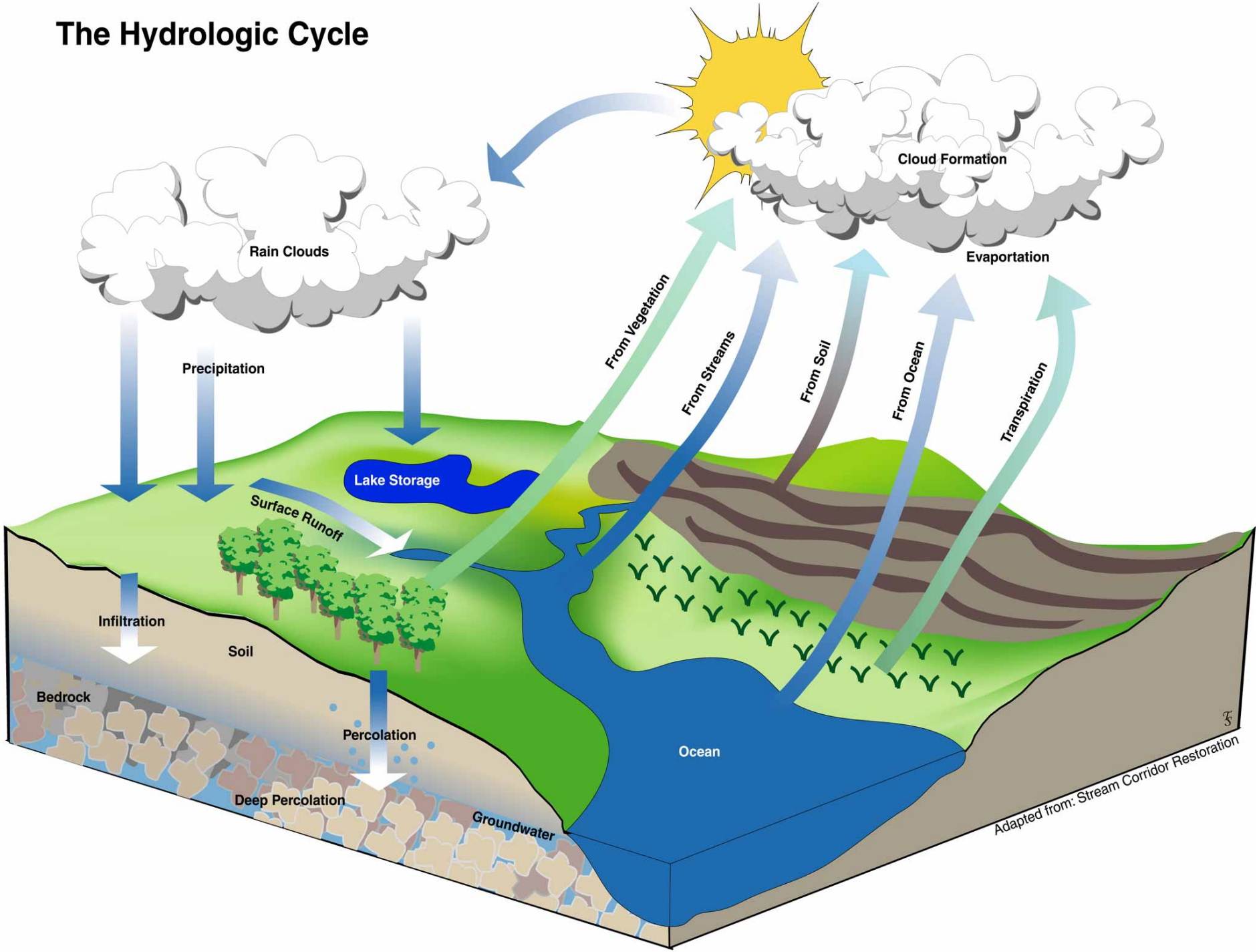
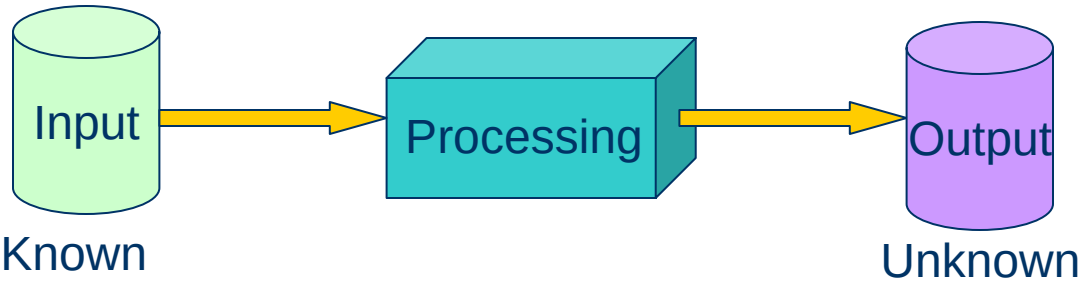
Hydrologic Modeling System HEC-HMS

The Hydrologic Cycle



Model !! What is it ?

