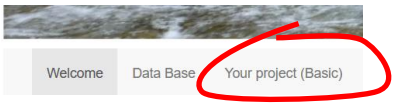
This short note explains the first step toward a bedload calculation with BedloadWeb

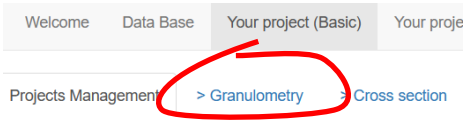
If you have a BedloadWeb account, first log in. Otherwise start typing:

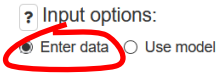
Click on 'your project'



1. Create a Grain Size Distribution (GSD)

Click on 'Granulometry'.





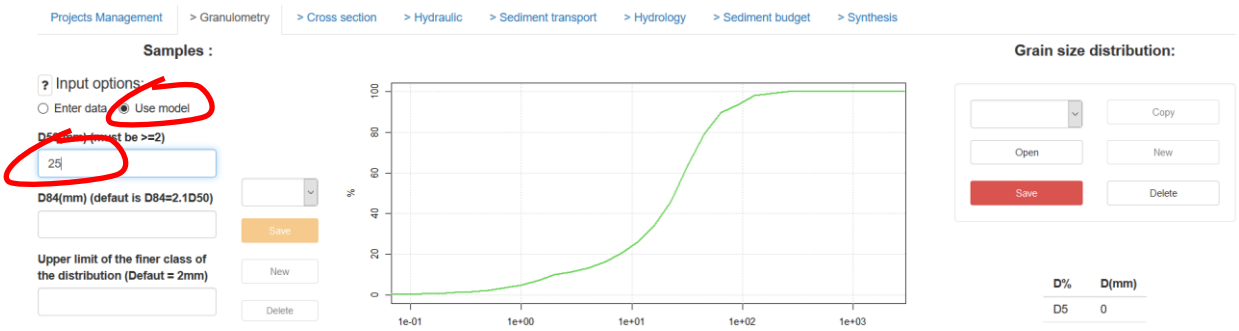
Input format

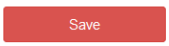
0.5Ψ Ψ Libre

Ψ	D(mm)	Count (or %)
1	2	
2	4	
3	8	
4	16	
5	32	

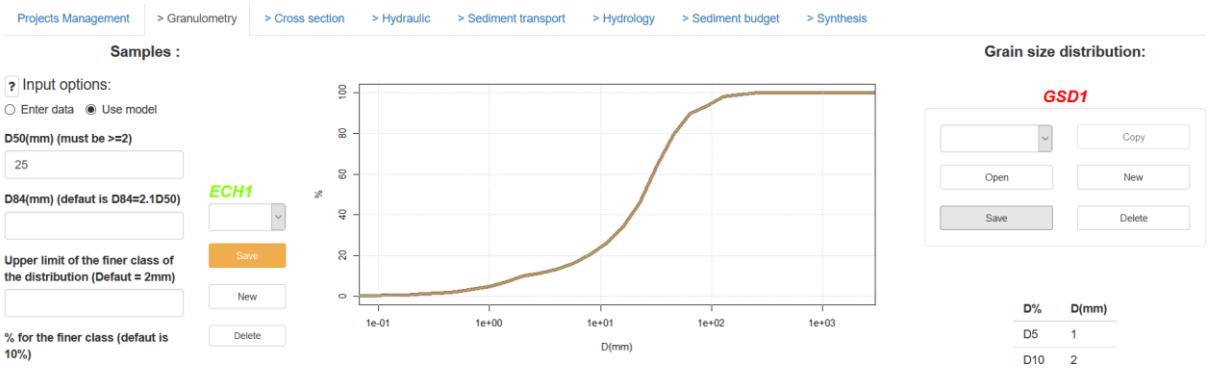
The right button offers 2 possibilities. 'Enter data' displays a table where you can enter your measurements (D=Class diameter, Count=Number of grains in this class).

