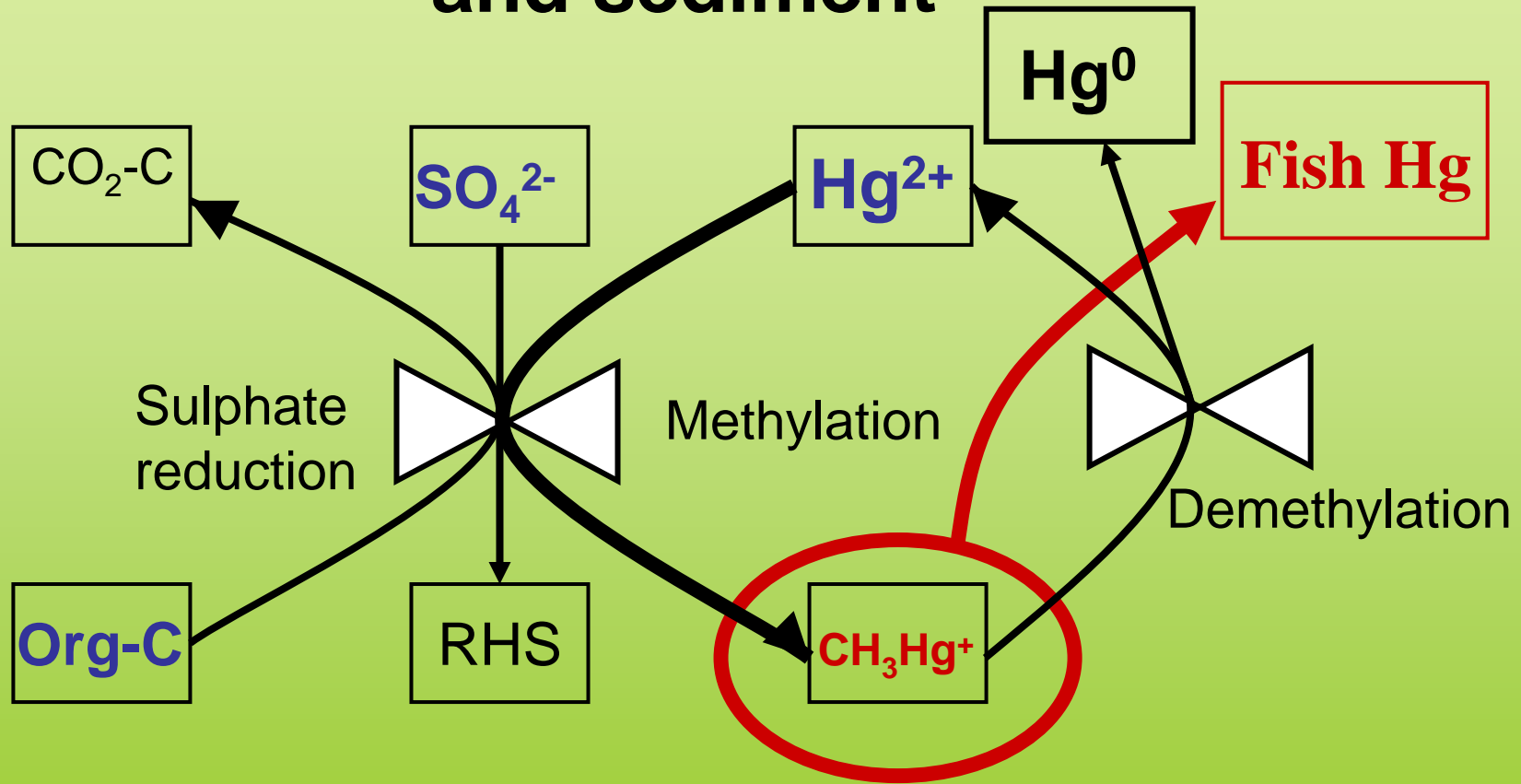


*Combining speciation and isotope labelling to
assess net mercury methylation in sediment
and soil samples*

