Annual dynamics of river bed clogging in a second order stream forms hyporheic community patterns

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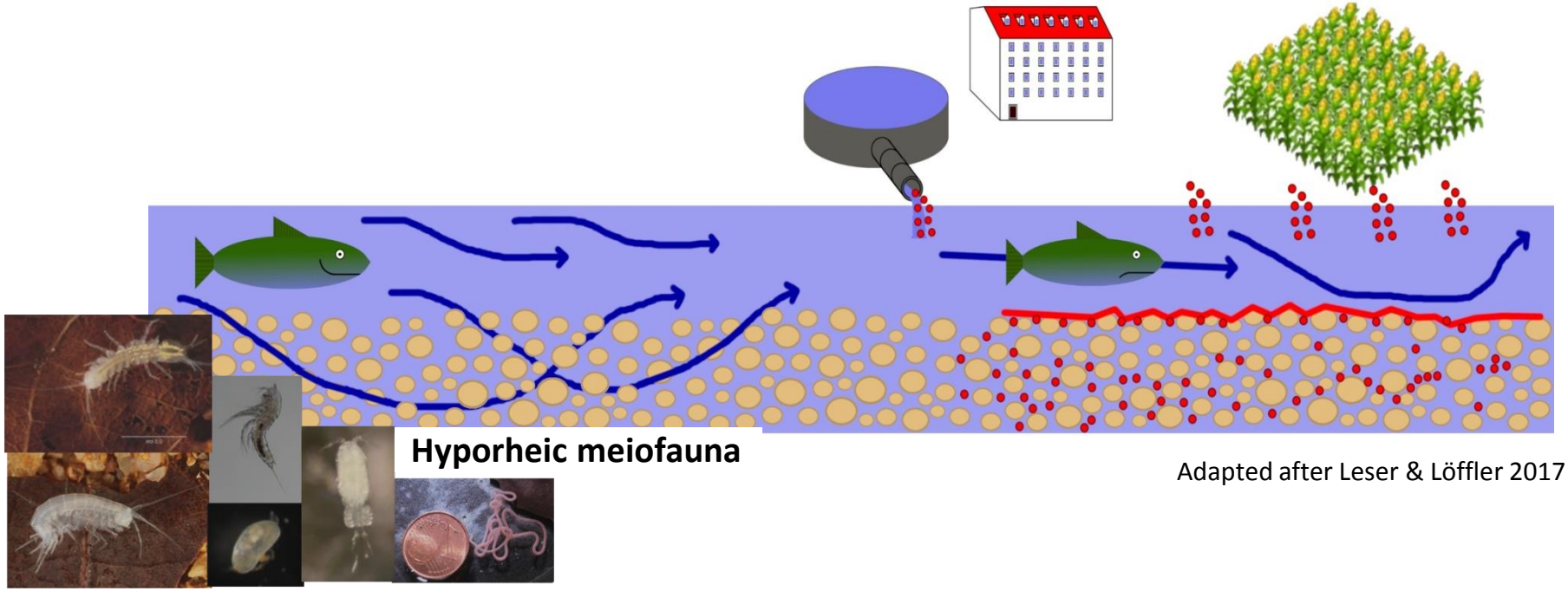
Colmation - clogging of riverbed sediments due to fine sediments
- natural & dynamic process: colmation ↔ decolmation
- enhanced by anthropogenic impacts



