

Groundwater pathways and storage dynamics in steep mountain topography: a study case of the Kahule Khola catchment (Nepal)

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Motivation

- A The Nepal Himalays is a part of the "water towers" of Asia
- Billions of people dowstreams depend on this freshwater
- At least 70% of the precipitation budget comes from monsoon rainfall
- 2/3 of groundwater goes to rivers
- Yet, the hydrological processes in mountainous areas are still poorly understood

Method & study area

A field investigation was carried out after monsoon in a steep catchment area: the Kahule Khola drainage basin in central region of Nepal.





Geology:

- Metamorphic rocks (Gneiss) in high elevation • Terrigenous alluvium near the outlet
- Crystalline rocks (Schists) and sedimentary rocks (sandstones) in between



Legend

- ^C Measurement site
- Électrical Resistivity Tomography (ERT) To prospect at least 20m depth for estimating the hydraulic conductivities from resistivity profiles
- Springs/streams sampled For isotopes and ions analyses that will determine the time residence of water
- Transect between Gumba (~3000 masl) and the outlet (~1100 msl)
- Permeability To measure the hydraulic conductivity at saturation in the first 2m depth
- Infiltration capacity To measure the hydraulic conductivity at the surface





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Below the steep relief of the Nepal Himalayas, groundwater is stored in deep and perched aquifers



Field observations in post-monsoon











> Hydraulic conductivity profiles of the soil (Ksat)





Range of Ksat from 2 cm/h to 160 cm/h