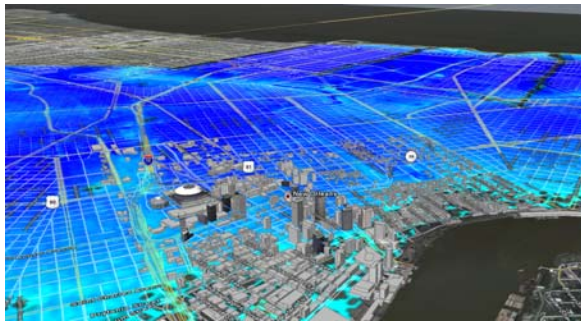


Precipitation → Watershed properties → Runoff

Hydrologic Models

- *Analog Models: Uses electricity*
- *Physical Models:* Constructed in Lab

- *Numerical Models:* Phenomenon described by the set of mathematical equations



HEC-HMS is a numerical model

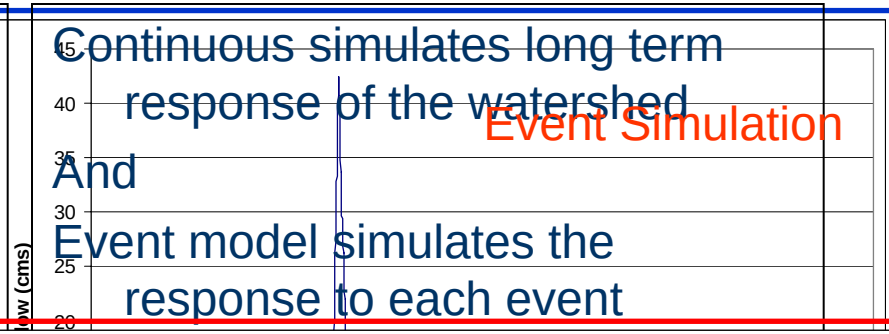
Model Categorization

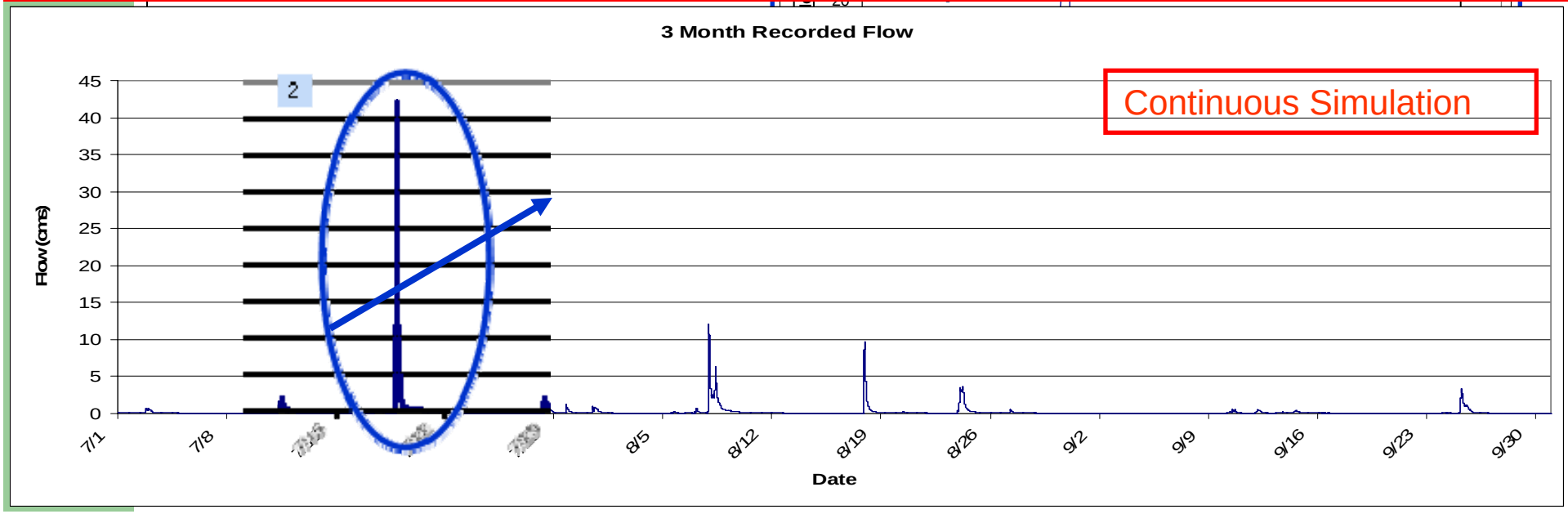
- Continuous and Event based models

Continuous simulates long term response of the watershed

And

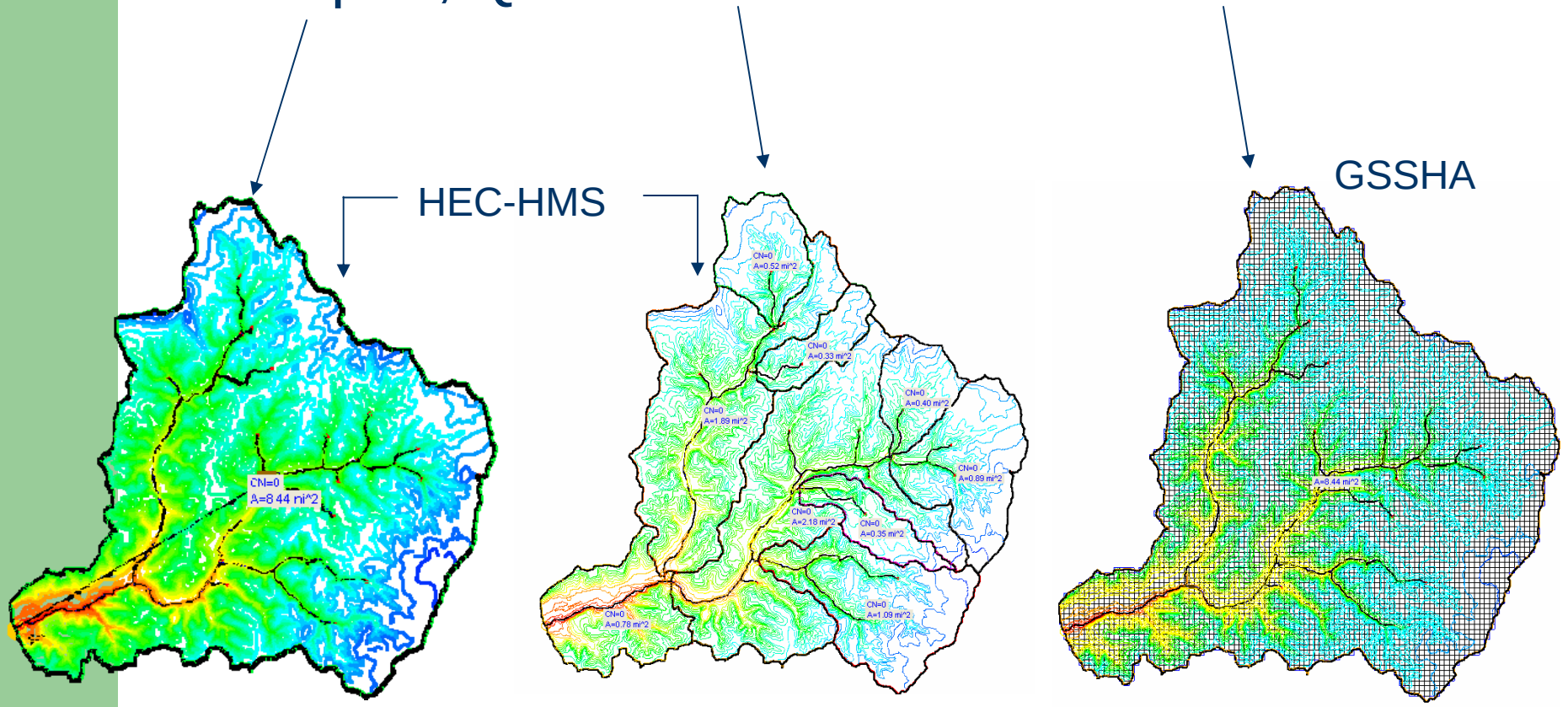
Event model simulates the response to each event





