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Mercury in stream water of selected catchments within the Czech Republic



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Mercury (Hg)...

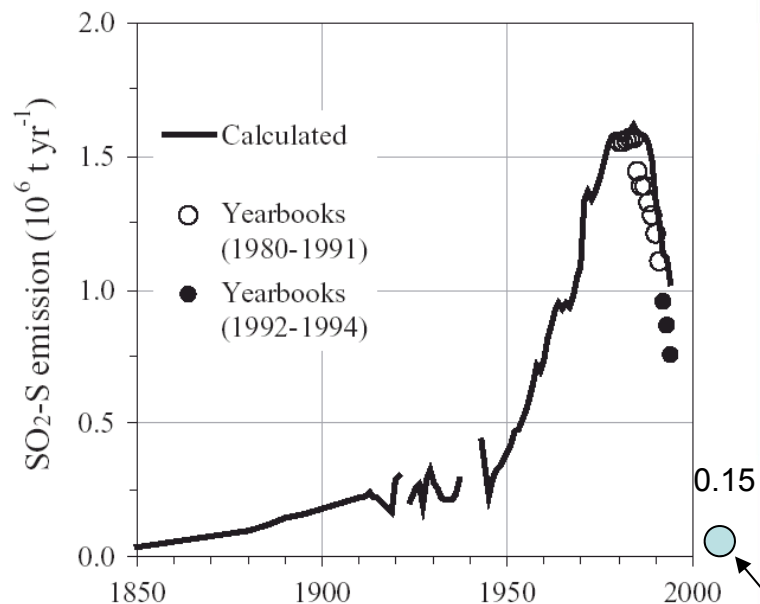
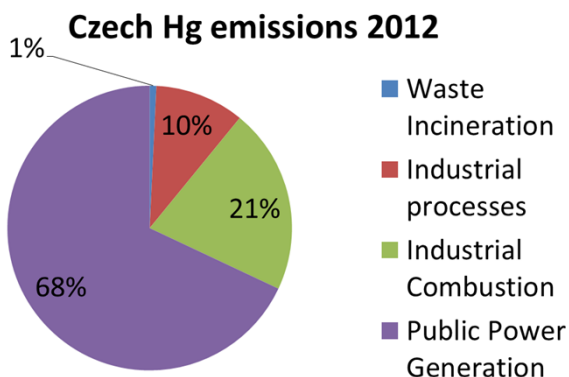
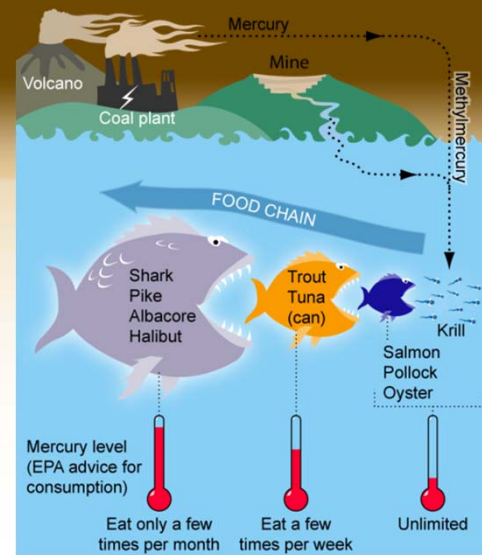
- Why care?

- toxic element, **bioaccumulation**, methylation

- Where does it come from?

