



Technische
Universität
Braunschweig

Institut für Geoökologie
AG Umweltgeochemie



Quecksilberkreisläufe in Seen und Sedimenten des Nordschwarzwaldes

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BIOLAB Umweltanalysen GmbH, Braunschweig

Arbeitsplatz: Umweltanalysenlabor

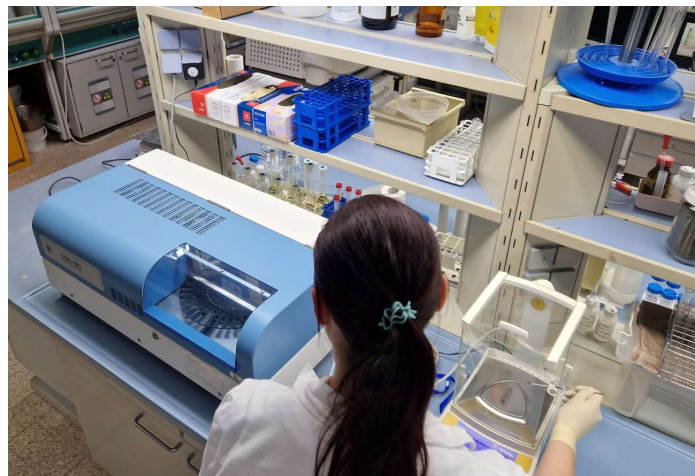


- BIOLAB Umweltanalysen GmbH wurde 1991 in Braunschweig gegründet
- seit 2020 Teil der UCL (Laborgruppe der REMONDIS SE & Co. KG)
- spezialisiert auf Umweltanalytik (Grundwasser, Boden, Baustoffe, Raumluft etc.)
- ~ 40.000 Proben pro Jahr
- ~ 50 Mitarbeitende

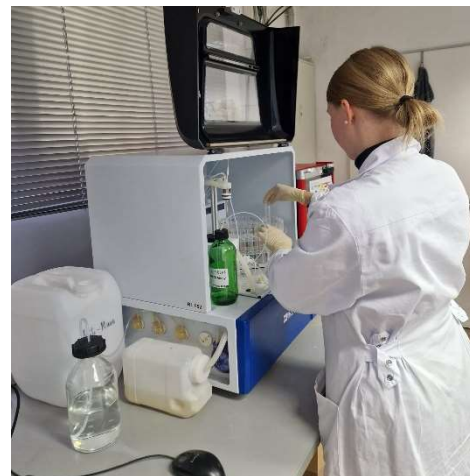
REMONDIS QR ist Global Mercury Partner der UNO



Berufsgruppen bei BIOLAB: Chemiker*Innen, Biologen*, Geologen*, Geoökologen*, Umweltingenieure*, CTA*/ BTA*/UTA*, Biotechnologen* u.a.



Hg solid: DMA 80



Hg liquid: RA-4300 (CV-AAS)



