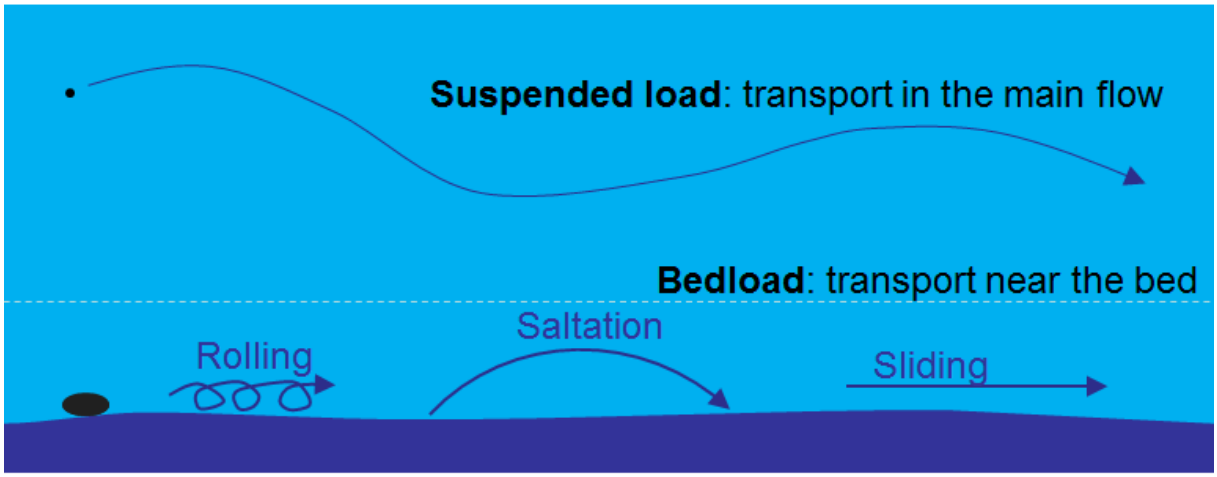
Some definitions before starting working with BedloadWeb

To start working with BedloadWeb in the best possible way, make sure you are familiar with the following definitions.

What is bedload?

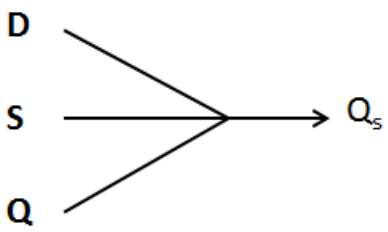


Bedload consists in sediments moving in contact with the bed, in response to hydraulics forces. It is responsible for the river morphology. It is difficult to measure and the alternative solution consists in computing the bedload flux with bedload equations.

Some definitions

- **The sediment grain size D** (often given in millimeter): because a natural sediment mixture contains many diameters (from sand to cobbles), the program uses characteristic grain sizes. For instance D_{84} represents the diameter such that 84% of the material has a size smaller.
- **The slope S**: a slope of 1% means that the bed level decreases of 1m when moving 100 m in the downstream direction (S=1/100=0.01 meter/meter)
- **The flow discharge Q** (cubic meter per sec m^3/s): it is the volume of water passing a section per second. Alternatively, the flow is also represented by the water height d.
- **The solid discharge Qs** (bedload) in grams per second (g/s) if we consider the mass or in cubic meters per second (m3 / s) if we consider the volume transported