- **natural** sources = forest fires, volcanic

- **anthropogenic** sources = **fossil fuel** production

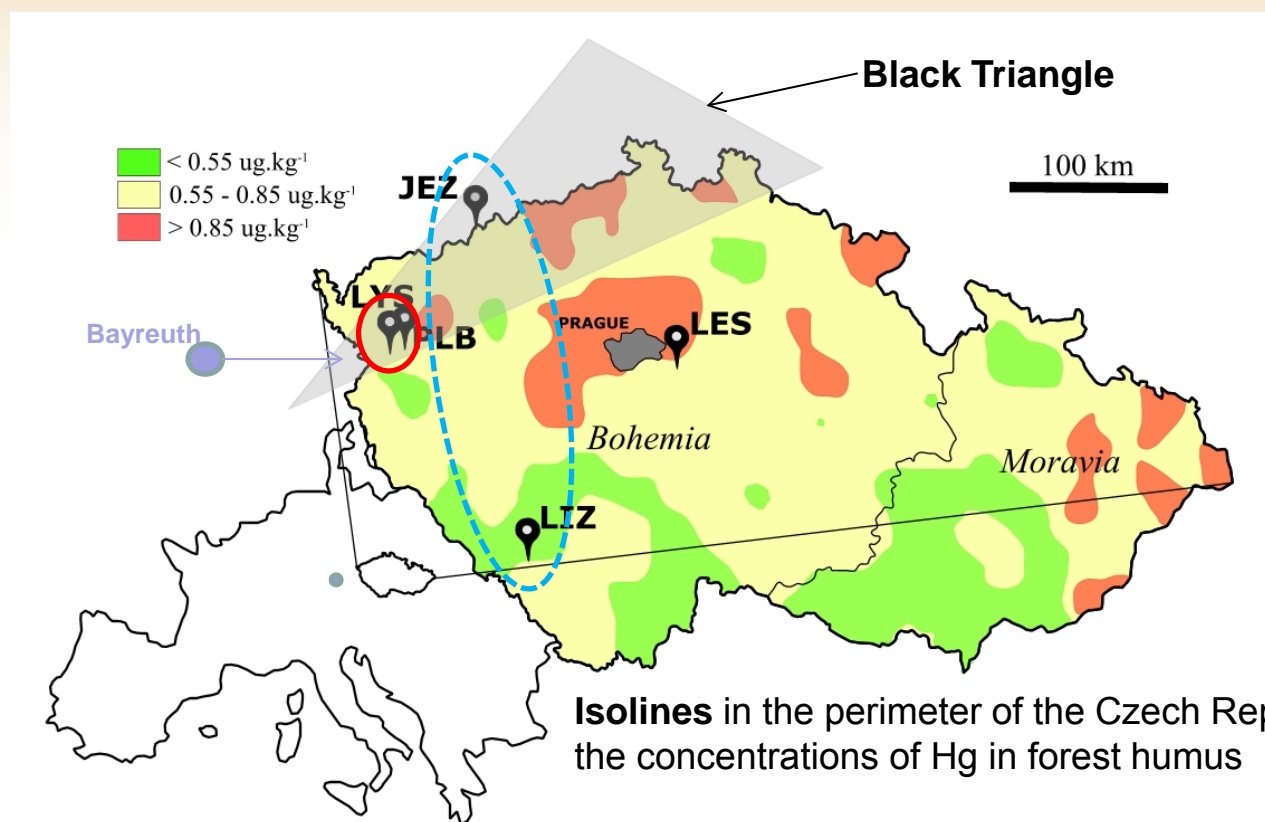


Source: Data from EMEP Centre on Emission Inventories and Projections <http://www.ceip.at>
Kopáček J, Veselý J (2005) - Atmospheric Environment 39(12).

2010



the Czech Republic

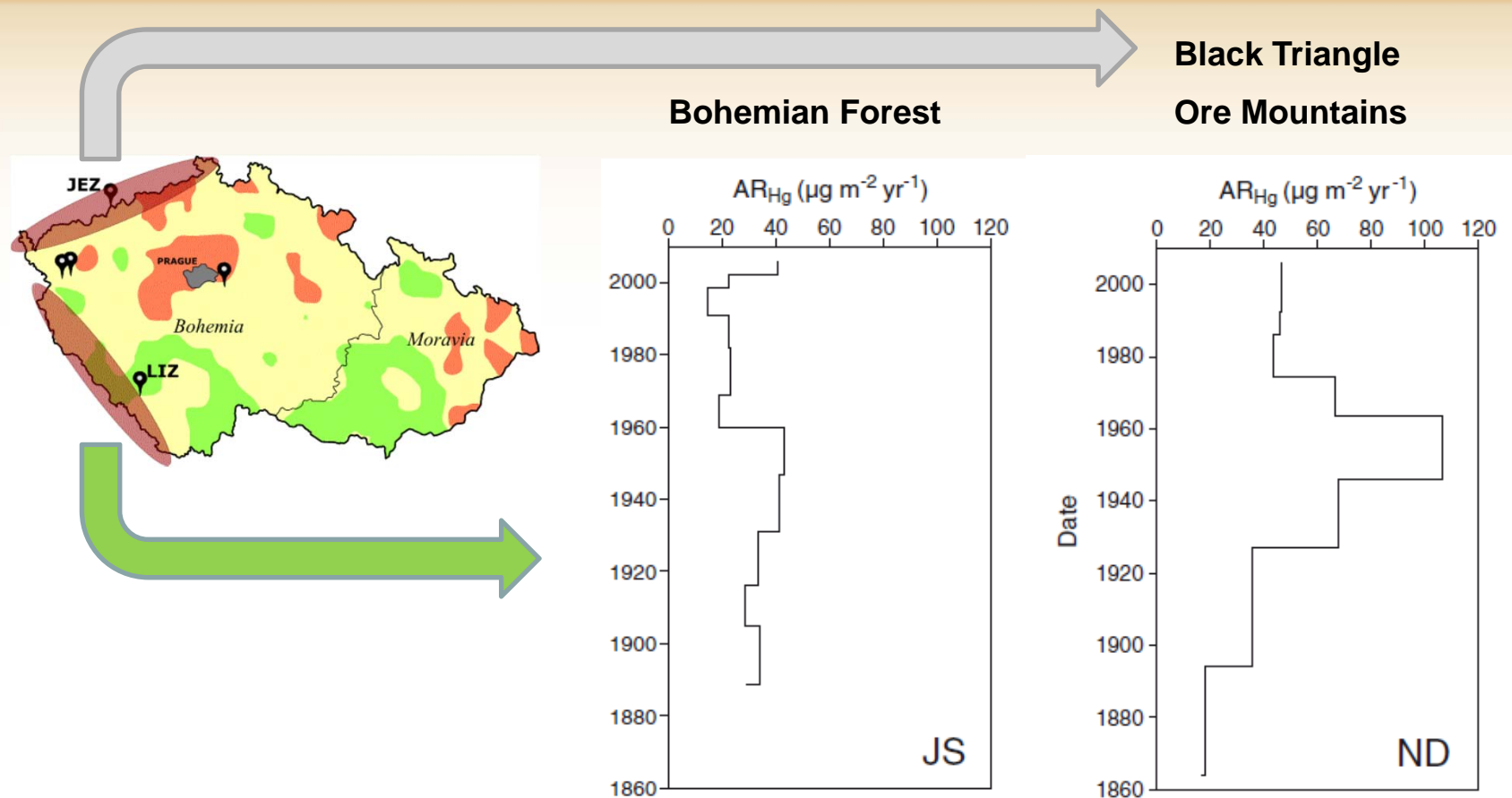


- high S emissions and deposition in the Black Triangle BUT what about the deposition of Hg?