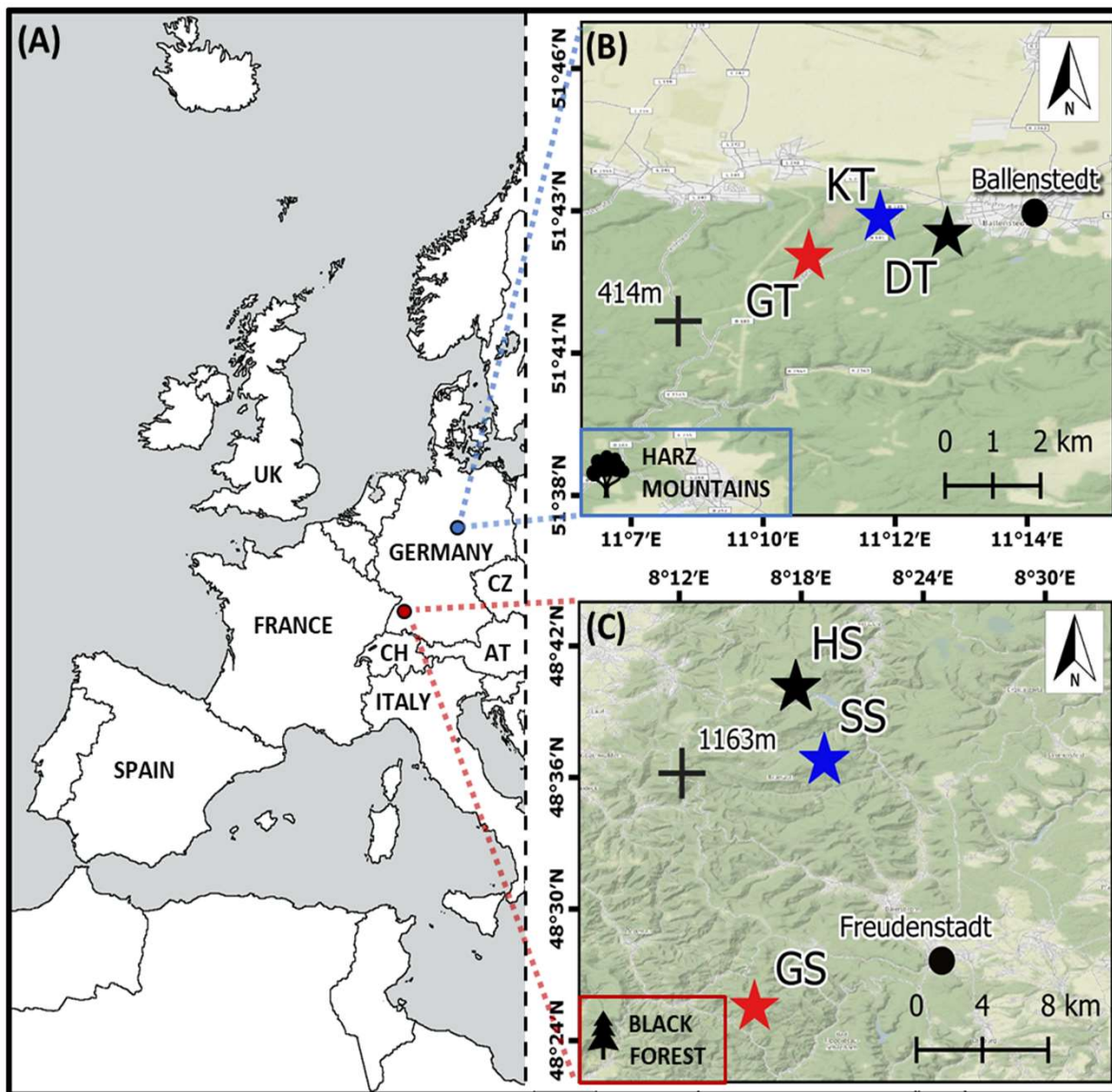
Asbest: Axia ChemiSEM



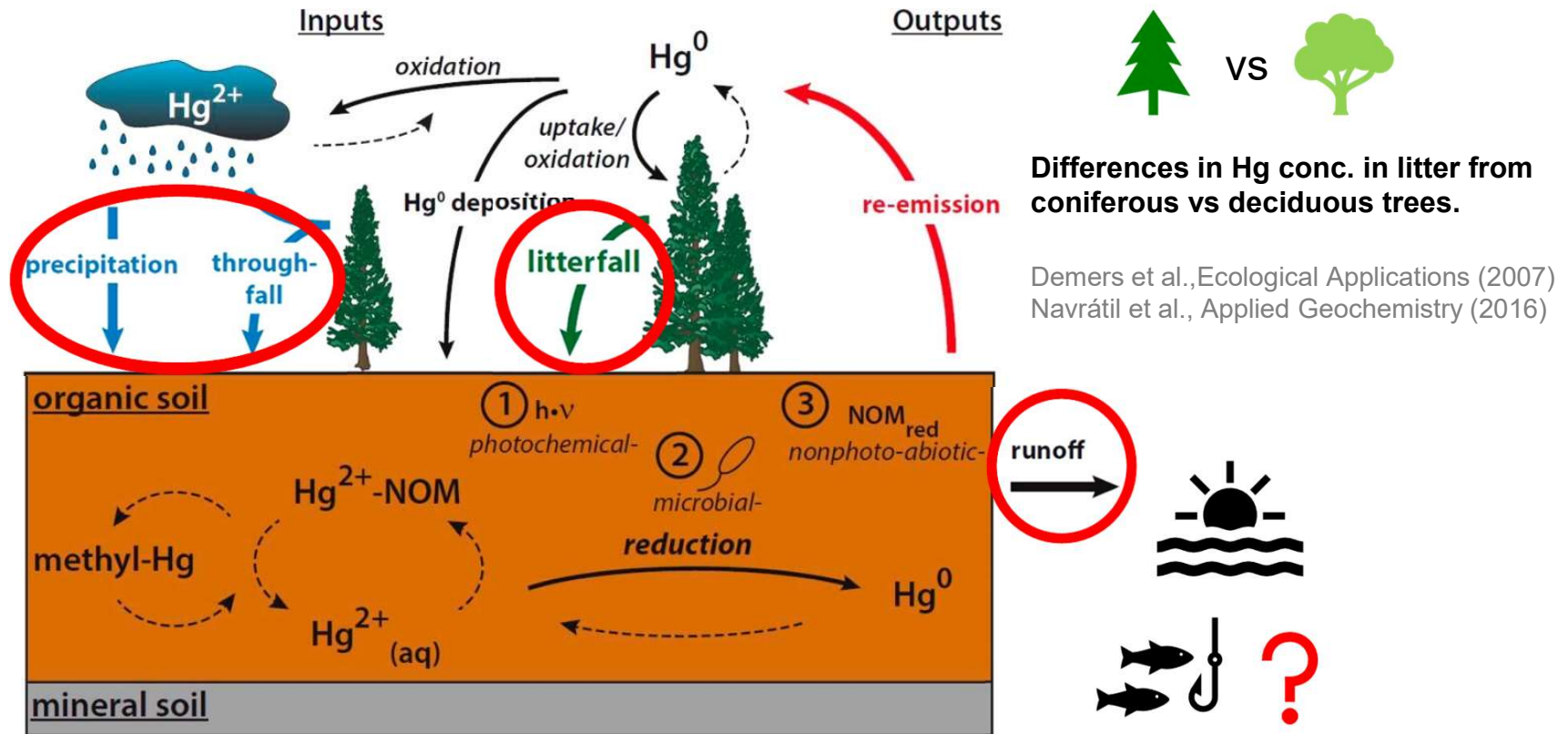
Study sites



| Area | Lake | Altitude (m a.s.l.) | Lake depth (m) | Surface area (km ²) | Catchment area (km ²) |
|------|------|------------------------|-------------------|------------------------------------|--------------------------------------|
| HZ | GT | 319 | 12 | 0.034 | 2.950 |
| | KT | 266 | 5 | 0.017 | 1.200 |
| | DT | 276 | 5 | 0.026 | 1.360 |
| BF | HS | 830 | 10 | 0.018 | 0.369 |
| | SS | 795 | 13 | 0.015 | 0.506 |
| | GS | 839 | 11 | 0.030 | 0.592 |