Adapted after Leser & Löffler 2017

Loss of permeability/ hydrological conductivity

➔ loss of ecol. functions

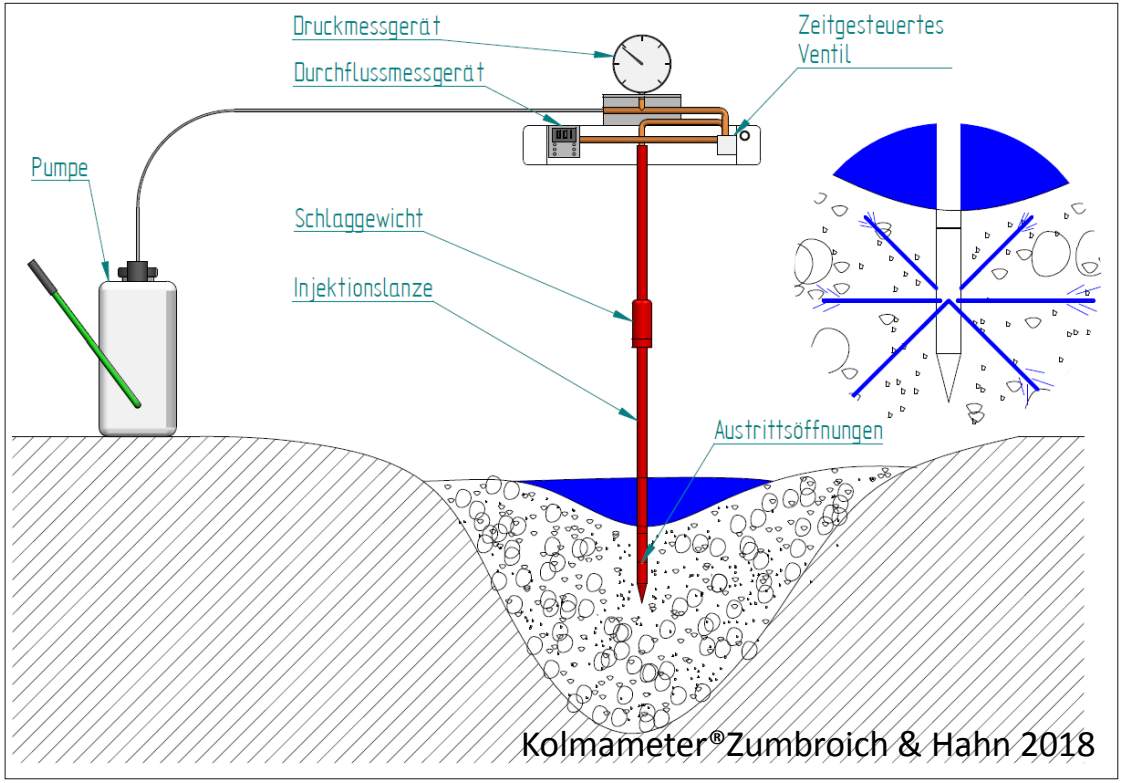
➔ loss of pore space, habitats & biodiversity

Internal Colmation: - measured quantitatively via sediment permeability

Kolmameter:

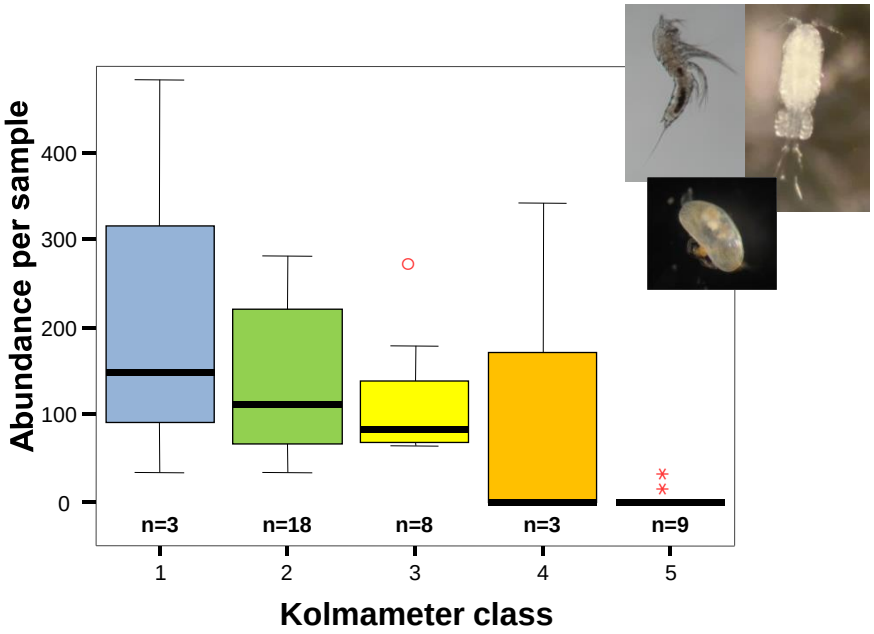
- measures the volume of water injected into the sediments

