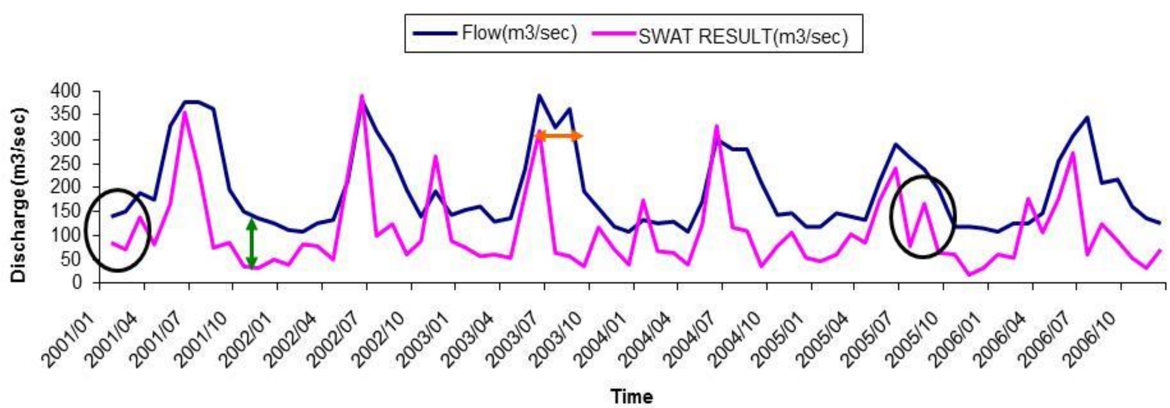
Calibration:

Calibration is done mostly to reach closer value with the overved data [for this case studies Discharge] Once the important parameters are identified from the sensitivity analysis, model calibration can proceed. This involves changing the values of the identified important parameters in the input files (e.g. *.hru files, *.gw files, *.sol files, etc.) and evaluating the quality of the model. Optimizing the important parameters can be done in two ways: 1) manually, and 2) automatically. In this exercise, both methods will be used. Manual calibration will be done on few important parameters identified in the sensitivity analysis. The values of these parameters will be changed manually. The aim of this is to see and to experience closely how the process of calibration works.

Calibration can be done automatically using veracious platform. Since all the input files are located in the txtinout folder we can modify them in order to have better match. Here we use Genetic Algorithm approach to reach the optimal value of discharge putting the objective function.

There are several common problems are listed below



[1] Systematic underestimation
[2] Low flow highly underestimated
[2] Sharp dropdown of recession limb
[3] Secondary peaks

Water balance:

Annual water yield $= \sum_{n=1}^{i} Q_n \times \Delta t \times \frac{1}{A}$

Where, Q_n = discharge for a given time step

Δt = time step (of measurement of data)

A= watershed area

Water balance calibration

1. Calibrate the surface runoff

Adjust the curve number (CN2 in .mgt) until surface runoff is acceptable. If surface runoff values are still not reasonable after adjusting curve numbers, adjust: soil available water capacity (±0.04) (SOL_AWC in .sol) and/or
soil evaporation compensation factor (ESCO in .hru).

2. Calibrate the subsurface runoff

If the simulated base flow is too high:
Increase the groundwater "revap" coefficient (GW_REVAP in .gw) the maximum value that GW_REVAP should be set at is 0.20. Decrease the threshold depth of water in the shallow aquifer for "revap" to occur (REVAPMN in .gw)—the minimum value that REVAPMN should be set at is 0.0. Increase the threshold depth of water in the shallow aquifer required for base flow to occur (GWQMN in .gw) If simulated baseflow is too low, check the movement of water into the aquifer. If groundwater recharge (e.g. GW_Q in output.sub or output.hru) is greater than or equal to the desired baseflow: decrease the groundwater "revap" coefficient (GW_REVAP in .gw) – the minimum value

that GW_REVAP should be set at is 0.02. increase the threshold depth of water in the shallow aquifer for "revap" to occur (REVAPMN in .gw). decrease the threshold depth of water in the shallow aquifer required for base flow to occur (GWQMN in .gw)—the minimum value that GWQMN should be set at is 0.0. Repeat steps 1 and 2 until values are acceptable. It may take several iterations to get the surface runoff and base flow correct.