

## H4 - Calibrating a SWMM5 model using the SRTC tool

### SRTC calibration tool

The method used by PCSWMM to assist in model calibration is done by using a known uncertainty percentage defined by the user. When you run an SRTC run PCSWMM completes two runs, one for each extreme high and low percentage of the selected uncertainty range.

The slider bars allow the user to get a better idea of how that parameter affects the results and from there fine tune the parameters to best suit the observed time series. When the slider bar is moved PCSWMM linearly interpolates between the two extreme values for the one parameter being changed. The more parameters calibrated the less un-certainty there is in the SRTC calibrated time series. The verification button allows the user to check the actual values selected using the slider bars. Many of the equations used to calculate the resultant hydrographs are not linearly based so it is expected that the verification run would not be exactly the same as the estimated calibration results. The verified results are the actual results with the selected positioning of the parameter slider bars where the calibrated is the linear estimate.

The high and low percentage values are calculated using the following formulas;

#### Equation 1 - Value of parameter for low end as calculated using the SRTC tool

$$V_{Low} = V_{Current} \times \left( \frac{1}{(1 + V_f)} \right)$$

#### Equation 2 - Value of parameter for high end as calculated using the SRTC tool

$$V_{High} = V_{Current} \times (1 + V_f)$$


Where;

$V_{Low}$  = Value of parameter for low end

$V_{Current}$  = Value of parameter used in PCSWMM5 model pre-calibration

$V_f$  = Fraction representing the percentage of the variability calculated for the range

This how- to page reviews how to calibrate a SWMM5 model using an observed hydrograph and events file.

1. Open the **Tables** panel and select the SWMM5 layer that has the attributes you wish to calibrate to (i.e. subcatchments, aquifers, etc.).
2. Click on the **Uncertainty**  button, the columns with calibratable parameters will be highlighted in green.
3. Click on the column header of the parameter you wish to calibrate to. You will notice that rendered percentages appear on the top right side of the **table** panel. Select the uncertainty percentage by clicking on a displayed percentage or click on the drop down arrow to manually define a percentage.

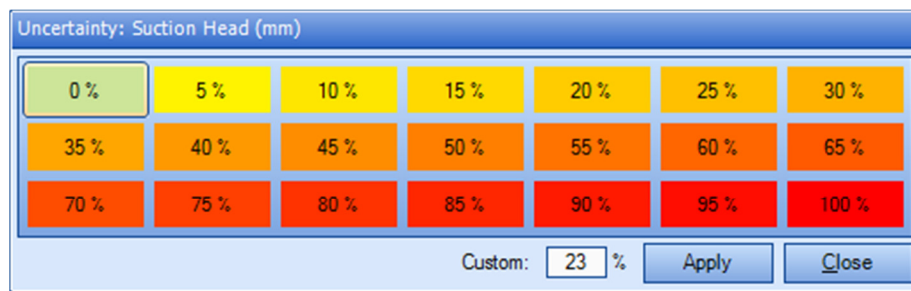





Figure 1 - Uncertainty percentage window drop down selection

4. Once completed press the **SRTC**  button and SWMM will run the model twice for every parameter selected. If you have more than one core processor you can use them here. You may want to select to calibrate to observed locations only, it will speed up the processing time (*To change the number of cores used go to the options button and select preference and in the grid tab change the number of cores used*).
5. Once completed a sensitivity-based radio tuning calibration window will open. On the left hand side there will be a list of the calibrated locations, if there is more than one select the location you wish to calibrate to. The observed flow as well as the computed flow should show up.
6. In the SRTC window select the events tab. If you have already defined events they should be displayed in the events table. If you have created an events file and do not have it loaded click on the **Open events** button and select your events file. Once loaded double click on an event, you will notice the graph window will zoom in on the event.
7. In order to see a plot of the events click on the objective calibration plot button  and there you can radio tune the events according to the mean, max and total. You also have the

option to see more than one plot at the same time by selecting the  button and selecting how many windows you wish to see at one time.

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