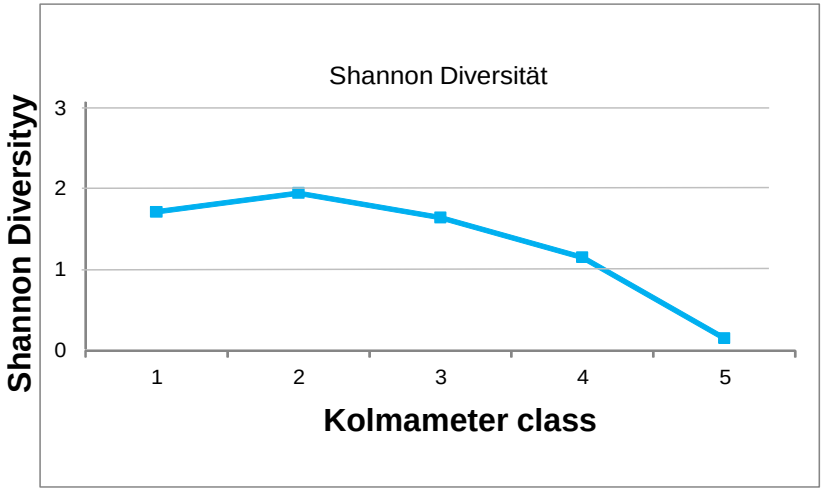
➔ time and pressure are defined



The less water can be injected, the higher is the degree of clogging & vice versa

Colmation & hyporheic meiofauna





Source: Stein et al. 2018

The stronger colmation the lower faunal abundance and diversity

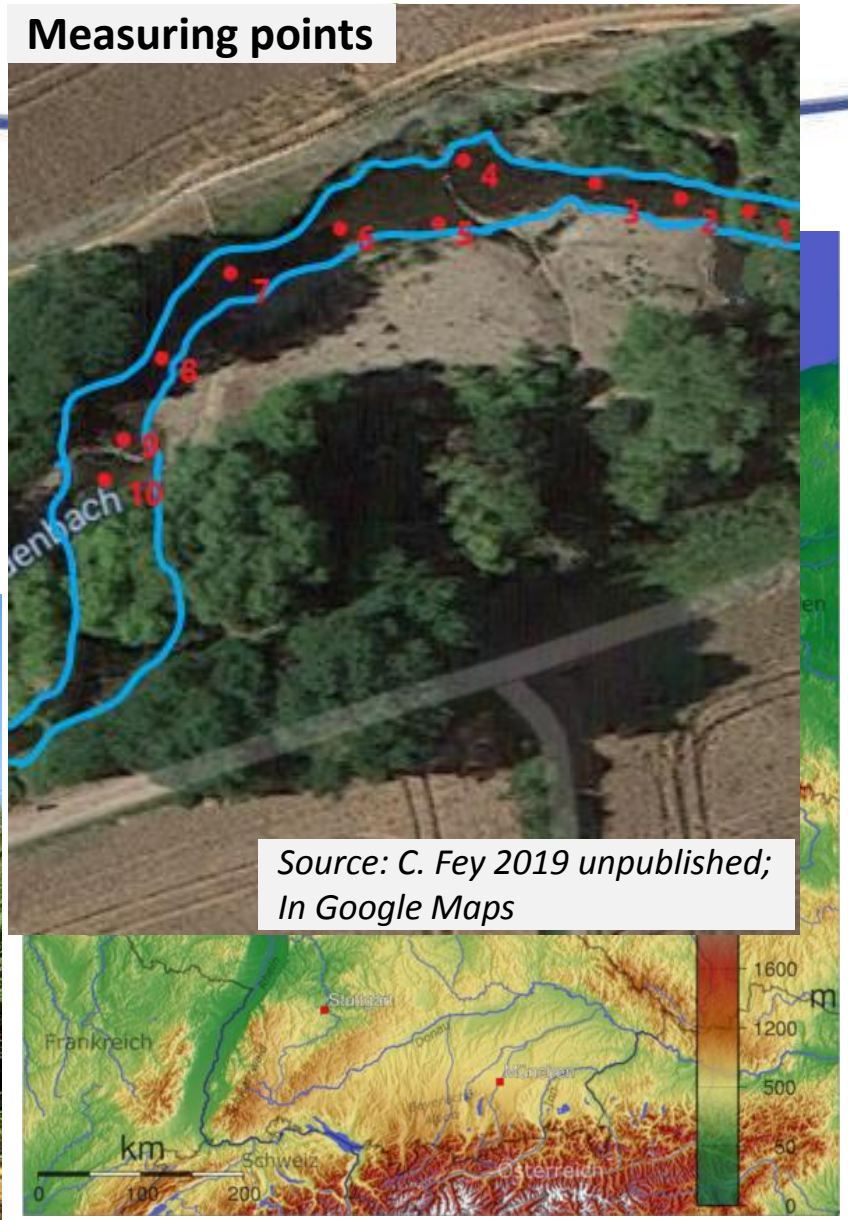
Significant correlation: the higher the degree of colmation, the higher the **degree of degradation & the worse the ecological state of the river**

