

Supplemental Information

Diurnal versus spatial variability of greenhouse gas emissions from an anthropogenic modified German lowland river

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muddy site / soil flux chamber C2

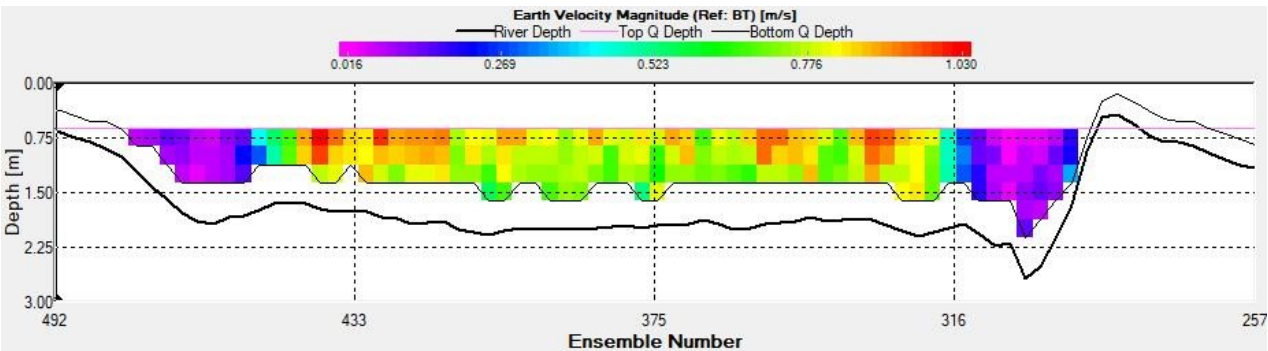


sandy site / soil flux chamber C1



vegetated site / soil flux chamber C3

15 **Figure S1: Photographs of automatic flux chambers in dry habitat types.**



20 **Figure S2: Example of ADCP contour map of flow velocity in a river cross section of the study reach.**

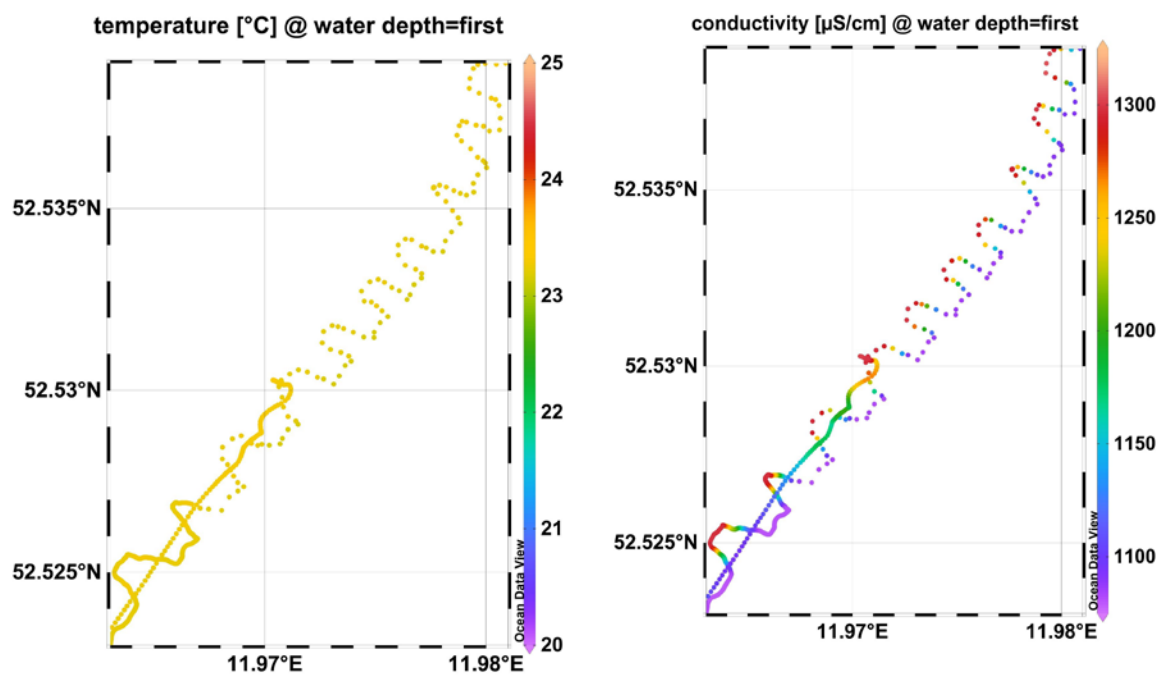


Figure S3: Water temperature and conductivity along the Elbe, on 19.8.2022 in the same area as shown in Figure 1c.