But for simplicity we will here use the GSD model proposed by BeloadWeb: simply enter a value in the text box D50.



A curve is automatically created. Click on the save button. 

It's done. We have created a GSD (automatically named **GSD1**) which is composed of one sample named **ECH1**.



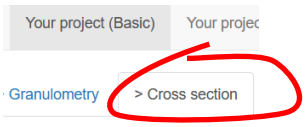
For a bedload calculation <u>we can stop here</u> and pass to the following.

But:

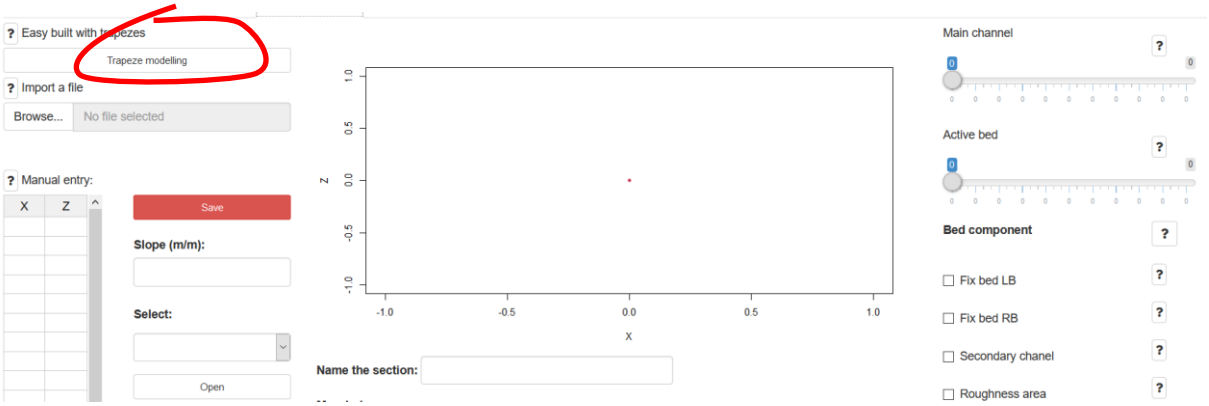
- you can add new samples to this GSD by clicking on ‘New’ in the left menu , and repeating the operation.
- you can create as many GSD as you want by clicking on ‘New’ on the right menu, and repeating the operation. Each sample must be saved before saving a Grain size Distribution (in other word always click Save before Save)
- Once you have created and saved several GSD you can display them on screen with the ‘open’ button

2. Create a bed geometry

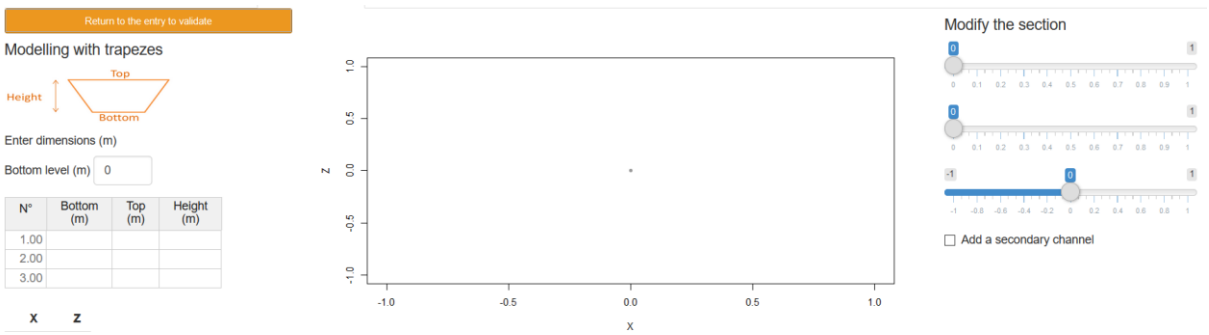
Click on ‘Cross section’.



