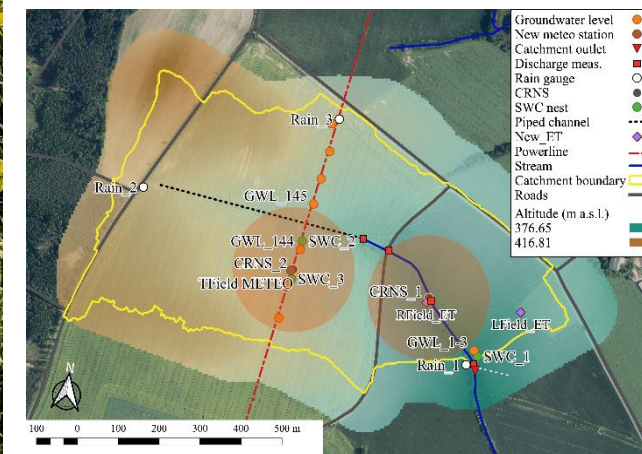
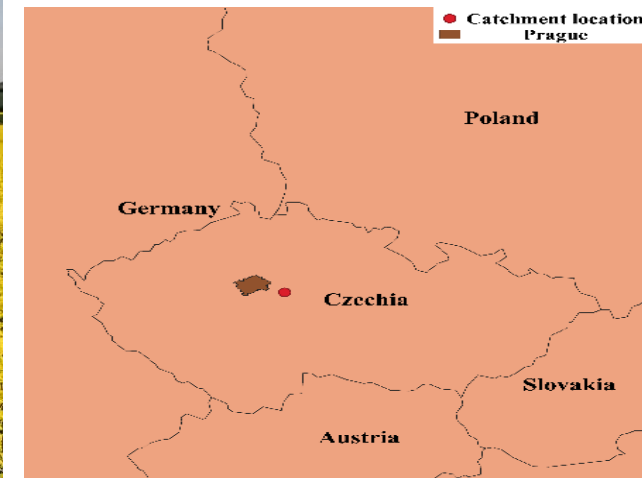


Nučice catchment

The Nučice catchment (0.531 km²) is located 30 km east of Prague in an agricultural landscape in the Central Bohemian Region, Czech Republic. The cultivated landscape and climatic conditions are representative of farmlands of the Czech Republic. To understand water balance, rainfall-runoff and soil erosion processes on the cultivated landscape, we started hydrological and meteorological monitoring at the Nučice catchment in 2011.



On-going research questions:

- What are the main water sources contributing to runoff during rainfall events?
- Which landscape characteristics dominate the dynamic of water flow and mixing at the catchment scale?
- How to obtain the travel time distribution and identify flow pathway at the catchment?
- What are the dominant factors that determine the spatial soil moisture variability within agricultural catchments?
- How does the agricultural activity affect the rainfall-runoff processes, the dynamic of soil moisture patterns, and water balance?

Observation:

- Meteorological observation
- Stream discharge and suspended sediment
- Soil moisture monitoring
- Field campaigns

Climate:

Humid continental climate, with average annual precipitation of 630 mm, evapotranspiration of 500–550 mm, and mean annual air temperature 6°C.

Soil:

Luvisols and Cambisols with a loamy Ap horizon (0.1–0.2 m deep) and underlain by a silty and silty-clay B horizon.



The landscape at Nučice



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Current understanding:

- The catchment often exhibits dry conditions during the summer and the baseflow recorded at the catchment outlet declines to $0 - 0.2 \text{ L s}^{-1}$, while in winter and early spring the baseflow is around 4 L s^{-1} .
- The average annual runoff coefficient is 1%. The runoff coefficient is low since the shallow groundwater level is usually below the water level in the stream, and some water leaves the catchment as unmonitored groundwater flow.
- Runoff has a threshold response to rainfall. Based on the rainfall-runoff data, we have identified a rather scattered rainfall-runoff relationship with a strong dependence of the runoff on the actual topsoil saturation.
- Even though the channel is straight and short, it has a high retention capacity and the flood wave peaks during runoff events are attenuated. The channel serves as a trap for eroded sediment during the summer months due to dense instream vegetation.
- Even though the arable soils are seemingly homogeneous, they exhibit spatial and temporal variability of the soil moisture pattern.

Activities and application

- Wave experiment: sediment resuspension in the stream (Zumr et al. 2017)
- Long term monitoring: storm runoff generation mechanisms in the catchment (Zumr et al. 2015)
- Spatial analysis: top-soil moisture, unsaturated Hydraulic Conductivity (Zumr et al. 2019)
- Numerical models: Hydrus/SWAT/MIKE-SHE (Gómez et al. 2020; Noreika et al., 2020)

