

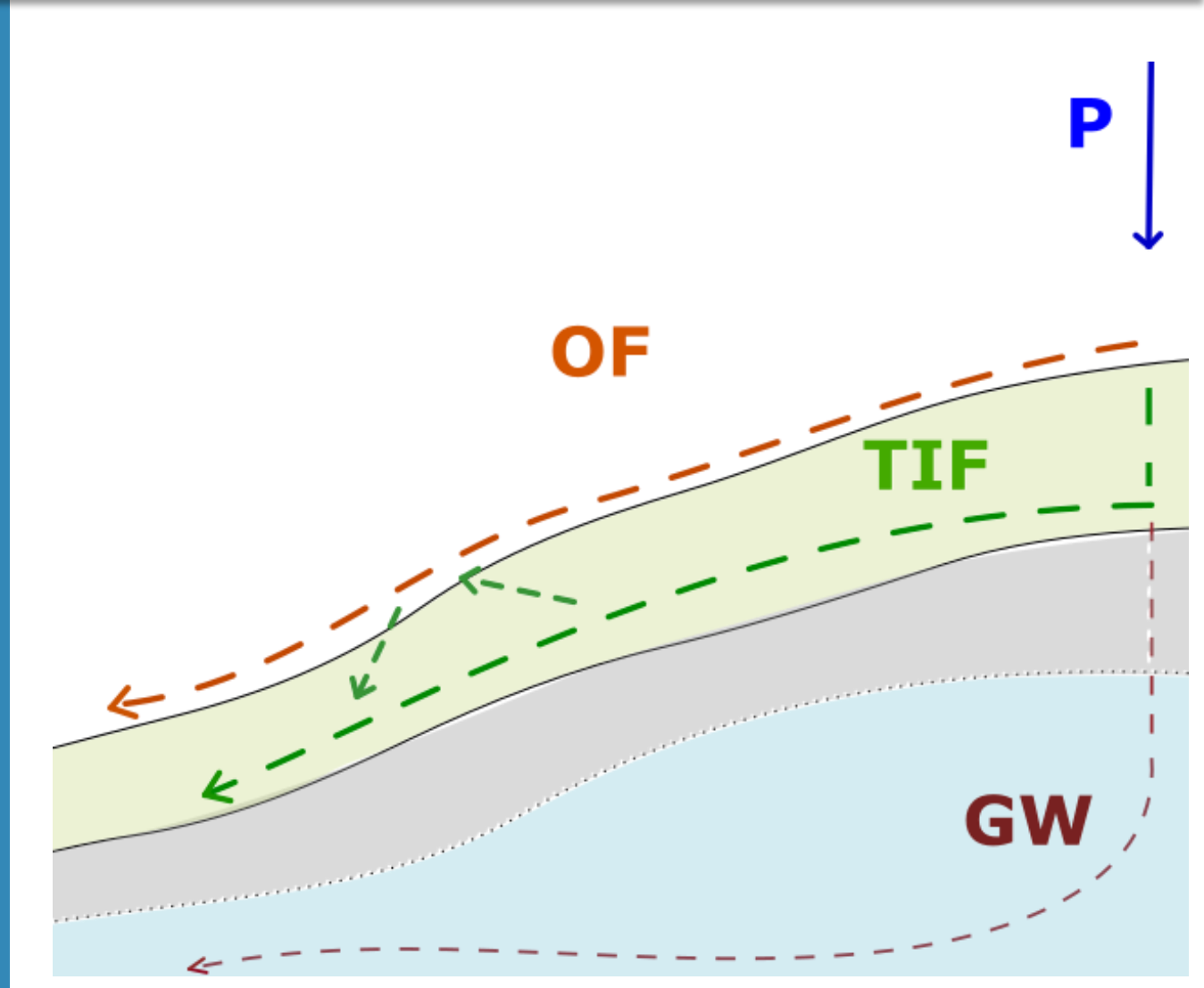
# Near-surface flow pathways in a Swiss pre-Alpine catchment

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## Background

Despite recent advances, near surface flow pathways, such as overland flow (OF) and shallow subsurface flow (top soil interflow; TIF) remain poorly understood, particularly in humid catchments. The high spatial variability makes studying these flow pathways and their connectivity to the stream network difficult. Therefore, the aim of the TopFlow project is to investigate the generation and connectivity of OF and TIF in the Studibach catchment in the summer and fall of 2021 and 2022.