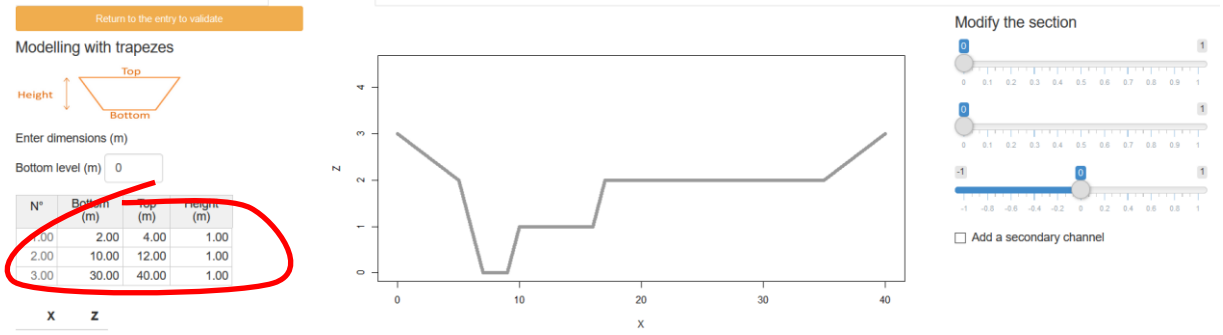
From the interface you can create a section either by uploading a xz.txt file (two columns named X, Z and tab separated), or by entering manually the X Z values in the left table. For simplicity we will use the trapeze modelling proposed by BeloadWeb:



You now see:

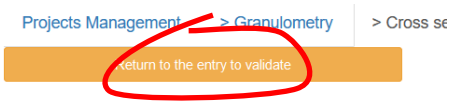


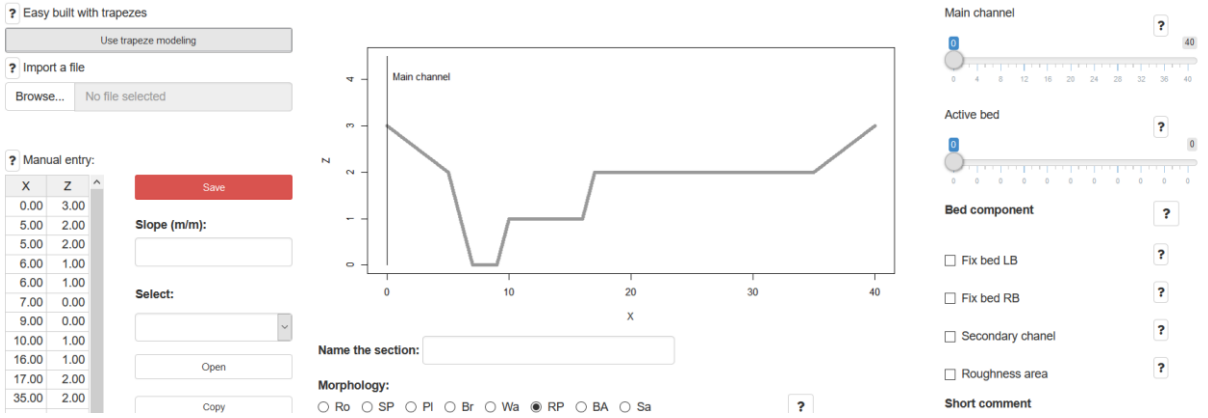
Enter values in the left table, in ascending order for column 1 and 2:



You have created a complex cross section, composed of a main channel located inside a flood channel. Plays with the slide buttons in the right and see what happens.

