

Coupled biogeochemical cycles need to be acknowledged in optimal eutrophication management

TEAQUILA Consortium:

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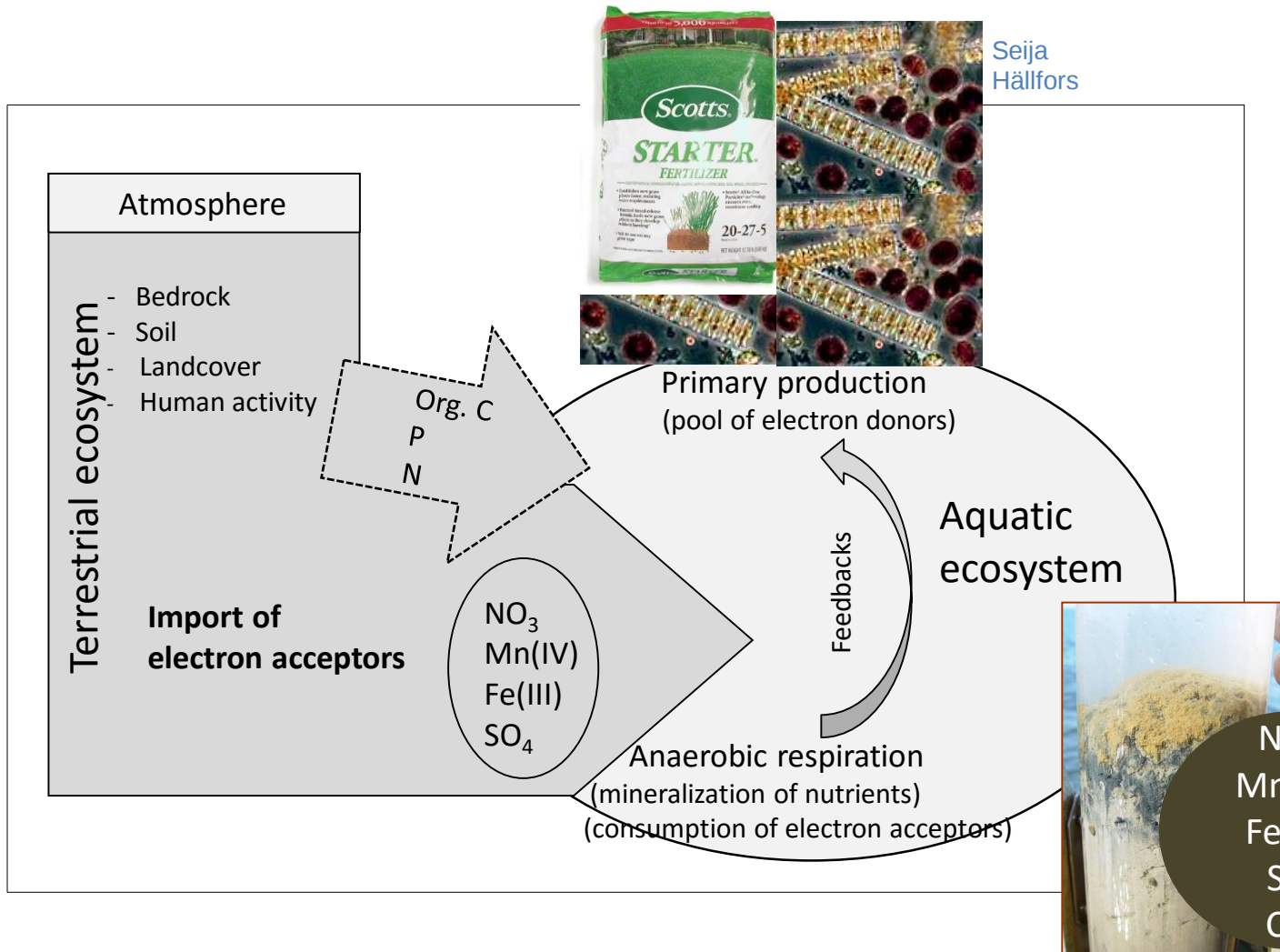