**Main challenge: High spatio-temporal variability**

## TopFlow Project

### How important are near-surface flow pathways for streamflow and stream chemistry?

#### Quantity:

- Flow amounts and occurrence
- Rainfall thresholds
- Relation to site characteristics
- Flowpath dynamics

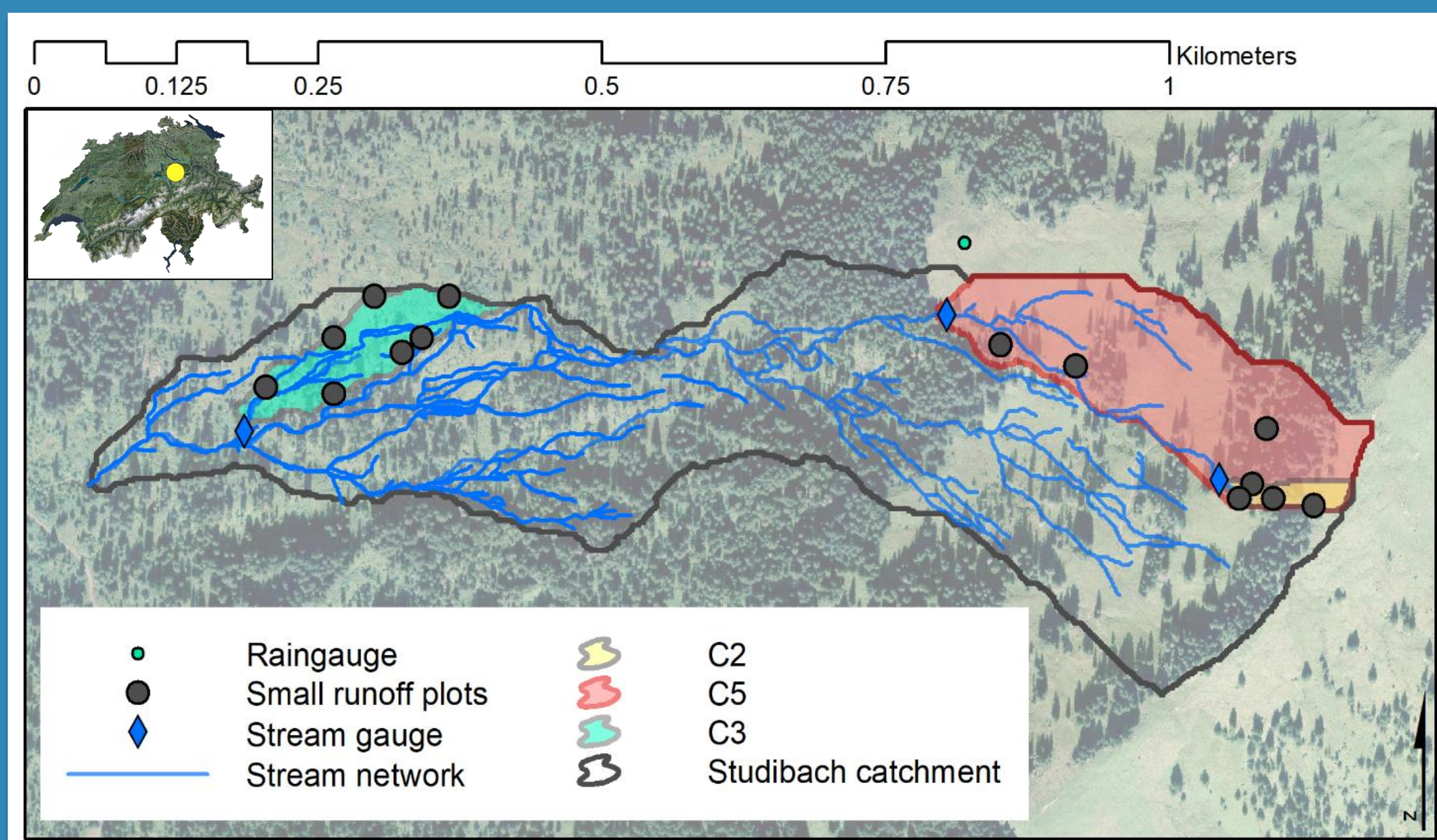
#### Quality:

- Stable water isotopes
- Major ions and traced elements
- Hydrograph separation
- End-member mixing analysis

#### Highlights:

- Long-term experimental catchment
- Innovative field set-up
- Chemical *and* hydrometric analyses