Source: Suchara I, Sucharová J (2002) - *Water, Air and Soil Pollution* 136.



Proxy to historical Hg deposition

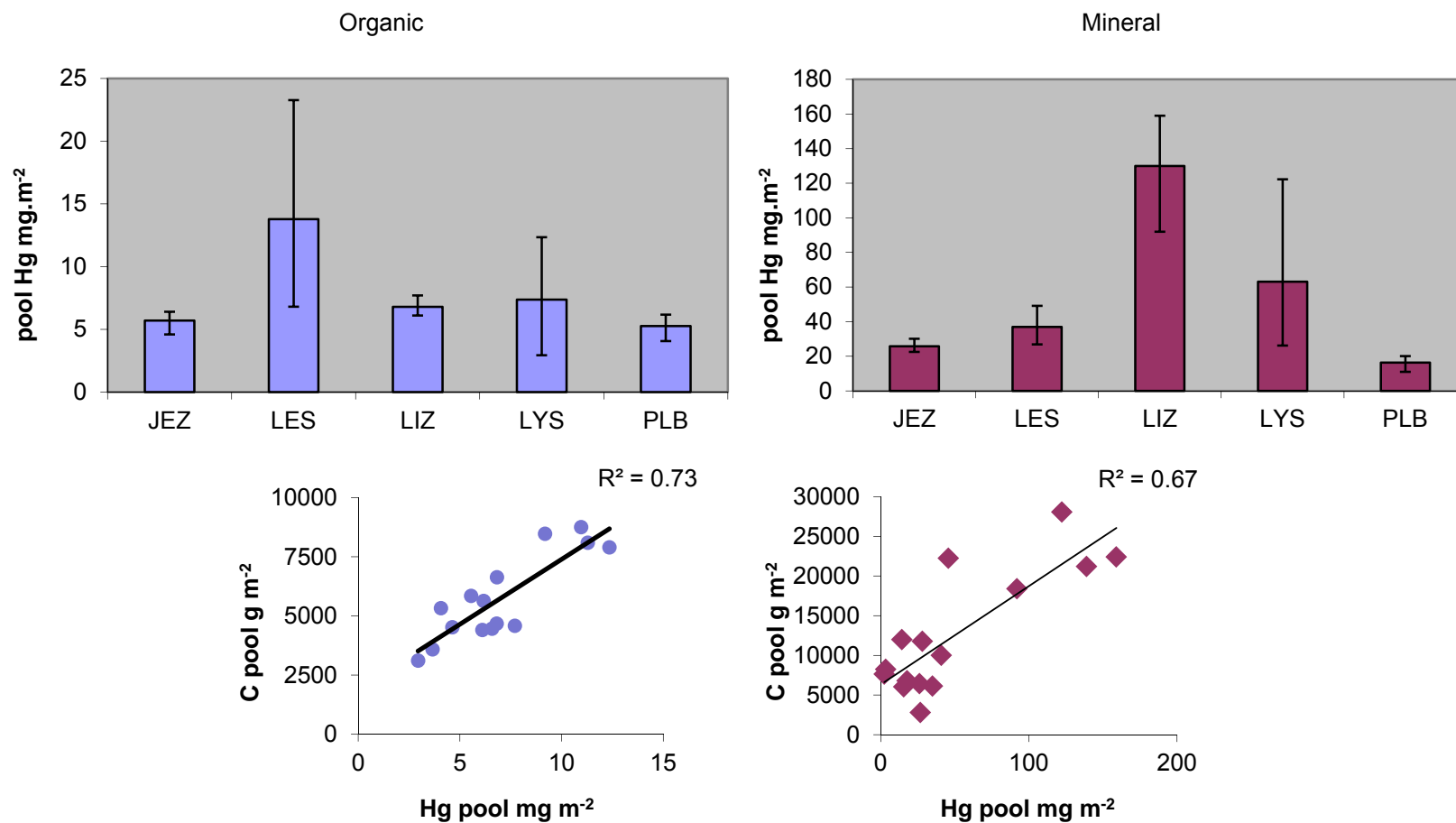


How do these differences in Hg deposition reprint into the soil and stream water Hg concentrations?

Source: Zuna et al. (2012) - Atmospheric Environment 424.



