Wasser und Phosphor auf der Spur -
Zeitlich hochaufgelöste Beobachtung von Wasser- und Nährstoffflüssen

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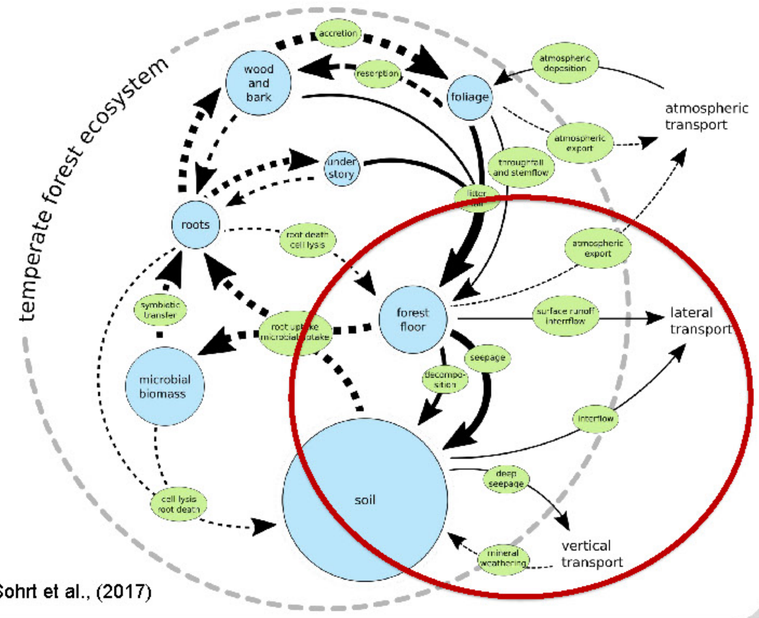
Aims & Objectives:

Hydrological effects on phosphorus (P) fluxes in beech forests

- Lateral & vertical subsurface flow
- Major loss of P from the forest ecosystem

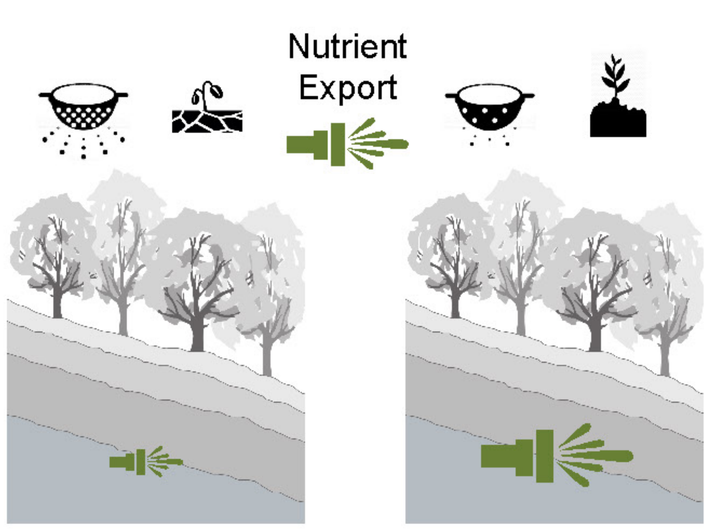


Sohrt et al., (2017)

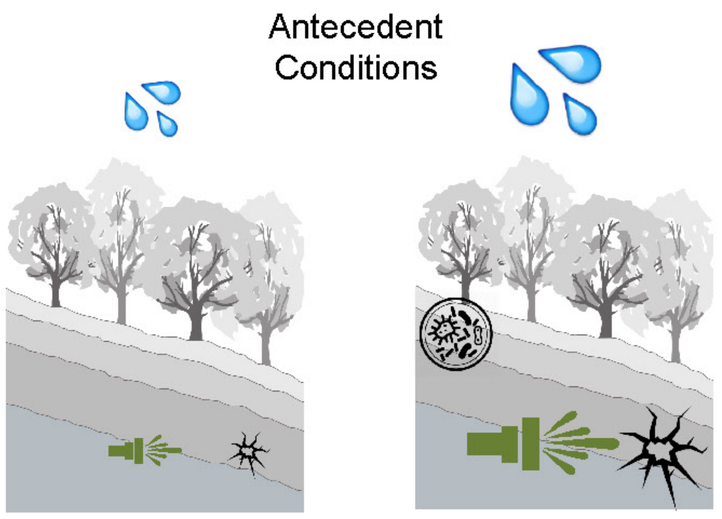
Hypotheses:

1) P-losses are higher in P-rich than in P-poor ecosystems

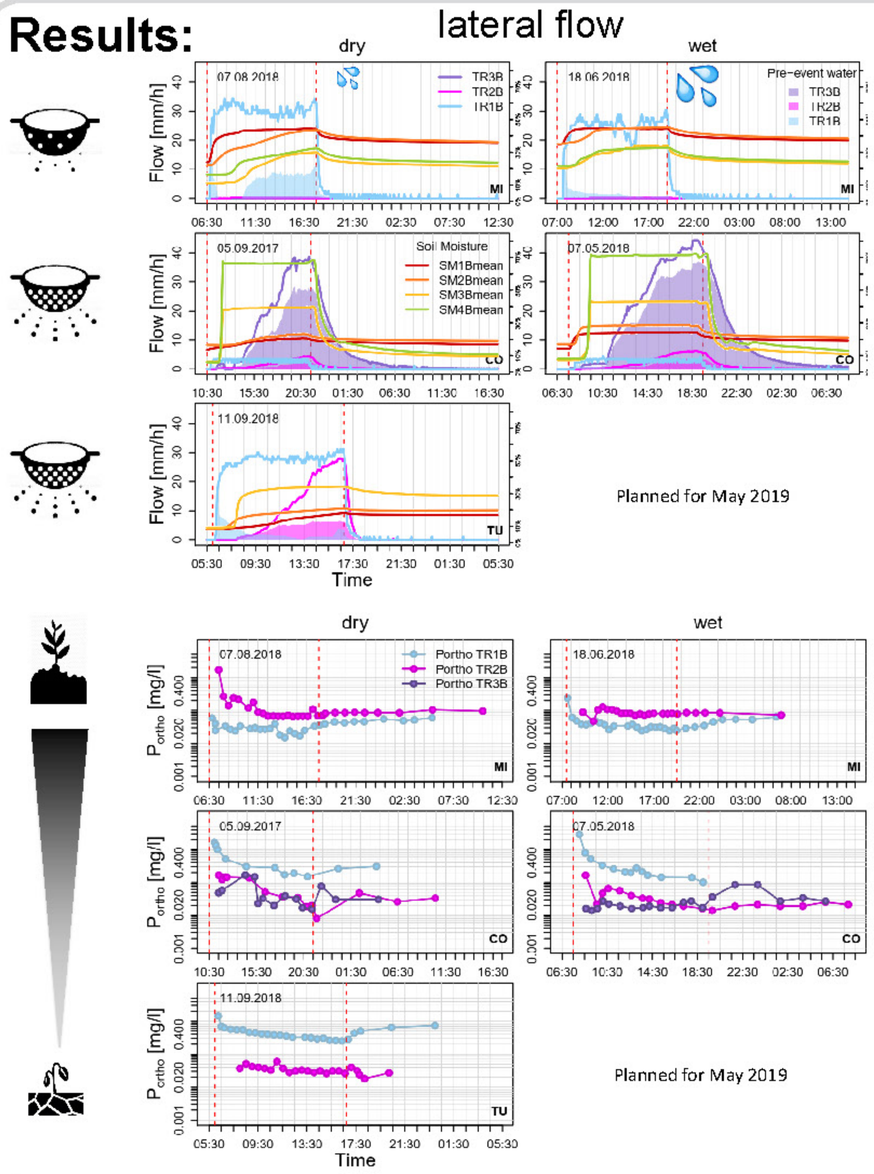
2) P-losses are higher in coarse textured than in fine textured soils

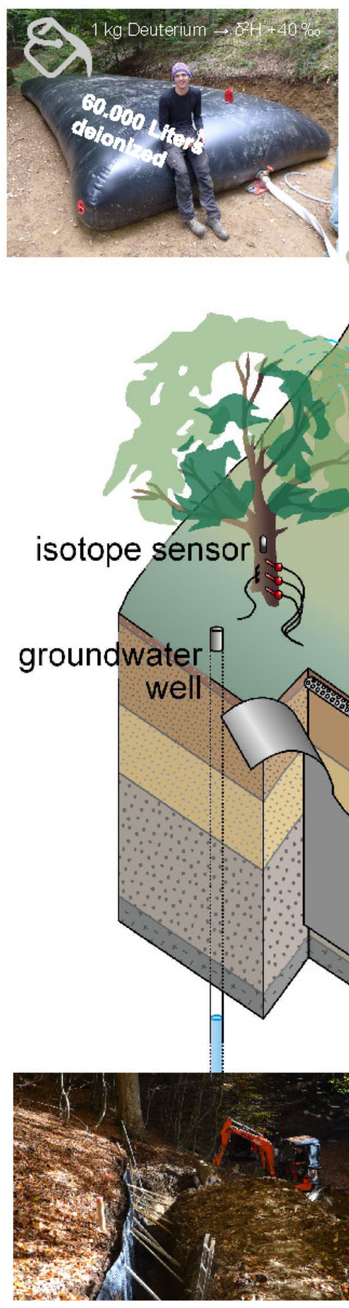


3) P-losses are higher during wet antecedent conditions than during dry antecedent conditions



