TUM

Master thesis/Study Project – Environmental Engineering

Master Thesis Workload: 30 ECTS, 900 hours

Study Project Workload: 12 ECTS, 360 hours

Applying an analytical solution for studying surface water – groundwater interaction under drought and flood periods in an Alpine catchment

When a stream and an aquifer are hydraulically connected, the response of the aquifer to river fluctuations can be estimated using the analytical solution of Singh (2004). While this solution requires some simplifications and certain assumptions, it provides fast and computationally cheap analysis compared with a numerical groundwater model. In a previous work, the analytical solution was applied to study the surface water-groundwater interactions under hydropeaking in the Adige Valley. The aim of this study is to apply the analytical solution to flood and drought events in the same region. This work will be done within the framework of the Hydromix project, which consists of studying the impact on surface water management on groundwater in Alpine Catchments.

References:

Singh SK. 2004. Aquifer response to sinusoidal or arbitrary stage of semipervious stream. Journal of Hydraulic Engineering 130: 1108–1118. DOI: 10Ð1061/(ASCE)0733–9429(2004)130 : 11(1108).

Tasks:

- Data analysis on groundwater and river stage timeseries.
- Identification of flood and drought events.
- Implementation of the analytical solution and parameter calibration.

Requirements:

- Basic knowledge in programming and timeseries analysis.
- Independent, conscientious and responsible way of working

Start:

From February, 2023

Contact:

Mónica Basilio Hazas, monica.basilio@tum.de
Prof. Gabriele Chiogna, gabriele.chiogna@tum.de