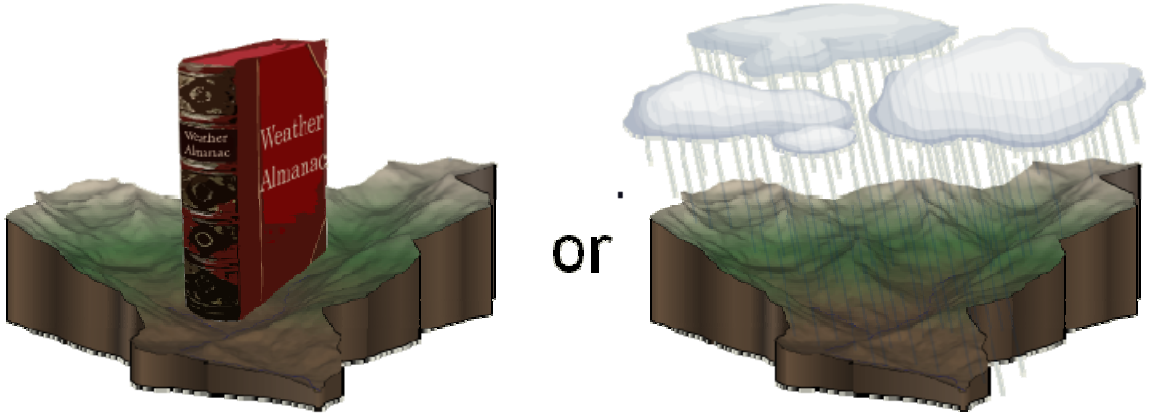
Model Categorization

- Lumped, Quasi-distributed and Distributed



Model Categorization

- Deterministic and Stochastic

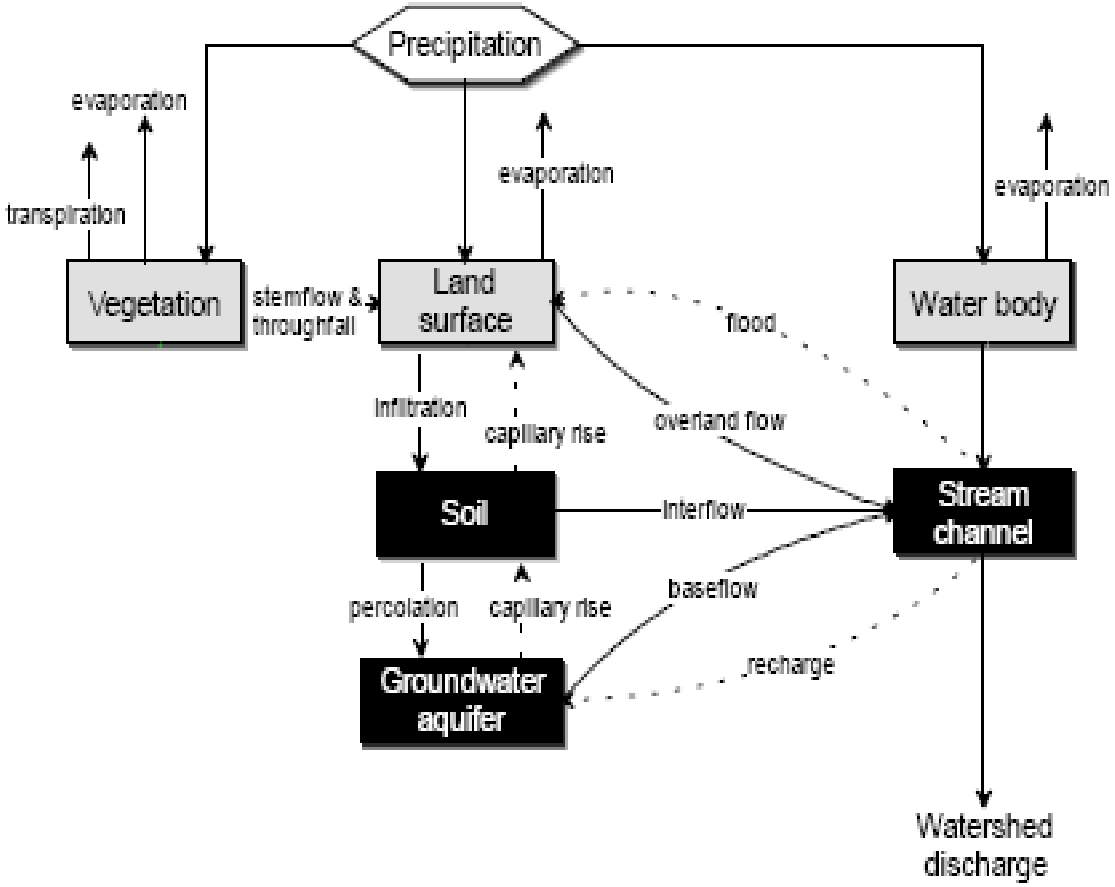


- Empirical and Conceptual
- Measured Parameter and Fitted Parameter

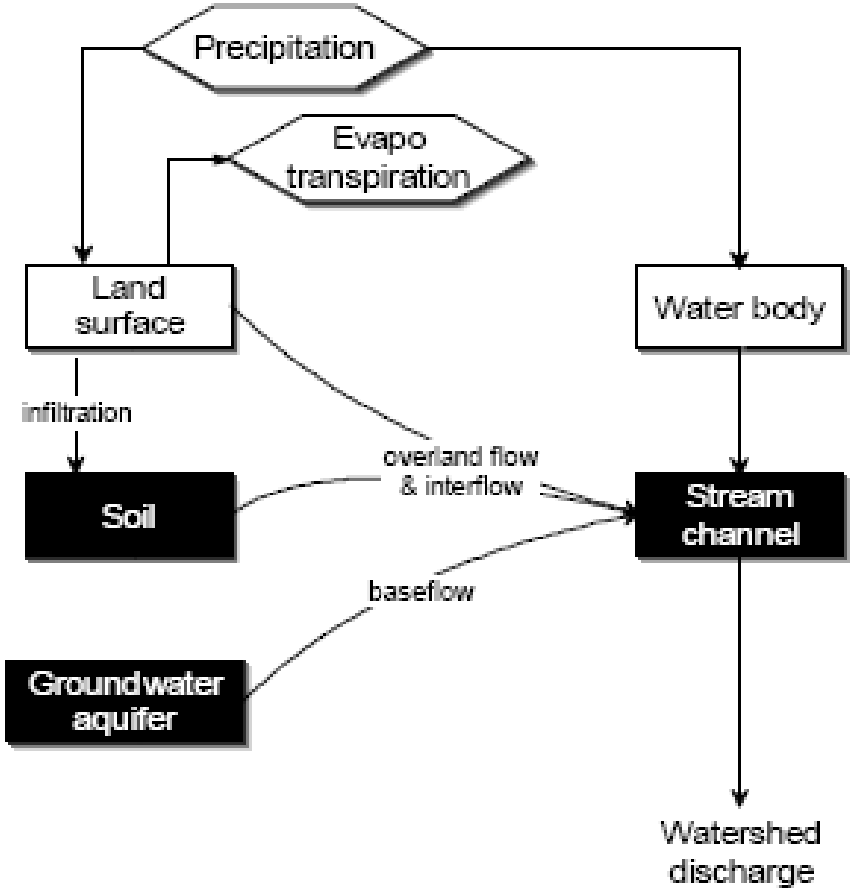
Constituents of Model

- State variables
- Parameters
- Boundary Conditions
