Erosion and Solids Transport

Component
École Nationale Supérieure d'Électrotechnique d'Électronique

In brief

Code ELP: N8EM04A

Presentation

Objectives

At the end of the course students will need to know :

- Identify the issues associated with sediment transport in rivers.
- Define dimensionless numbers associated with sediment transport and associated modes of transport.
- Determine the threshold of movement of a watercourse from the granulometry, the water level and the slope of the watercourse.
- Explain the mechanisms associated with the equilibrium slope of a watercourse.
- Plan the evolution of a watercourse in model situations from the mechanisms associated with the balance of a watercourse.
- Plan the evolution of a watercourse in concrete situations from the mechanisms associated with the balance of a watercourse.
- Describe the different types of watercourse and their link with their environment (mountain, plain, ..).
- Understand technical documents on the transport of sediments in rivers.
- Defend a watercourse development project by arguing on a scientific basis.
- Interact and convince an audience.
- Evaluate the work and understanding of other students.

Description

The objective of the course is to give you a first approach to sediment transport, more specifically focused on sediment transport in rivers.

Non-contractual information.
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Starting from the mechanisms at the particle scale, we will introduce the dimensionless sediment transport numbers to identify the main parameters and define the different transport regimes. The role of dimensionless numbers and their implications will be illustrated through concrete applications. Subsequently, we will introduce the concept of power in relation to the equilibrium slope of the watercourse. This will allow us to analyze a number of field situations and to understand the basic mechanisms of sediment transport. From there, we will also study the different forms of watercourse, from the mountain to the plain.

The rest of the course will be dedicated to the study and analysis of concrete documents written by actors from the field (engineering office, RTM, river unions ...), which will then be explained and defended orally before other students.

The teaching will be largely based on student participation, through activities, reflections and group work.

Pre-requisites

- Fluid mechanics: forces on a particle in a flow, free surface hydraulics (flow regime, general knowledge), power of a flow.
- Curiosity
- Motivation
- Participation

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