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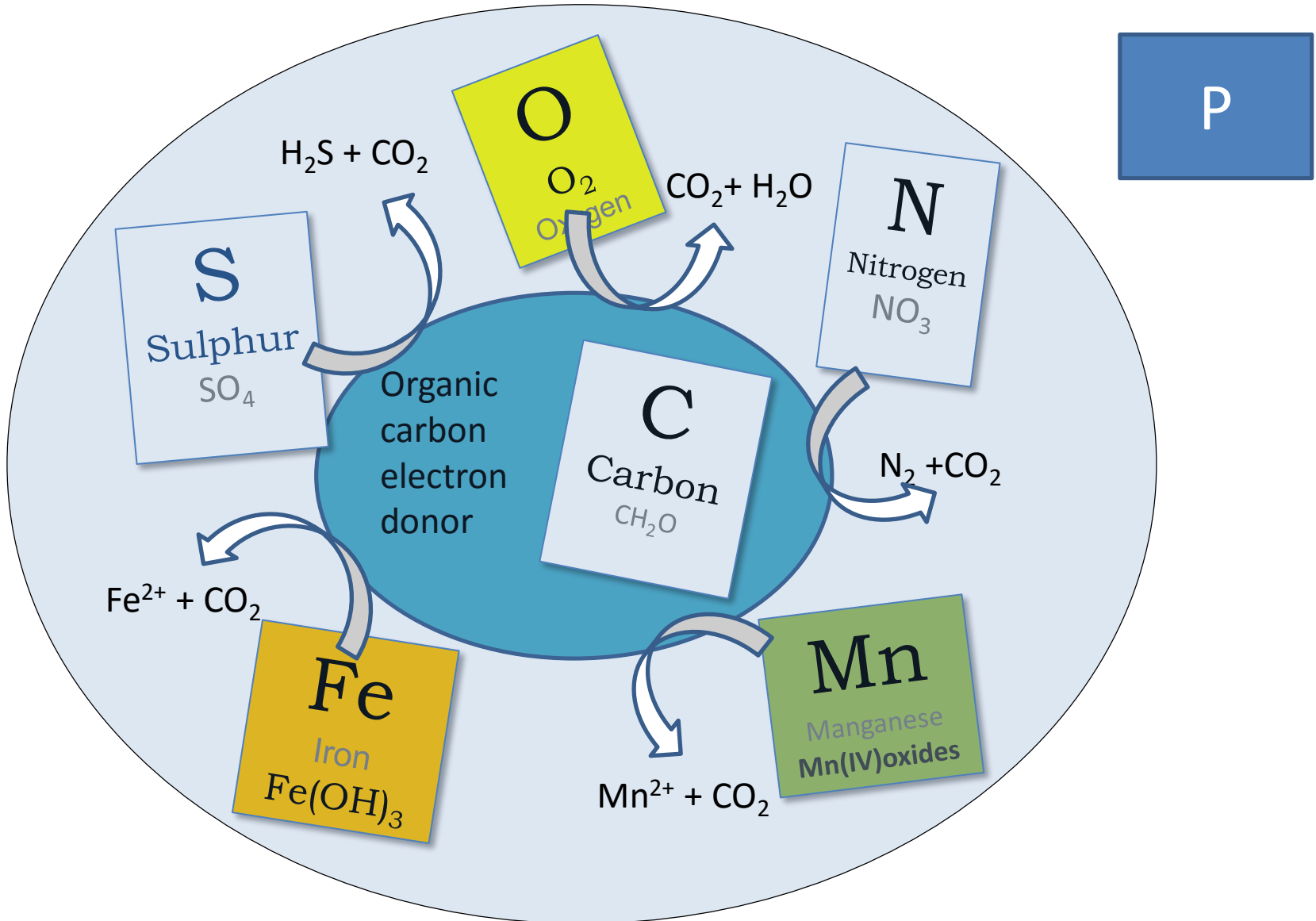
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TEAQUILA