Soil Hg

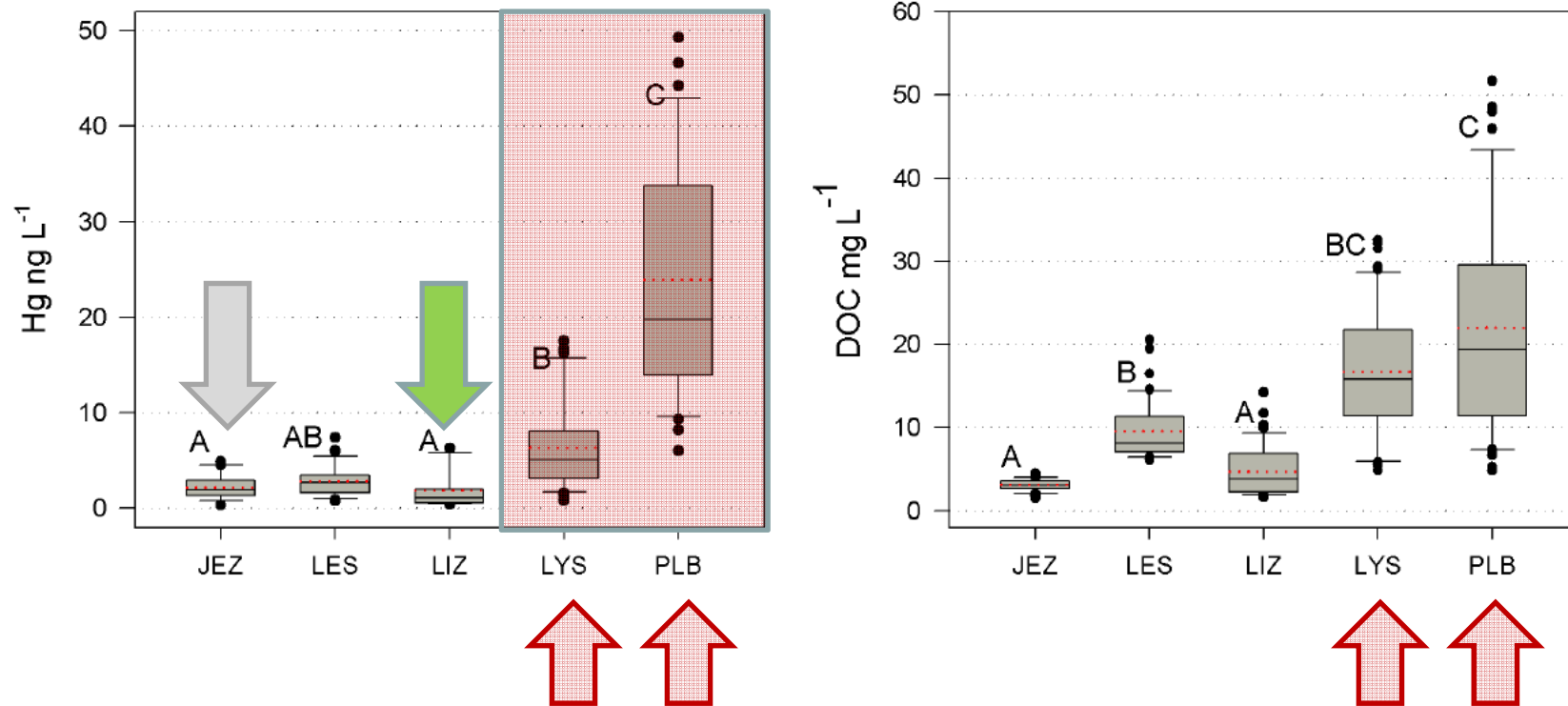


- size of soil Hg pools determined by size of C pools...



Stream water Hg and DOC

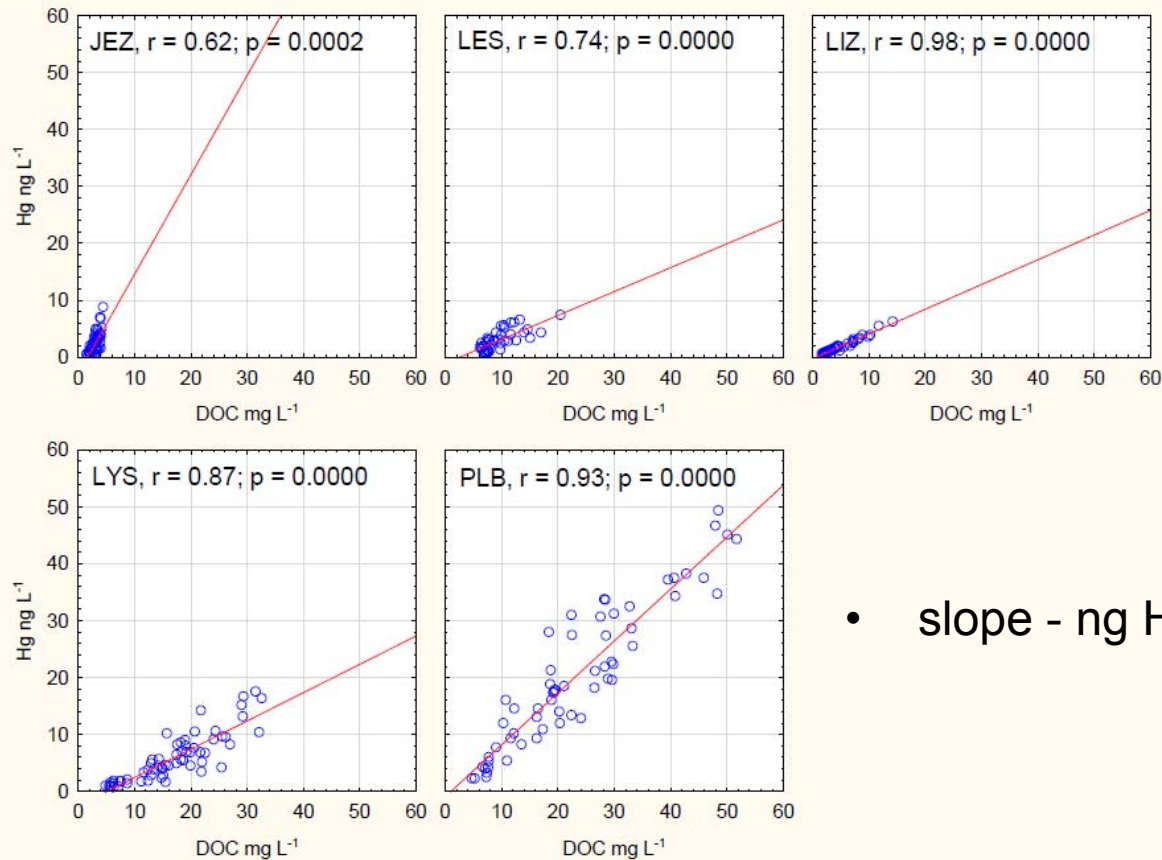
- export of DOC from forested catchments is governed by competing processes of *production*, *decomposition*, *sorption* and *flushing*