Introduction: Hg cycling in forest soils

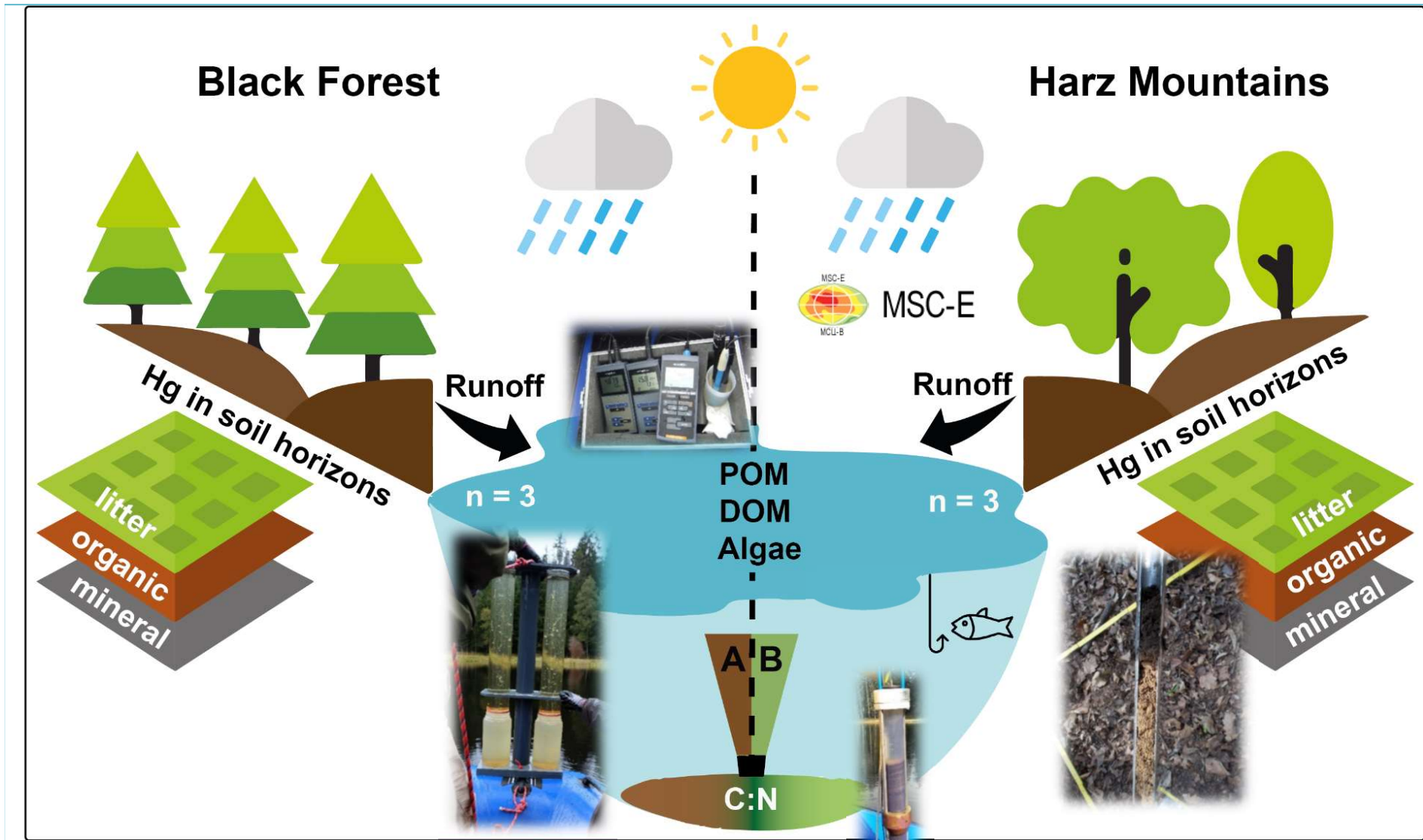


Differences in Hg conc. in litter from coniferous vs deciduous trees.

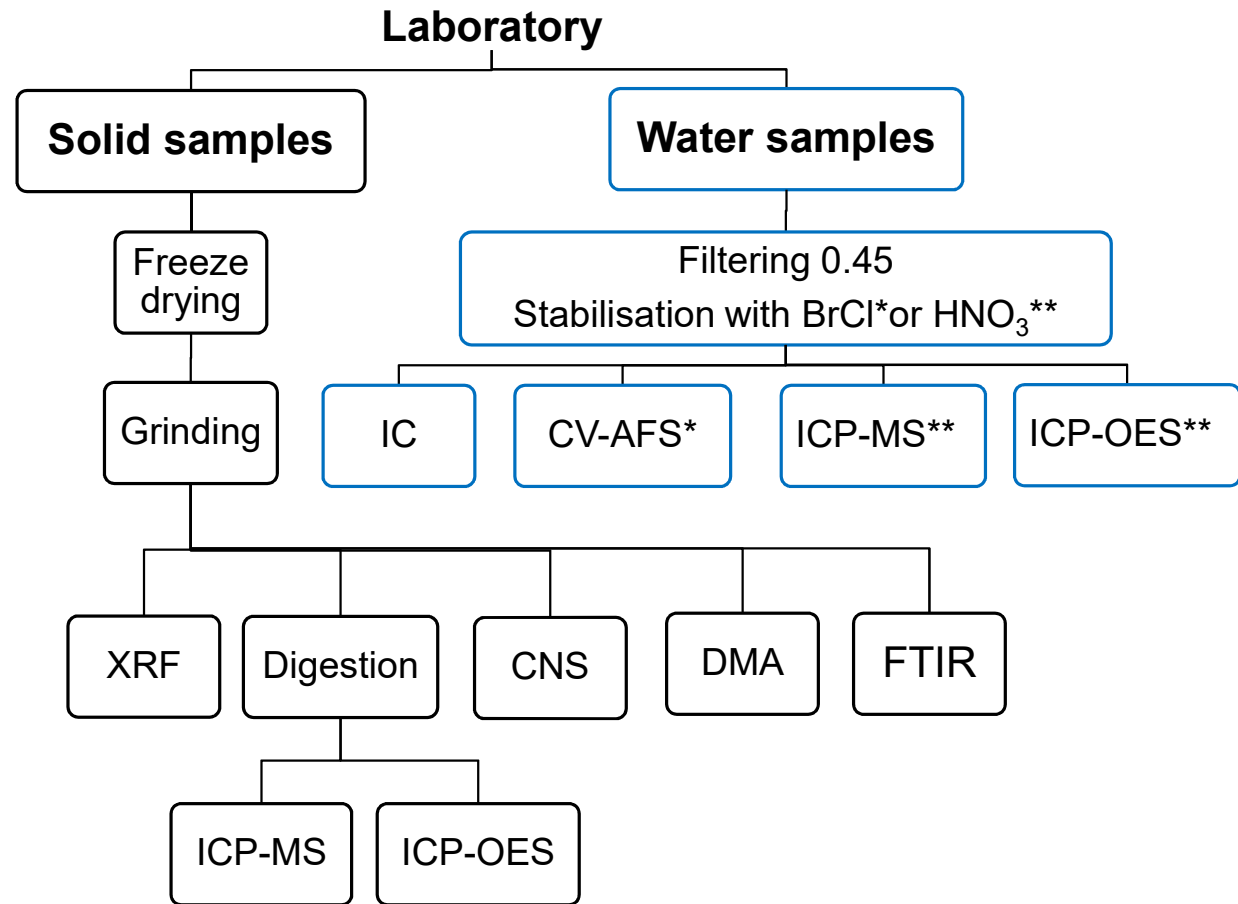
Demers et al., Ecological Applications (2007)
Navrátil et al., Applied Geochemistry (2016)