Field of research



Coupled biogeochemical cycles through respiration processes



Land-cover regulates export of terminal electron acceptors (TEAs)

Palviainen, M., Lehtoranta, J., Ekholm, P. and Kortelainen, P. 2015. Land-cover controls the export of terminal electron acceptors from boreal catchments. *Ecosystems* 18: 343–358.

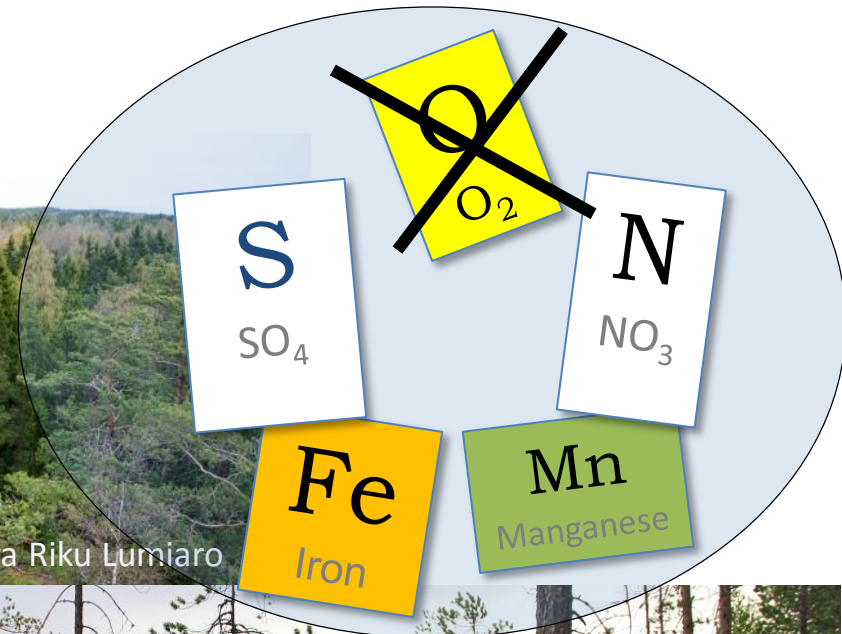
Fields



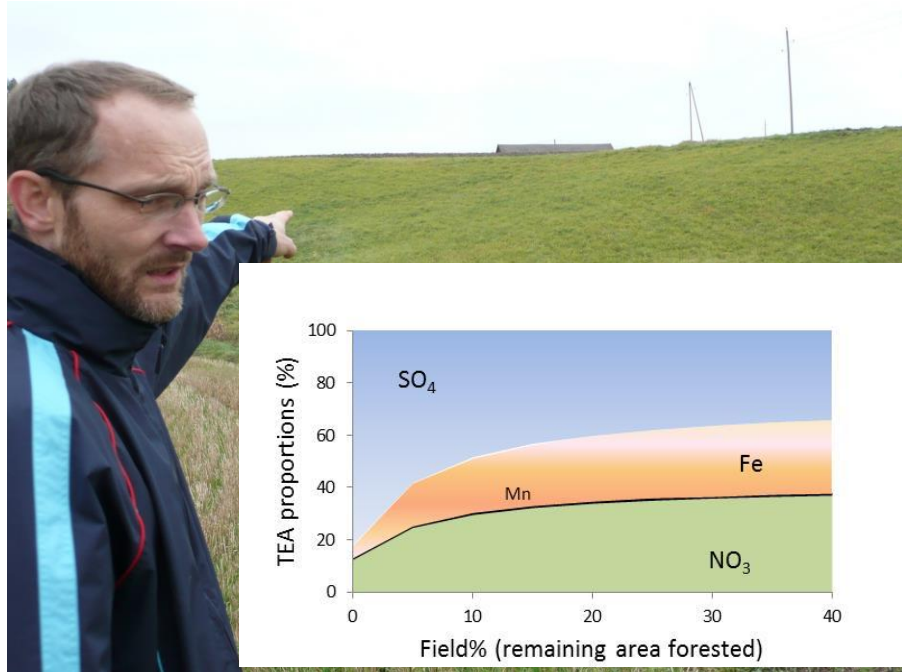
Forests



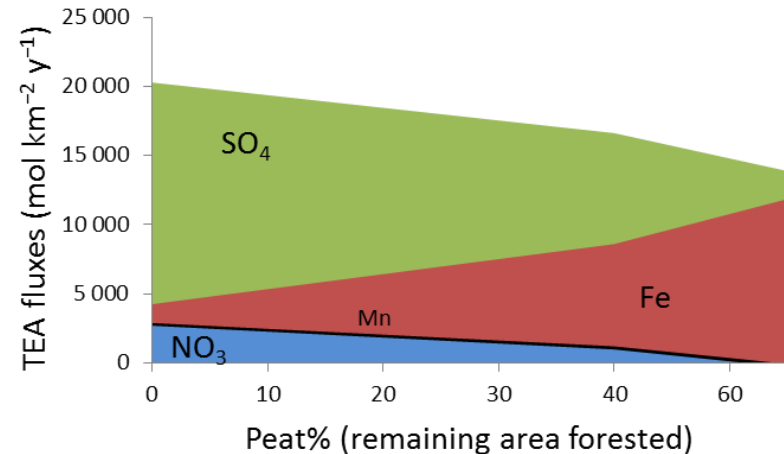
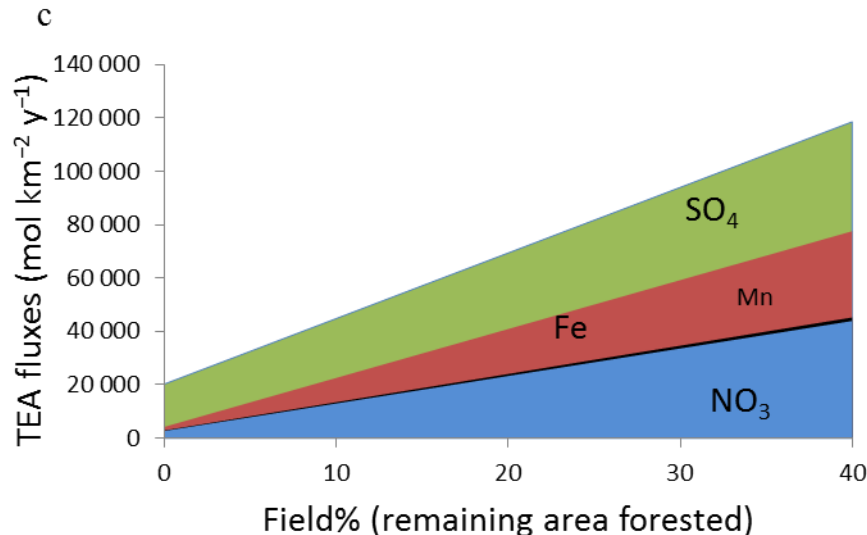
Peatlands