- Initial Conditions

HEC-HMS Representation of Watershed



Typical HEC-HMS Representation

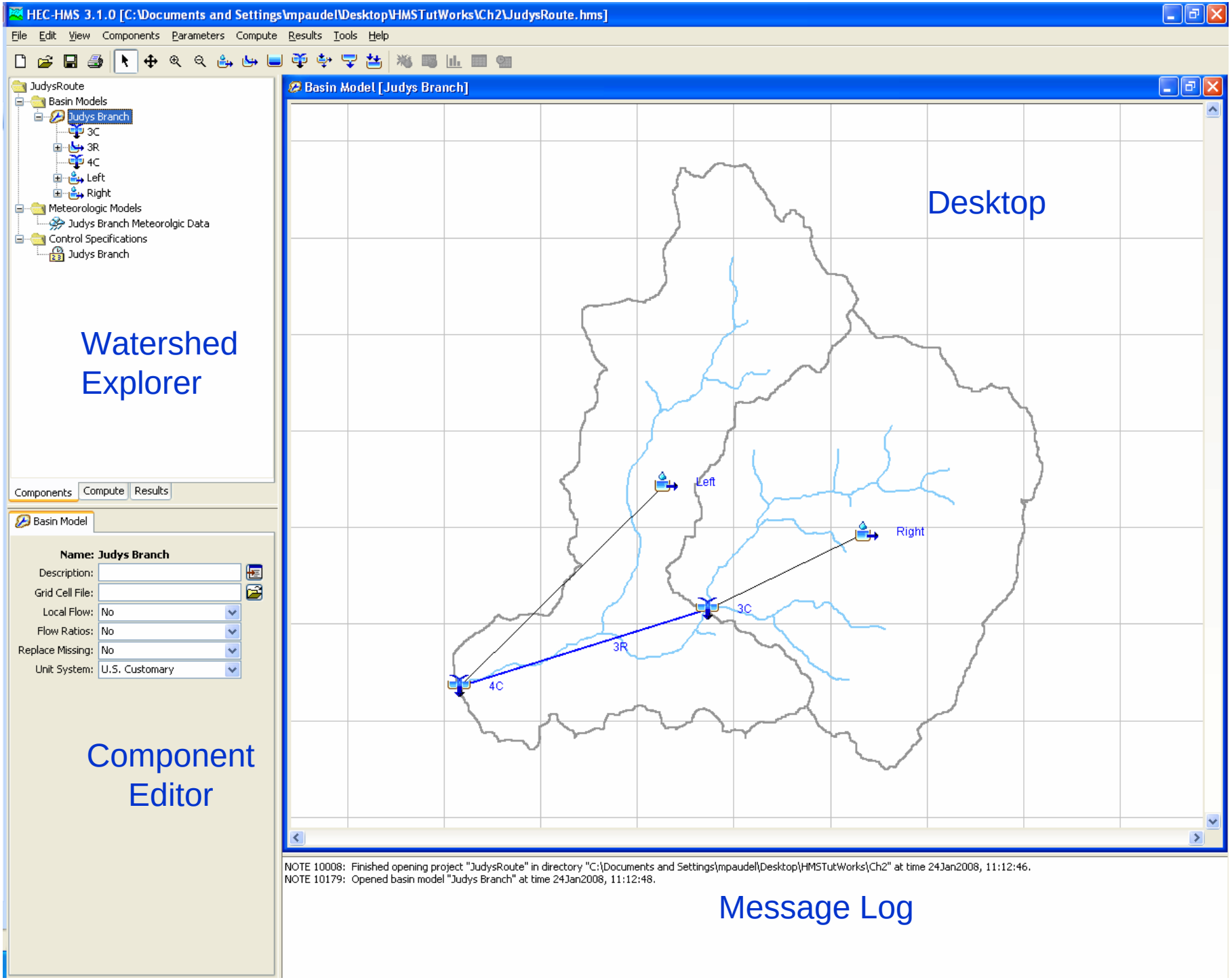


HEC-HMS and HEC-1

- Both the models are developed by US Army Corps of Engineers, Hydrologic Engineering Center (HEC)
- HEC-HMS is the advanced version of HEC-1 model
- HEC-1 is a lumped parameter hydrologic model
- HEC-HMS is lumped + quasi-distributed model

