RVK-PHS VARIABLE SOURCE AREA MODEL SOFTWARE USER NOTES

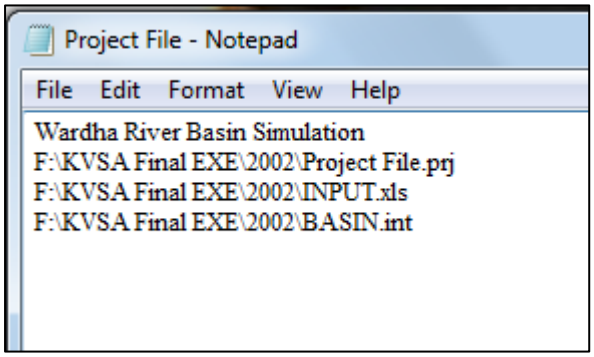
1. Preparing Model Input Files

(i) Project Files

To carry out simulations of catchment application a project file giving paths of data files on local computer required to be prepared. This file has only four lines as follows:

1. Description of simulation application (Text)
2. Project file name (Project File.prj)
3. Input Data filename (Input.xls or Input.peq)
4. Basin Data filename (basin.int)

This sequence shall be maintained while preparing project file (see figure).



An example Project file is supplied as "wardha.prj"

(ii) Input Data file ((INPUT.xls or INPUT.peq)

Input data file may be prepared with Microsoft excel as a worksheet or with Notepad application as a tab delimited text file. This file contains the rainfall, potential evapotranspiration and observed discharge data.

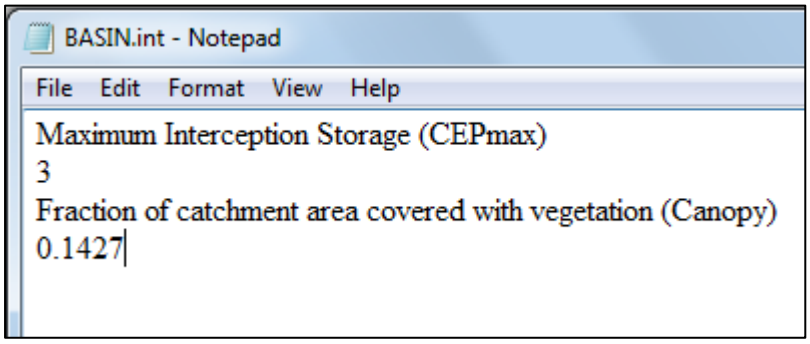
INPUT [Compatibility Mode]

	A	B	C	D
1	Day	Rainfall	PET	Obs_Discharge
2	152	1.05	5.91431888	1.05148095
3	153	1.1875	5.38447264	1.07113953
4	154	0	4.663299	1.06009747
5	155	0.275	4.36719569	1.05683647
6	156	0	3.16054259	1.04770046
7	157	3.0125	3.9050577	1.10591215

An example input data file is supplied as “Input.xls or Input.peq”

(iii) Basin Data file (BASIN.int)

Basin data file may be prepared by using notepad application. This file contains maximum interception storage (CEPmax) and Fraction of catchment area covered with vegetation (canopy).

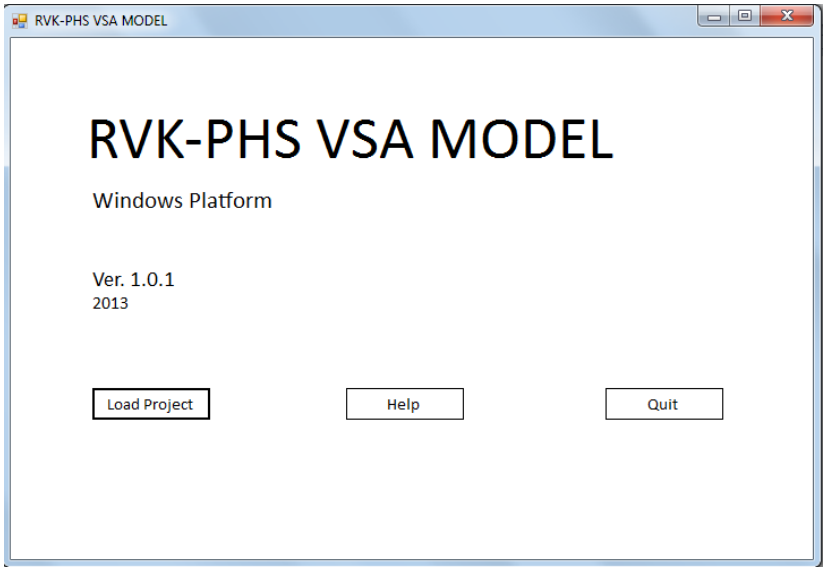


An example Inputs data file is provided as “BASIN.int”

2. Load project

(i) Start RVK-PHS model application. The load project screen will be displayed.

