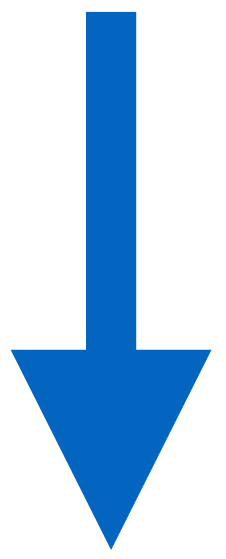
Better physics for coastal dynamics

School of Geosciences

Sediment transport

- **grain size**
- **densities** of sediments and of ambient water (in practise the density contrast between particles and water)
- **viscosity** of the ambient water
- **flow regime** turbulent / laminar



these factors also control the rate at which particles sink, and therefore are important when considering sediment deposition

- The shear stress is proportional to the product of the density of the water and the square of the time averaged current speed:

$$\tau_0 \propto \rho \bar{u}^2$$

shear stress at the bed density of water time-averaged current velocity

Movement of sediment:

if shear stress at the bed > the frictional and gravitational forces

critical shear stress.

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The relationship between grain size and critical shear stress is not linear.
it is strongly dependent of the nature of the bed sediments.

Cohesiveness results from the presence of clay in the sediment.
Clay particles tend to form aggregates in which the individual flakes are held together by **electrostatic attraction** and the **surface tension** of the films of water surrounding the flakes.