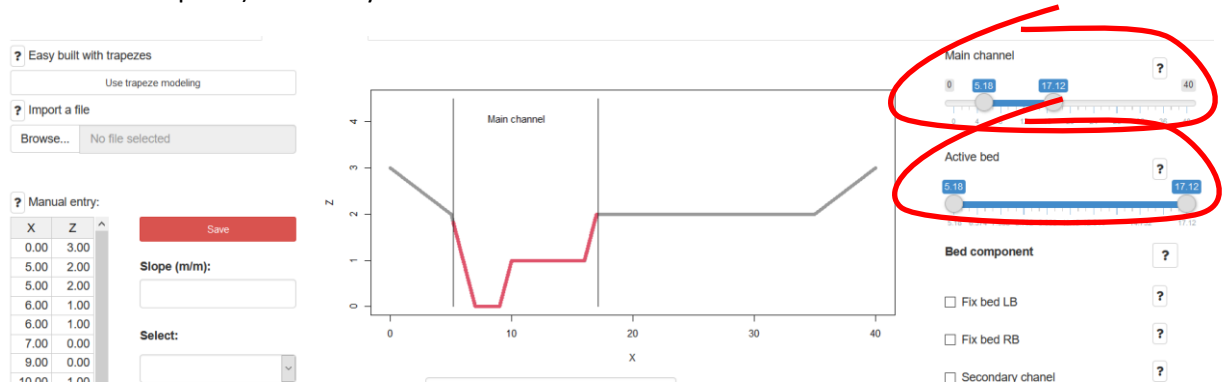
Click on 'return to the entry to validate' for coming back to the section menu.



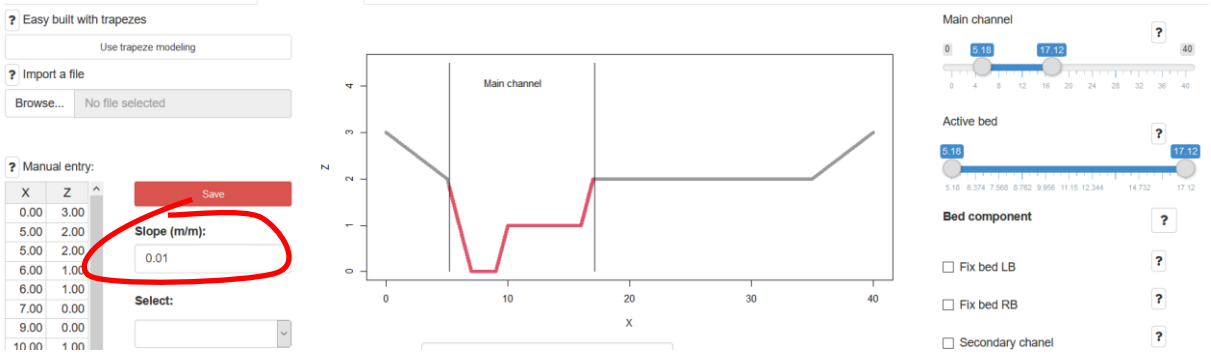


The section data are automatically reported in the left table, and you can modify them manually.

Use the sliders in the right for defining the **main channel** (where the main floods occur) and the **active bed** (part of the bed which is morphodynamically active for common floods and where bedload takes place). Generally the main channel and the active bed are identical.



Enter **the slope**. For instance 1% (S=0.01):



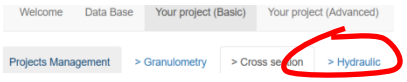
It's done, you can save the section with the save button. A name **SEC1** appears on screen.

We stop here for this example but you can create as many sections as you want.