(ii) Click Load Project button and navigate to project folder on local drive to supply project file. The model software will load the Input data file and basin data file.



3. Hydrograph simulation

Once the project is loaded and input data files are supplied, the main screen of the model software is displayed. Parameter values can be changed on screen and model is run using the user defined parameter values. After each run the values of four objective functions are given for evaluation. These performance indicators are

Efficiency: The Nash and Sutcliffe Efficiency

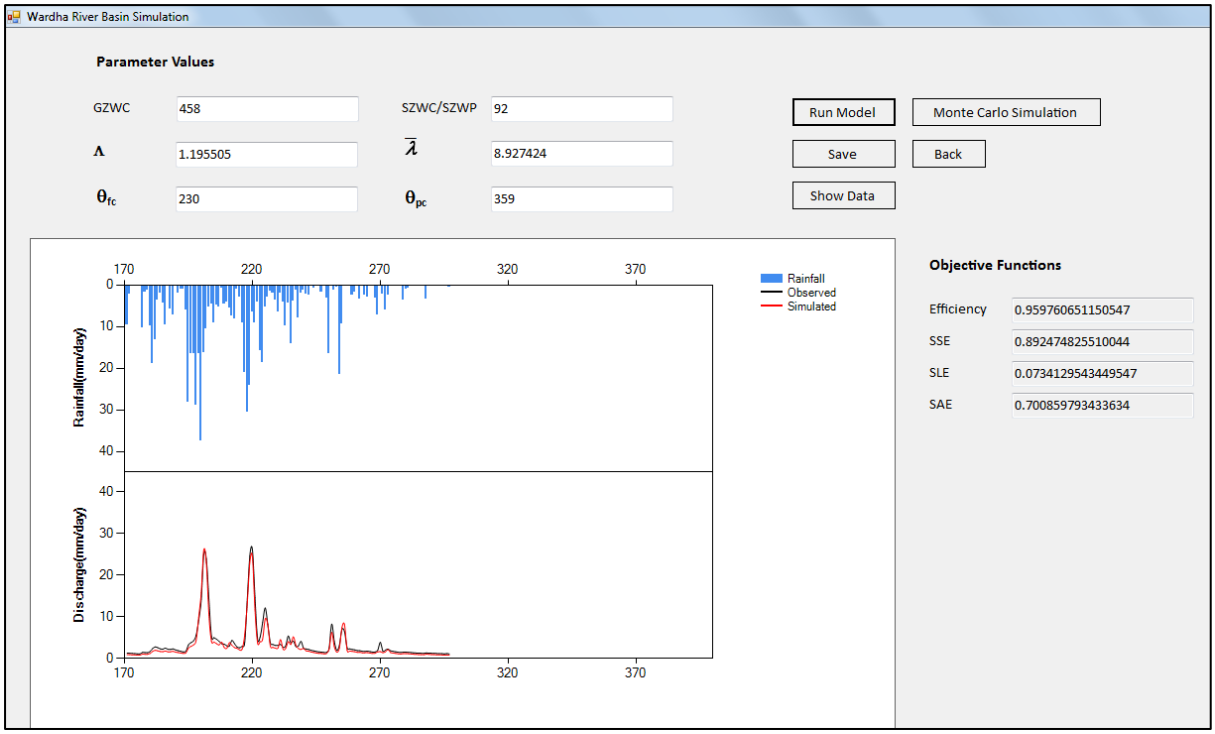
SSE: Sum of squared residuals over all time steps $(Q_{obs} - Q_{sim})^2$.

SLE: Sum of squared log residuals over all time steps $(\log(Q_{obs}) - \log(Q_{sim}))^2$

SAE: Sum of absolute errors over all time steps $(Q_{obs} - Q_{sim})$.

Note that for best fit NSE value should move towards maximum value of 1, while the values of other performance indicators, should move close to zero.

Show data / Show graph button can be used to display the model calculations and graph window alternately.