⇨ **BedloadWeb uses D,S and Q for computing Qs.**



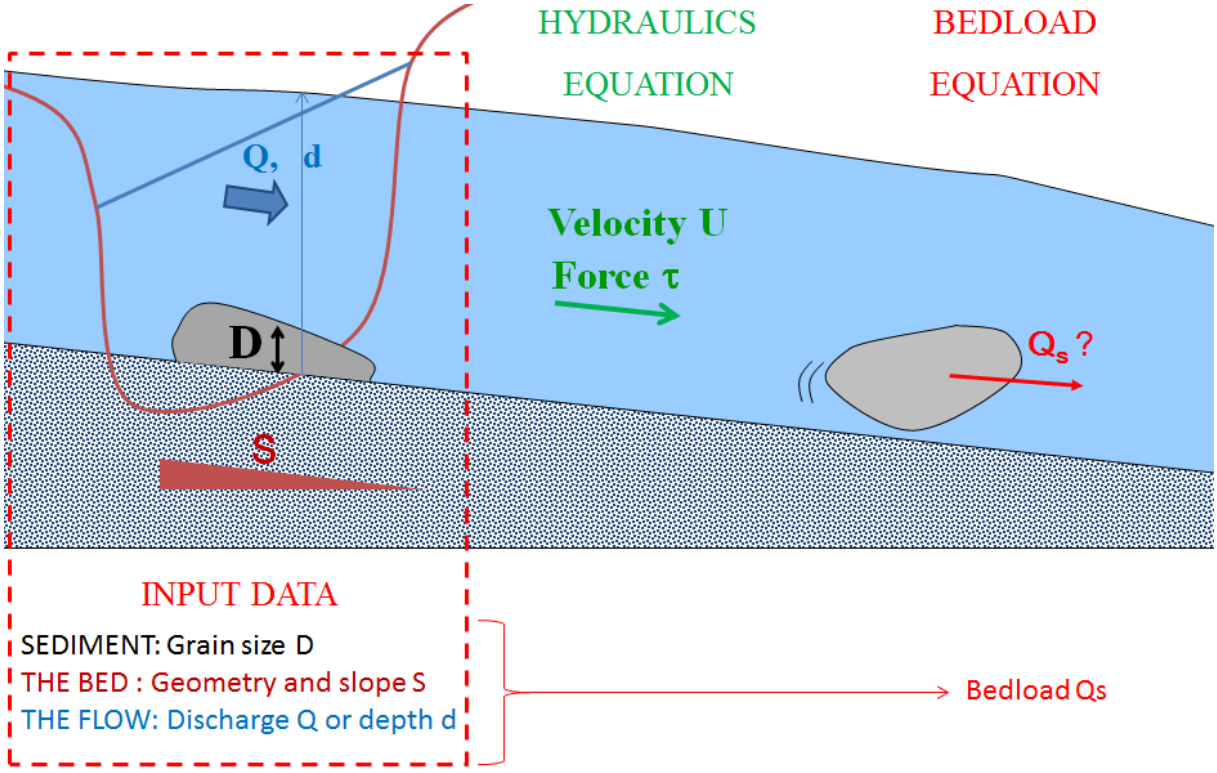
How do we compute the bedload flux Qs?

3 inputs:

- The sediment: grain size distribution **D**
- The bed: geometry of the section and the slope **S** of the reach
- The flow: discharge **Q** (or depth d)

1 output:

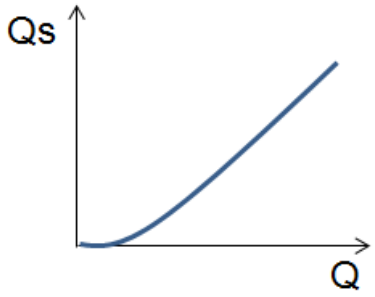
Bedload **Qs**



A first calculation converses the input data into **shear stress** τ (hydraulic force which is applied to each surface unit, in N/m²)

The second calculation quantifies how much grains this force can transport.

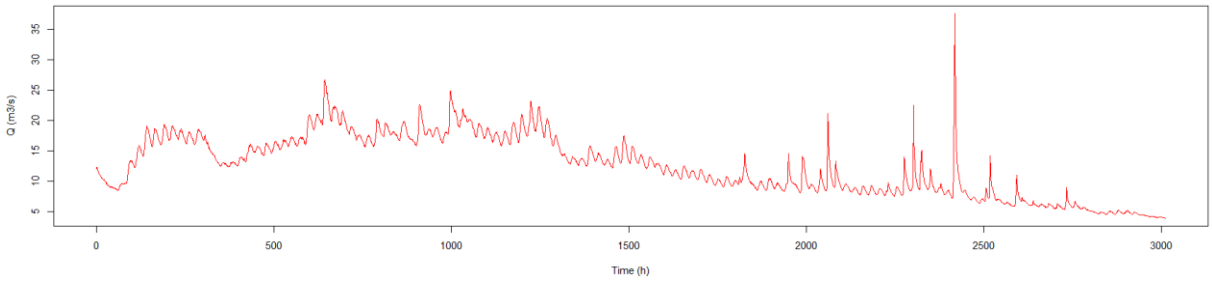
At this stage we compute a solid discharge Qs for each flow discharge Q. It permits to build a **sedimentograph** Qs(Q).