Study site: Guldenbach river

Annual dynamics of colmation processes & its effects on hyporheic meiofauna

May 2019 to April 2020, monthly

Measuring points



Source: C. Fey 2019 unpublished; In Google Maps

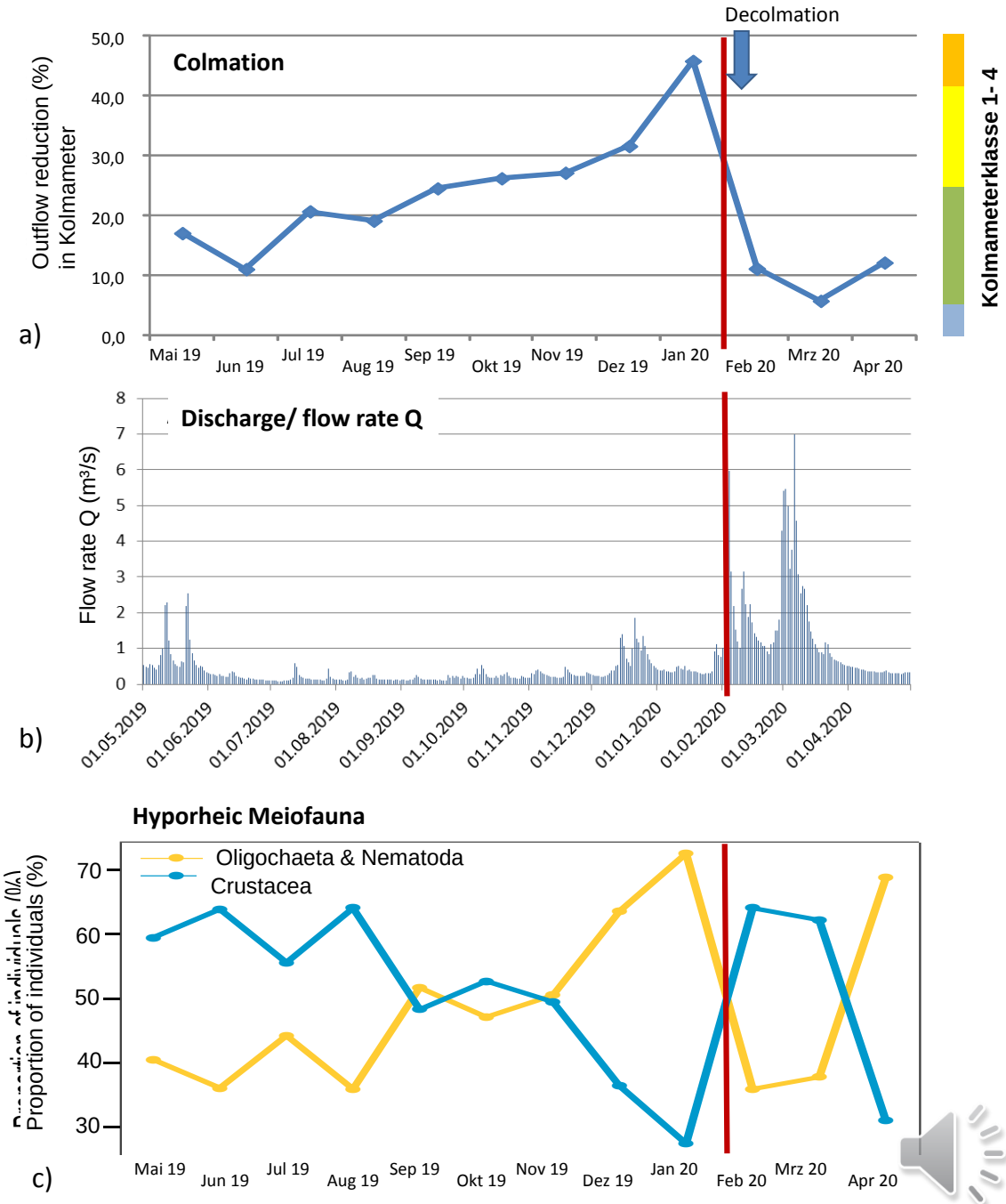
Sampling the hyporheic zone: May 2019 to April 2020, monthly