Mats Nilsson, SLU, Umeå

W. Frech, L. Lambertsson, E. Björn, K. Bishop, I. Bergman, N.
Larsson

Control on MeHg-concentrations in soil and sediment



Boxes indicate element pools

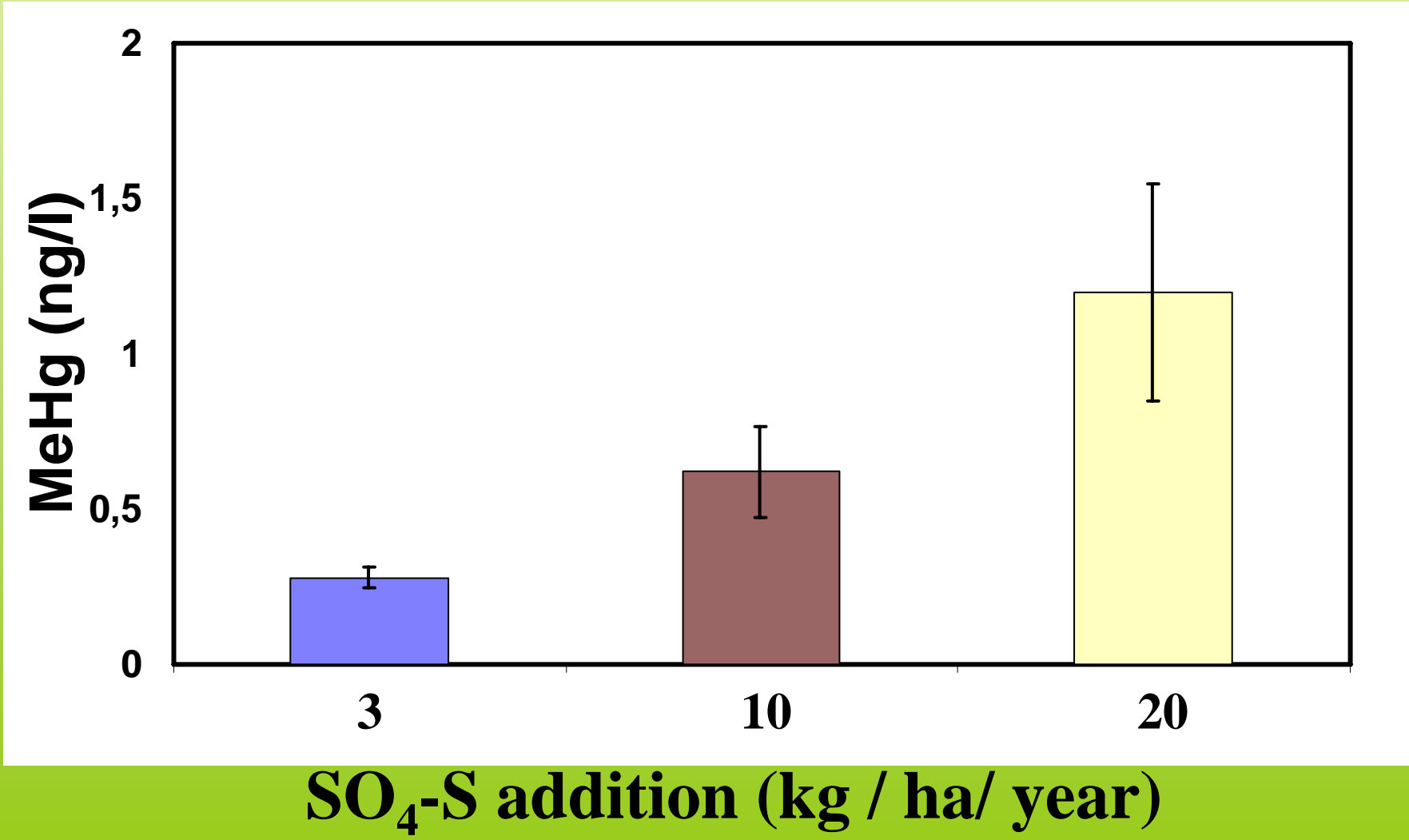
Collates indicate processes

Applications of Hg-speciation and isotope labeling to understand environmental controls on soil- and sediment concentrations of MeHg

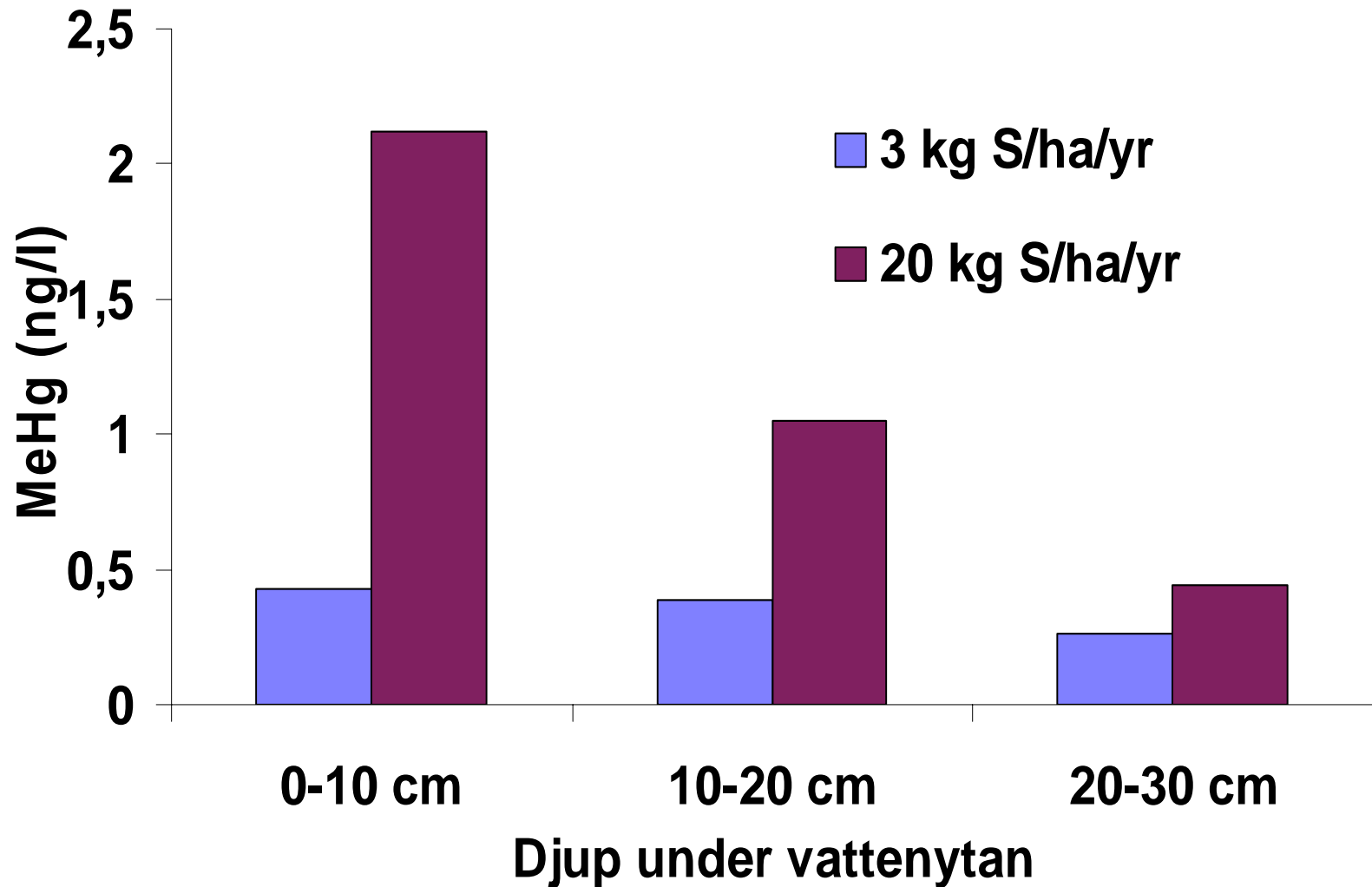
- Effect of experimental addition of S on mire pore water MeHg
- Effect of natural variation in S deposition on mire pore water MeHg and Hg-methylation
- Controls on MeHg and Hg-methylation in a brackish estuarine environment

