Hydrological Measurements

Mw. A.M.J. Coenders

1. Introduction

Course instructors

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Why hydrological measurements?

| Purposes:	Data requirements:
• Planning	• Planning
• Can we build houses in this area?	• Long term data series • Large time scale
• Design	• Design

• How high should my bridge be?
   • Where do we need a pumping station?
	• Long term data series
	   • Small time scale

• Management	• Management
• When should we start pumping and close the storm barrier?	• Real time • Forecasting models
• Research	• Research
• How is river water interacting with the groundwater?	• High quality • Small time scale

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Why hydrological measurements?

Hydrological engineer:

- Quantifying amount of water in phases of the hydrological cycle

- Evaluating transfer rate between phases
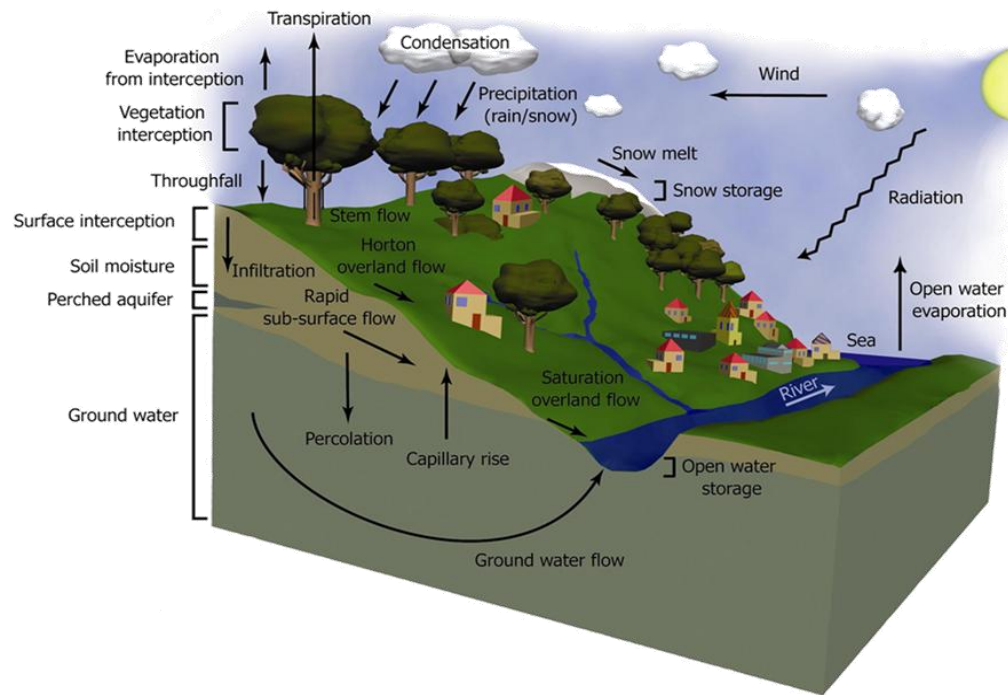
Topics in this course

Water balance

- Rainfall
  - In situ measurements
  - Remote sensing
- Discharge
  - Velocity area method
  - Stage-discharge
  - Dilution method
- Evaporation
  - In situ measurements
  - Energy balance
- Unsaturated zone
- Tracers
  - Natural tracers
  - Hydrograph separation

Data analysis

- Correlation theory
- Theory of errors
- Screening of data
  - Statistical tests
  - Trend tests
- Interpolation techniques
  - Inverse distance
  - Kriging

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