- site by site stream water Hg concentration determined by stream water DOC concentration!



Stream water Hg and DOC

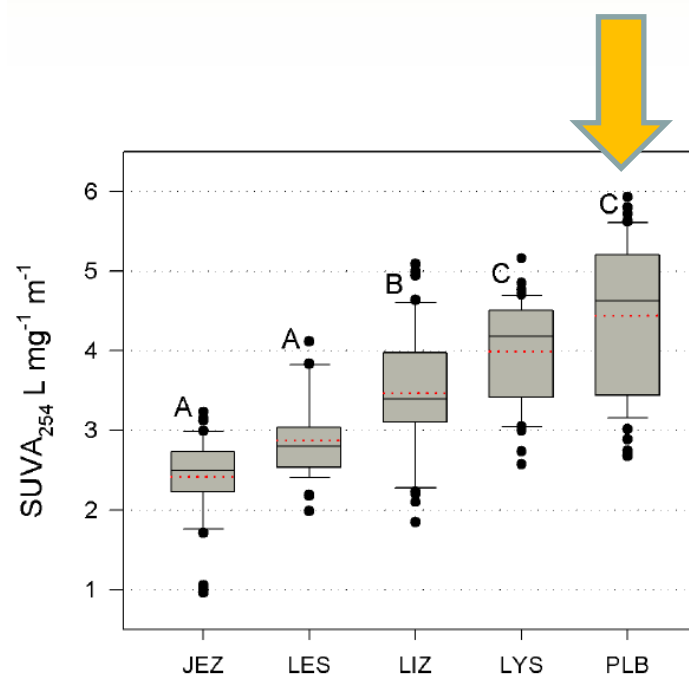
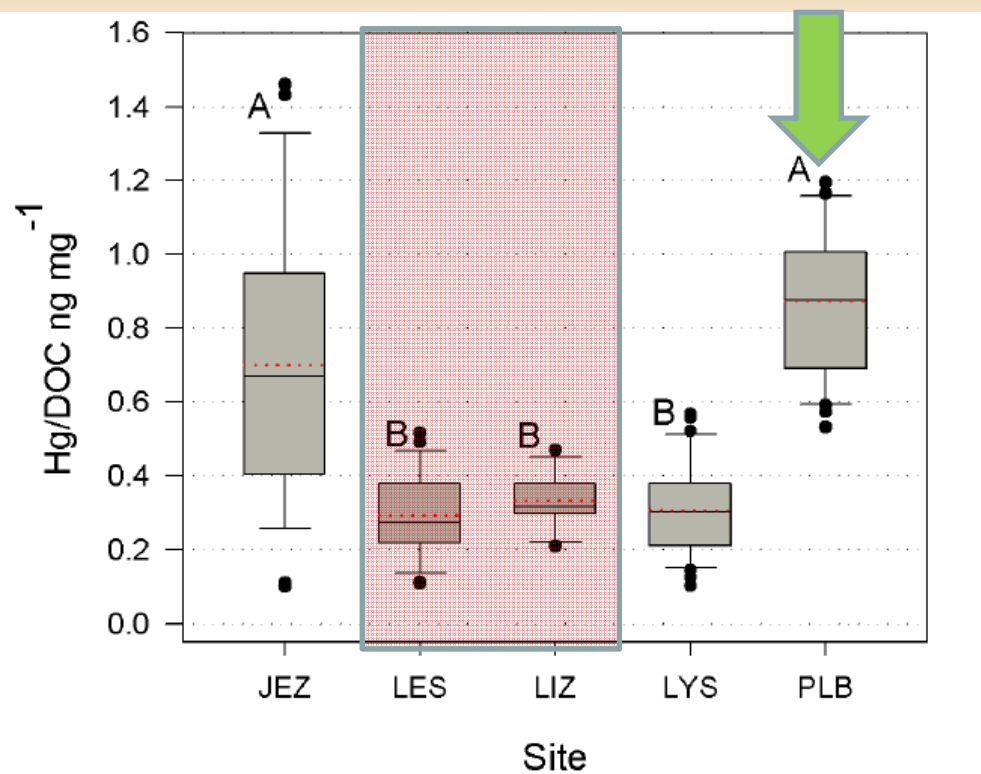


- slope - ng Hg per mg C

- stream water Hg concentration determined by stream water DOC concentration!