Land-cover regulates export of electron acceptors



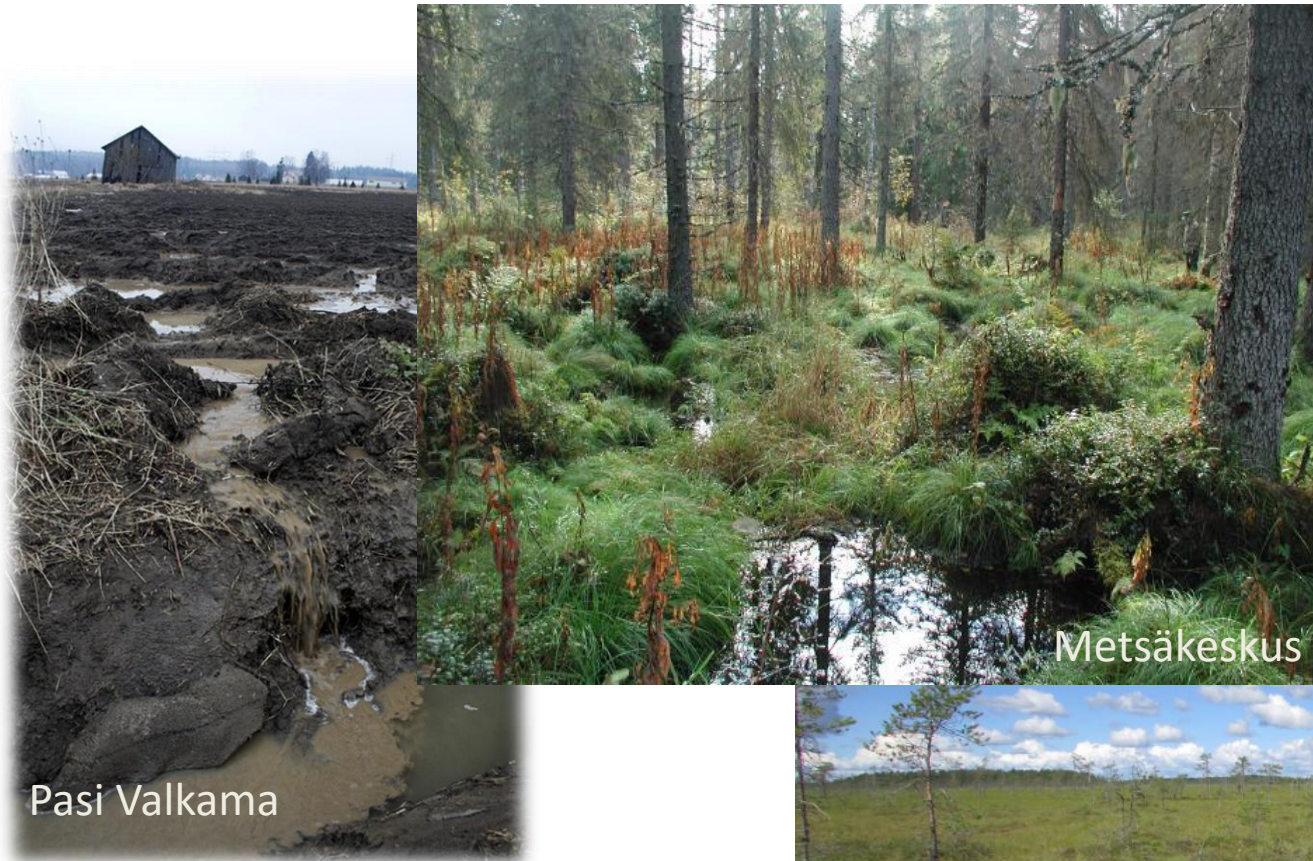
- Fields export much more electron acceptors downstream than catchments with peat and forests
- Fields have exceptionally high proportion of NO_3 in export



Runoff and electron acceptors

Mattsson T., Lehtoranta J., Ekholm P., Palviainen, M., Kortelainen P.