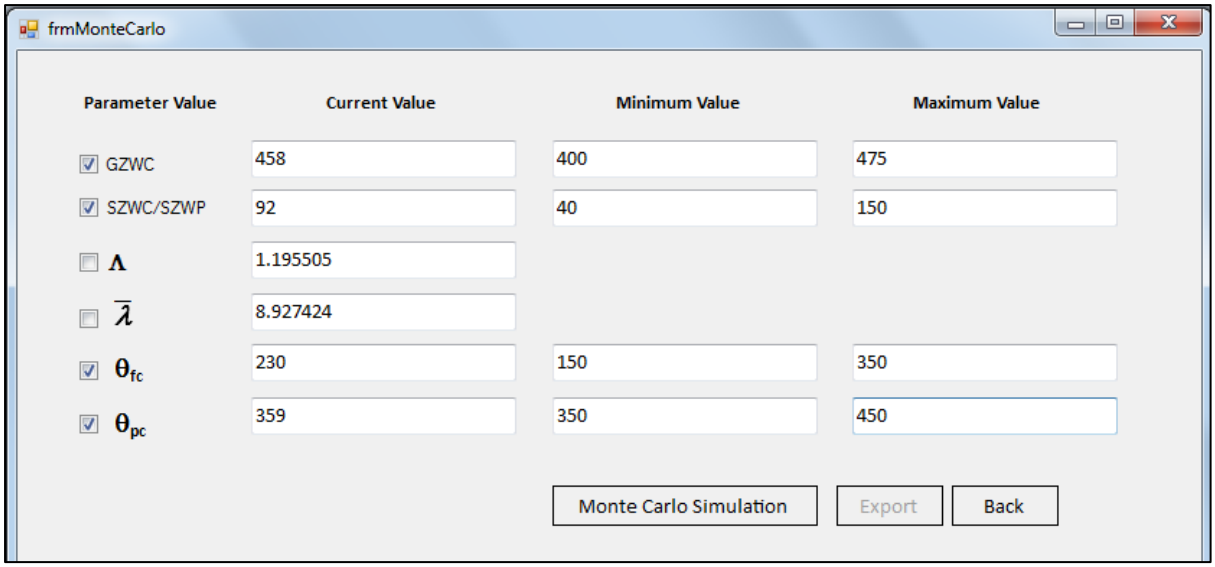
Model calculations can be saved in Excel sheet format or tab delimited text file format by clicking **SAVE** button.

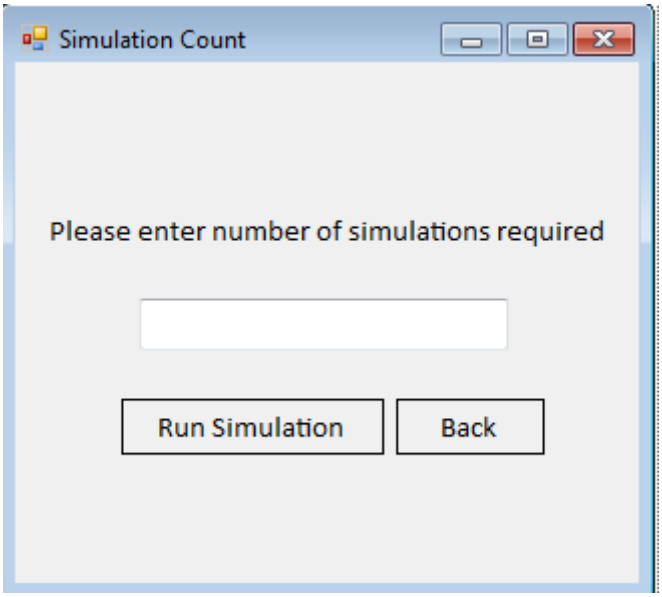
4. Monte Carlo Analysis

Model calibration using Monte Carlo simulation involves following steps:

(i) Select imprecisely known model input parameters to be sampled. Assign the ranges (upper and lower bound) for each of these parameters in the text boxes given for minimum and maximum values.

(ii) Click Monte Carlo Simulation button. Input the number of sample sets (realizations) with random values of model parameter to be generated.





(iii) Click Run Simulation. The model is run for all realizations of the calibration period and the Nash-Sutcliffe efficiency and other performance indices were calculated for each of the calibration year.

(iv) Click **EXPORT** button to save results of Monte Carlo simulation results on local disk drive. These results can be used to arrive at optimum parameter set, Sensitivity analysis and uncertainty estimation.