Stream water Hg/DOC ratio

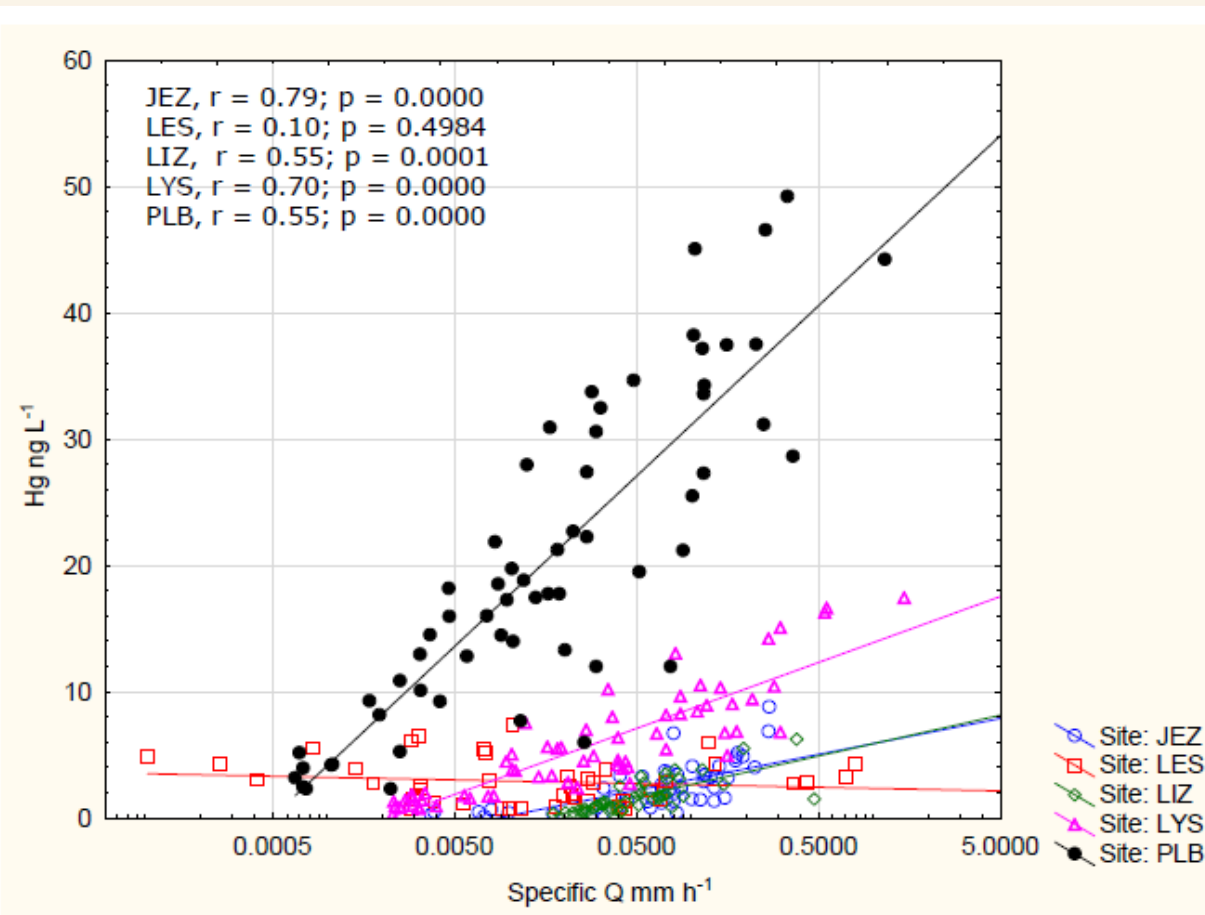


- high stream water Hg/DOC ratios at JEZ site with possibly the highest Hg historical deposition and at **PLB** the alkaline site (serpentinite bedrock)