### Study Area



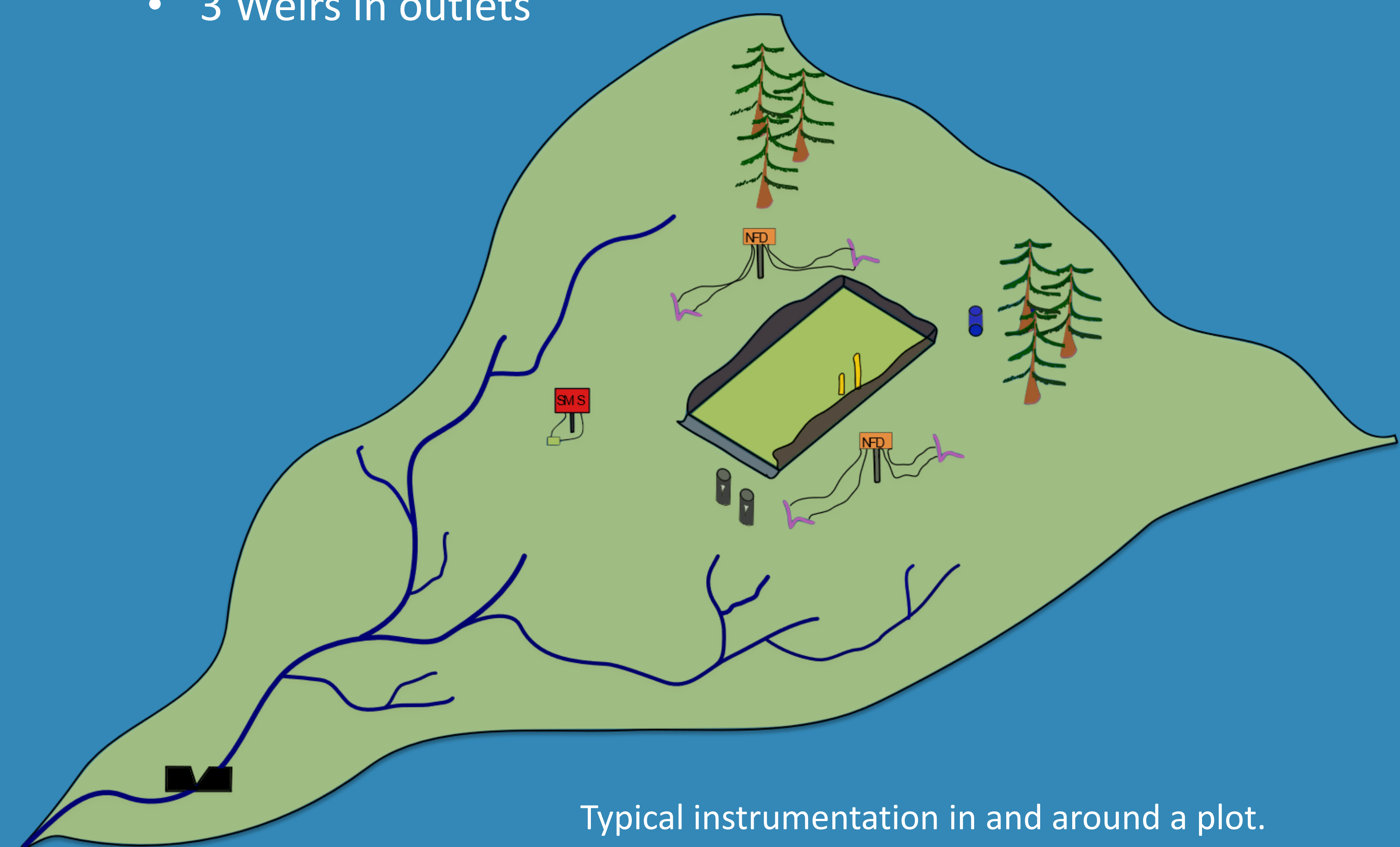
Map of the plot locations in the Studibach catchment. Plot locations were selected based on the Topographic Wetness Index and land use.