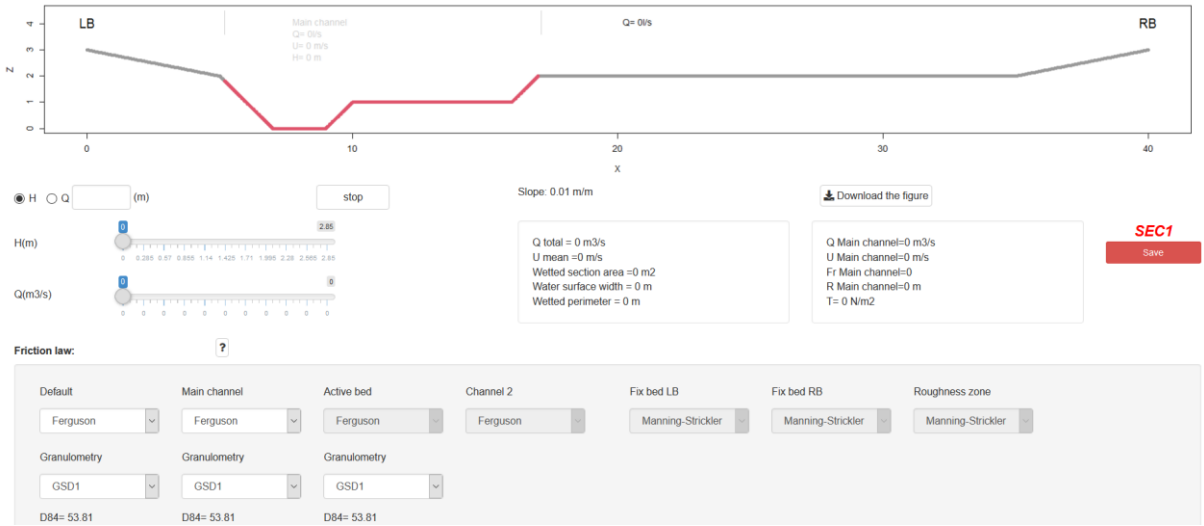
<u>We have no more data to enter. In the following we will just play with sliders.</u>

3. Hydraulics

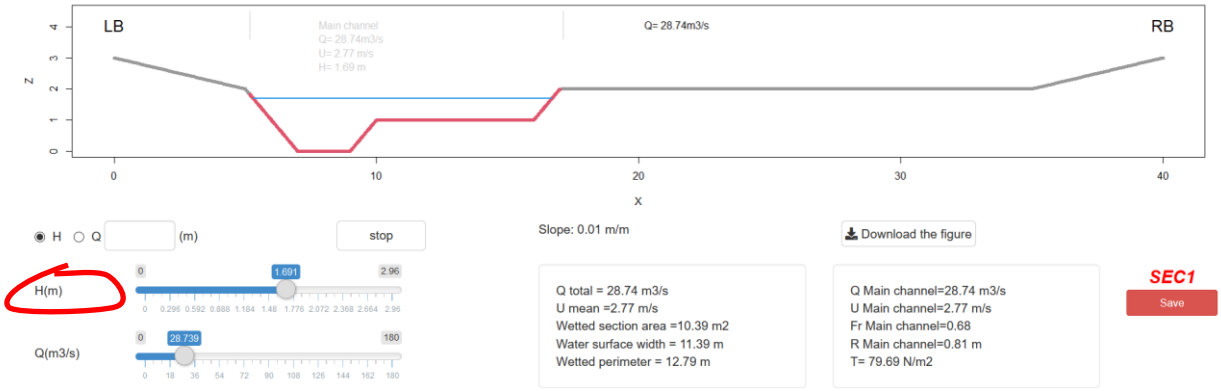
Click on 'Hydraulics'



The section **SEC1** is displayed. Bellow the figure you can see that the grain size distribution **GSD1** has automatically been affected to each part of the bed (It could be changed by creating several GSD in the GSD menu if you consider that each part of the bed has a different granulometry).



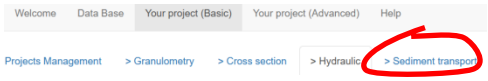
Change the water level with the slide button and see what happens…