HEC-HMS components

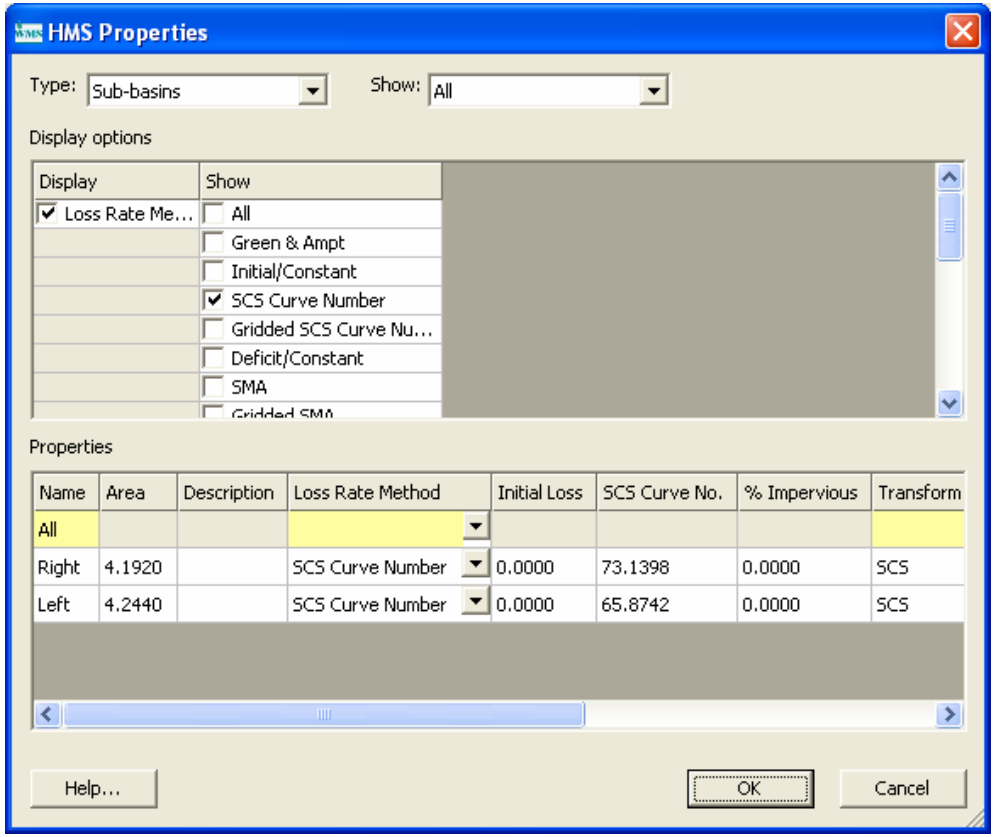
- Basic components
  - Basin Model
  - Meteorologic Model
  - Control Specification
- Comprehensive modeling includes following components too
  - Time series data
  - Paired data
  - Grid Data


HEC-HMS 3.1.0 [C:\Documents and Settings\mpaudel\Desktop\HMSTutWorks\Ch2\JudysRoute.hms]
File Edit View Components Parameters Compute Results Tools Help
JudysRoute
Basin Models
Judys Branch
3C
3R
4C
Left
Right
Meteorologic Models
Judys Branch Meteorolgic Data
Control Specifications
Judys Branch
Watershed Explorer
Components Compute Results
Basin Model
Name: Judys Branch
Description:
Grid Cell File:
Local Flow: No
Flow Ratios: No
Replace Missing: No
Unit System: U.S. Customary
Component Editor
Basin Model [Judys Branch]
Desktop
Left
Right
3C
3R
4C
NOTE 10008: Finished opening project "JudysRoute" in directory "C:\Documents and Settings\mpaudel\Desktop\HMSTutWorks\Ch2" at time 24Jan2008, 11:12:46.
NOTE 10179: Opened basin model "Judys Branch" at time 24Jan2008, 11:12:48.
Message Log

WMS Interface for Preparing HMS Input file

- **Basin Model** is generated from WMS watershed.
- And to input other basin characteristics