Results:





Measuring concept:

Fine textured soils / P-rich:

- moderate and delayed flow response
- almost all flow is pre-event water
- higher P-concentrations in the sub soil than top soil

Coarse textured soils / P-poor:

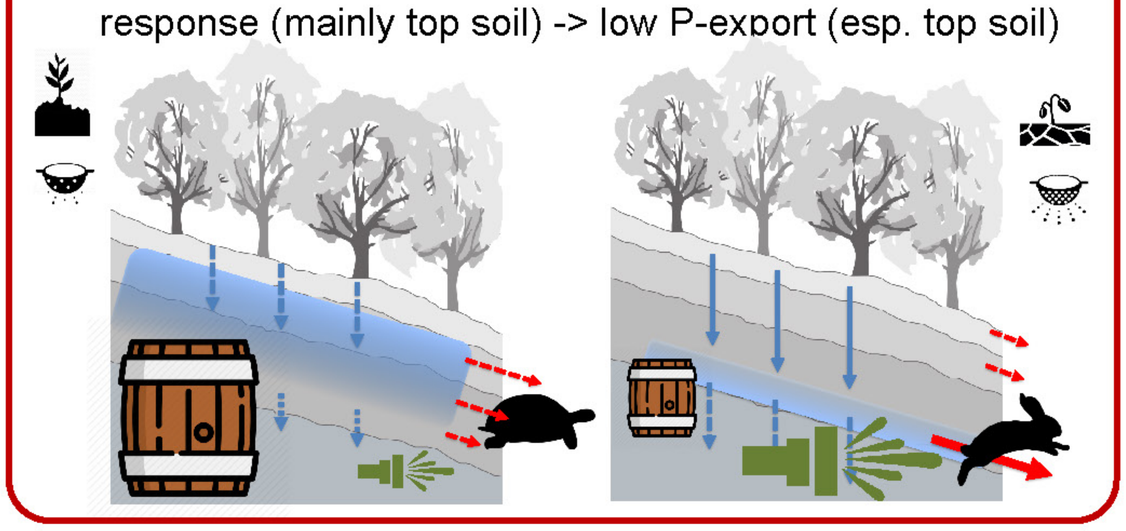
- high flow response, most likely due to saturation at deeper soil depth (see increase in soil moisture)
- increased event water fractions (TU)
- lower P-concentrations in the sub soil than top soil

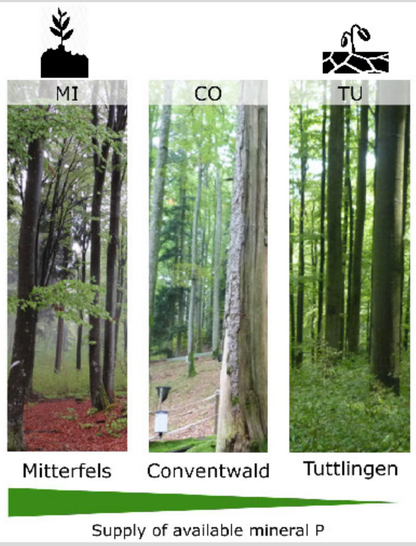
Antecedent conditions:

- Faster response of subsurface flow during wet than during dry antecedent conditions
- Peaks do not differ much between wet and dry antecedent conditions

Synthesis:

- **Coarse textured soils / P-poor:** small storage, saturation near the saphrolite -> high and fast flow response -> more P export (esp. sub soil)
- **Fine textured soils** -> more storage - > slow flow response (mainly top soil) -> low P-export (esp. top soil)





Experimental sites:

Three sites from P-rich to P-poor

- Mitterfels (MI): Bavarian Forest
- Conventwald (CO): Black Forest
- Tuttlingen (TU): Schwäbische Alb

Sprinkling experiments:

- 60.000 liters, deionized sprinkling water
- 15-20 mm/h intensity for 12h
- Water samples every 30 min

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