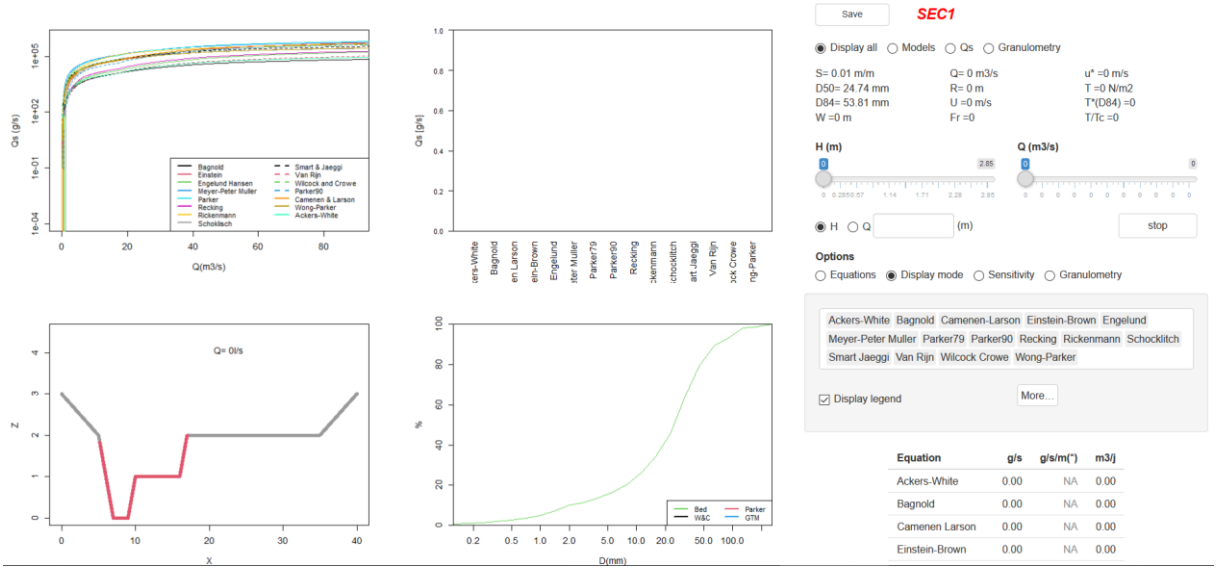
It's done for the hydraulics. Continue to play with the different buttons and see what happens.

4. Bedload transport

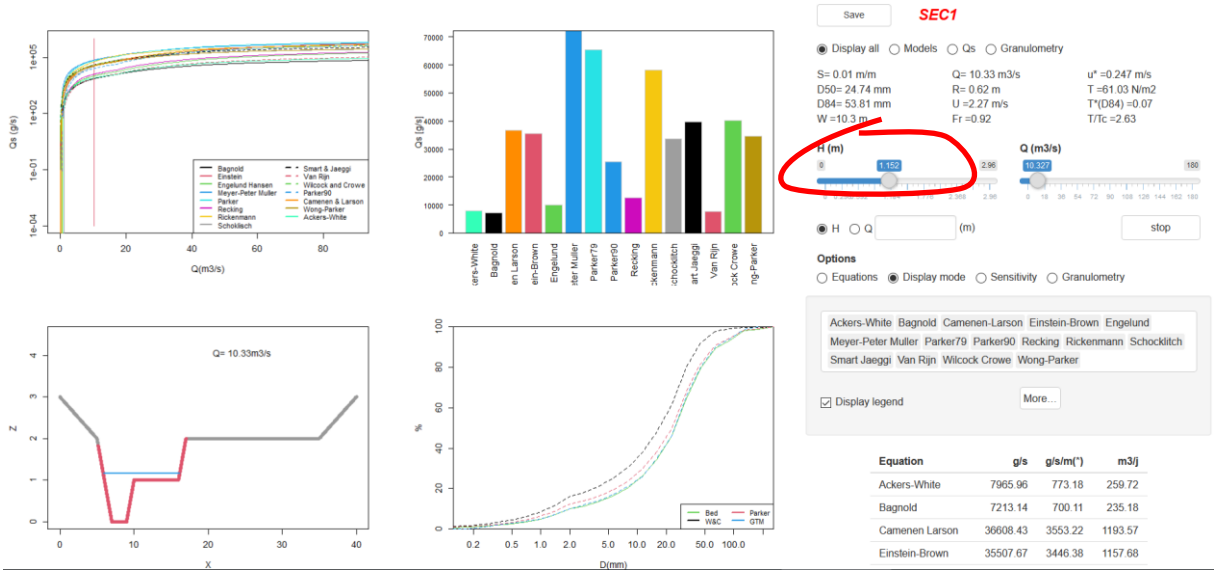
Click on the 'sediment transport' button



What you see is a summary of what have been created. The first panel of the figure presents the bedload models (as selected in the select box in the right of the screen) which have been constructed for the given section **SEC1** and grain size distribution **GSD1**.