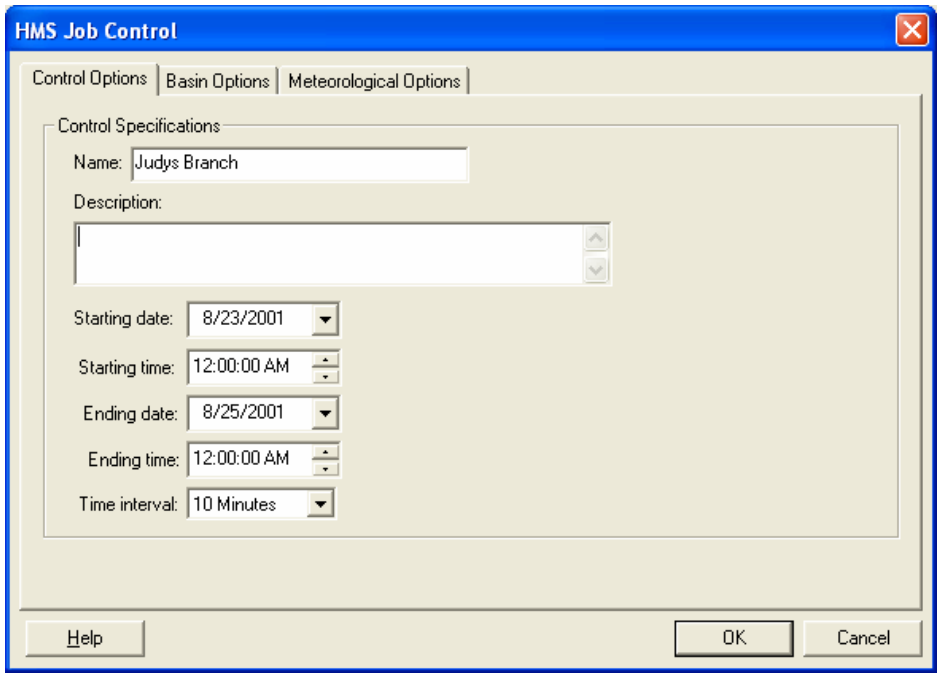
HEC-HMS | Edit Parameters



WMS Interface for Preparing HMS Input file

- For **control specification:**

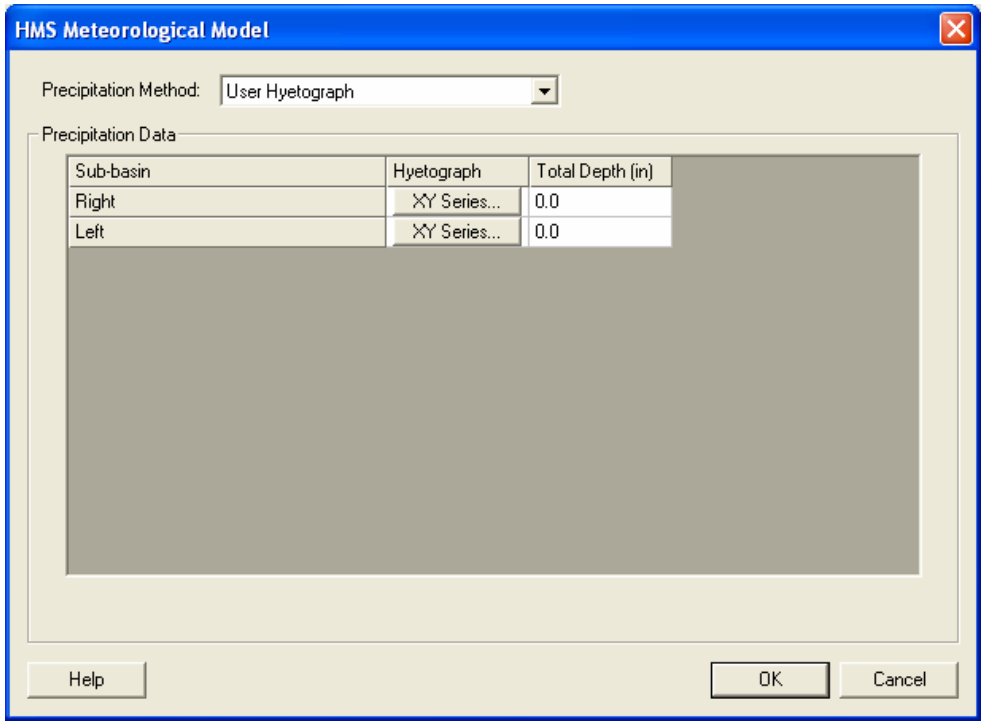
HEC-HMS | Job Control



WMS Interface for Preparing HMS Input file

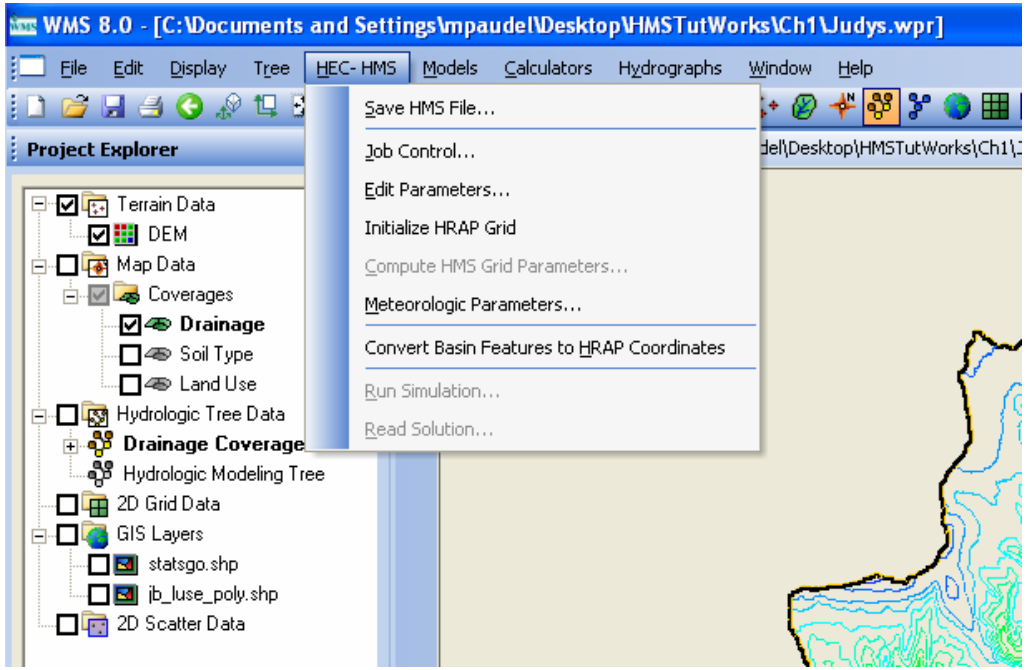
- For **Meteorologic Model**