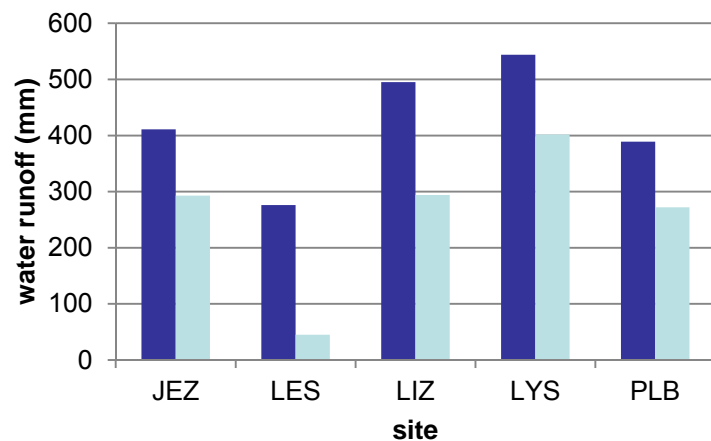
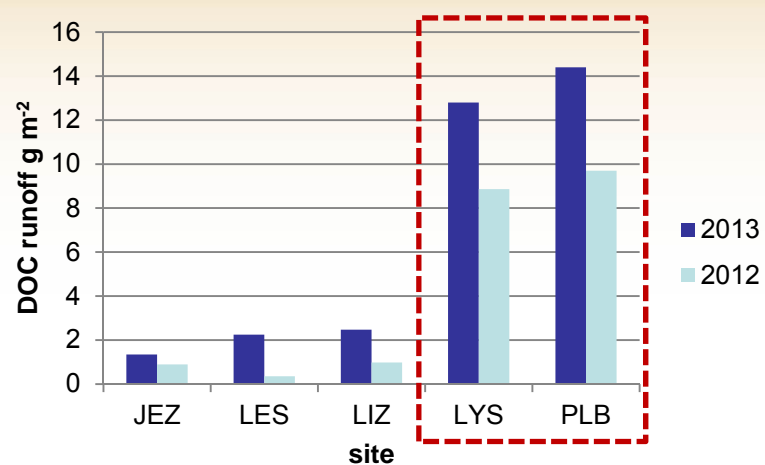
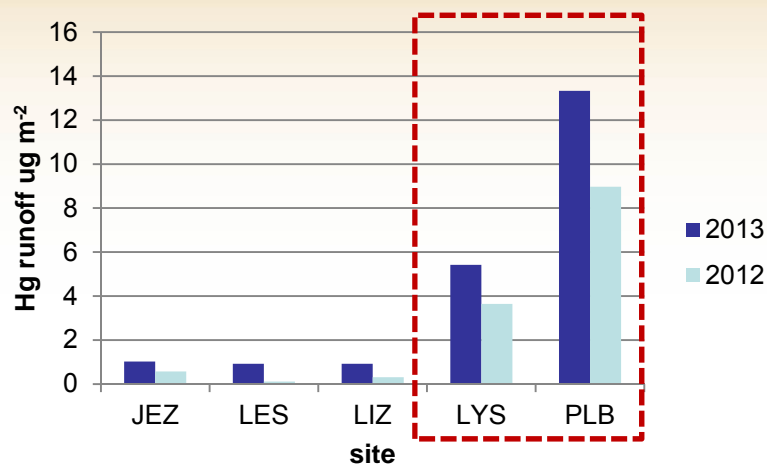
Discharge related Hg and DOC

- site-specific changes in discharge determine the site-specific Hg and DOC runoff