Runoff changes have a land cover specific effect on the seasonal fluxes of terminal electron acceptors in the boreal streams.



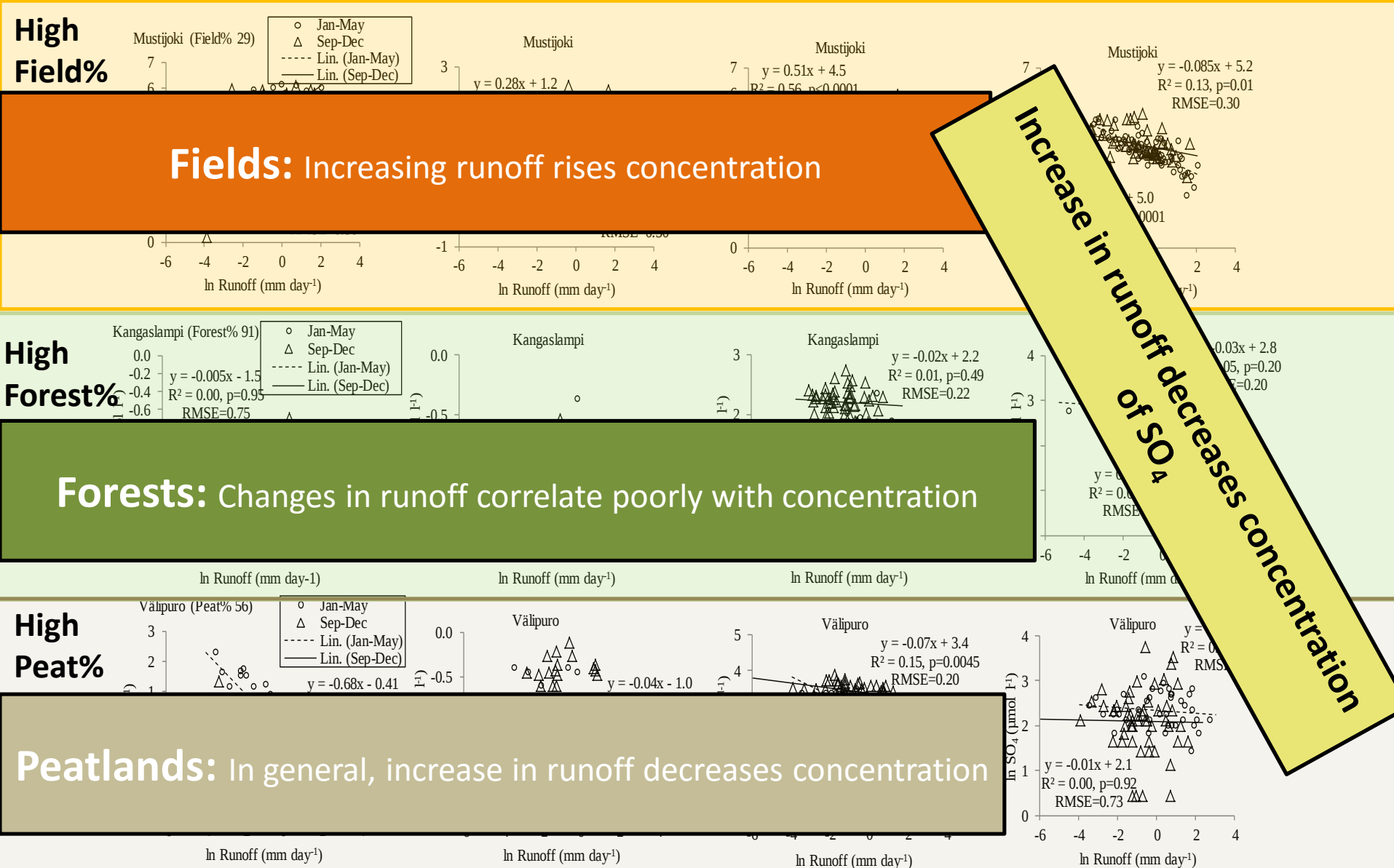
Runoff and concentrations of electron acceptors