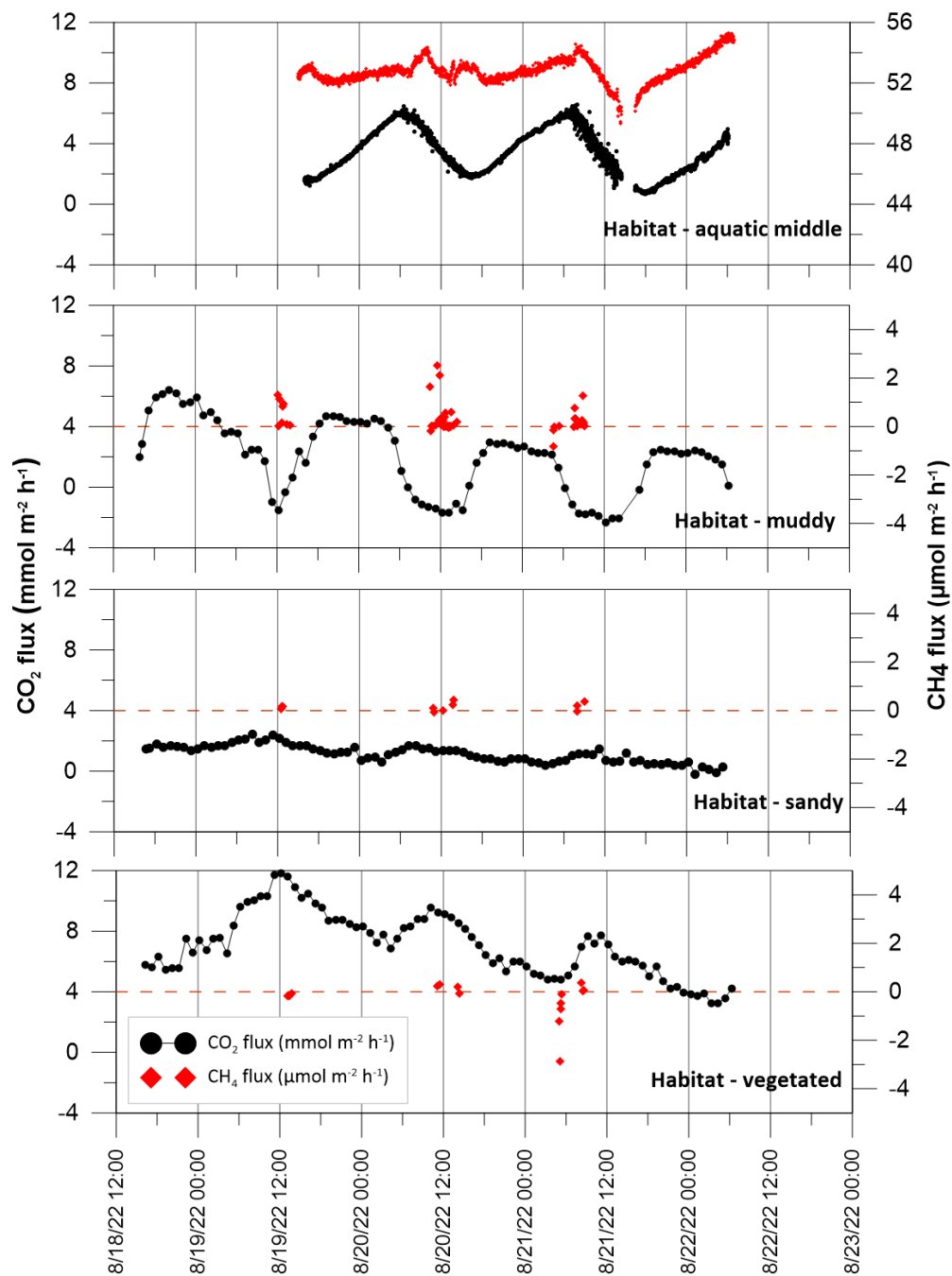


Figure S4: Time series of CO₂ flux (black) and CH₄ flux (red) at different sites: (a) aquatic side (b) dry sand (c) dry mud (d) dry vegetated. Aquatic fluxes calculated from concentration data, dry fluxes directly