Effect of experimental addition of S on mire pore water MeHg

MeHg in mire pore water after addition of sulphate

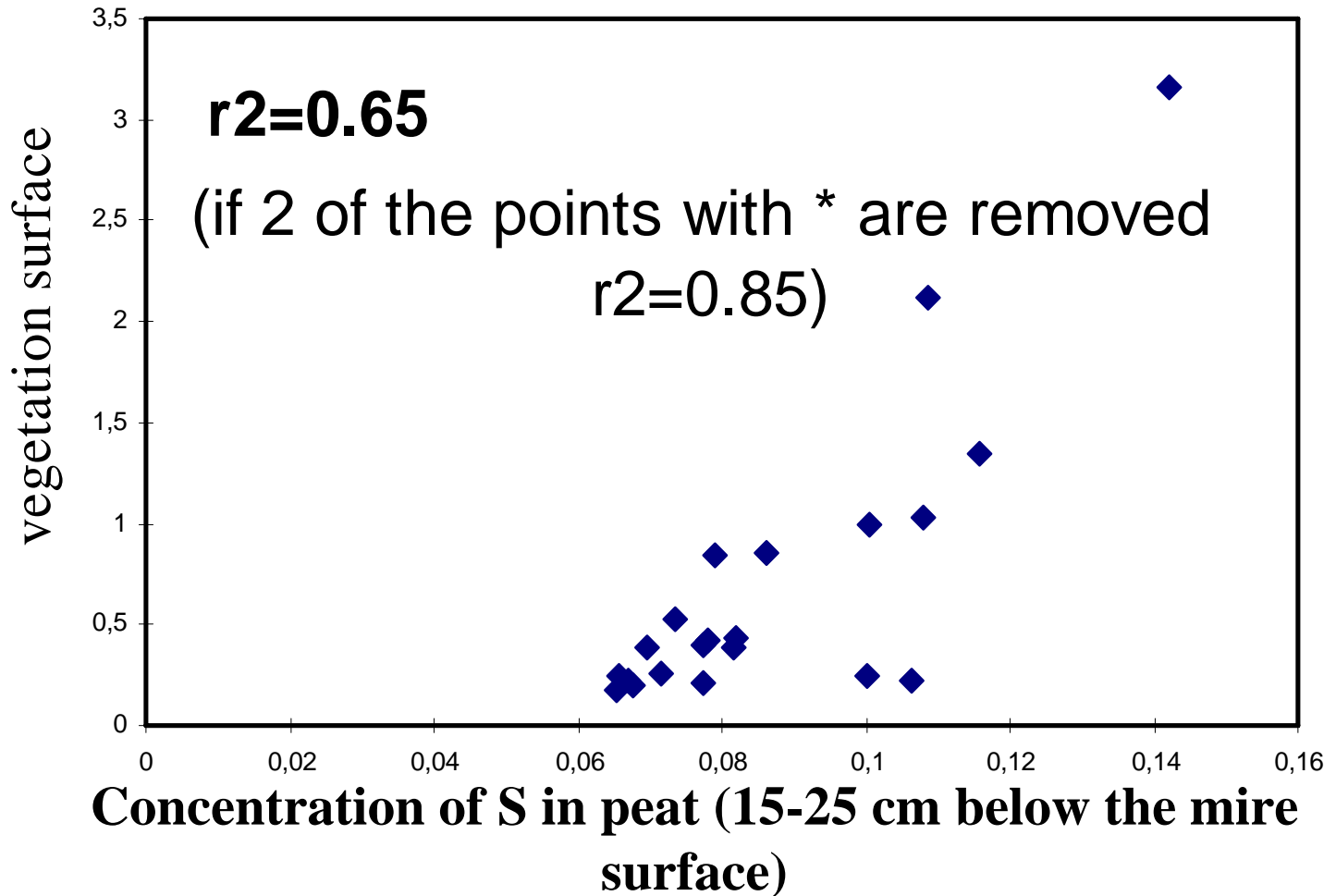


MeHg in mire pore water at different depth below the water table

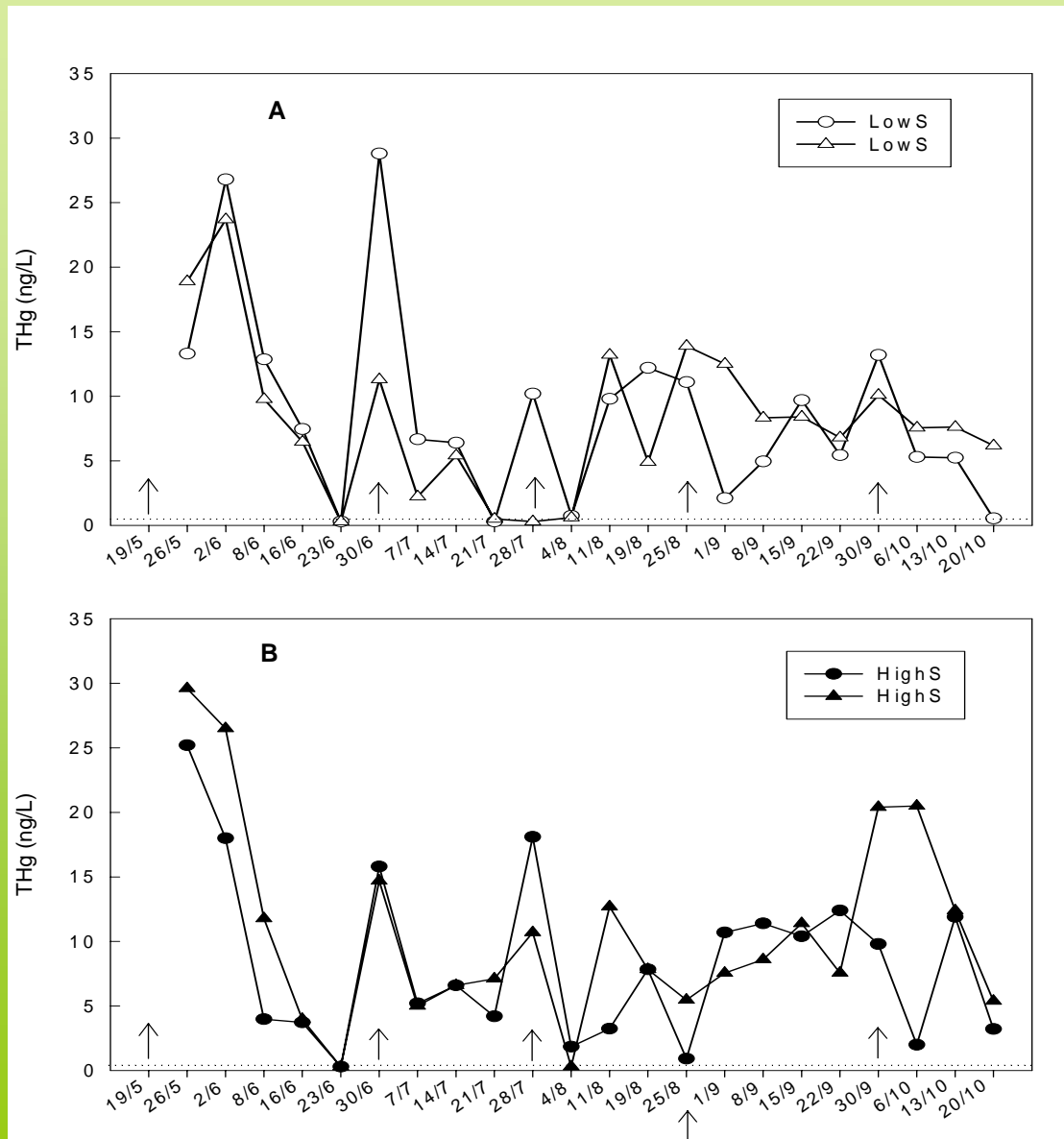


MeHg in mire pore water plotted against sulphur in the peat at corresponding depth