Nitrate (NO₃)

Manganese (Mn)

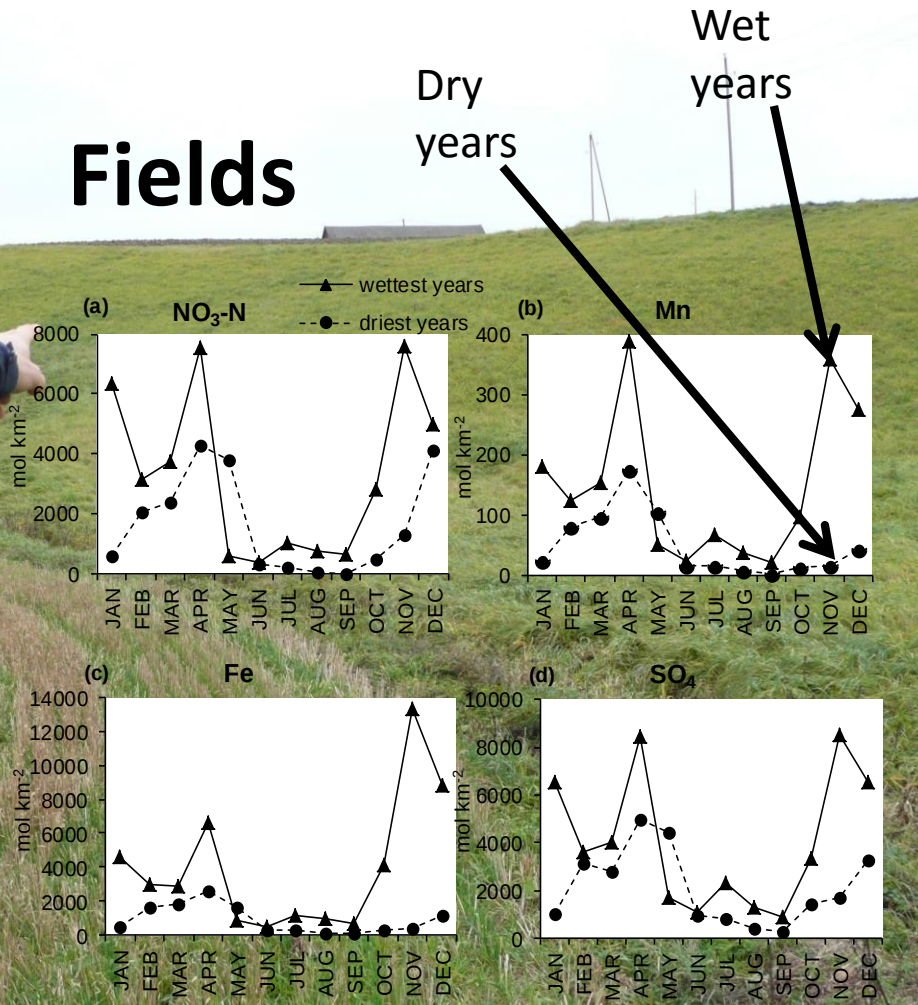
Iron (Fe)

Sulfate (SO₄)