measured with chambers. Note different scale for aquatic data. All data are shown.

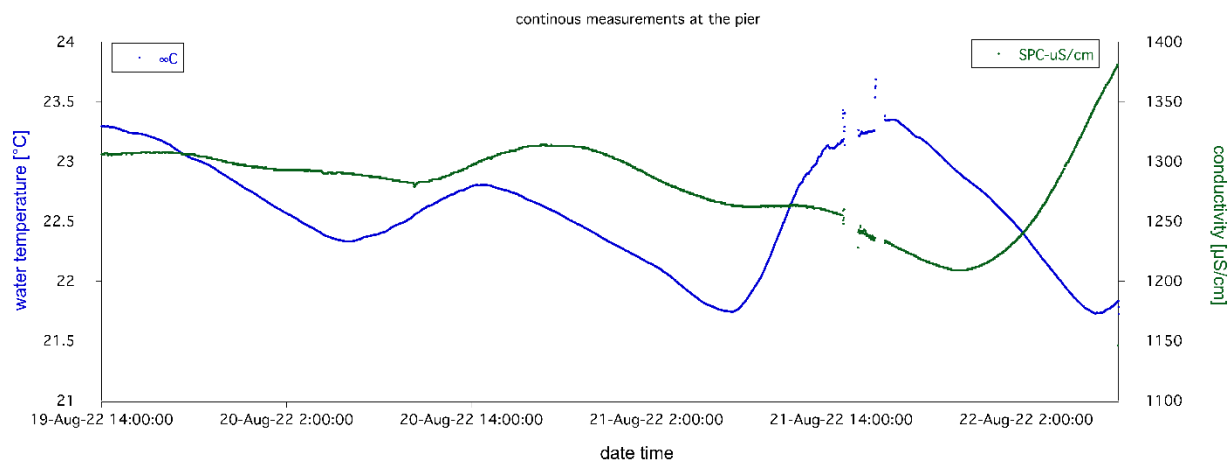


Figure S5: Time series of water temperature (blue) and electrical conductivity (green) measured in the moonpool of RV Albis.