Jiskra et al., Environmental Science & Technology (2015)

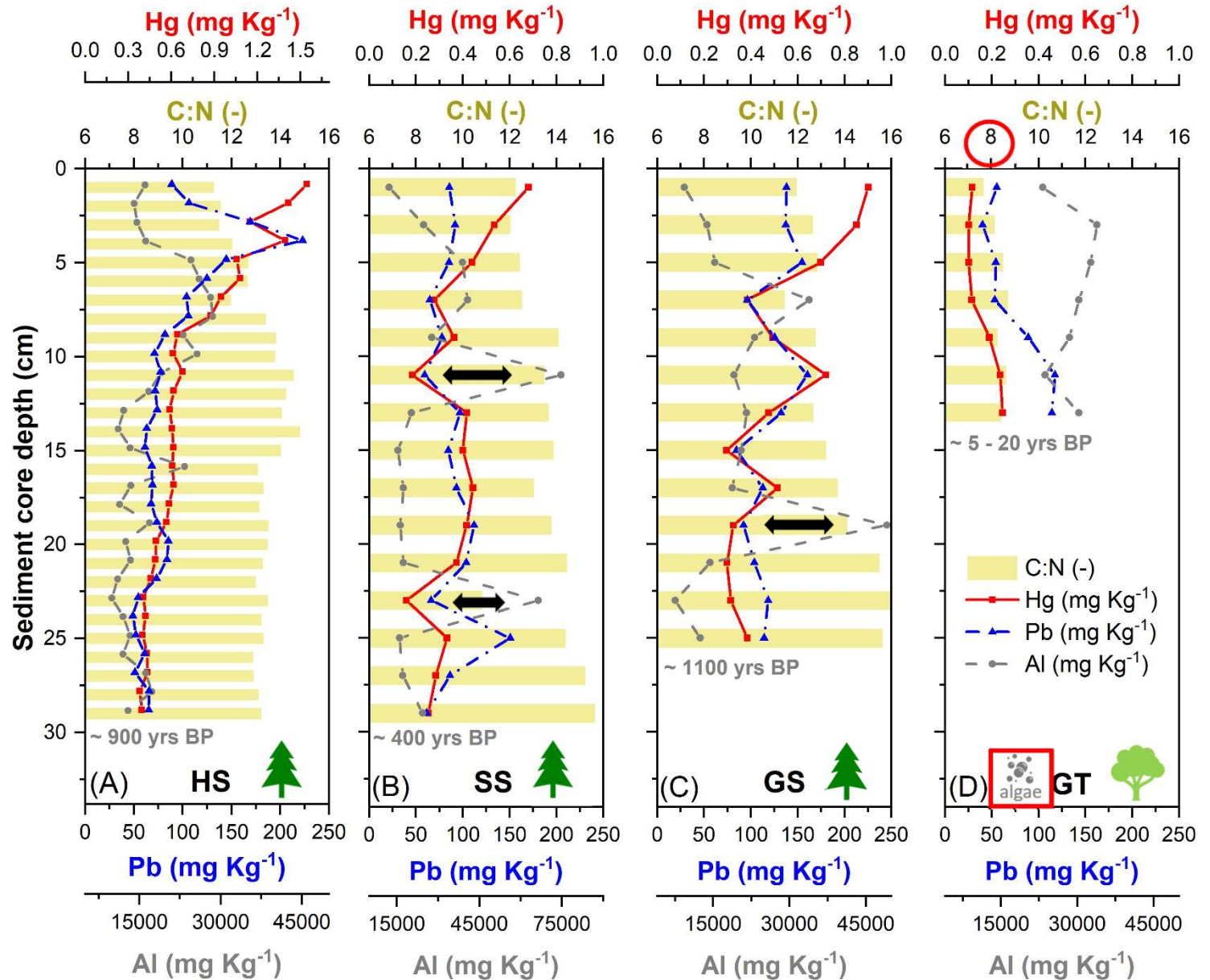
Study objectives and methods



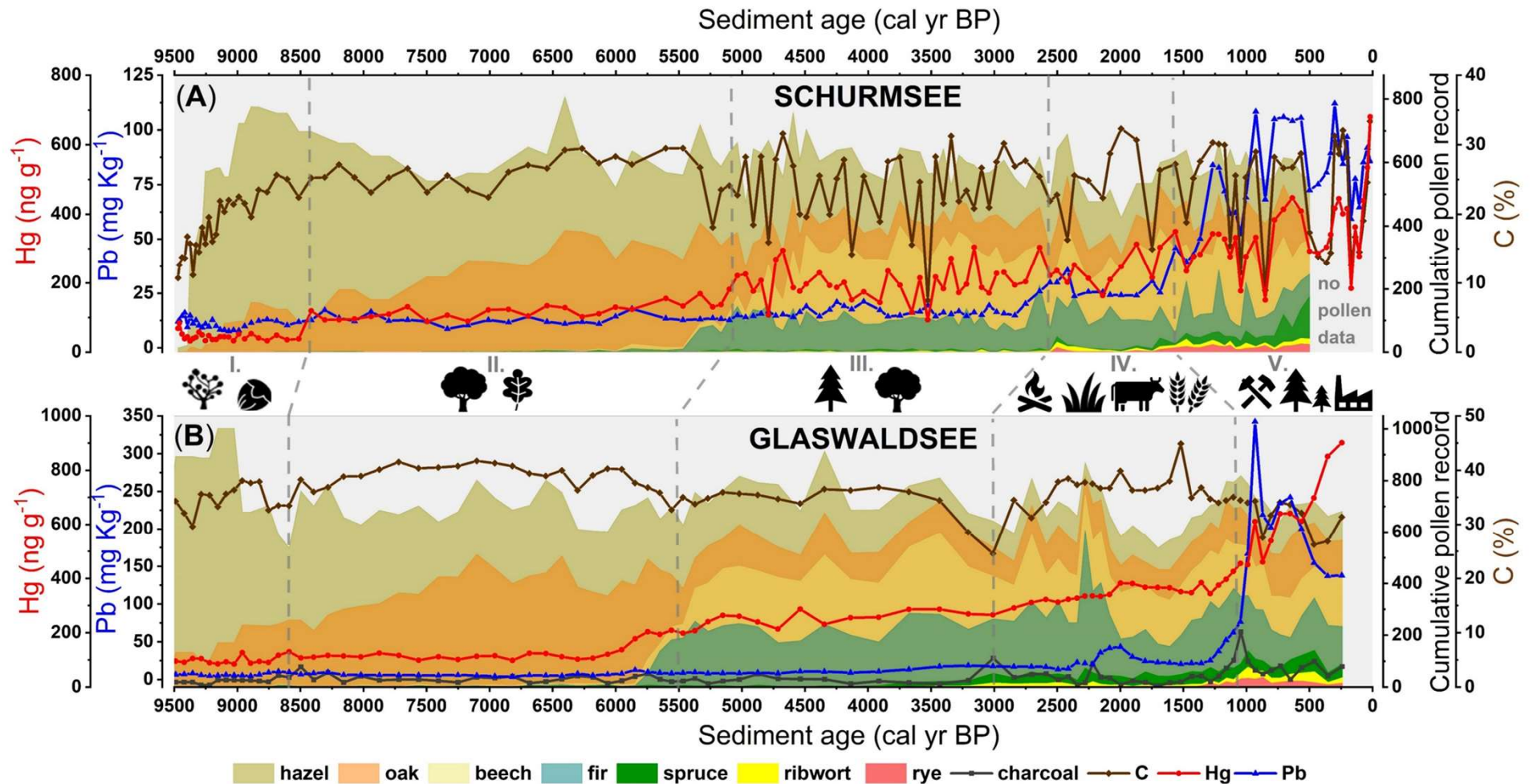