Hg and DOC output fluxes



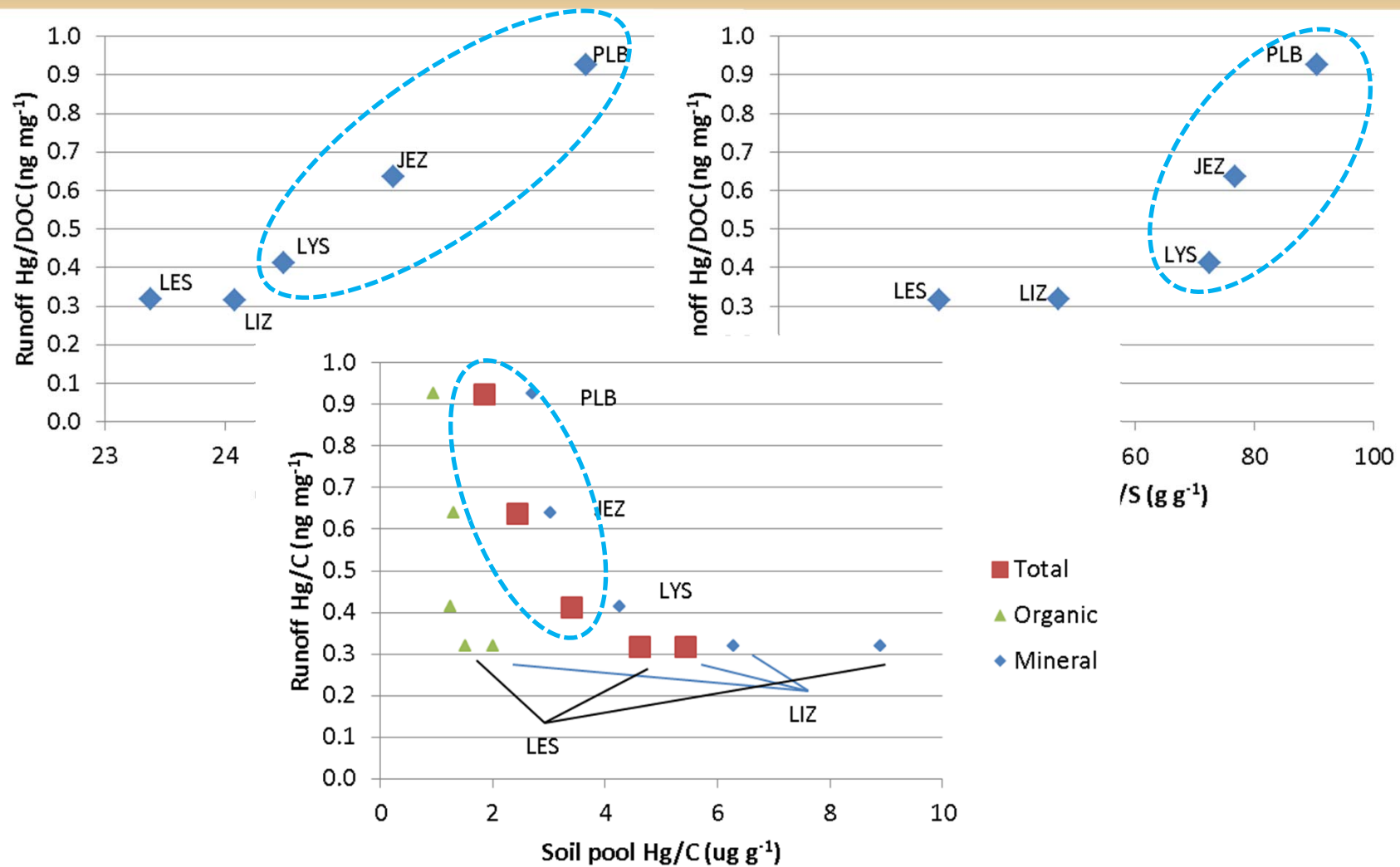
above
average
water
year

below
average
water
year

• how does stream water Hg link to soil Hg?



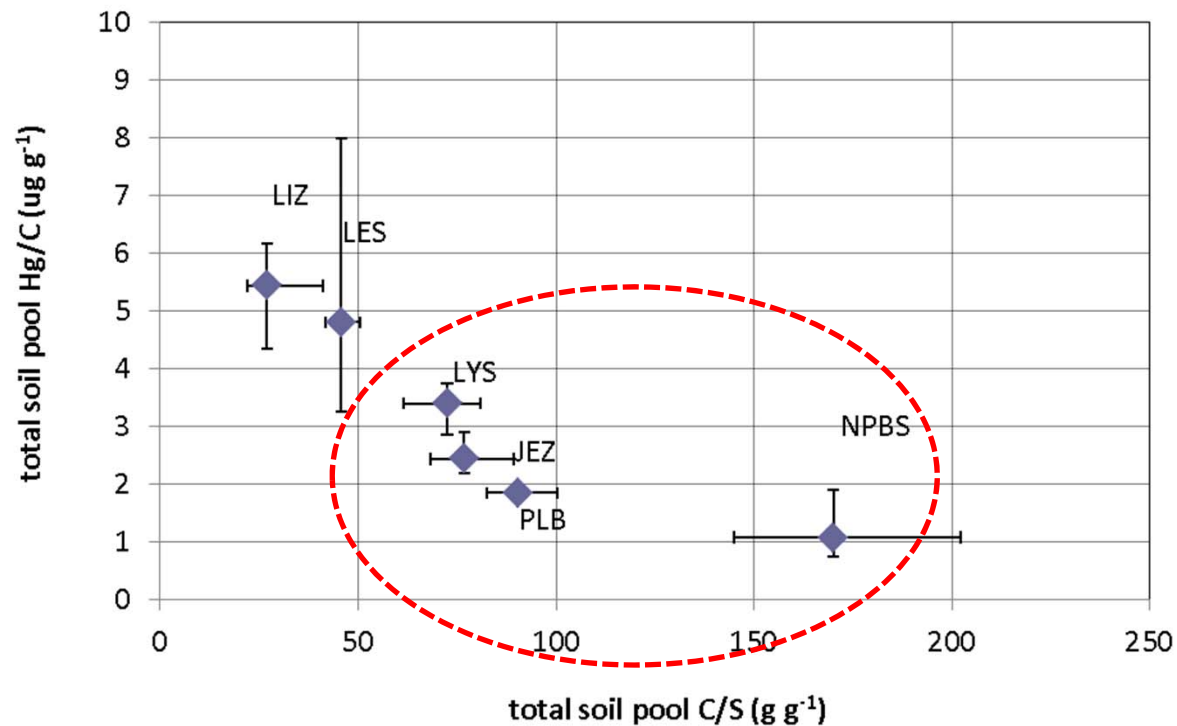
Linking soils and runoff



Source: Navrátil et al. (2014) - *Water, Air and Soil Pollution* 225.



Soil pool Hg to C to S relations



- soil Hg/C and C/S ratios could be related to site-specific SOM mineralization...



Conclusions

- Hg deposition history appeared to be but one of several factors affecting current stream Hg dynamics
- other factors, many of which are interrelated, include soil Hg pools, soil organic matter pools and dynamics, DOC quality and hydrology
- soil Hg correlated strongly to total carbon (TC) and total sulfur (TS) concentration in soil
- the association of Hg to TS may follow from the known affinity of Hg for S functional groups in organic matter
- intriguingly, median stream Hg/DOC was inversely correlated to soil Hg/DOC