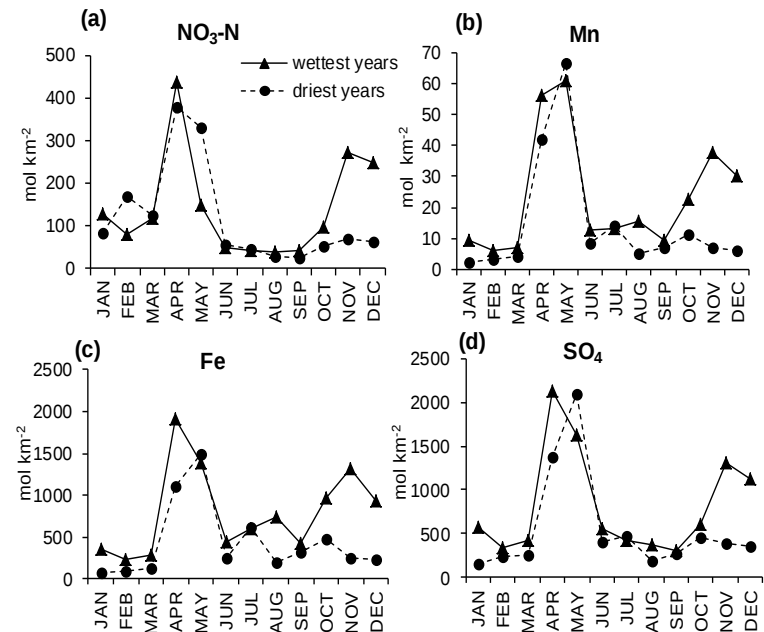


Runoff and export of TEAs

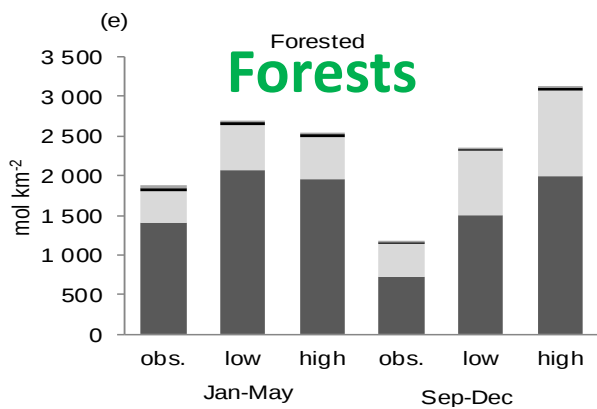
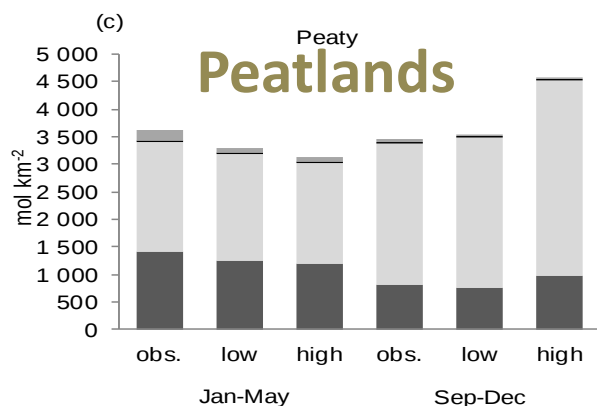
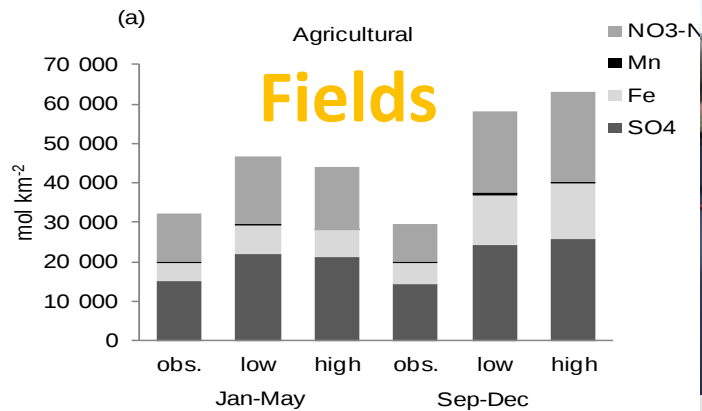
Fields



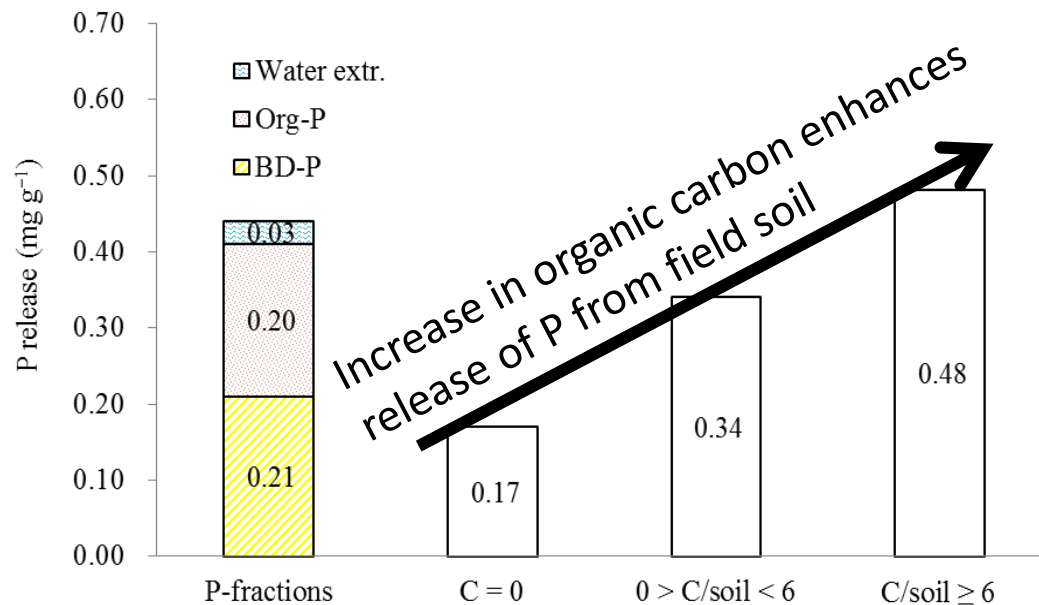
Peaty and forested catchments



Climate change induced variation in runoff may impact export of all TEAs from fields