Sampling and analytical methods



Sediment



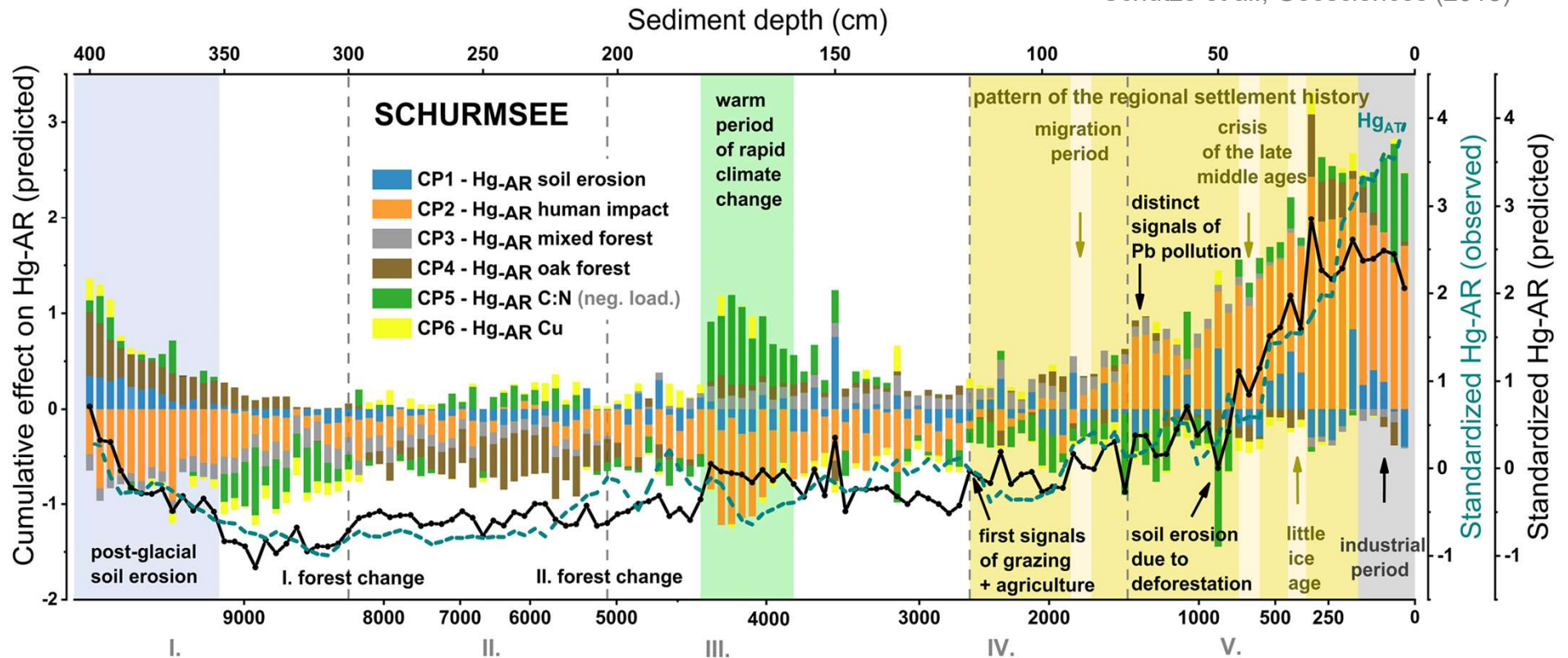
Sediment long core



Schütze et al., Geosciences (2018)

PCR - Prediction of Hg accumulation:

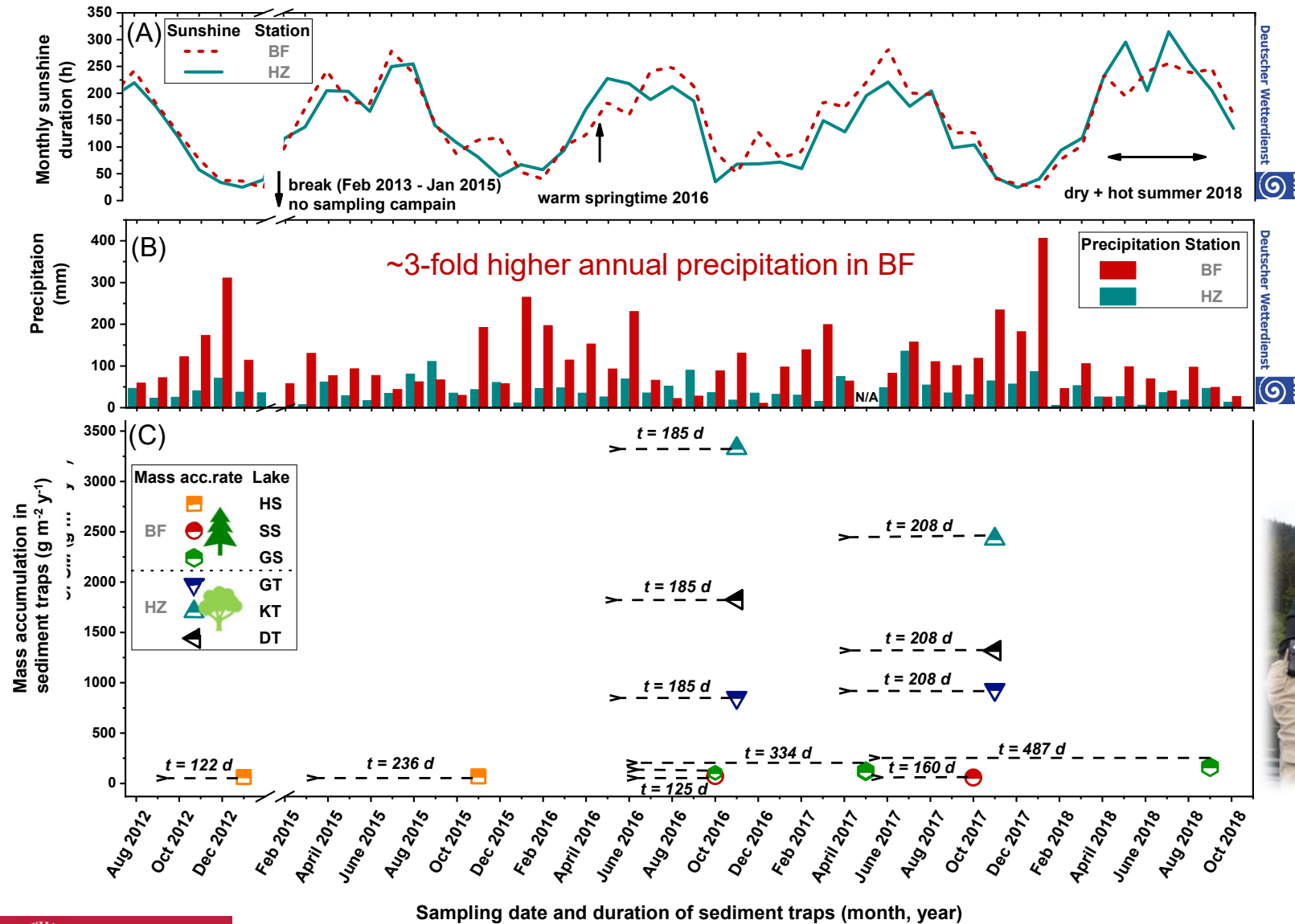
Schütze et al., Geosciences (2018)



| significant CPs expl. Hgacc. | CP2 | CP1 | CP3 | CP4 | CP5 | CP6 | R | error |
|------------------------------|--------------|---------|--------------|-------|------|------|------|-------|
| component proxies | human impact | erosion | mixed forest | oak | C:N | Cu | | |
| correlation coefficient | 0.73 | -0.2 | 0.11 | -0.26 | 0.33 | 0.08 | 0.88 | 0.49 |



