

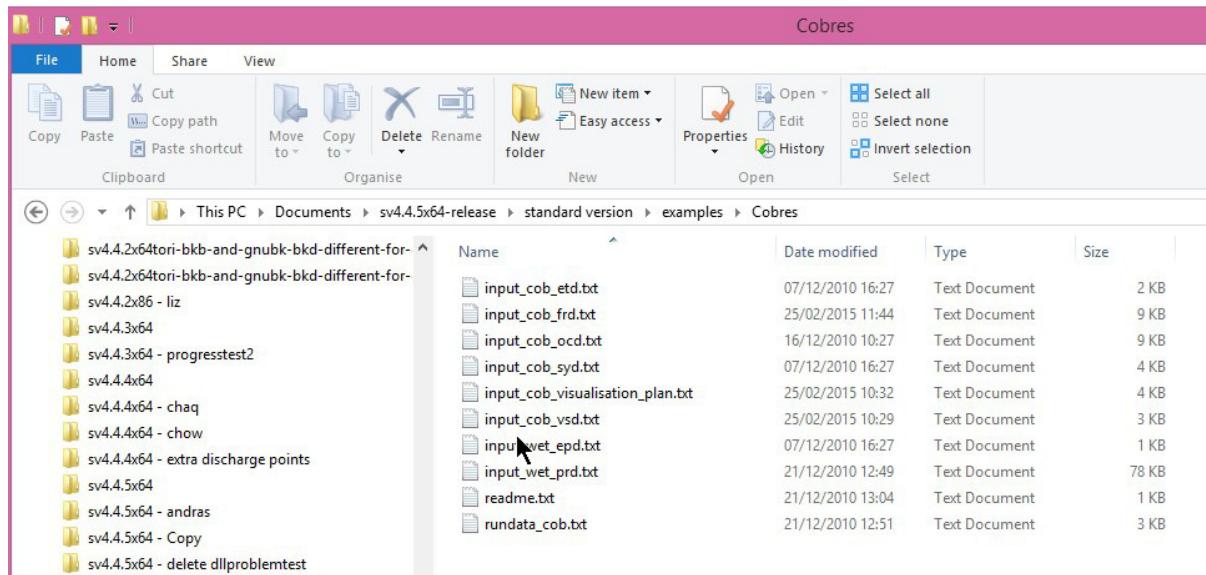
# Shetran Standard Version

See Video at <https://youtu.be/ptimgTkRz0I>

This document tells you how to run the standard version of Shetran. It takes the standard Shetran input files (and a rundata file) runs a simulation and produces the Shetran output files. Setting up the Shetran input files is really difficult and time consuming so for a new catchment it is much, much better to start with the “Easy Setup”. However, there are various things (such as boundary conditions) that can only be done in the standard version.

## 1. Go to folder “standard version\examples\Cobres”

There are nine inputs files and the file “rundata\_cob.txt”



## 2. Open “rundata\_cob.txt”

**This is the key file.** It is the first one selected and points to the location of all the other input files and output files. For example the first file is

10: frame ----- INPUT DATA  
input\_cob\_frd.txt

There are no folders specified which means the file is in the same folder as the rundata file.

The lists of input files used here is:

**Input\_cob\_frd.txt** - frame file. Start and end times. Size and shape of catchment. Location of channels. Land-use and weather station grids