Monitoring:
Guldenbach river

- strong annual dynamics in the degree of colmation
- changes in colmation in accordance with the hyporheic fauna
- discharge shapes colmation processes

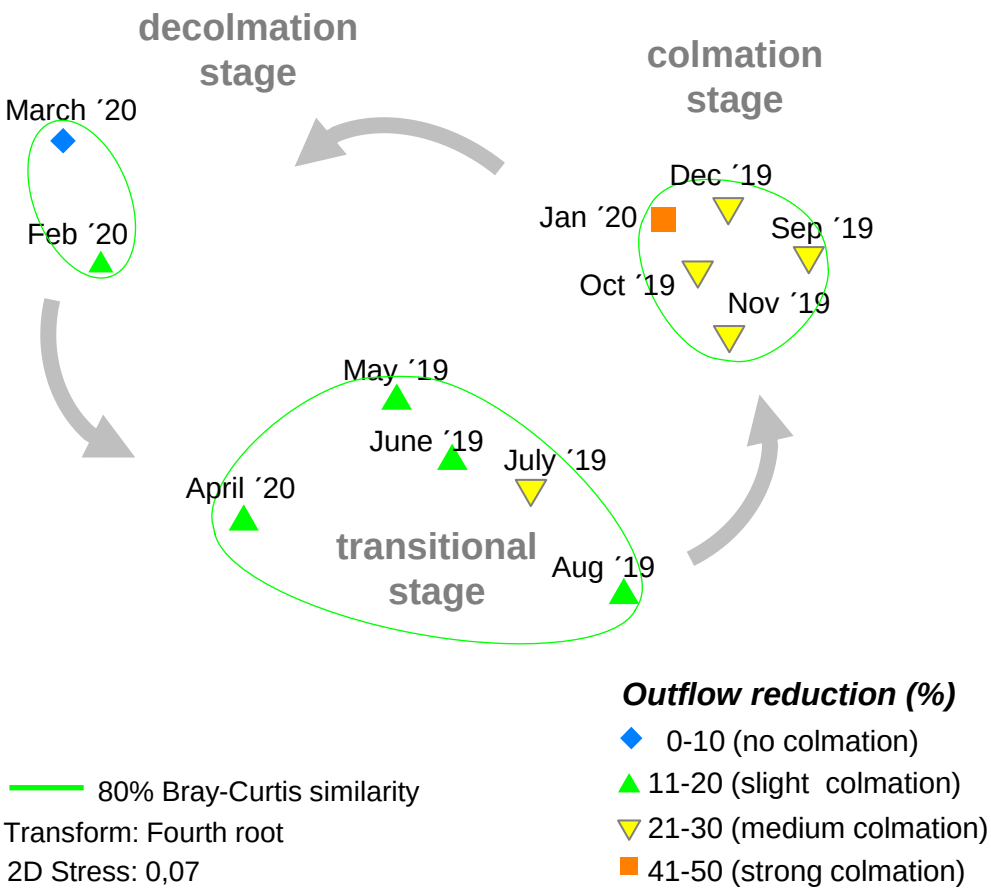
➔ Meiofauna reflects sediment conditions

