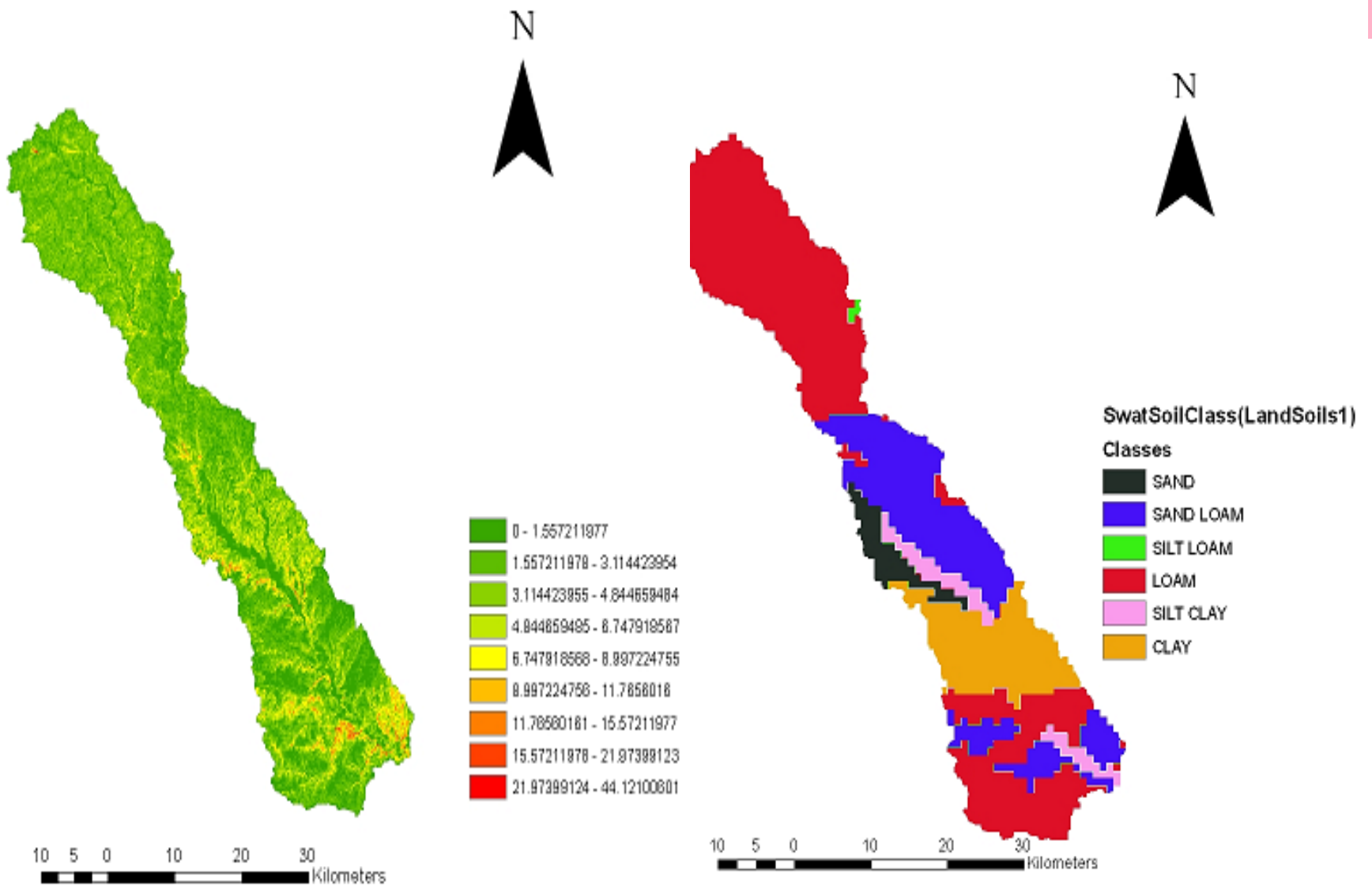


Automatic delineation sub-basins of Blue river basin

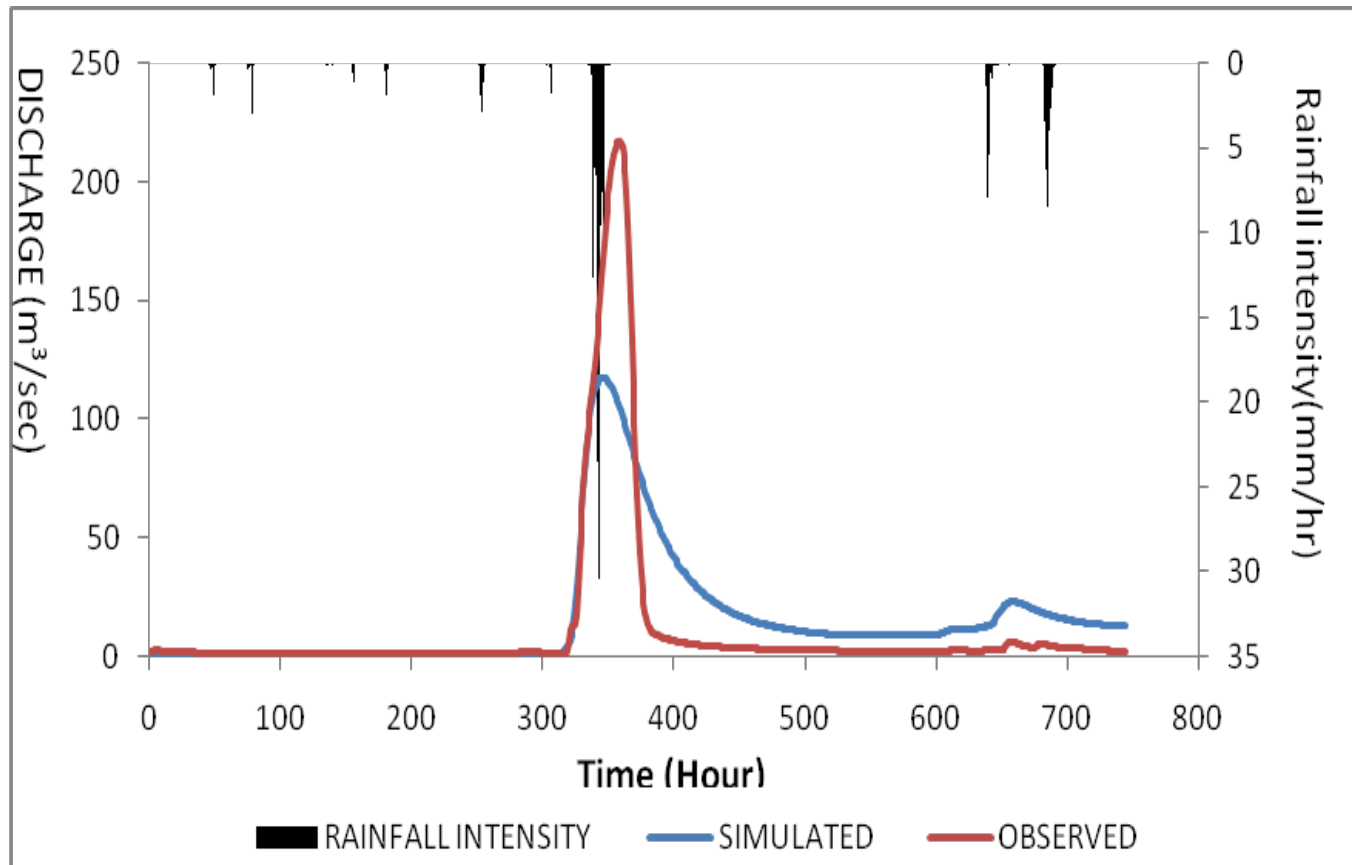
- Soil and Land Use/
Land Cover
- Provided in zipped .asc
format
- Unzipped the files to .asc
format
- Convert from .asc to grid
- Reproject to UTM 14N
- Clip the data to boundary



**Modified Land use/Land cover map
of Blue river basin**



Modified slope map of Blue river basin Modified soil map of Blue river basin



Simulation and observed runoff hydrographs for the Blue river basin for the month of August, 2002

Table 1. Simulation results for Blue River Basin

Rainfall month	Volume of runoff (mm)		Peak runoff (m³/sec)		Time to peak (Hr)	
	observed	simulated	observed	simulated	observed	simulated
August, 2002	2.6158	3.35106	217.04	117	358	348

RESULTS AND DISCUSSIONS

- Volume of runoff and time to peak has been simulated within the variation of 70%
- Model was not able to capture the peak runoff
 - Reasons
 - Channel width and Channel depth vary along the channel reaches
 - Incomplete information on parameters
- Values of runoff on recession limb of hydrographs are higher than observed one
 - Variations in channel roughness and infiltration parameters

CONCLUSIONS

- Model is able to simulate the volume of runoff and time to peak runoff, but large variations are observed in peak runoff.
- Sensitivity analysis and calibration over the model parameters may improve the simulation results.
- Simulation of more rainfall events is under progress.

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