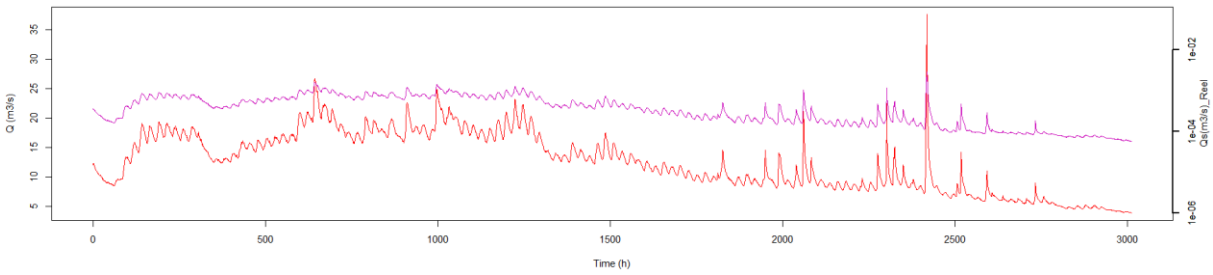
What is a sediment budget?

The question is: what is the **volume of sediment V (m^3)** transported by the river during a time period T?

During this period the discharge Q varies with time: it's the **hydrograph Q(t)**.

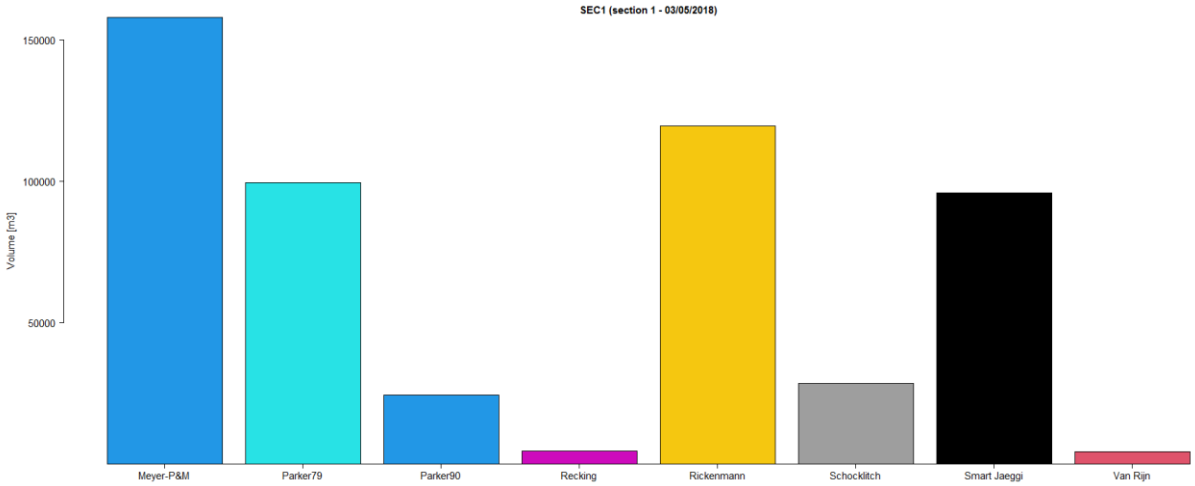


Replacing Q by Q(t) in the the sedimentograph Qs(Q) gives the evolution of solid discharge with time Qs(t).



Then, summing Qs for each time t over the period T gives a volume transported V (m^3).

Each equation will compute a volume different, and differences can be very large!



It is very easy to use the program and to compute volumes. But this previous figure illustrates how the computation of bedload transport can be uncertain, and invite the user to be critical on the results (by considering the quality of the input data, the validity domain of each equation…).

This is sufficient for your first steps with BedloadWeb. But you can learn more about the theory by reading "The Equations.pdf" in the help menu, or the numerous documents available online.