➔ Permanent taxa suitable indicators for colmation

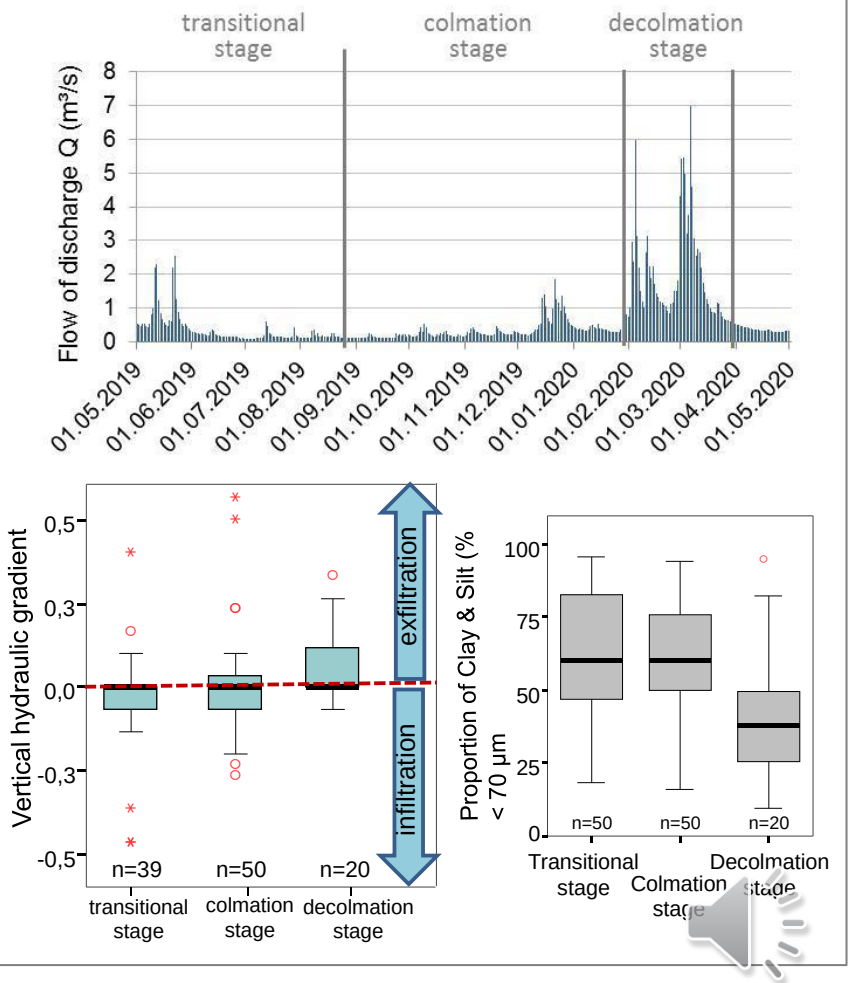


nMDS-Analysis revealed 3 temporal stages of colmation:

Hyporheic meiofauna (crustaceans)



Abiotical conditions



Conclusion

1) **strong annual dynamics of colmation processes**

   ➔ discharge events, precipitation & gw-table are driving factors

2) **Hyporheic meiofauna** reflects sediment permeability and colmation

   ➔ potential **bioindicators**

3) **Assessment of colmation** requires a careful selection of sampling occations

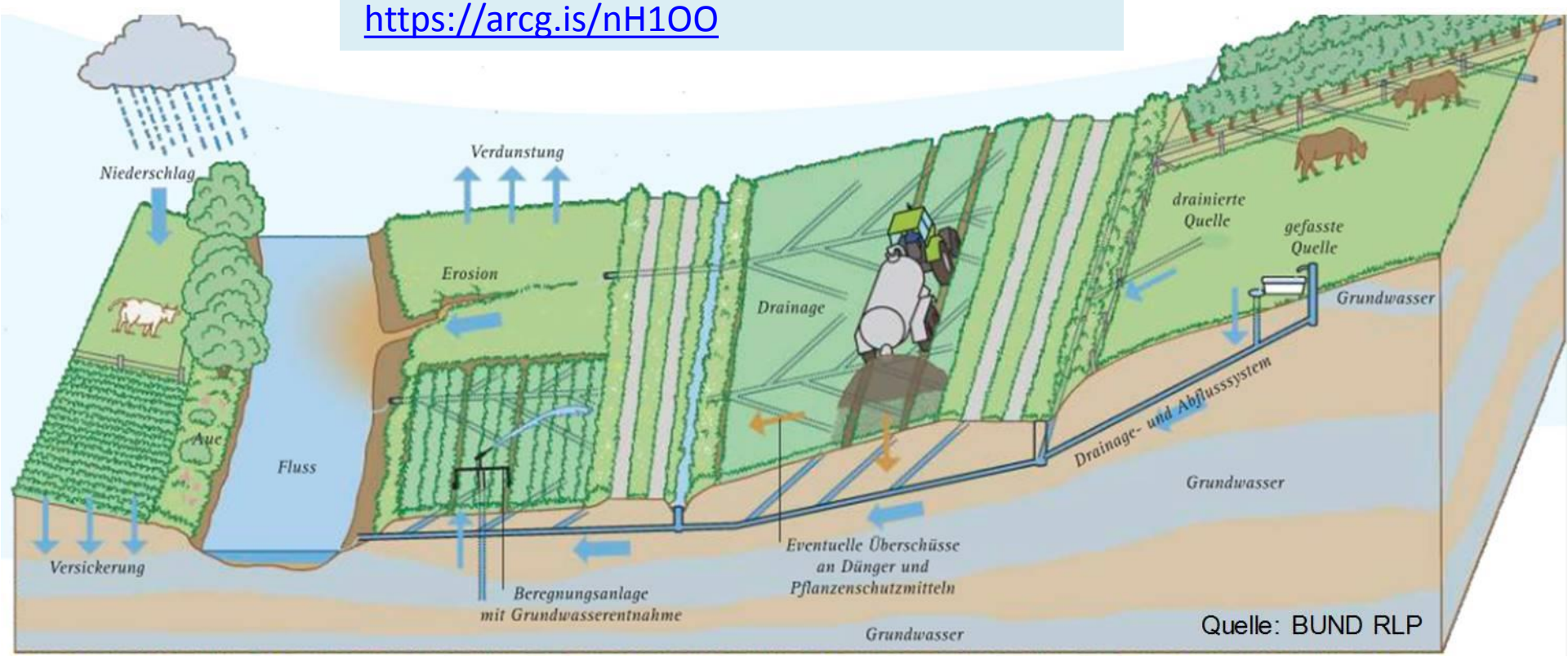
4) Significant correlations between **WFD evaluation and colmation**

   ➔ colmation should be considered by the management plans and the monitoring

   ➔ catchment related sediment management required

Thank you for your attention

Further information:
https://arcg.is/nH1OO



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