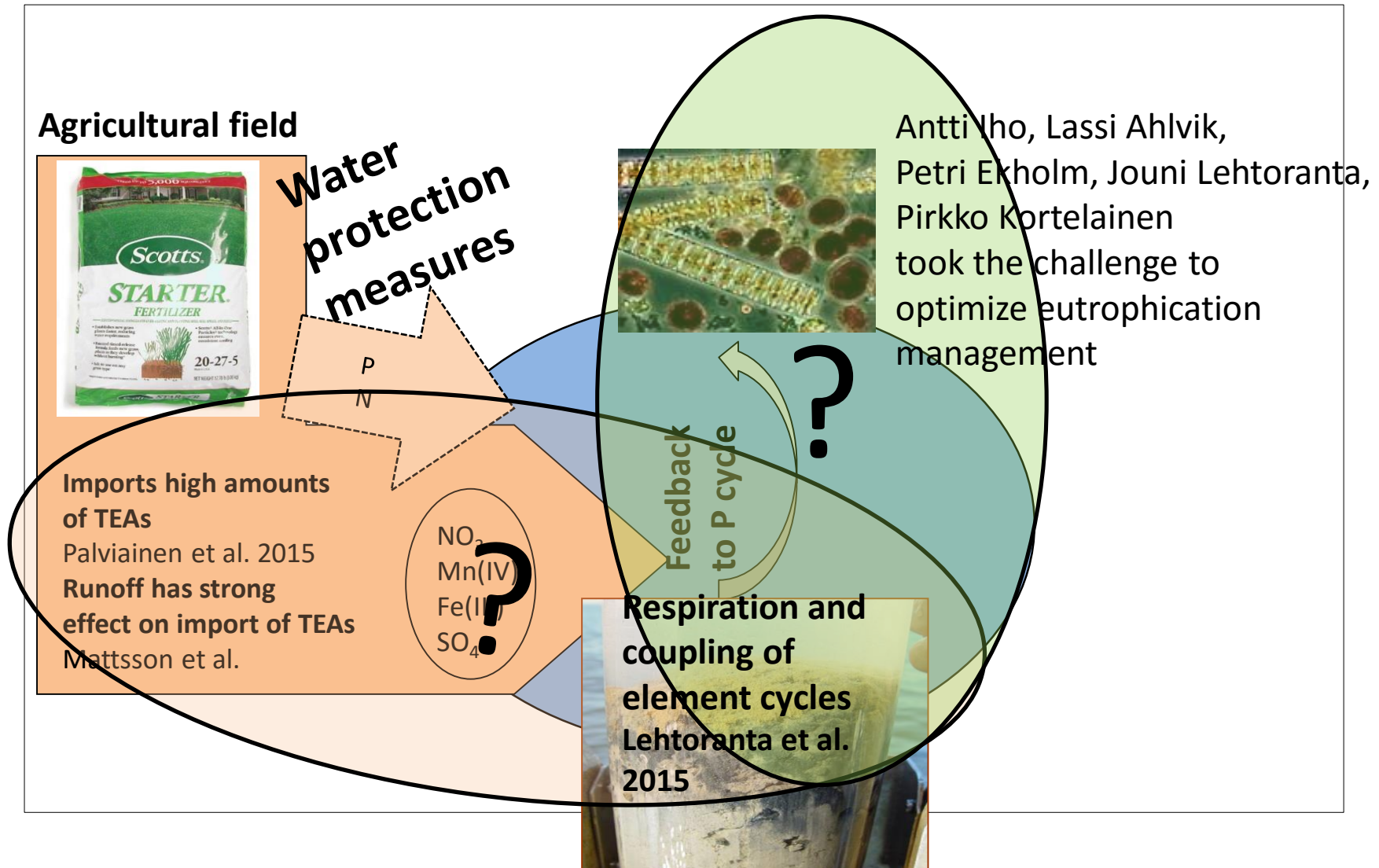


Release of field soil phosphorus in anoxic brackish water



Carbon controls respiration pathways and coupling of C, Mn, Fe, S and release of P from field soil

Optimal eutrophication management and coupled biogeochemical cycles



Thank you!



Photo: Ilkka Heikkinen