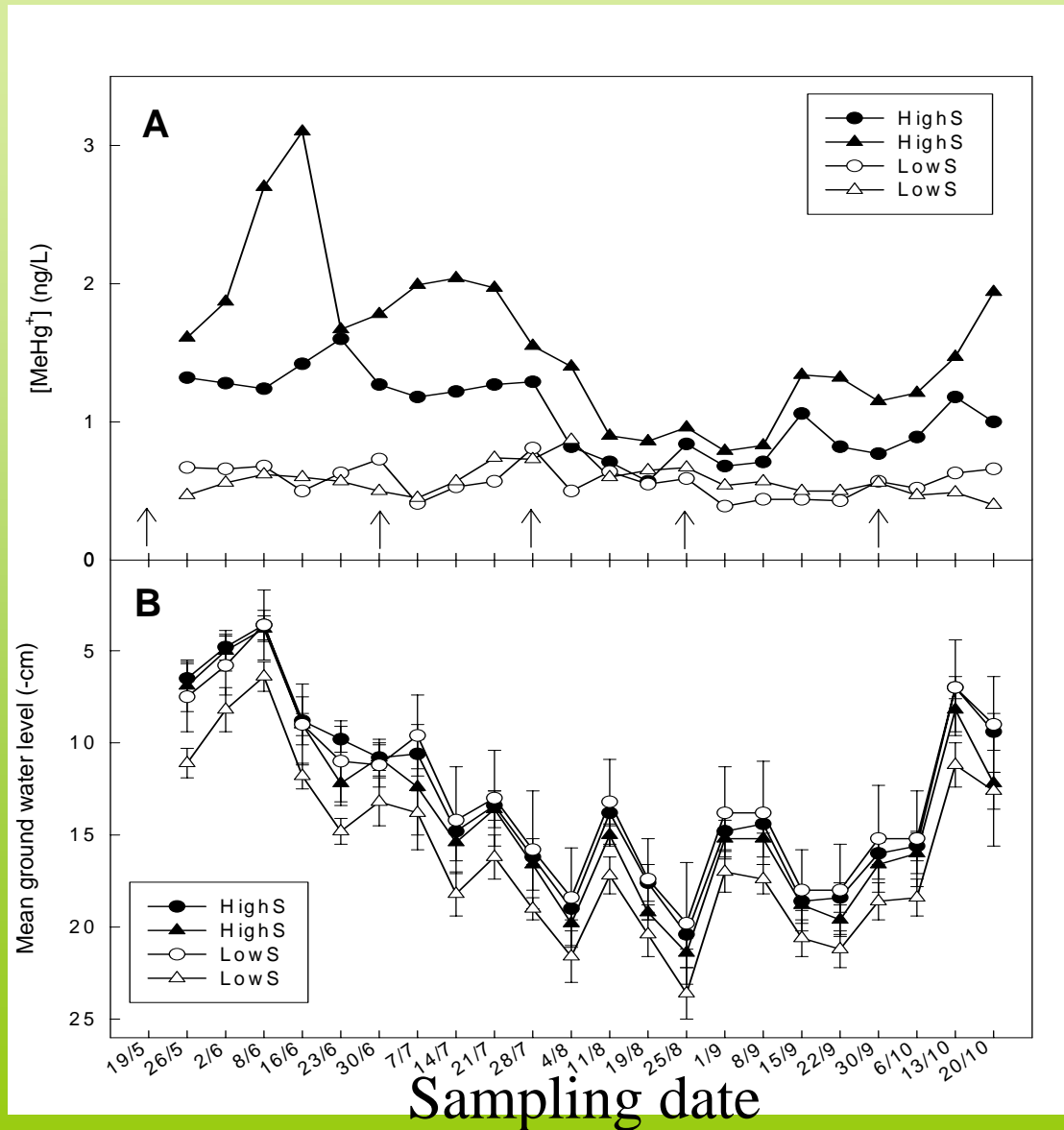
MeHg (ng/l) in mire pore water 15-25 cm below the vegetation surface