**Input\_cob\_etc.txt** - evapotranspiration file.

**Input\_cob\_ocd.txt** - overland flow and river channel file.

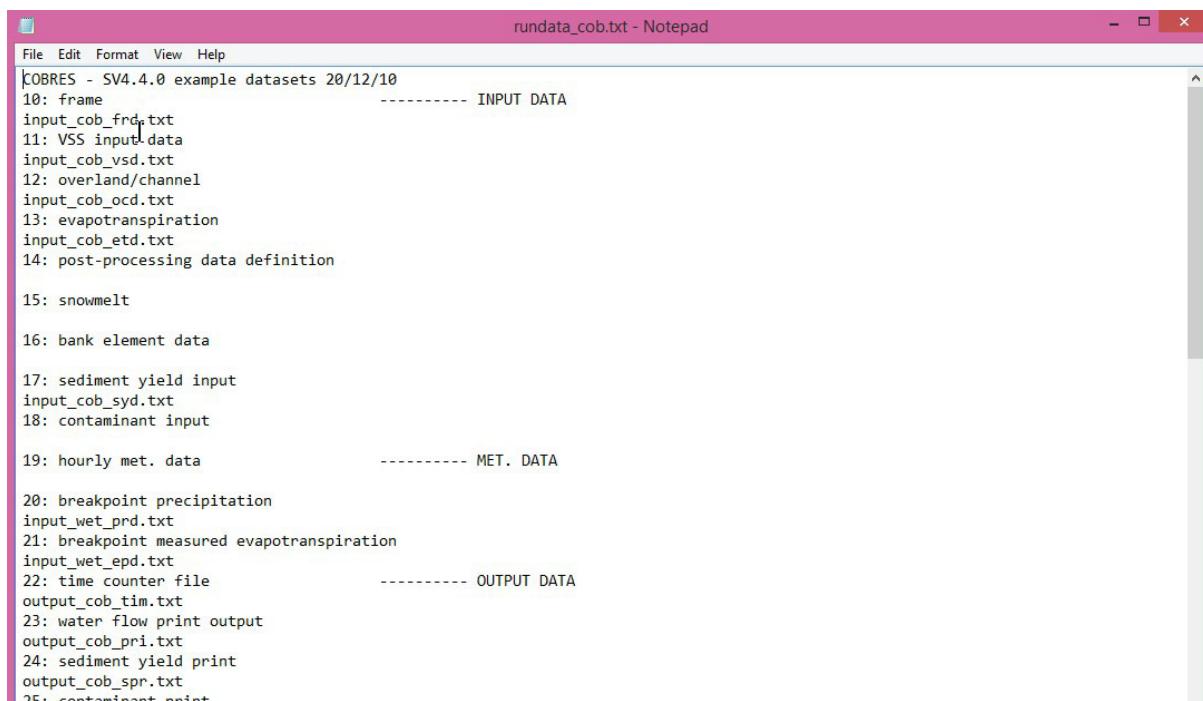
**Input\_cob\_vsd.txt** - variably saturated subsurface file. Everything below ground

**Input\_cob\_prd.txt** - precipitation data file. Time series of precipitation data

**Input\_cob\_epd.txt** - evapotranspiration data file. Time series of potential evapotranspiration

**Input\_cob\_visulisation\_plan.txt** - specifies what will be produced in the HDF5 (H5) output file.

**Input\_cob\_syd.txt (optional)**- sediment yield file



```
File Edit Format View Help
rundata_cob.txt - Notepad
[COBRES - SV4.4.0 example datasets 20/12/10
10: frame ----- INPUT DATA
input_cob_frd.txt
11: VSS input.data
input_cob_vsd.txt
12: overland/channel
input_cob_ocd.txt
13: evapotranspiration
input_cob_etd.txt
14: post-processing data definition

15: snowmelt

16: bank element data

17: sediment yield input
input_cob_syd.txt
18: contaminant input

19: hourly met. data ----- MET. DATA

20: breakpoint precipitation
input_wet_prd.txt
21: breakpoint measured evapotranspiration
input_wet_epd.txt
22: time counter file ----- OUTPUT DATA
output_cob_tim.txt
23: water flow print output
output_cob_pri.txt
24: sediment yield print
output_cob_spr.txt
25: contaminant print
```

### 3. Open “Input\_cob\_frd.txt”

All the Shetran input file are text files. They are not intuitive and to work out what is going on you need to read the files with the manual

(<http://research.ncl.ac.uk/shetran/SHETTRAN%20V4%20User%20Guide.pdf>)

Another thing to note is that sometimes the formatting matters (the user guide contains this information). So an extra space can make all the difference (tabs also should be avoided). For example for the Cobres the grid sizes are 2000m and Shetran is reading this assuming each column has seven spaces (F7.0 in the user guide).

So

2000.002000.0020000.002000.002000.00... Is correct

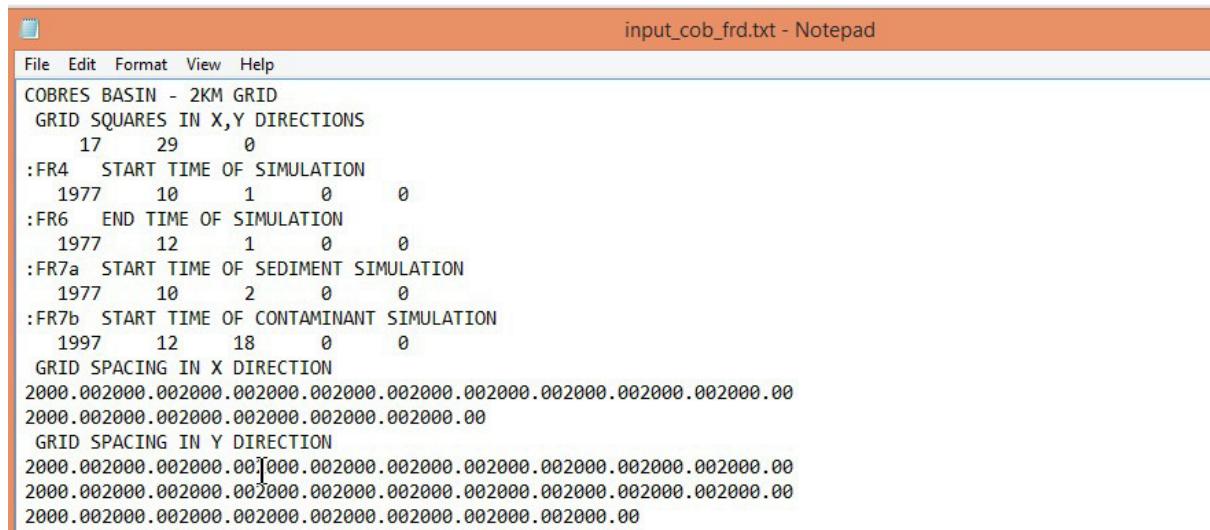
2000.0 2000.0 2000.0 2000.0 2000.0.... Is correct