Local climate and in-lake mass accumulation



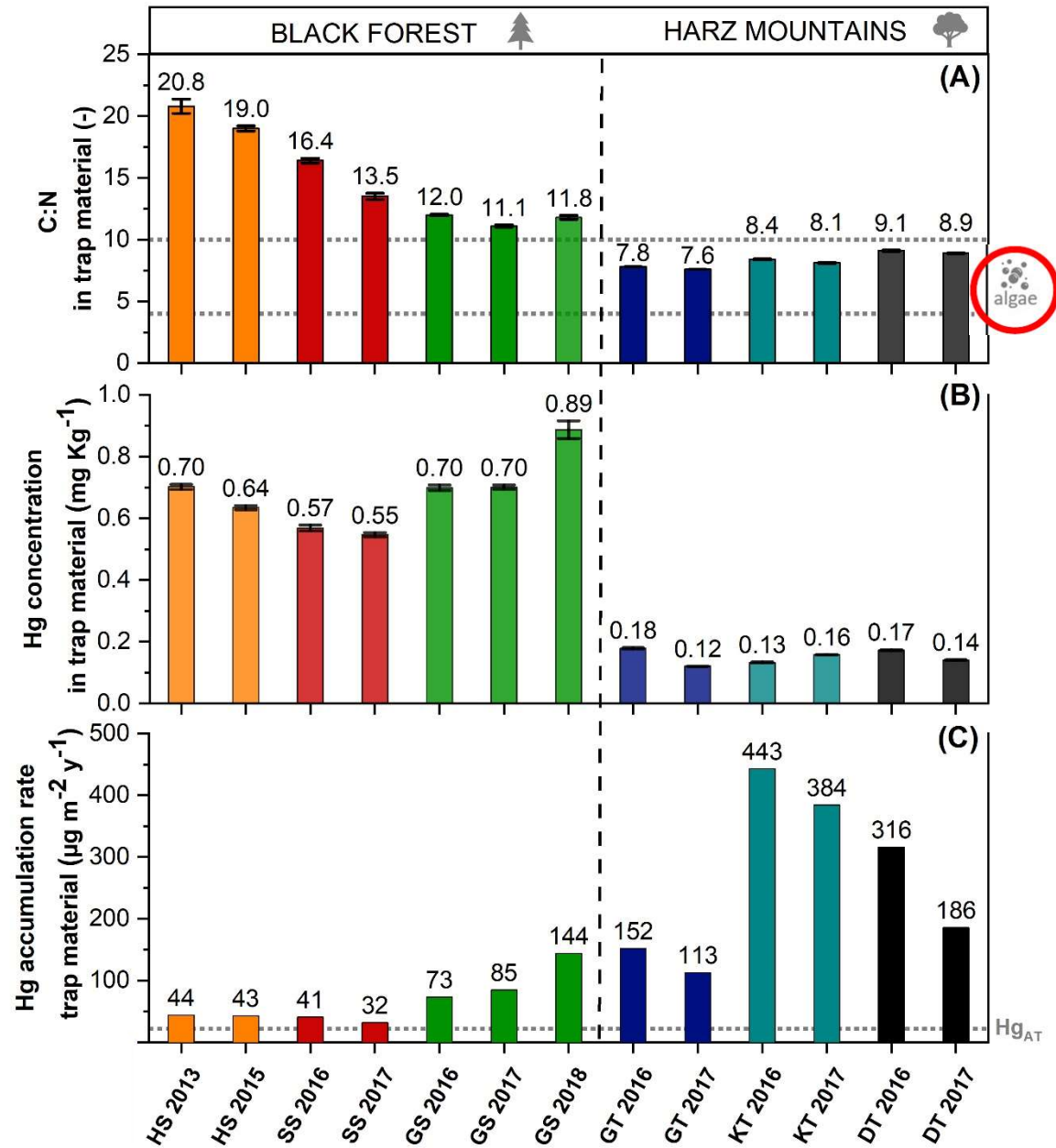
Hg concentration vs Hg accumulation



Trap GS 2016



Trap GT 2016



Hg_{AT}

Spectral information of trap material

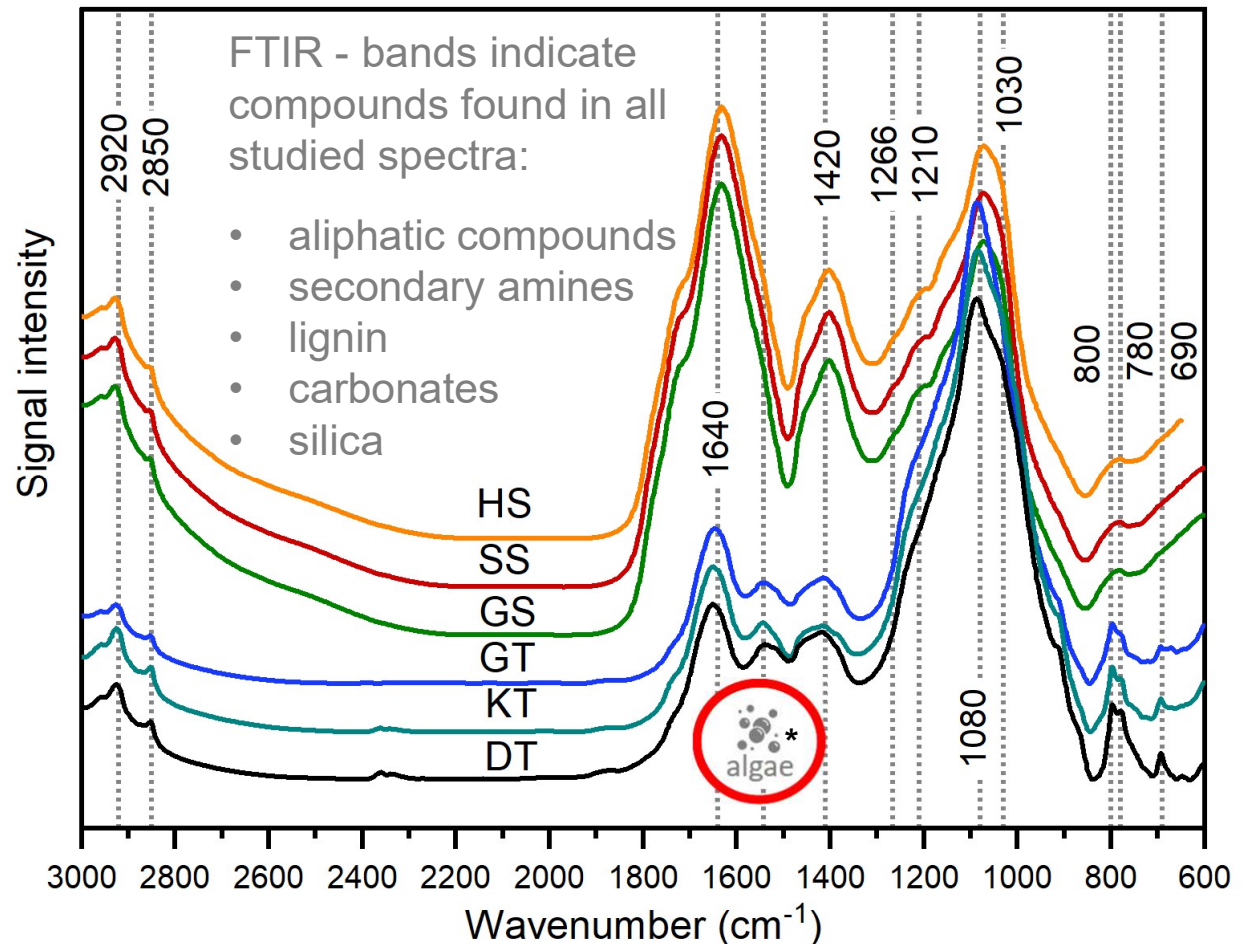


Trap material of GS 2016



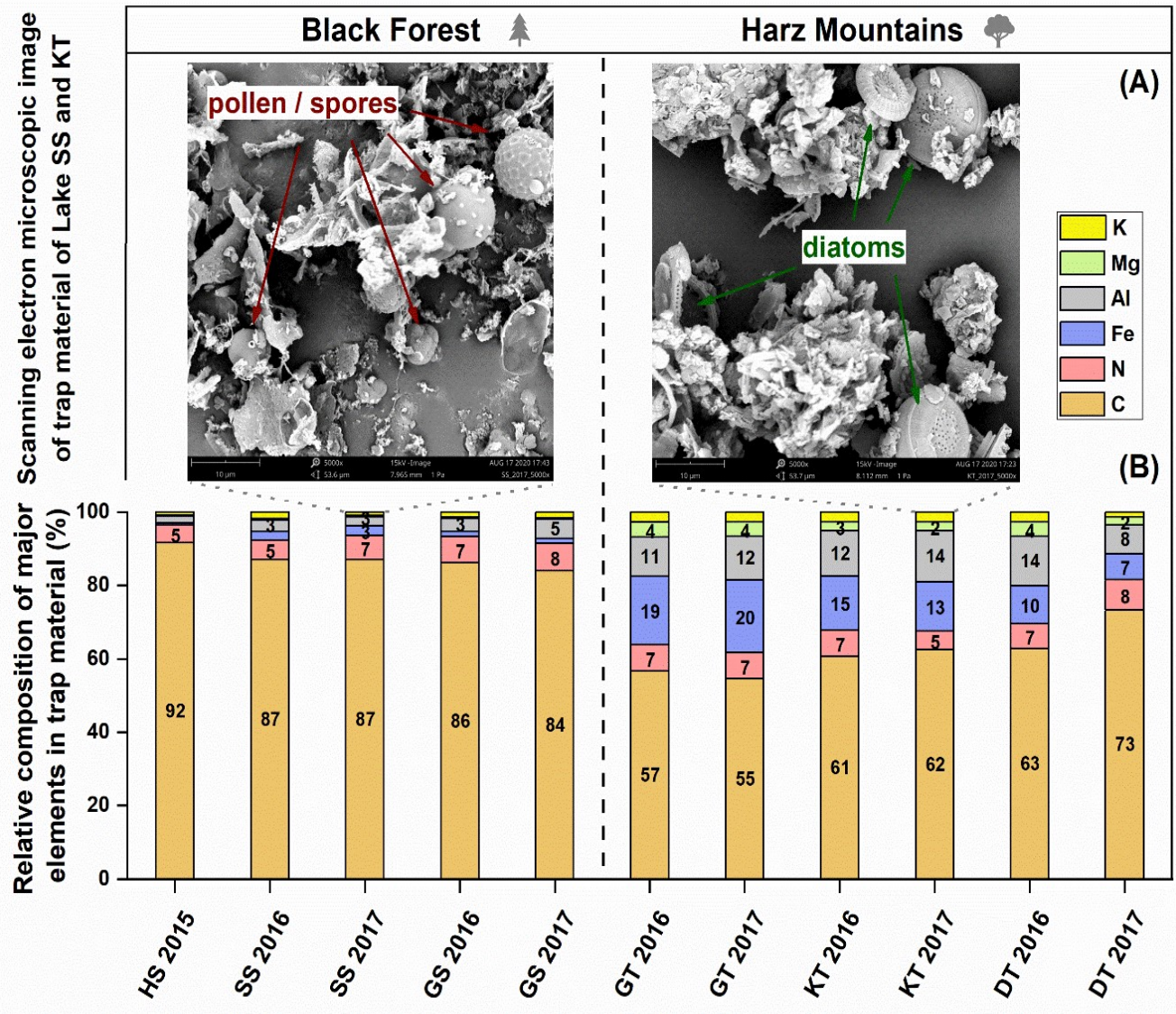