Temporal variation in Hg_{tot} mire pore water



Temporal variation in MeHg mire pore water

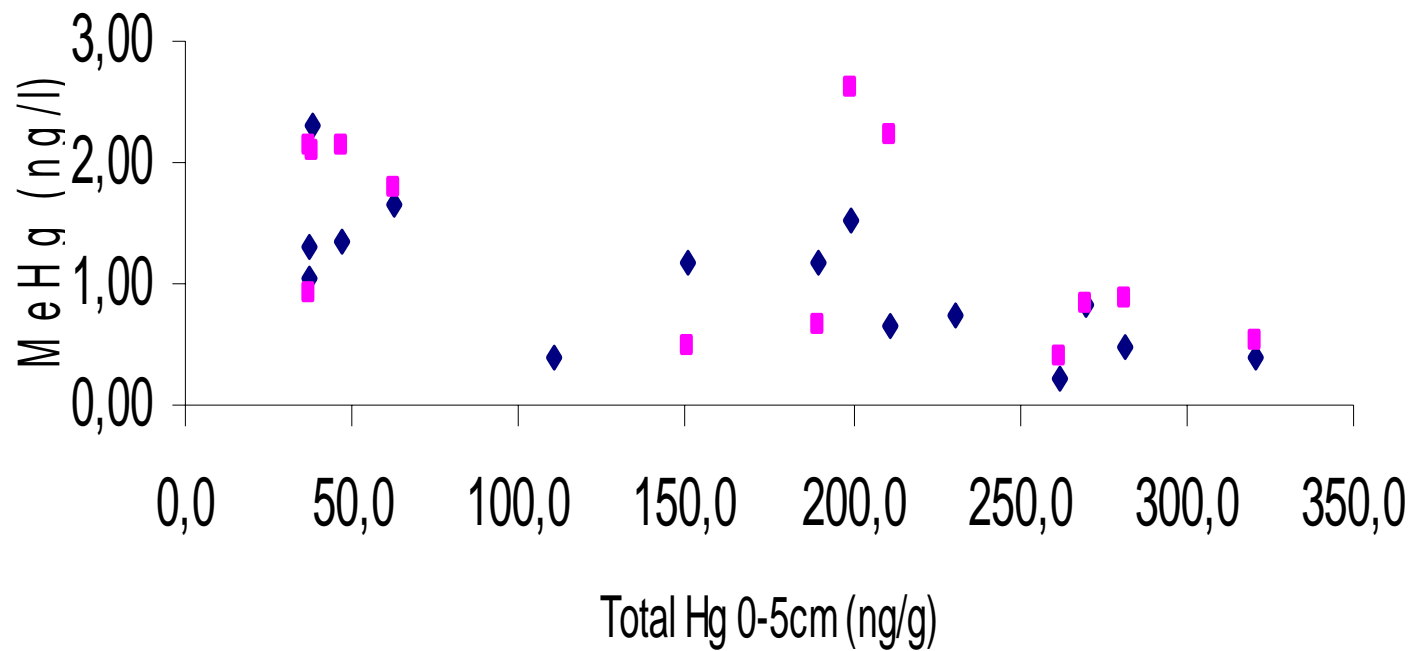


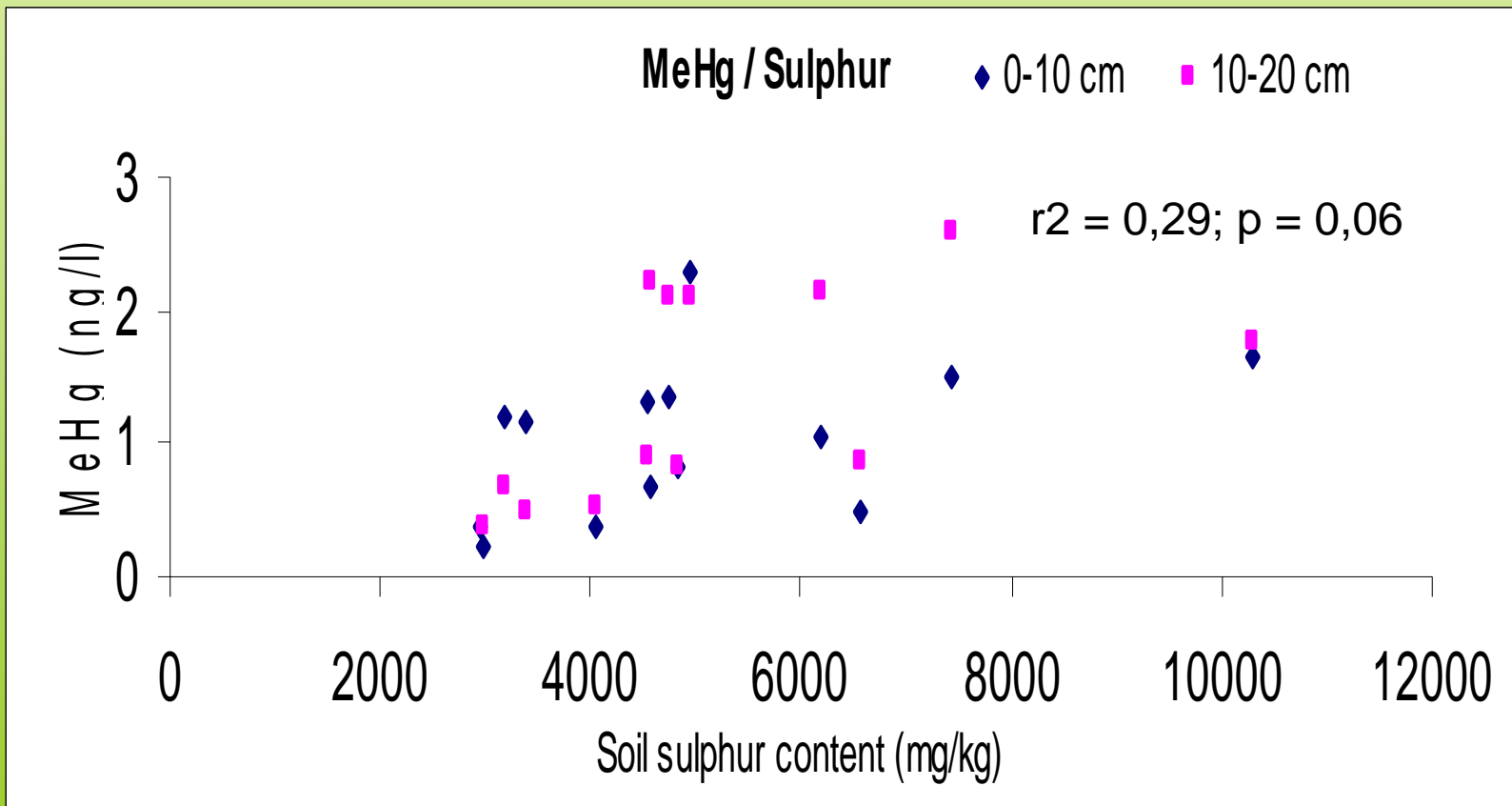
Effect of natural variation in peat S concentration on mire pore water MeHg and Hg-methylation

18 mires from the west to the east coast of southern Sweden spanning a deposition gradient from 5 – 20 kg S ha⁻¹ yr⁻¹