But

2000.00 2000.00 2000.00 2000.00 2000.00.... Is incorrect.

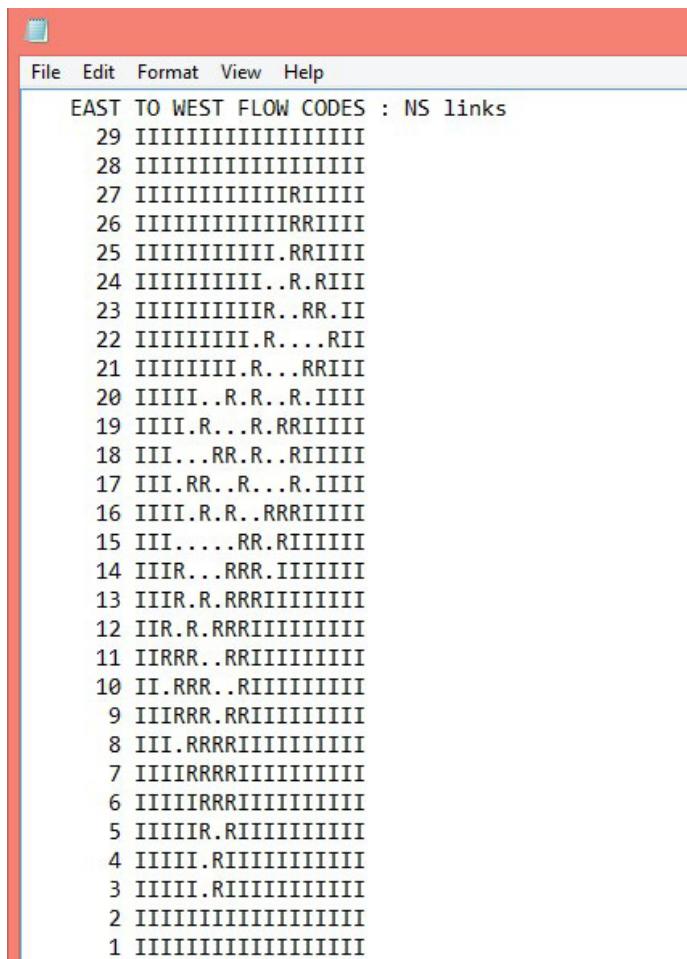
It reads the next 7 characters. So "2000.00", "2000.0", "0 2000.", "00 2000", ".00 200"

It thinks the 5<sup>th</sup> value is .002 and this then causes the model to crash (although it would be very hard to guess this looking at the error messages)



```
File Edit Format View Help
COBRES BASIN - 2KM GRID
GRID SQUARES IN X,Y DIRECTIONS
 17      29      0
:FR4  START TIME OF SIMULATION
 1977      10      1      0      0
:FR6  END TIME OF SIMULATION
 1977      12      1      0      0
:FR7a  START TIME OF SEDIMENT SIMULATION
 1977      10      2      0      0
:FR7b  START TIME OF CONTAMINANT SIMULATION
 1997      12      18      0      0
GRID SPACING IN X DIRECTION
2000.002000.002000.002000.002000.002000.002000.002000.002000.00
2000.002000.002000.002000.002000.002000.00
GRID SPACING IN Y DIRECTION
2000.002000.002000.002000.002000.002000.002000.002000.002000.00
2000.002000.002000.002000.002000.002000.002000.002000.002000.00
2000.002000.002000.002000.002000.002000.002000.002000.002000.00
```