Trap material of GT 2016

Fourier Transform Infrared Spectroscopy (FTIR)

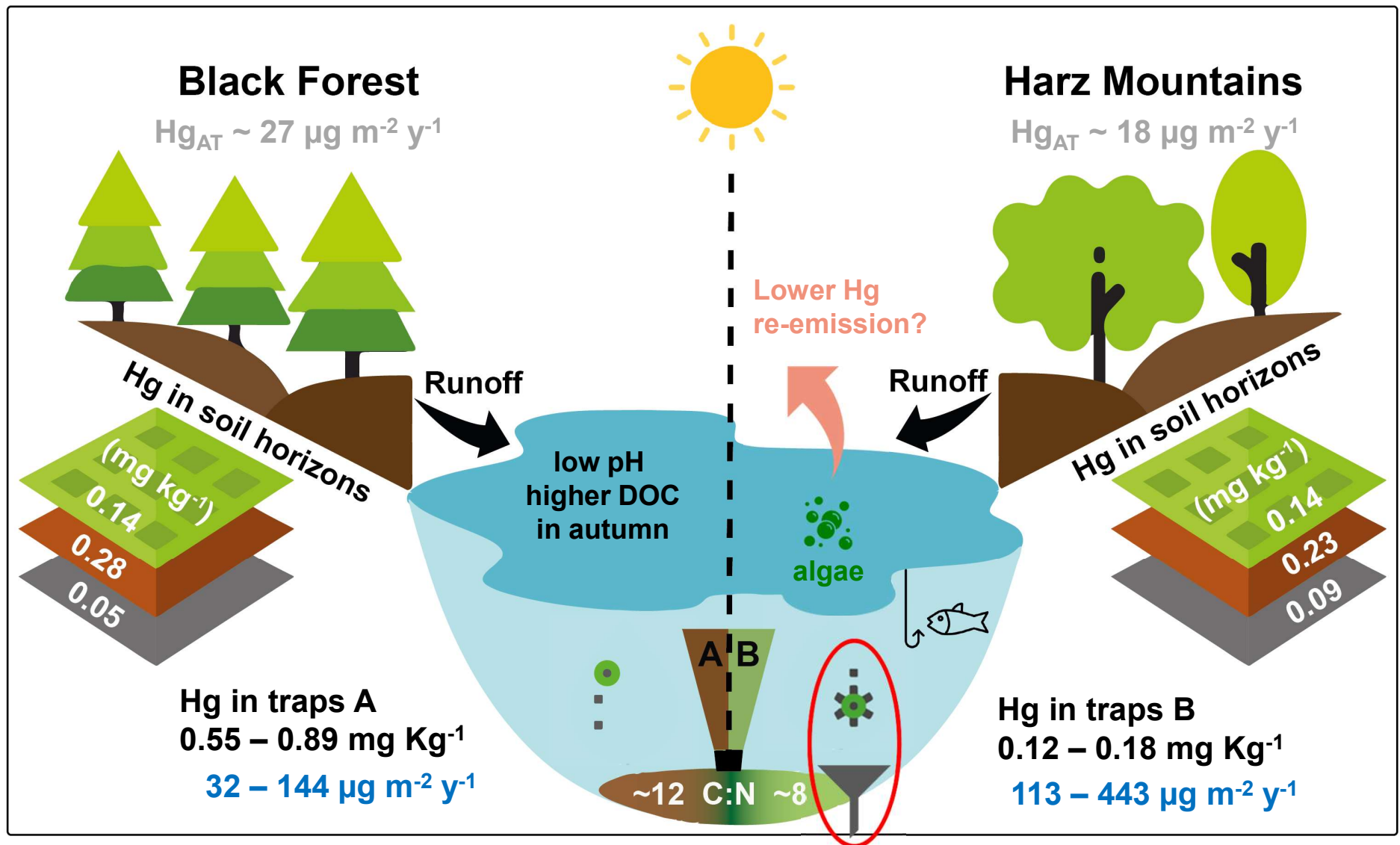


*Dean and Sigeo (2006), Murdock and Wetzel (2009)

Scanning electron microscopic images



Conclusions



Acknowledgement:

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Thank you