HEC-HMS | Meteorologic Parameters



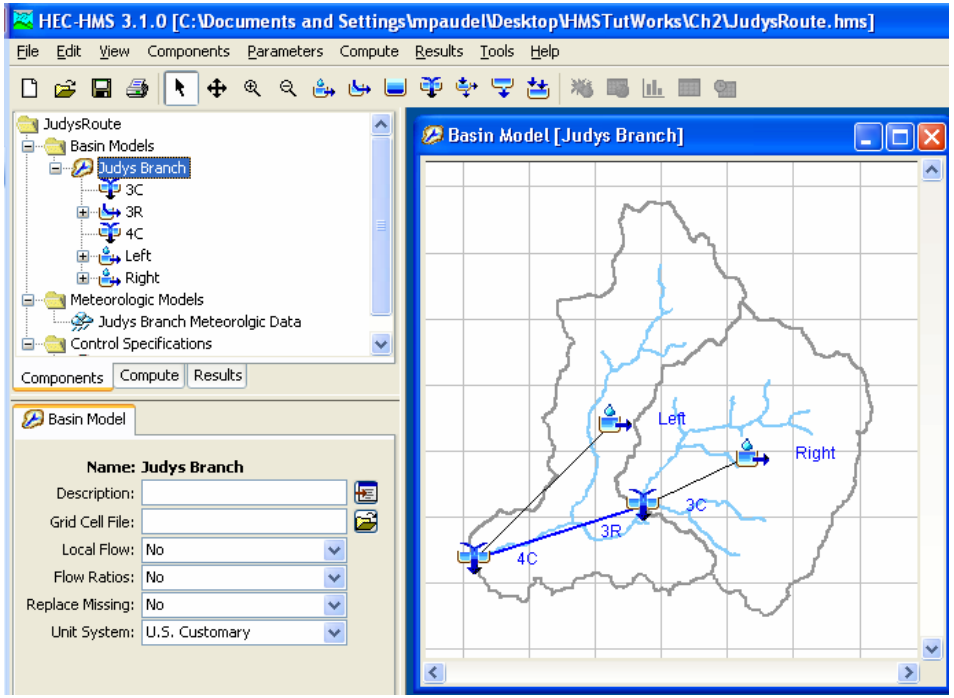
Running HEC-HMS

- Save HEC-HMS file from WMS

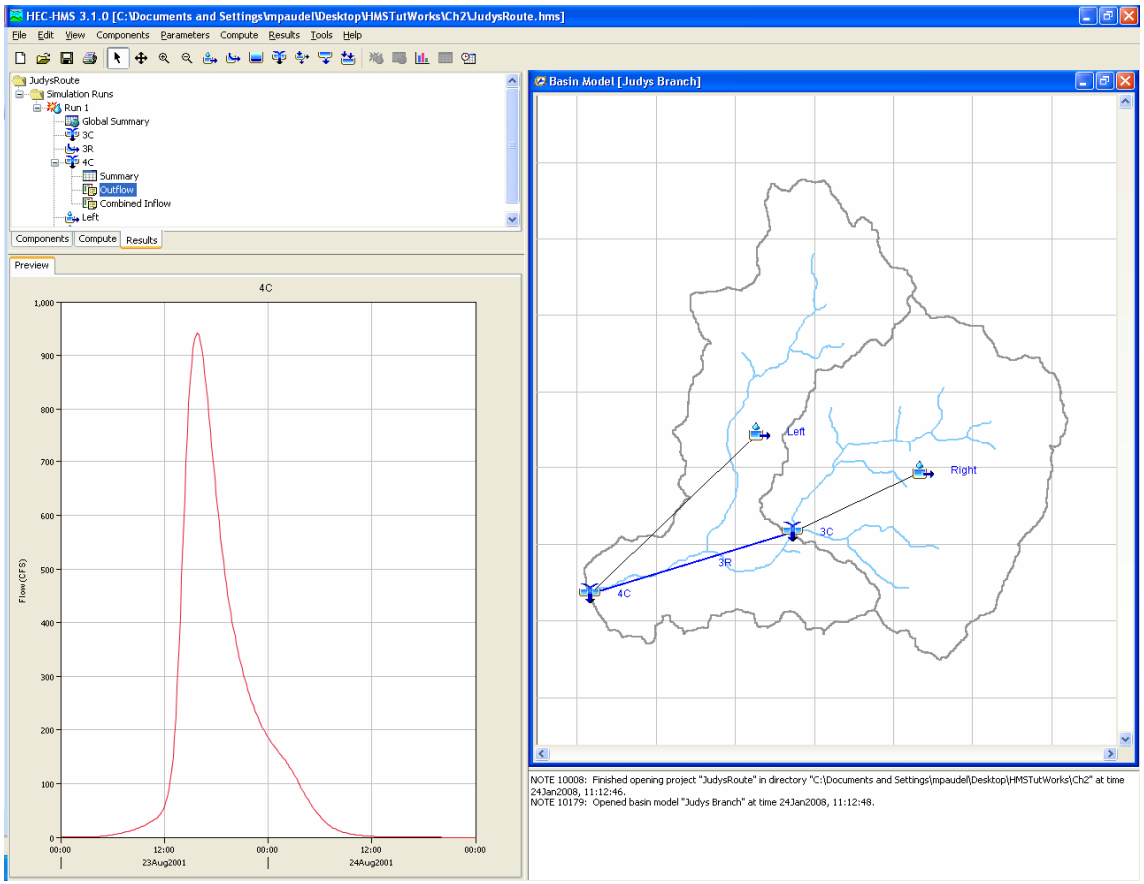


Running HEC-HMS

- Open the file saved in WMS it will create all the three components of HMS Model.



Viewing Results



Demonstration