The river channels are the worst to set up manually. These flow around the edge of the grid squares. These can be seen below for the channel flowing in a north south direction. "I" means it is outside the catchment, "." Means there is no channel and "R" means there is a channel. There is a similar grid for the channels flowing east west.



```
EAST TO WEST FLOW CODES : NS links
29 IIIIIIIIIIIIIIIIIIII
28 IIIIIIIIIIIIIIIIIIII
27 IIIIIIIIIIIIIRIIIIII
26 IIIIIIIIIIIIIRRIIIII
25 IIIIIIIIIIII.RRIIIII
24 IIIIIIIIII..R.RIII
23 IIIIIIIIIR..RR.II
22 IIIIIIII.R....RII
21 IIIIIIII.R...RRIII
20 IIIII..R.R..R.IIII
19 IIII.R...R.RRIIIII
18 III...RR.R..RIIIII
17 III.RR..R...R.IIII
16 IIII.R.R..RRRIIIII
15 III....RR.RRIIIII
14 IIIR...RRR.IIIIIII
13 IIIR.R.RRIIIIIII
12 IIR.R.RRIIIIIIIII
11 IIRR..RRIIIIIIIII
10 II.RR..RRIIIIIII
9 IIIRR.RRIIIIIIIII
8 III.RRRRIIIIIIIII
7 IIIIIRRRIIIIIIIIIII
6 IIIIIIRRRIIIIIIIII
5 IIIIR.RIIIIIIIIII
4 IIIII.RIIIIIIIIIIII
3 IIIII.RIIIIIIIIIIII
2 IIIIIIIIIIIIIIIIIII
1 IIIIIIIIIIIIIIIIIII
```

#### 4. Run the simulation

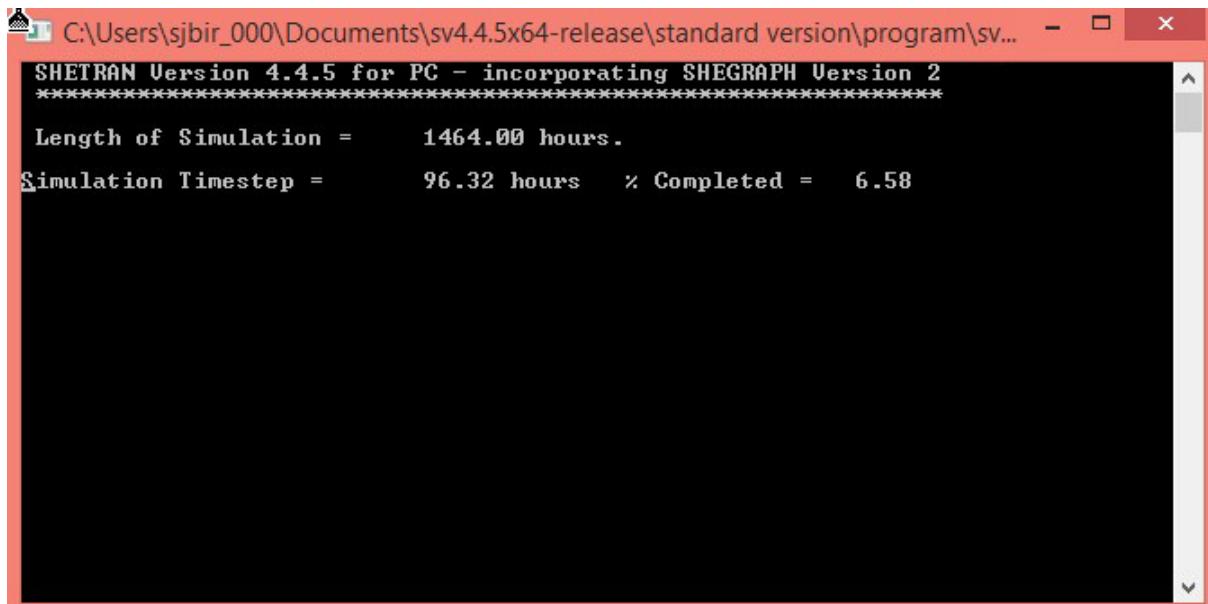
Go to “standard version\program”

Double click on “sv4.4.5x64.exe”

Select the rundata file for the example catchment. Go to “examples” and “cobres” and select “rundata\_cob.txt”

The simulation will start and as its progress can be seen. When completed successfully the window will disappear. Normally if there are any messages these are shown on the Window and the simulation pauses. Press “Enter” to go through the messages, these will also be seen in the “output\_cob\_pri.txt” file.

If the simulation crashes and the window also disappears then open a “command Prompt” window. Go to “File Explorer” and drag the “sv4.4.5x64.exe” into the command prompt window. Select the rundata file and when the simulation is finished the window will not disappear.



A screenshot of a terminal window with a red border. The window title is "C:\Users\sjbir\_000\Documents\sv4.4.5x64-release\standard version\program\sv...". The text inside the window is as follows:

```
SHETRAN Version 4.4.5 for PC - incorporating SHEGRAPH Version 2
*****
Length of Simulation = 1464.00 hours.
Simulation Timestep = 96.32 hours x Completed = 6.58
```