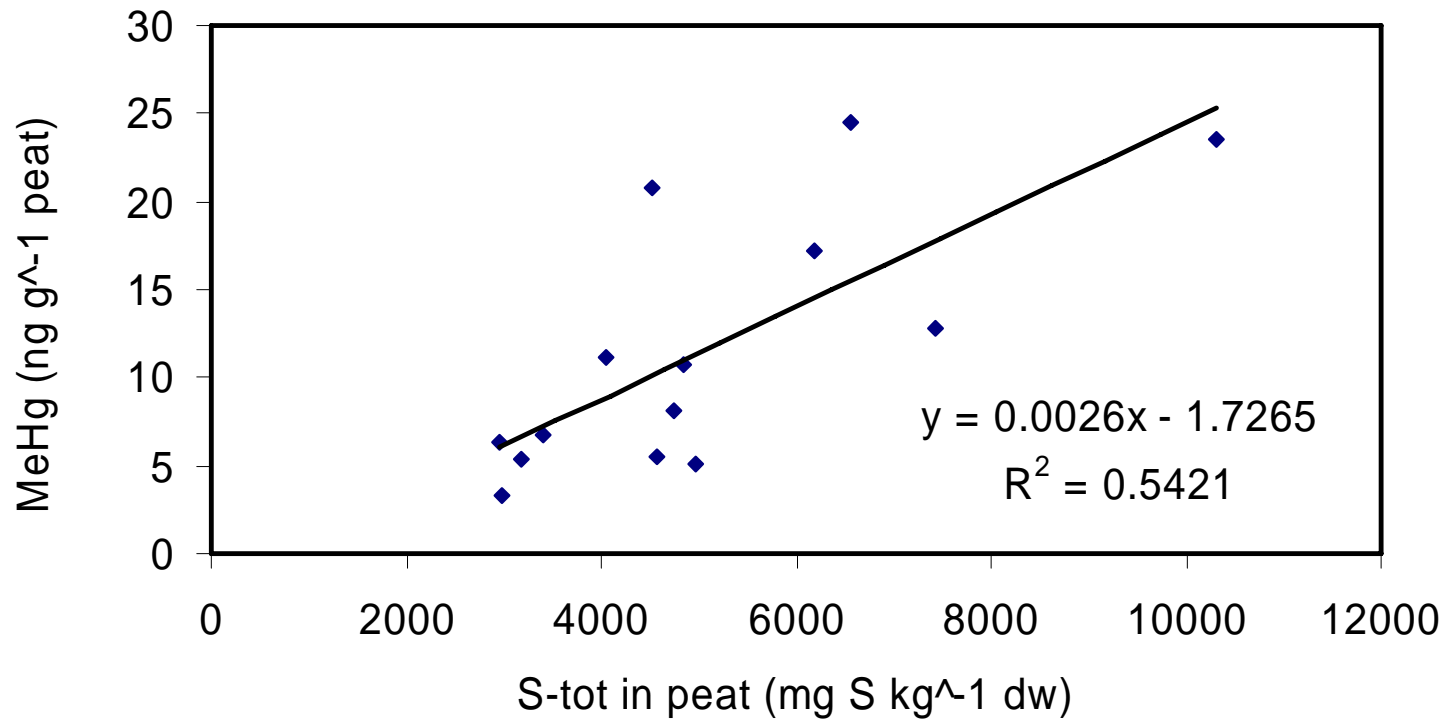
MeHg soil pore water / Total peat Hg

◆ 5 cm ■ 15 cm

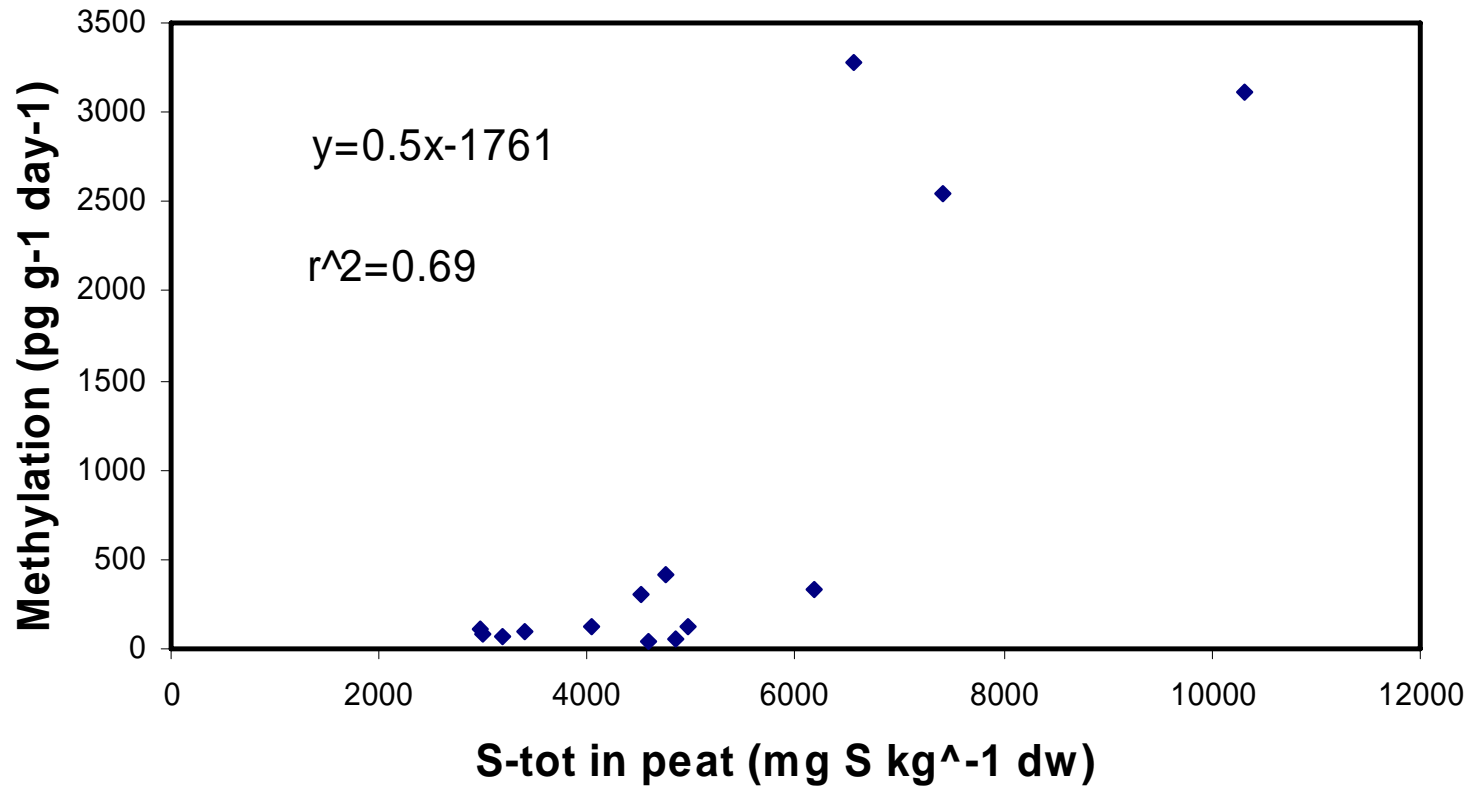




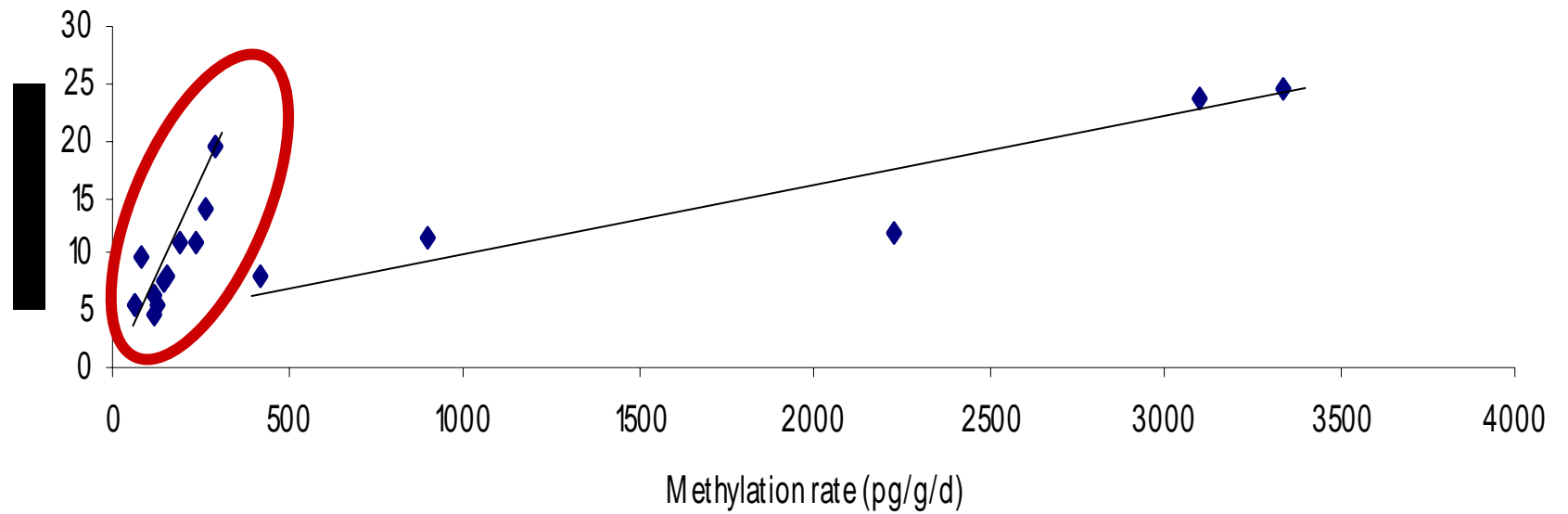
MeHg in peat against S-tot in peat



Hg methylation against S_tot



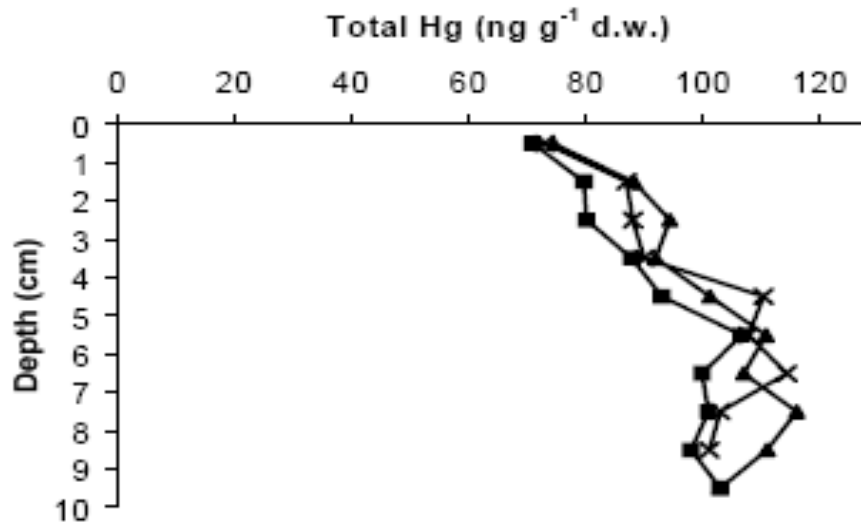
Peat MeHg/Methylation rate



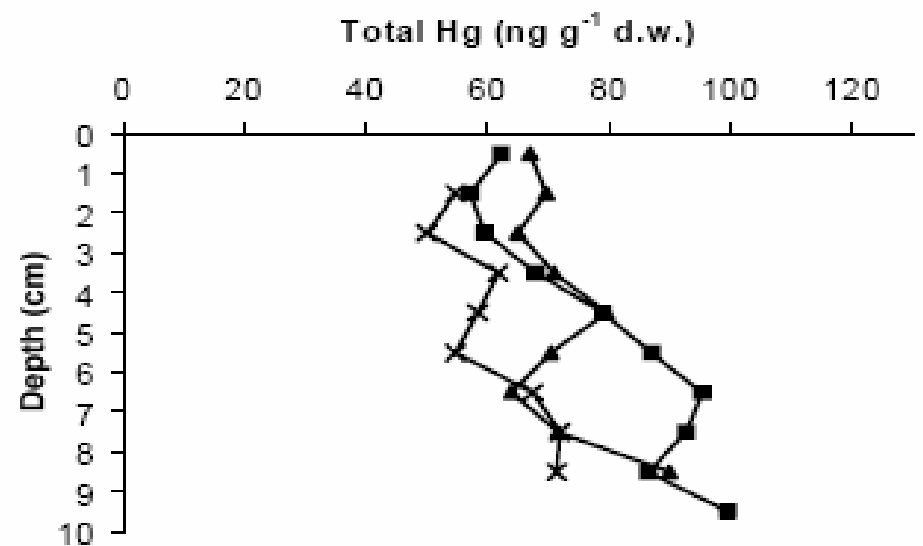
Controls on MeHg and Hg-methylation in a brackish estuarine environment

Depth profiles of total mercury at two brackish water sediments at three sampling occasions

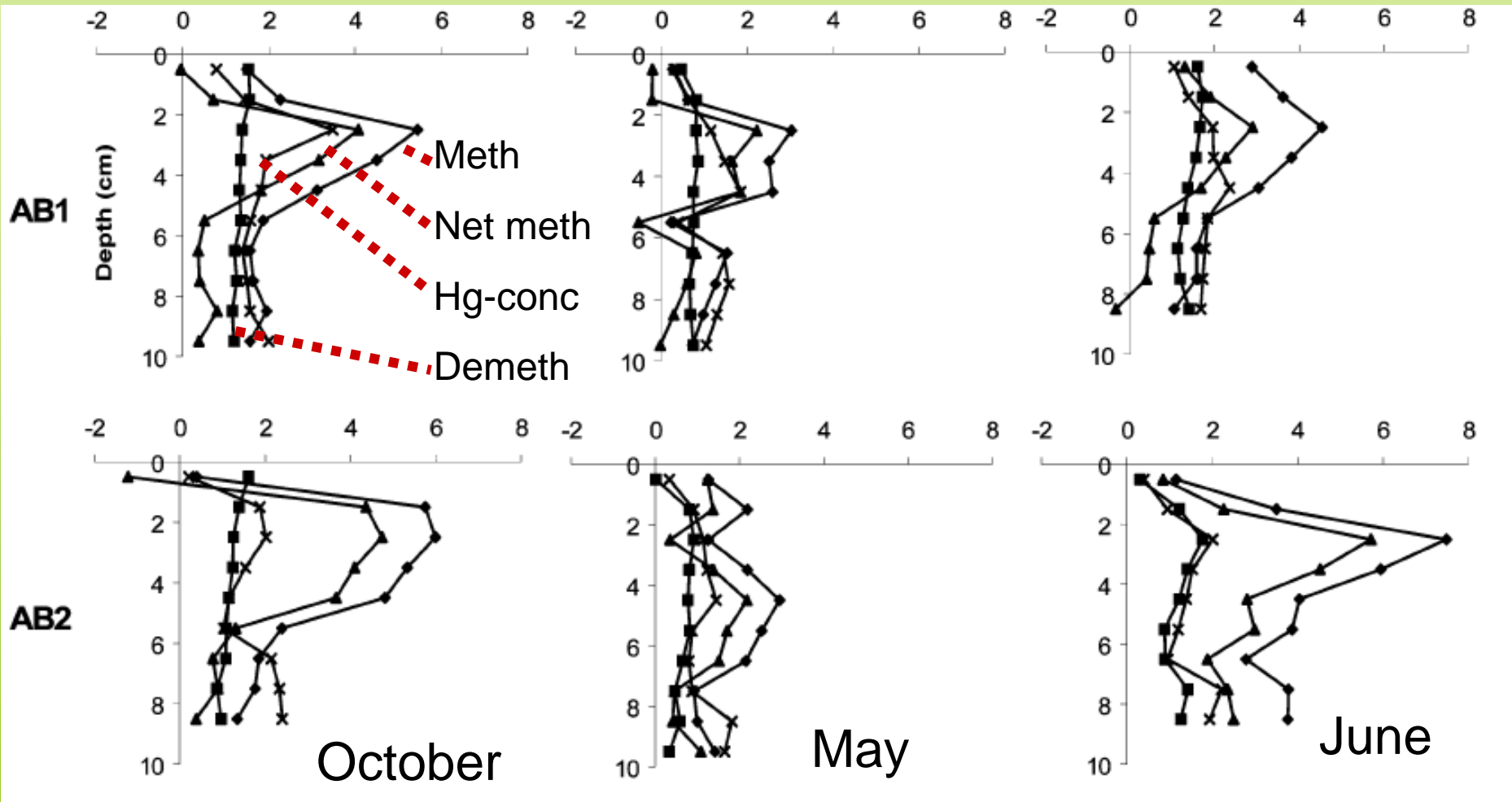
AB1



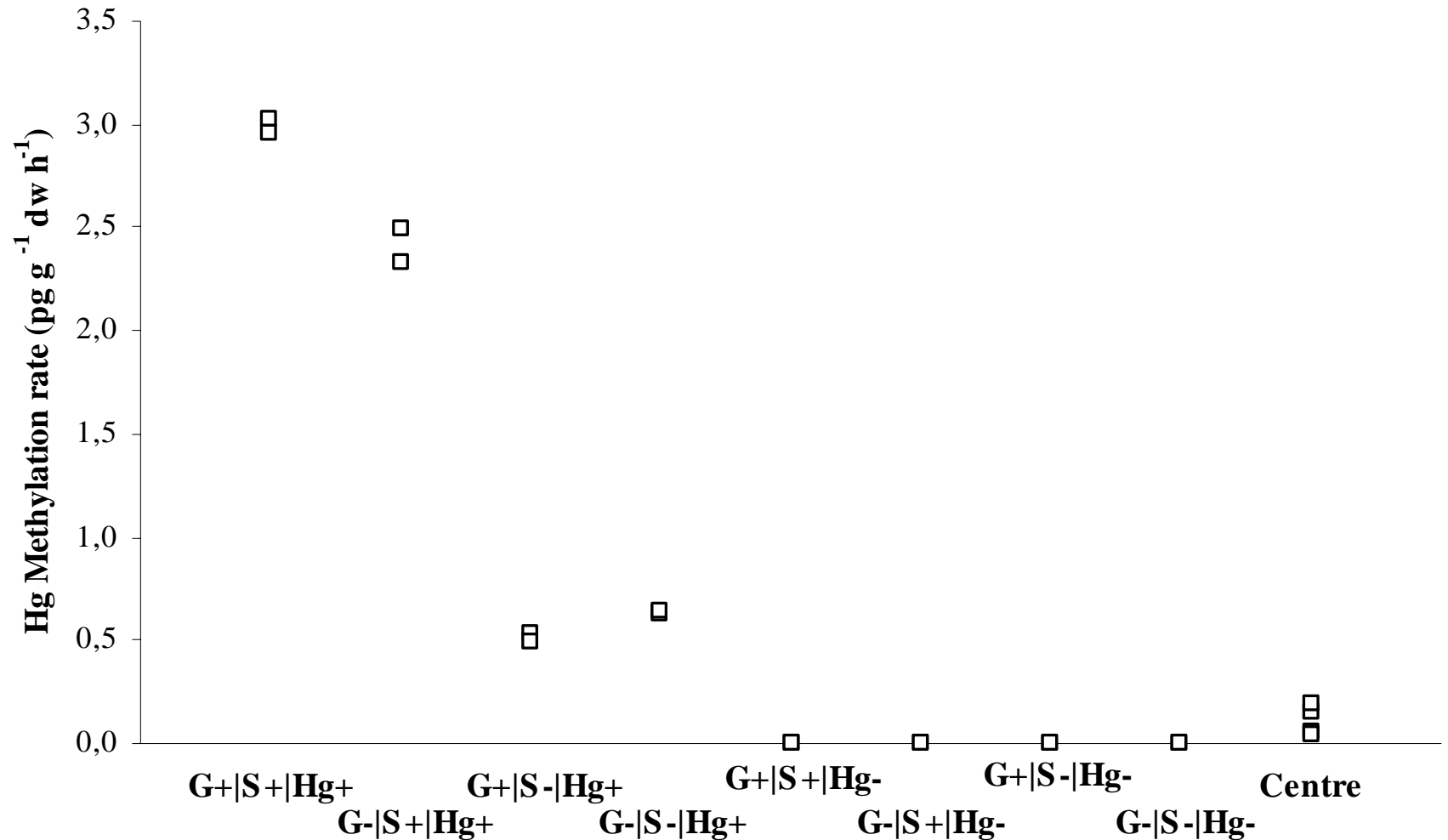
AB2



Depth profiles of methylation, demethylation, net methylation and MeHg-concentrations



The effect of Hg, sulphate and glucose concentrations on the rate of Hg methylation in a boreal forest peat sample.



How do speciation data improve risk assessment?

- The **rate (potential)** of MeHg production is an important link to the bioaccumulation of Hg in aquatic biota
- A relevant assessment needs to consider the main controls on net MeHg production i.e. easily degradable carbon, sulphate and total mercury