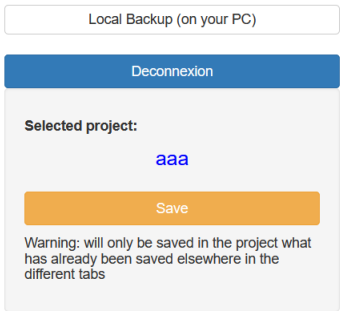
Change the water height and see what happens:



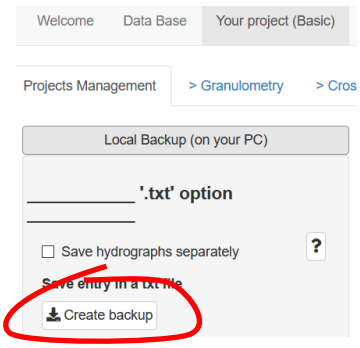
The second panel of the figure and the right table display the values of bedload transport calculated by each equation for the given flow height. The last panel of the figure presents the grain size distribution of what is transported (which is usually finer than the bed material).

You can play with the different button and see what happens.

It's finished!!! You have computed bedload transport. Go back to the first page and save your project.



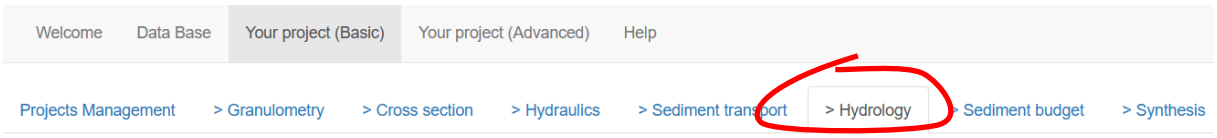
Note : at this stage if you are not connected to an account the only possibility you have to save these entries is to use the 'Local Backup' menu. All data will be saved in a txt file you can conserve in your computer, and reuse later with the same menu.



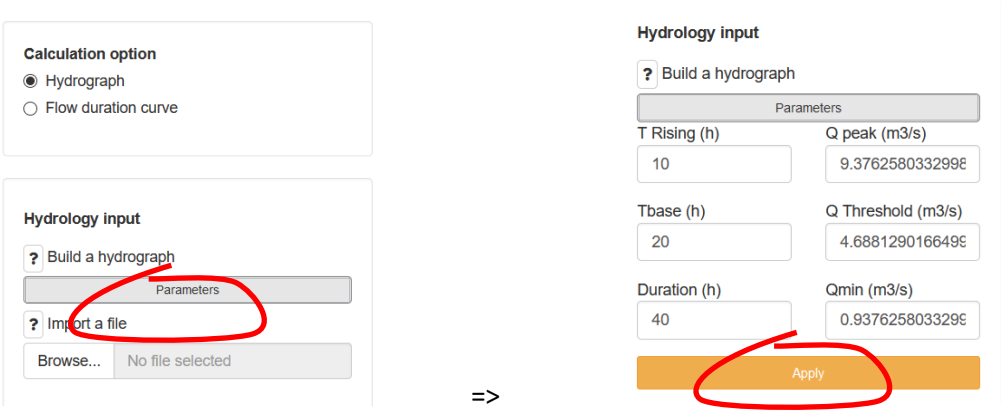
To go further: the SEDIMENT BUDGET

With a few additional clicks you can calculate a sediment budget.