#### Studibach, Alptal, Switzerland

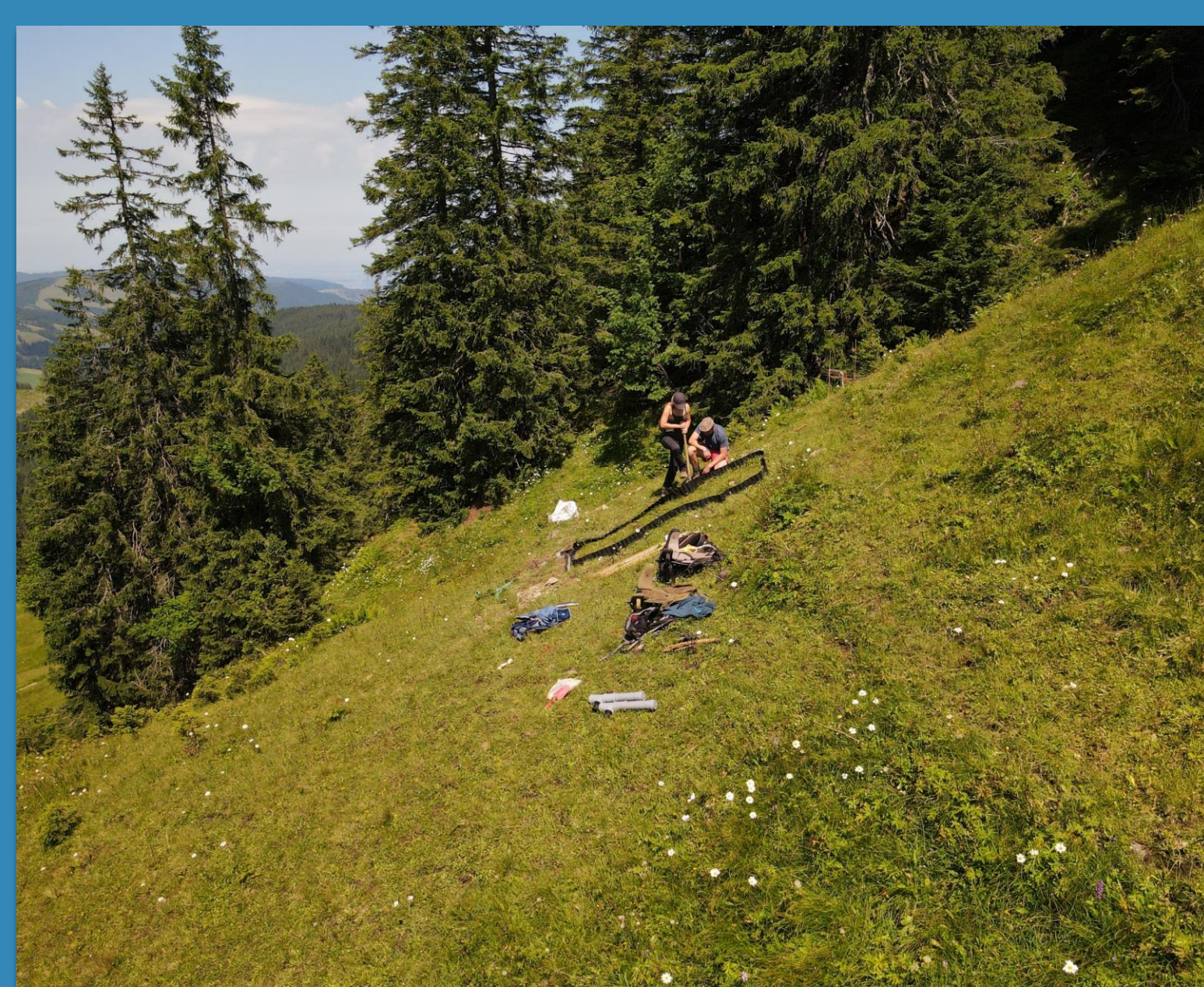
- Long-term research catchment
- Low permeability gleysol
- High precipitation (2300 mm/year)
- Open forest, pastures, wetlands

### Instrumentation

- 2 Rain gauges
- 14 Small runoff plots (3x1m)
- 2 Large runoff plots (20x20m)
- 28 Overland flow detectors
- 3 Weirs in outlets
- Time lapse cameras
- 14 Groundwater wells
- Soil moisture sensors
- 28 Suction lysimeters
- Automatic water samplers



Typical instrumentation in and around a plot.



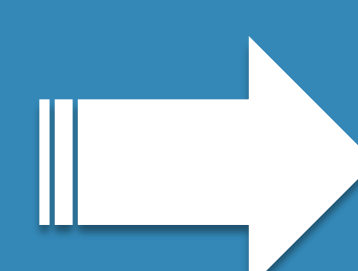
Pictures of the plots

#### Additional measurements

- Infiltration rates
- Microtopography
- Vegetation cover
- Soil hydraulic characteristics (pF curve)

#### Experiments:

- Sprinkling
- Dye tracing
- Salt tracing
- Scaling effect (different plot sizes)



#### Advantages of setup:

- Large spatial cover
- High frequency measurements (5 min)