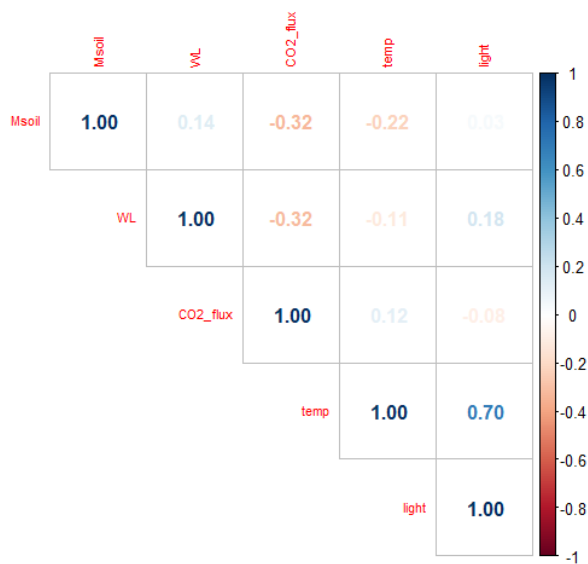
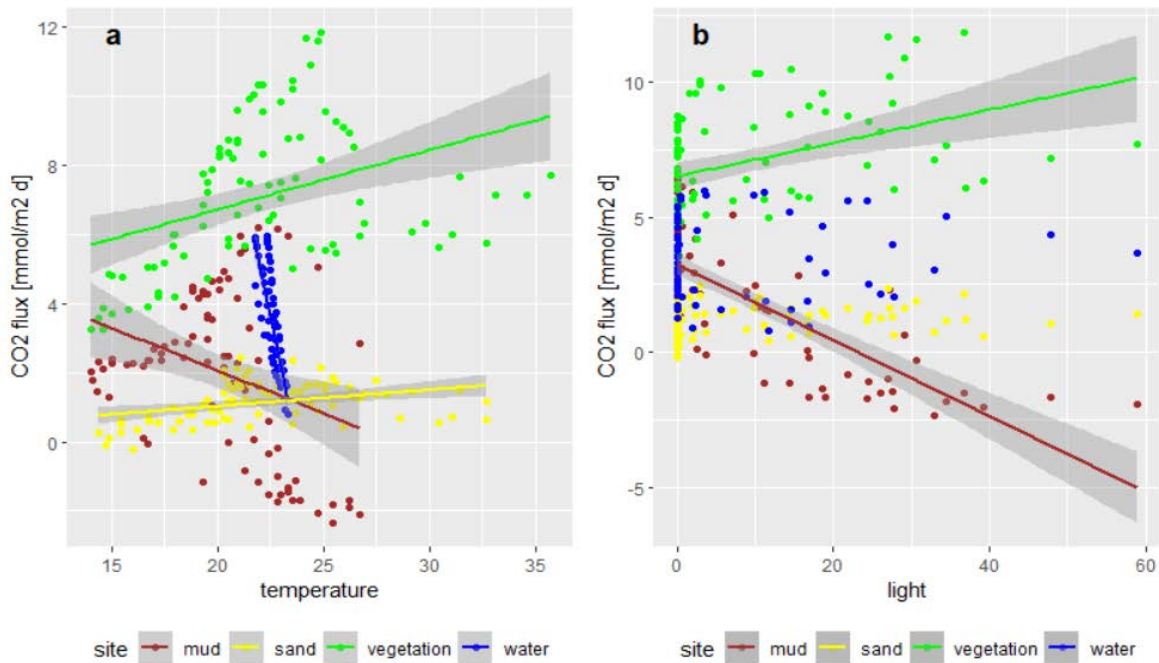


Fig. S6: Correlation matrix including CO₂ flux and its potential regulators.



40 **Figure S7: Linear correlation of CO₂ fluxes with temperature, (a) and light $R_{\text{mud}}=-0.77$, $R_{\text{Sand}}=0.23$, $R_{\text{veg}}=0.38$, $R_{\text{Water}}=0.02$ (b). Lines show linear fit if significant ($p < 0.05$), shaded areas are confidence intervals.**

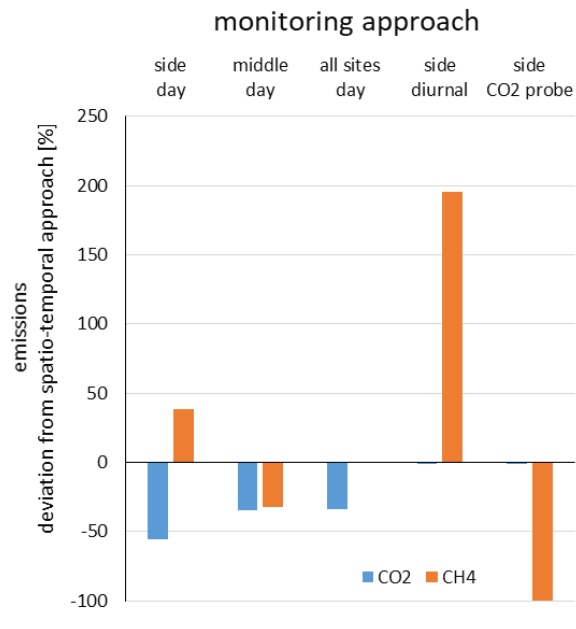


Figure S8: Deviation of total CO₂ (blue) and CH₄ (red) emissions obtained by different monitoring approaches from perfect approach (both spatial and diurnal variability considered).