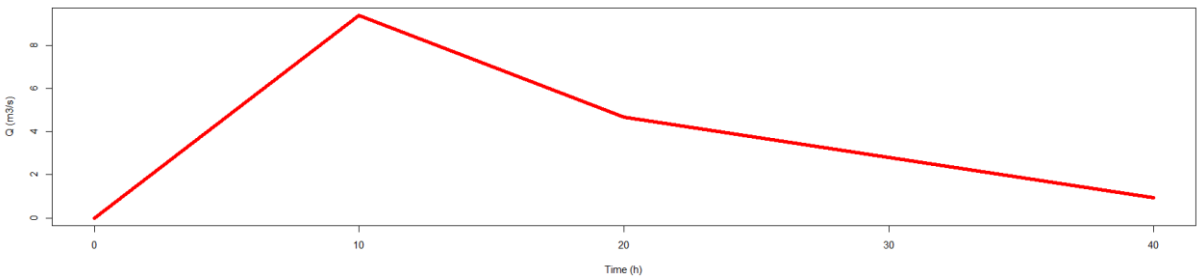
1) Create an hydrograph Q(t):



You can import a hydrogaph in text format (two columns T, Q separated by a tabulation). But for this example we will automatically generate a simplified hydrograph with BedloadWeb. A section must be open (see above). Click on 'Parameter:



Values are automatically proposed, and when clicking on "Apply" a triangular theoretical hydrograph compatible with the flow section (maximum water depth that can pass through the section) is generated:

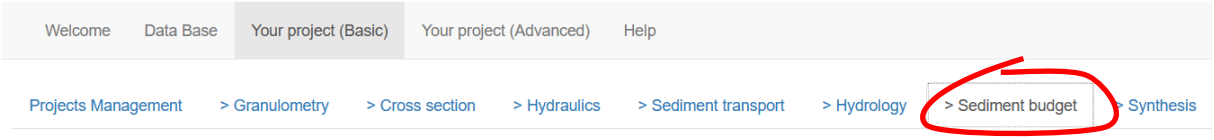


You have to save it, which creates a new object called "HYD1":

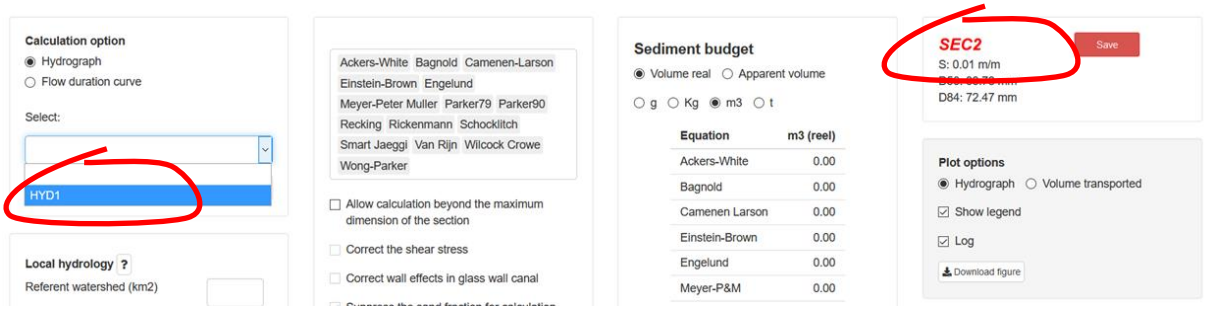
You can create as many hydrographs as you want and manage them with the page menu.

2) Create a sediment budget

Move to the next tab:



The name of the section that is opened in the "Section" tab, and for which we will calculate a sediment budget, is recalled at the top right.



By clicking on the drop-down menu on the left you can select the previously created hydrograph Q(t). Click on "Open" and the hydrograph is automatically associated with the section (for which the sedimentograph Qs(Q) has already been constructed in the "Solid Transport" page).

The solid discharge Qs(t) is then calculated for each of the equations selected. The graph shows the evolution over time.

The volumes transported by this event are presented in the table on the right or graphically by clicking on "Transported volume”: