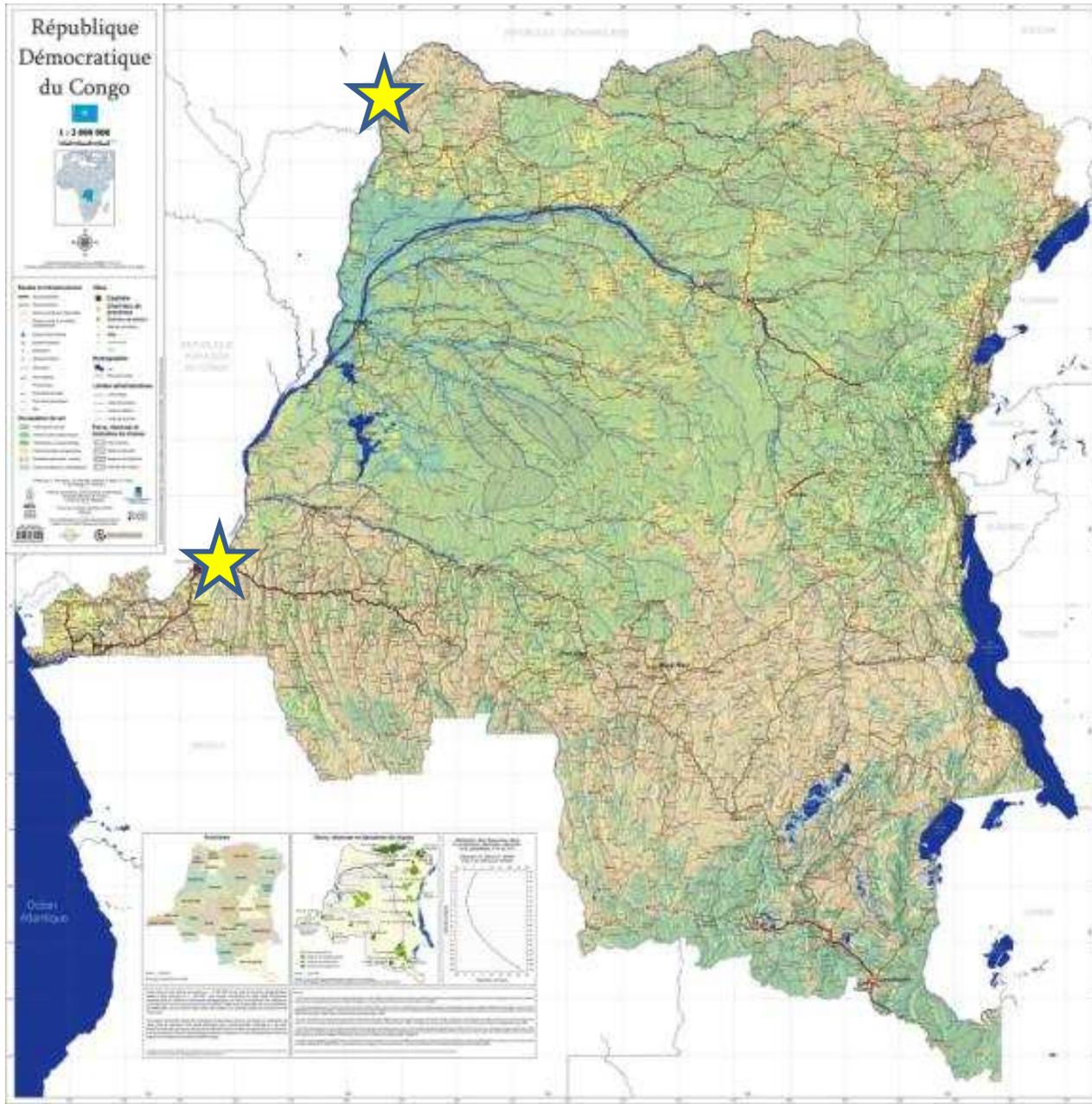


First assessment of the biogeochemistry of the Congo River and its tributaries

Darchambeau F., Borges A.V., Wabakanghanzi J.N., Massicotte P., Servais P.,
Leporcq B., Descy J.-P., Bouillon S.

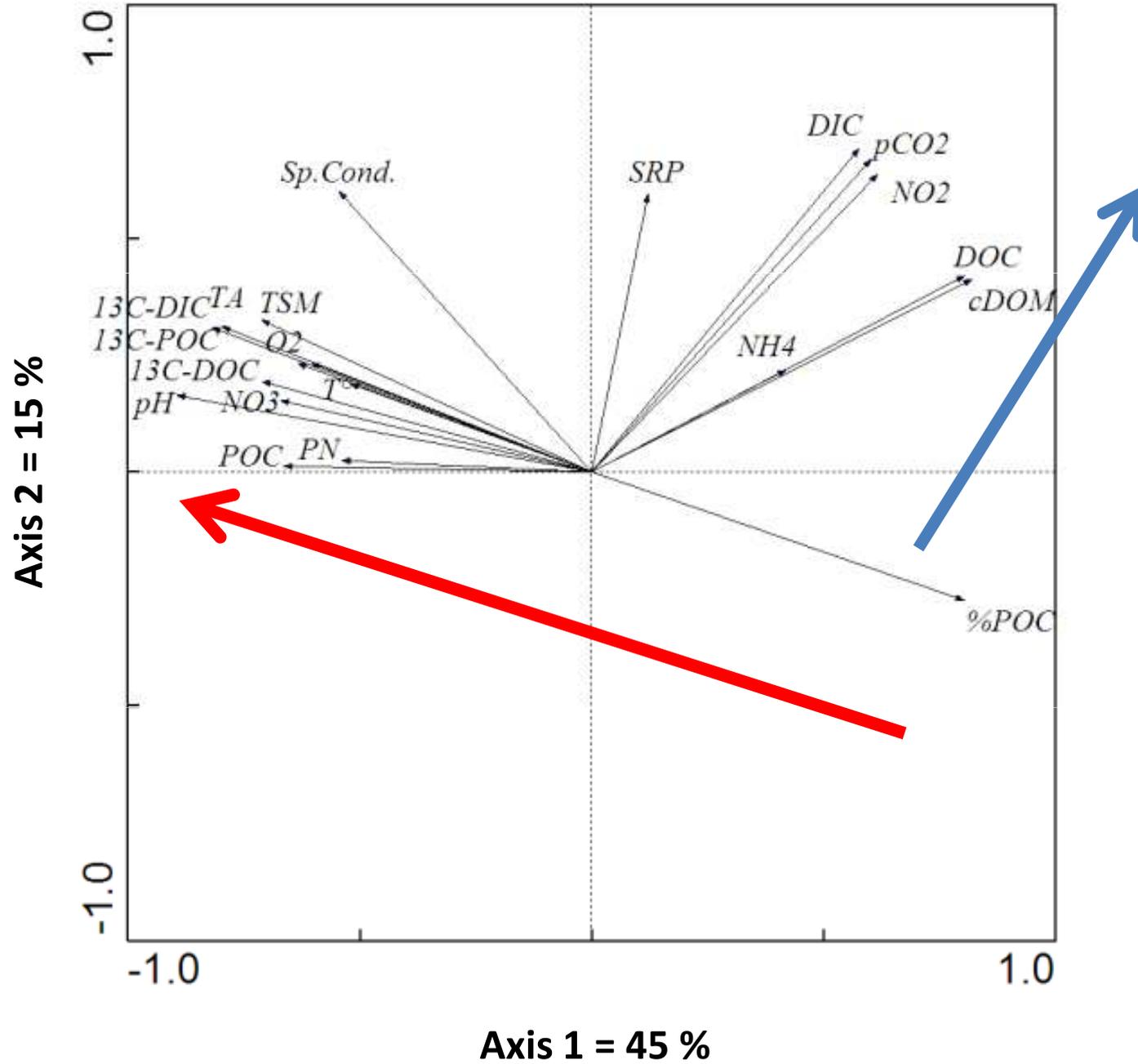


First assessment of the biogeochemistry of the Congo River and its tributaries

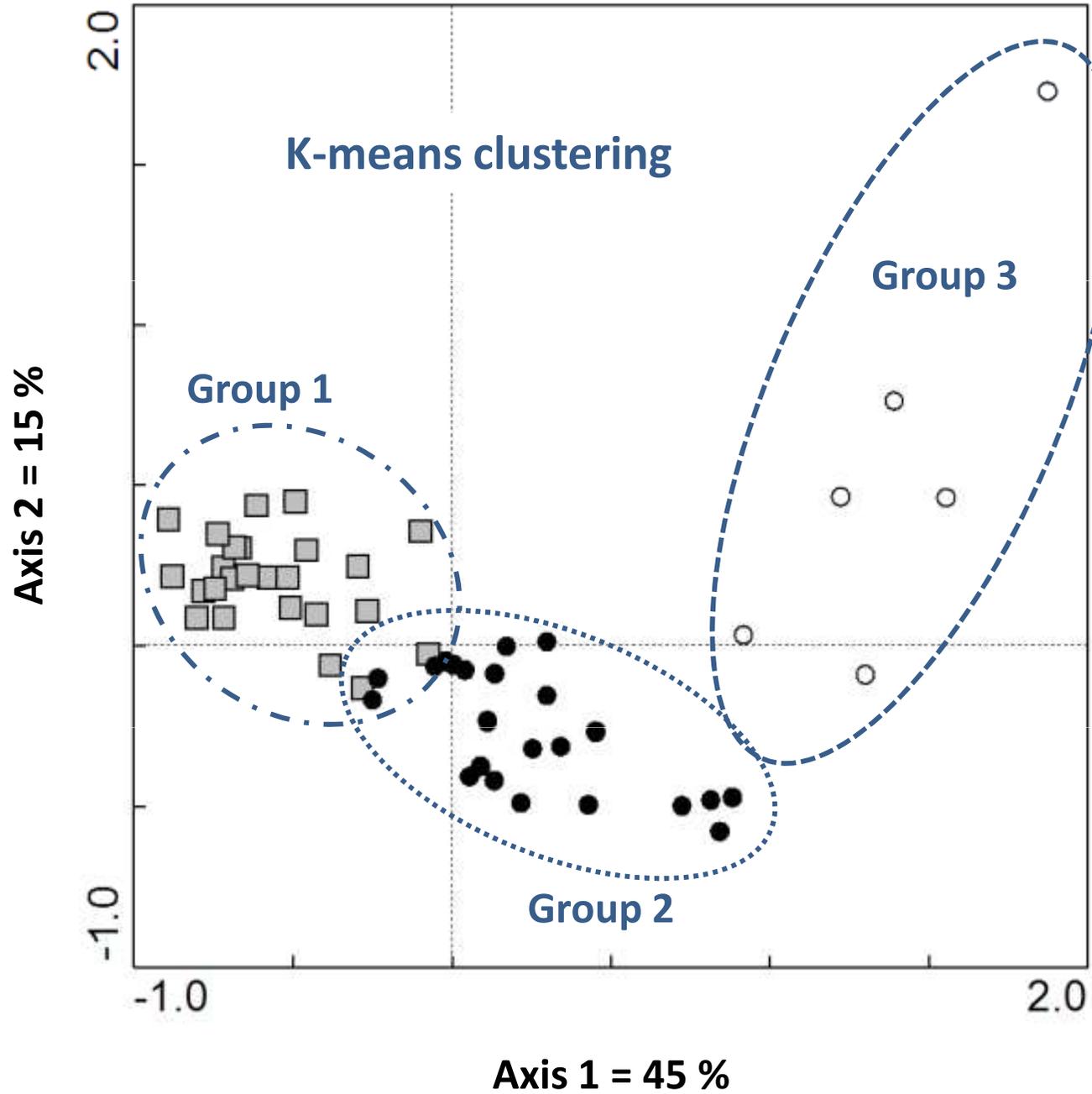


- Total length = ~4400 km
- Drainage basin = $3.7 \cdot 10^6 \text{ km}^2$ (second only to the Amazon river basin)
- Water discharge = 1st river for Africa (World's second)
- World's second largest supplier of organic carbon to the oceans

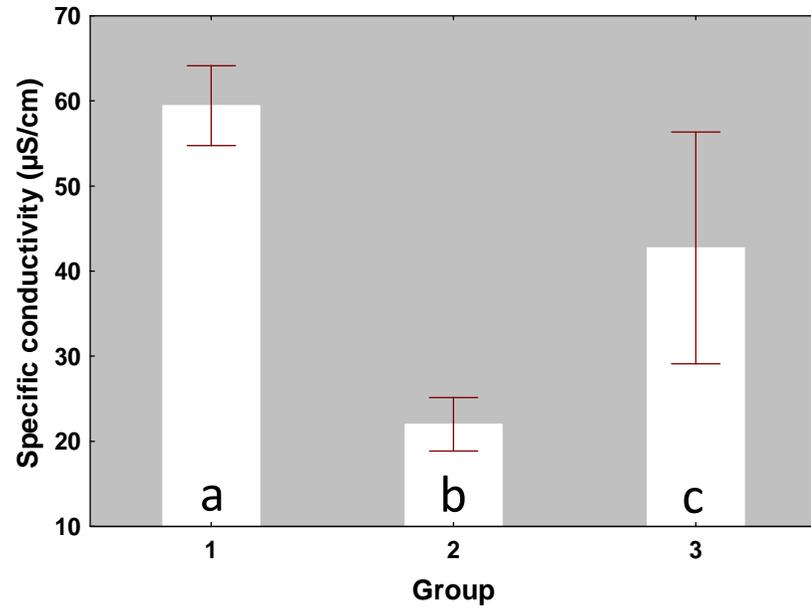
Principal component analysis



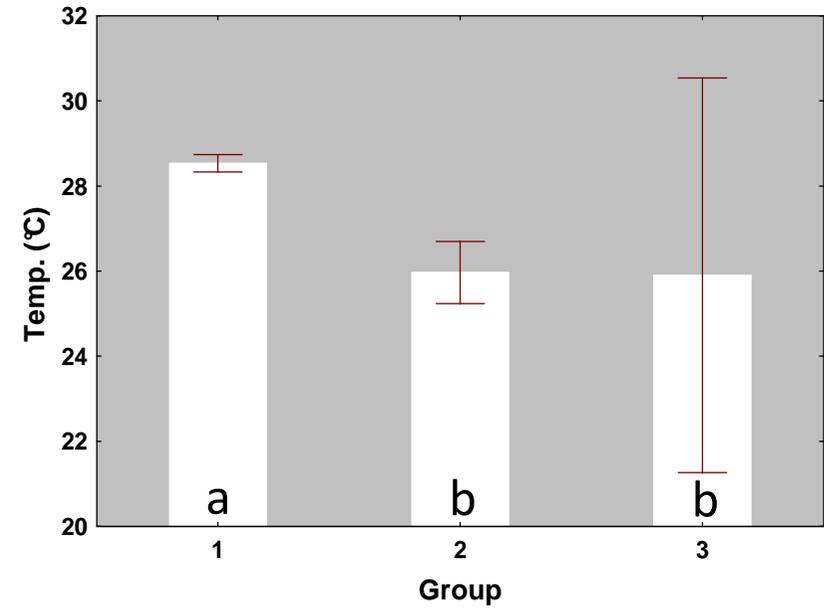
Principal component analysis



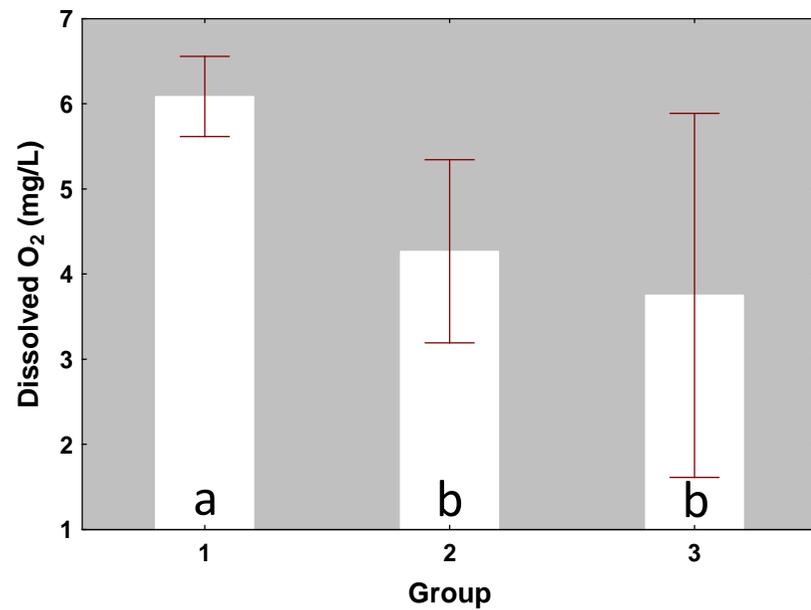
Conductivity



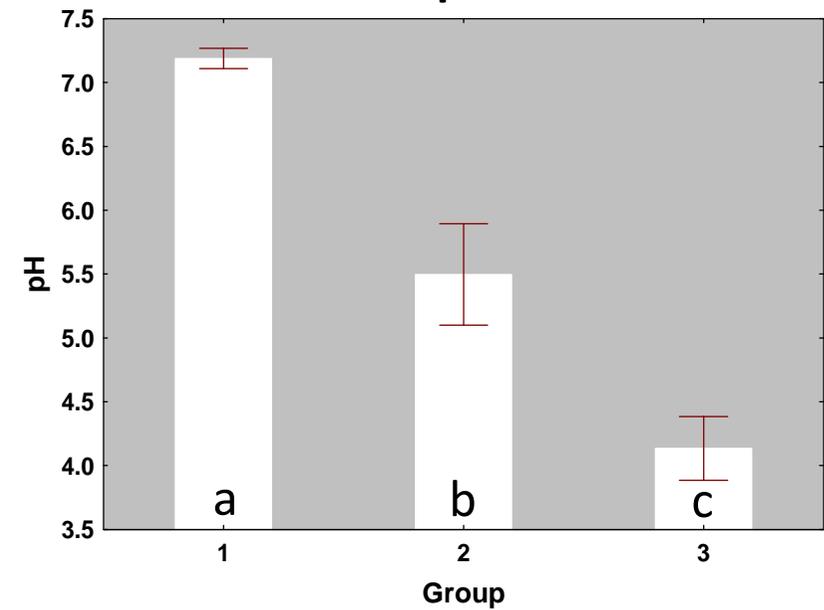
Temperature



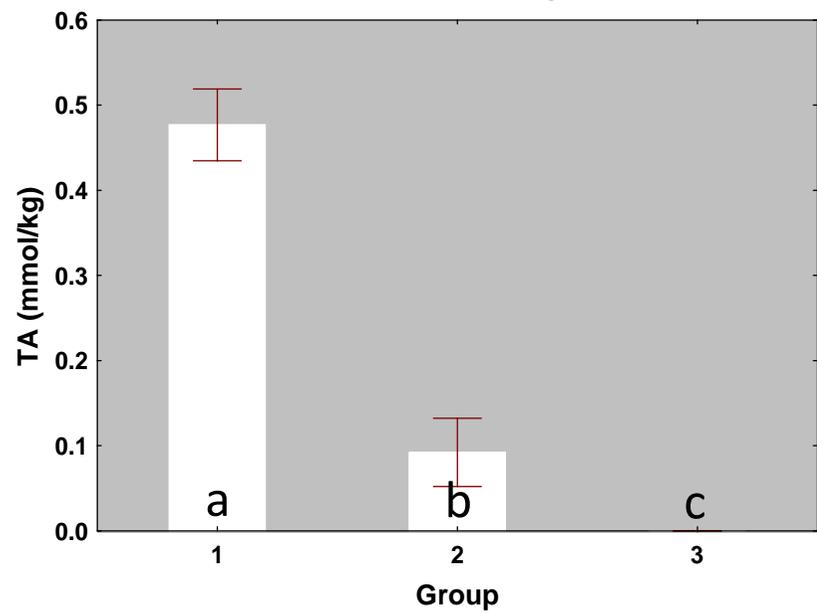
Dissolved oxygen



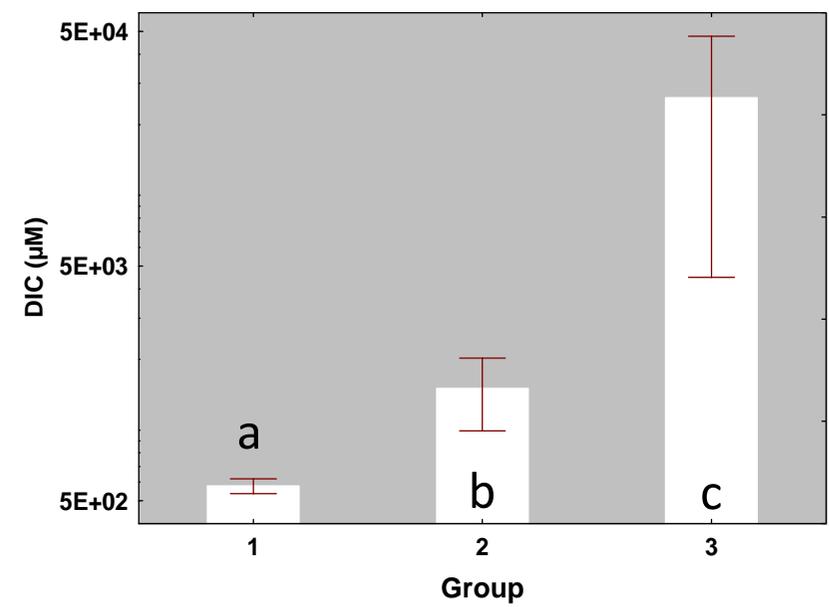
pH



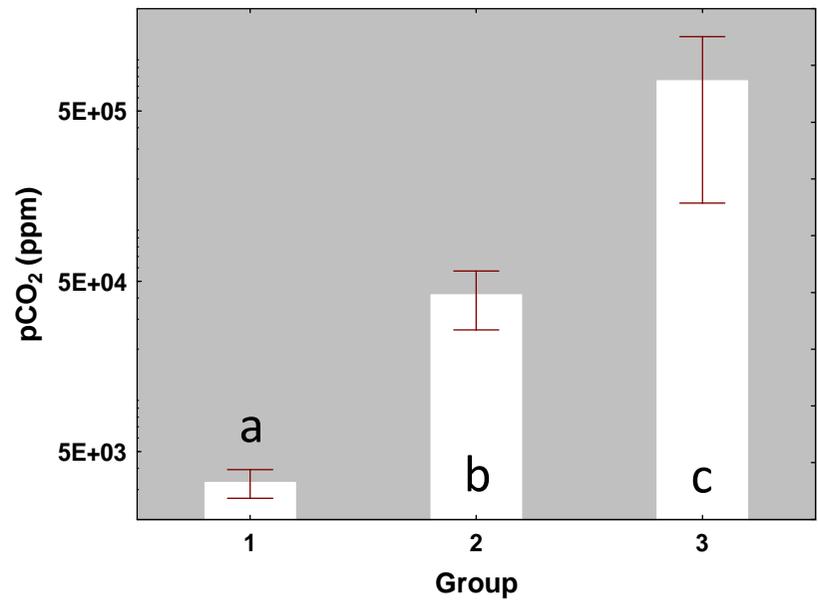
Alkalinity



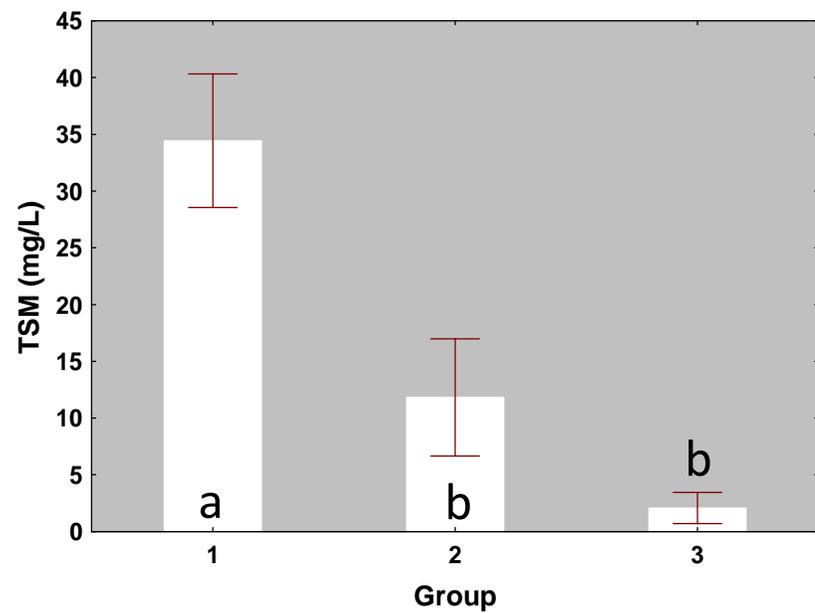
DIC



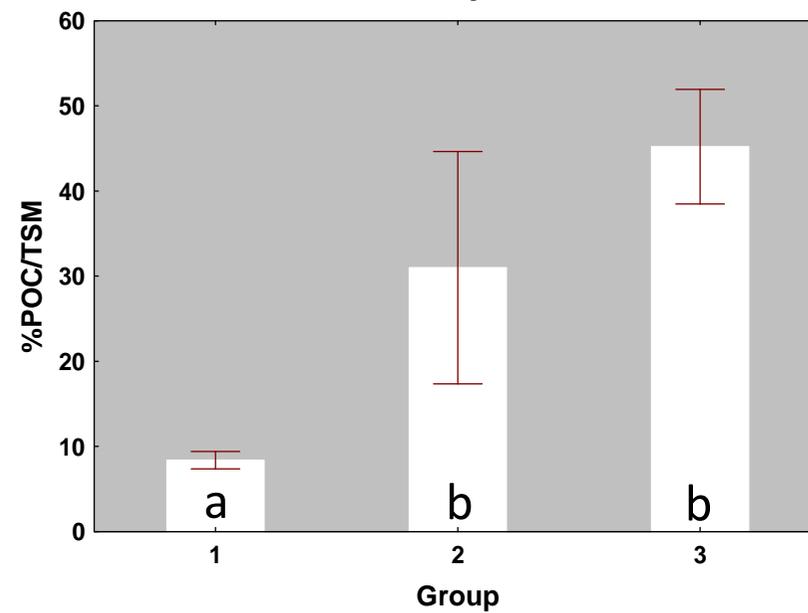
pCO₂



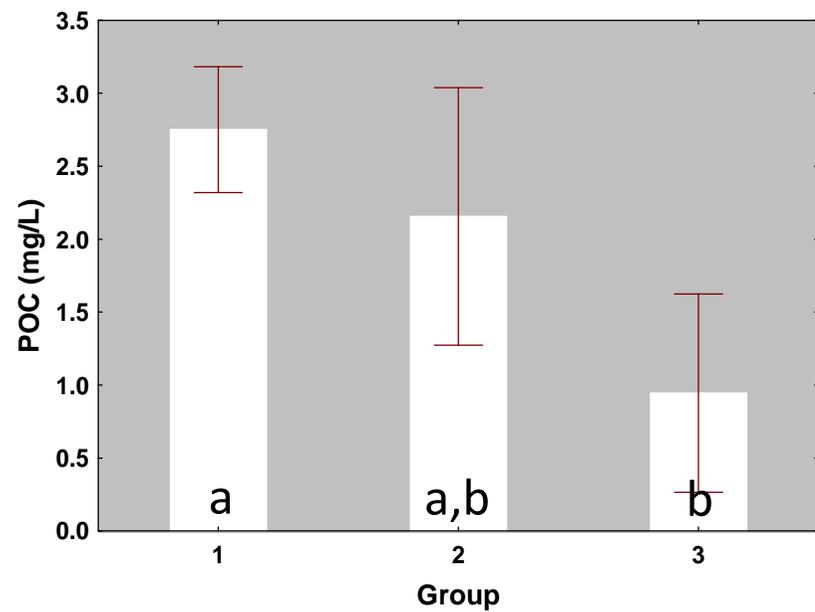
TSM



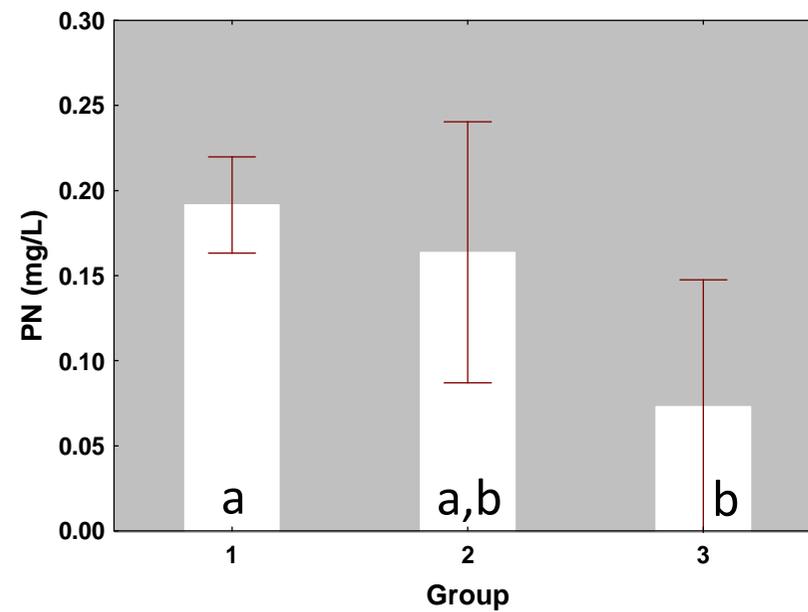
%POC/TSM



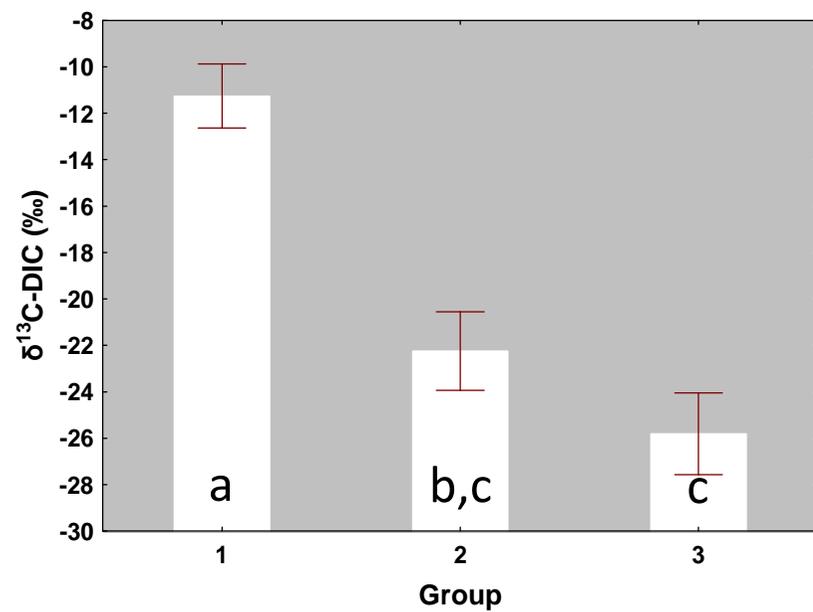
POC



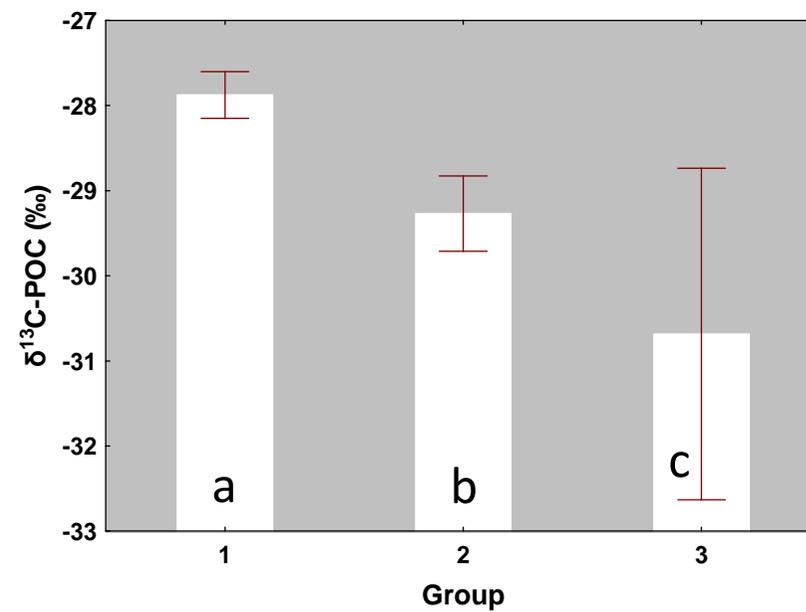
PN



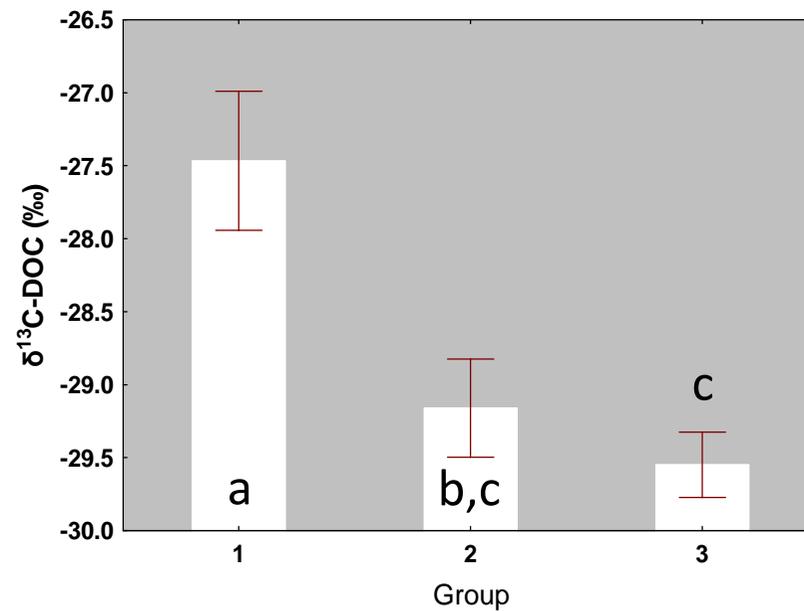
$\delta^{13}\text{C-DIC}$



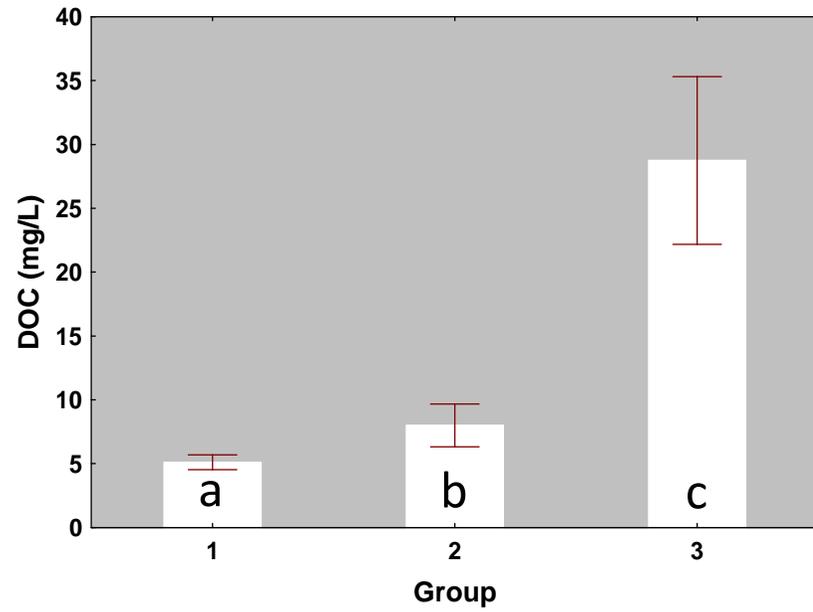
$\delta^{13}\text{C-POC}$



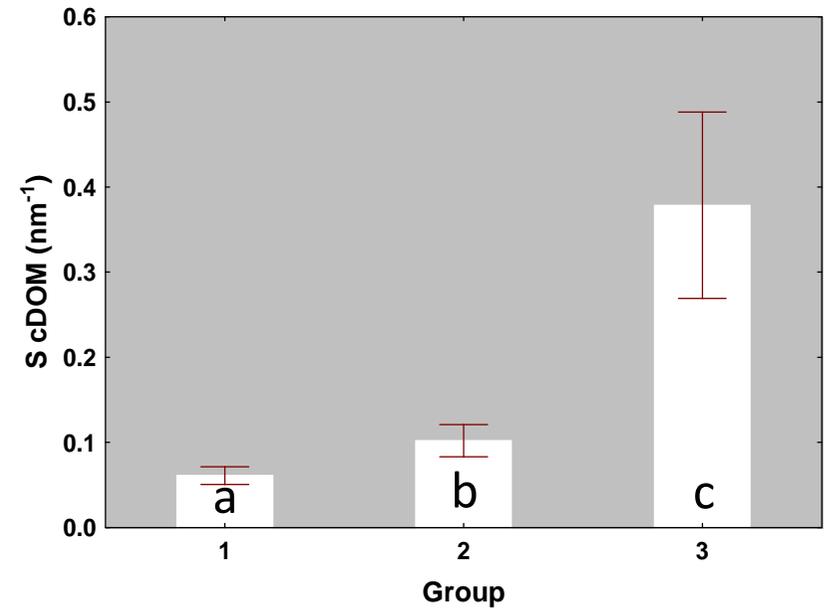
$\delta^{13}\text{C-DOC}$



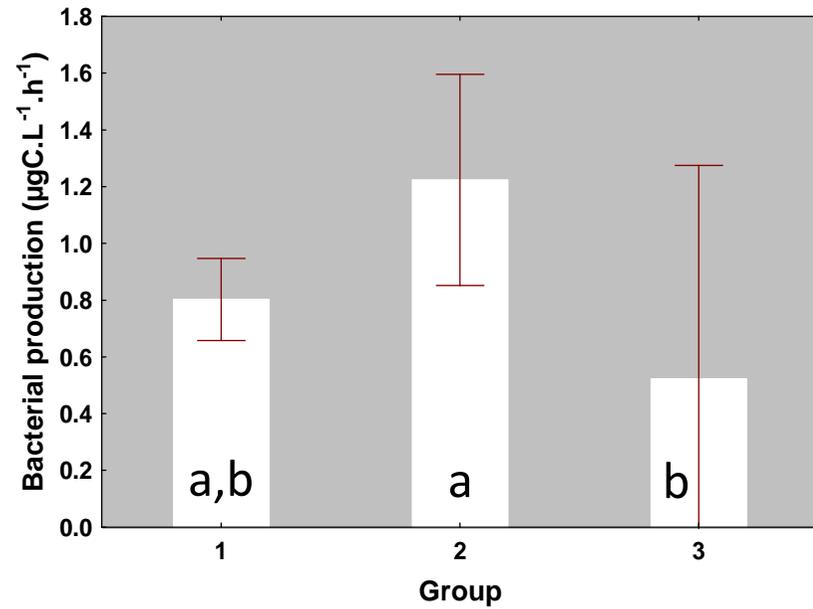
DOC



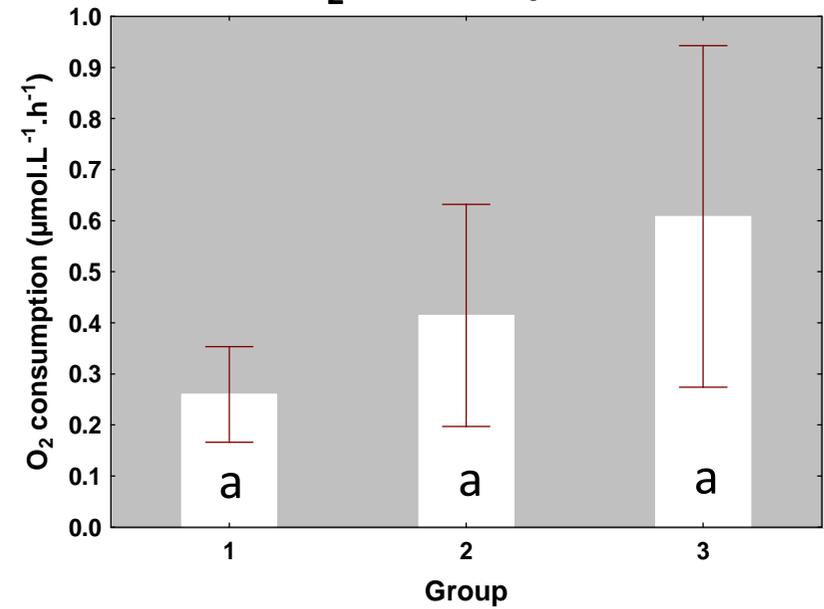
S cDOM

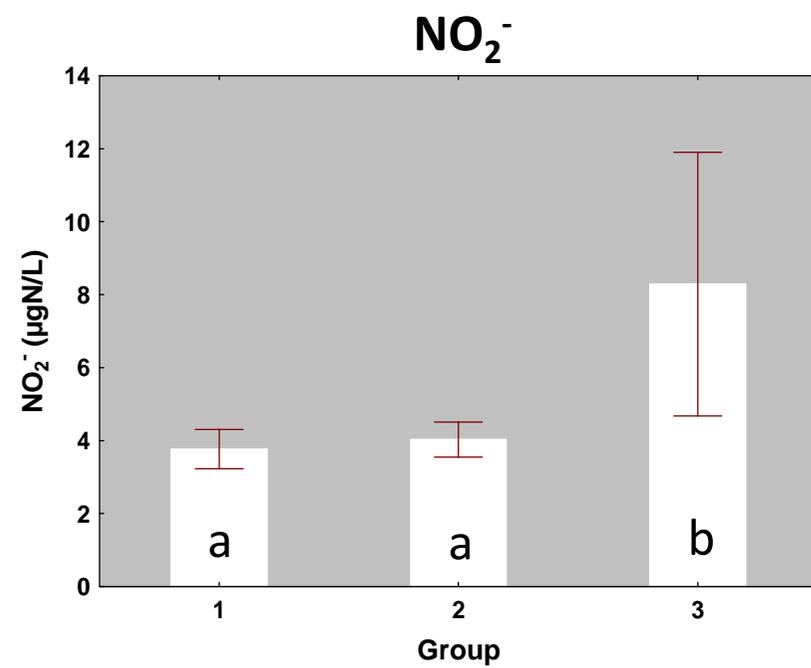
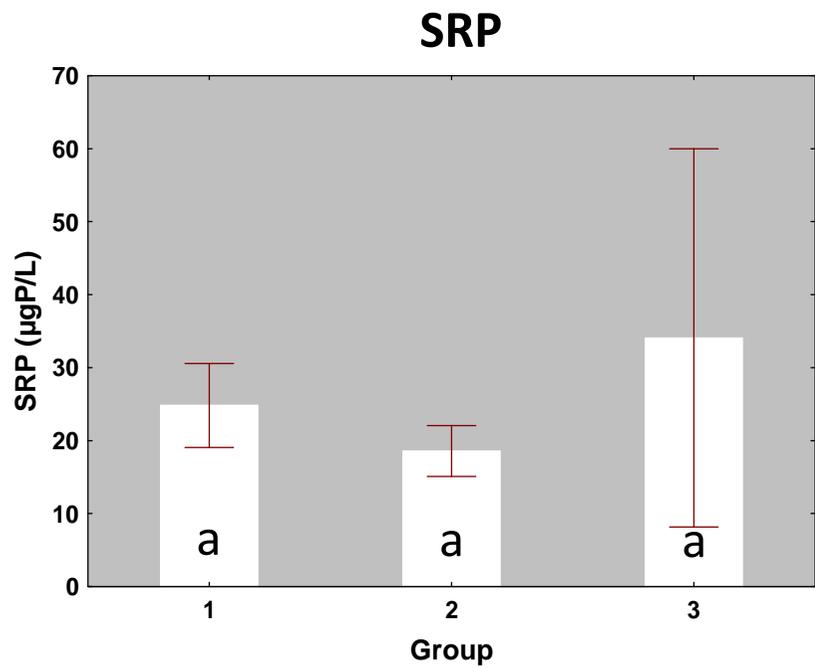
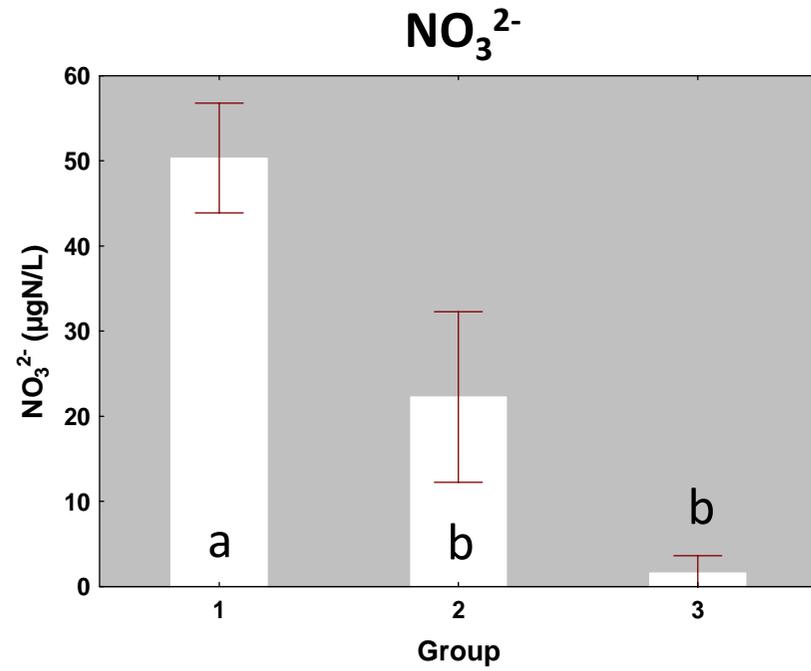
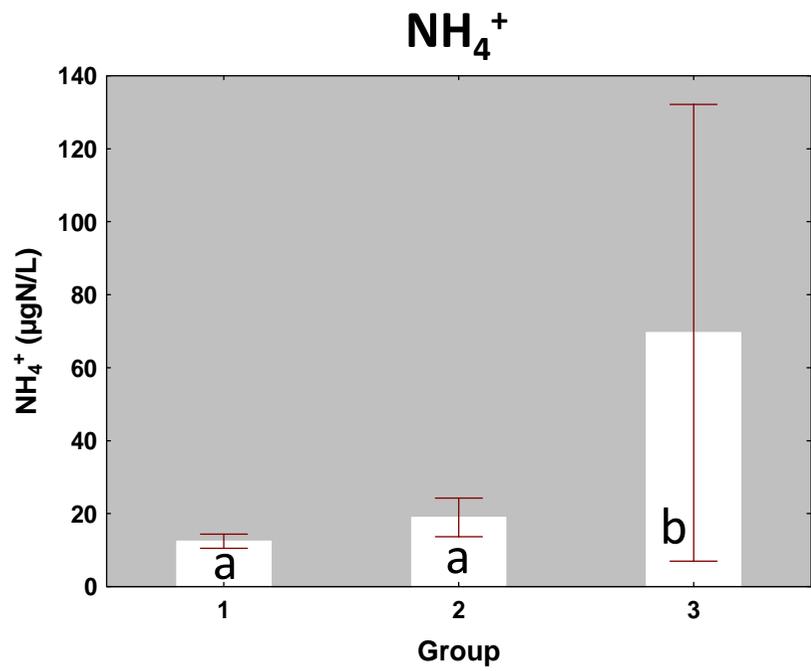


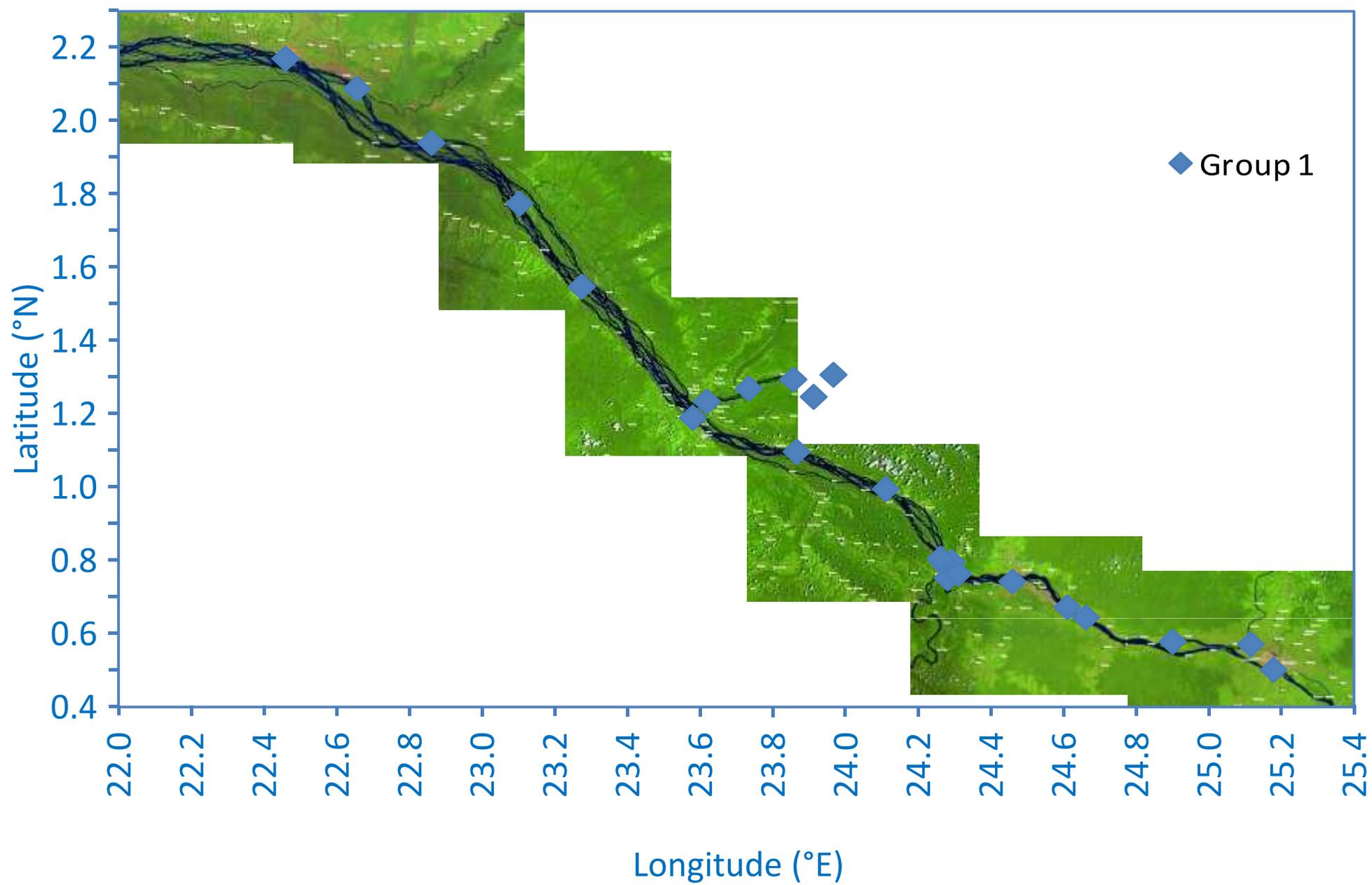
Bacterial production

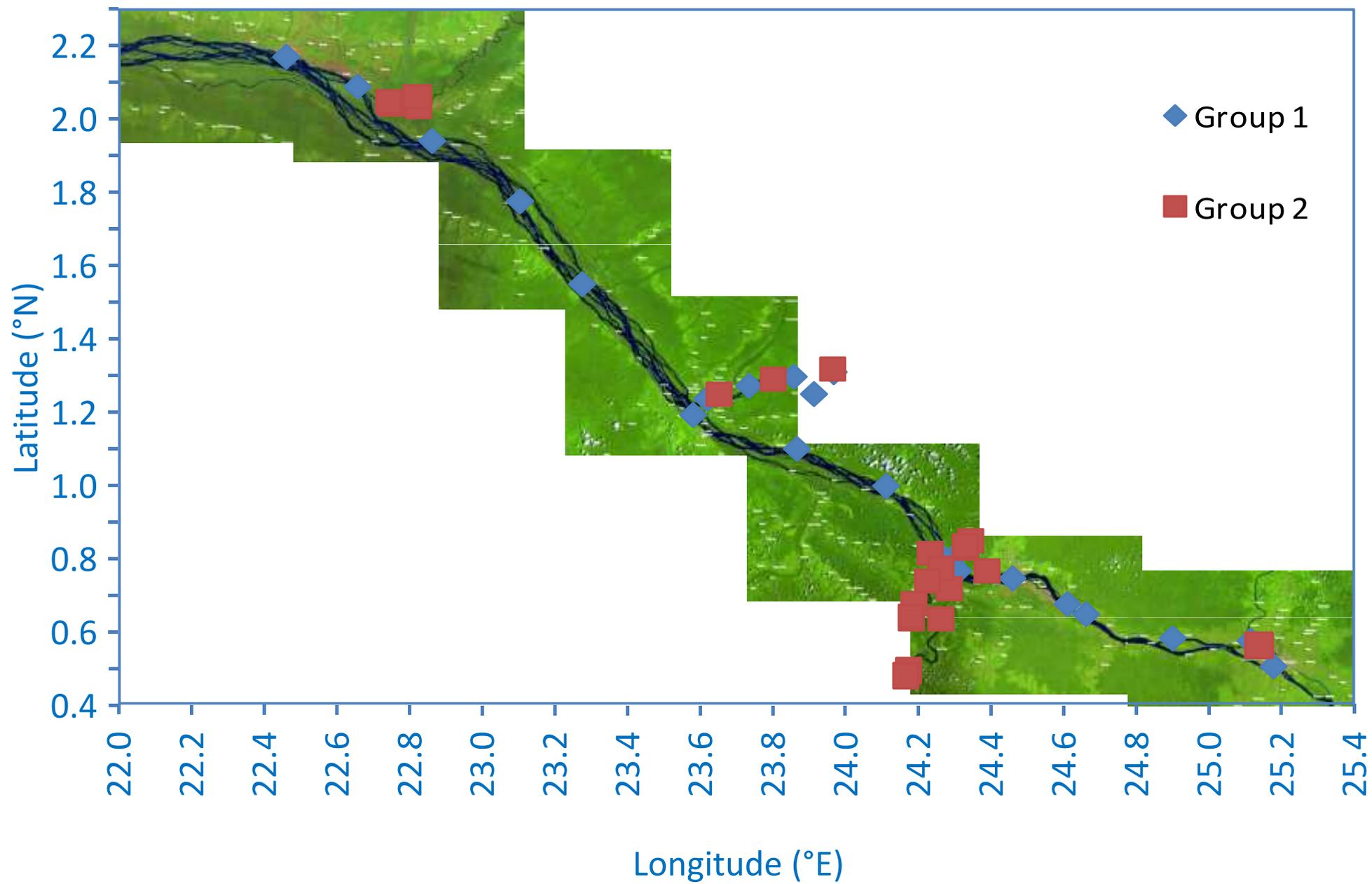


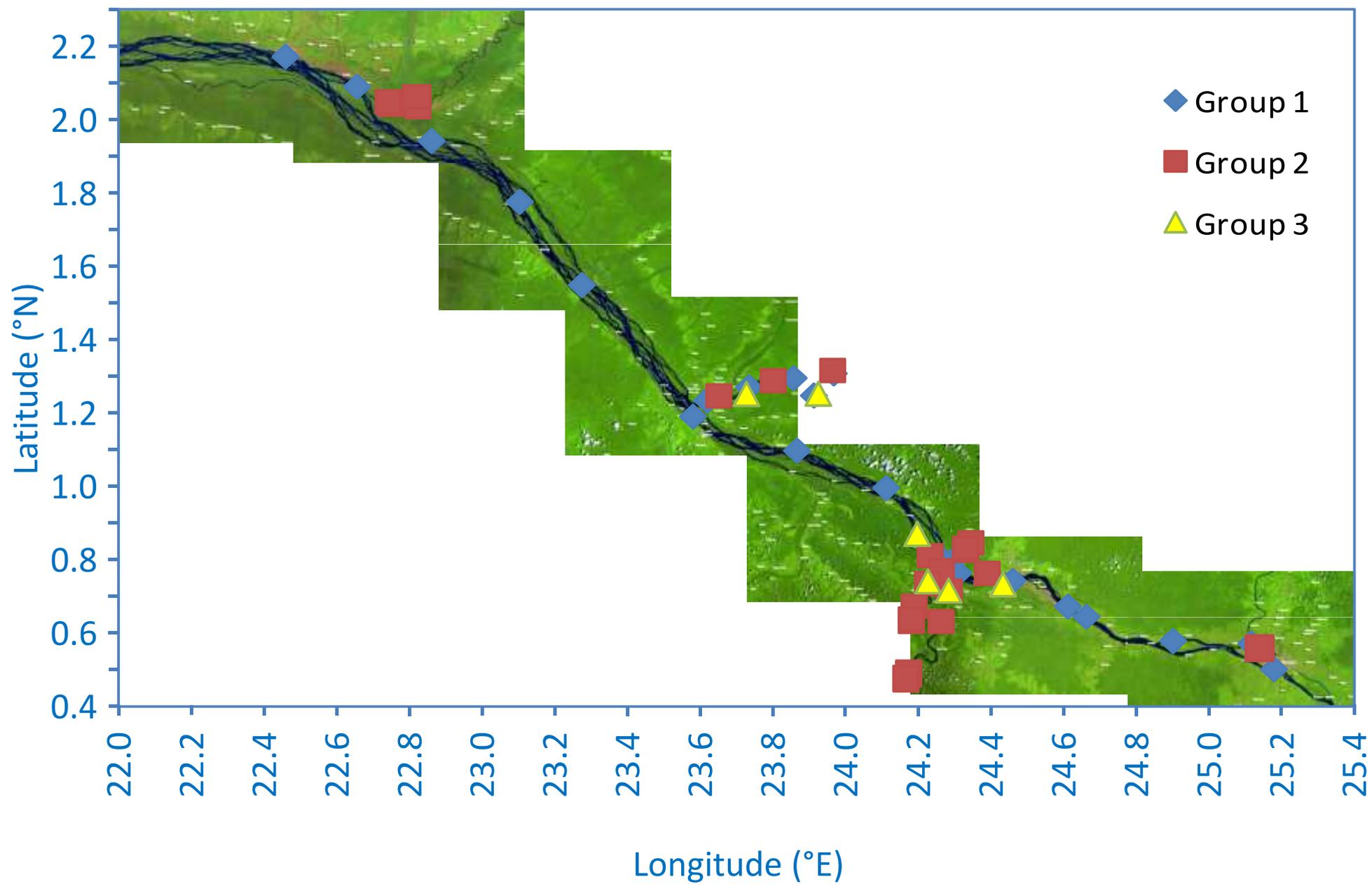
O₂ consumption





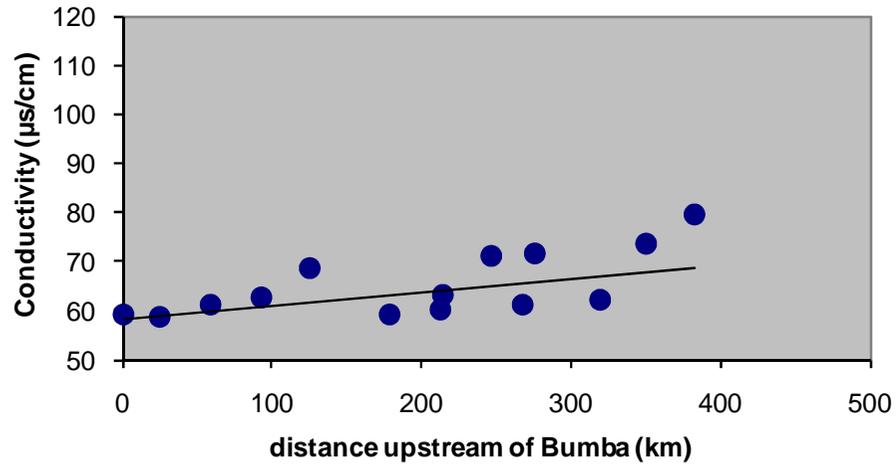




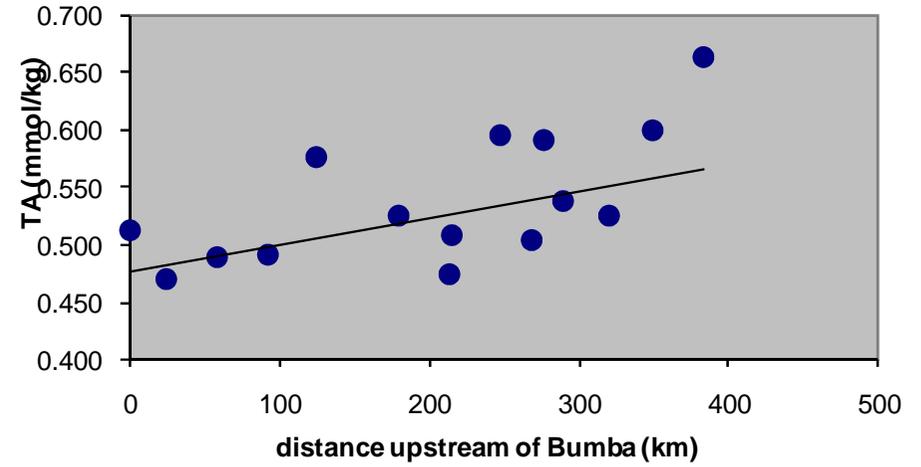


Congo River – main stem

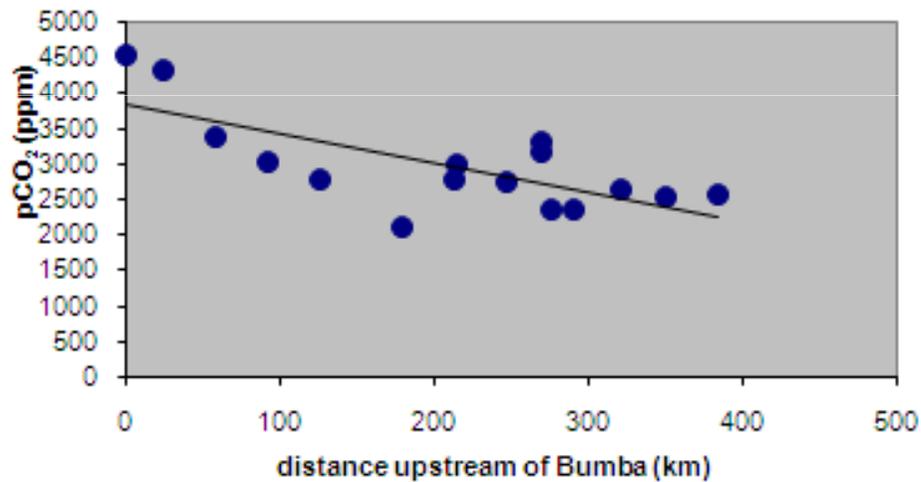
Conductivity



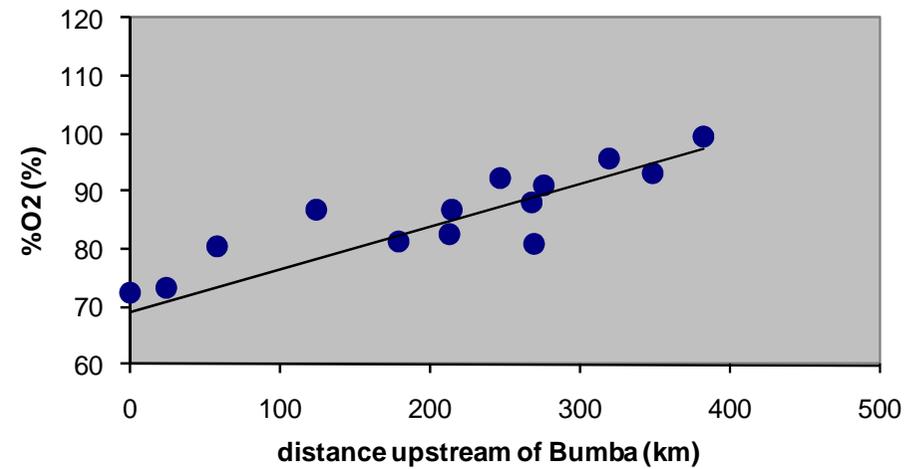
Alkalinity



pCO₂



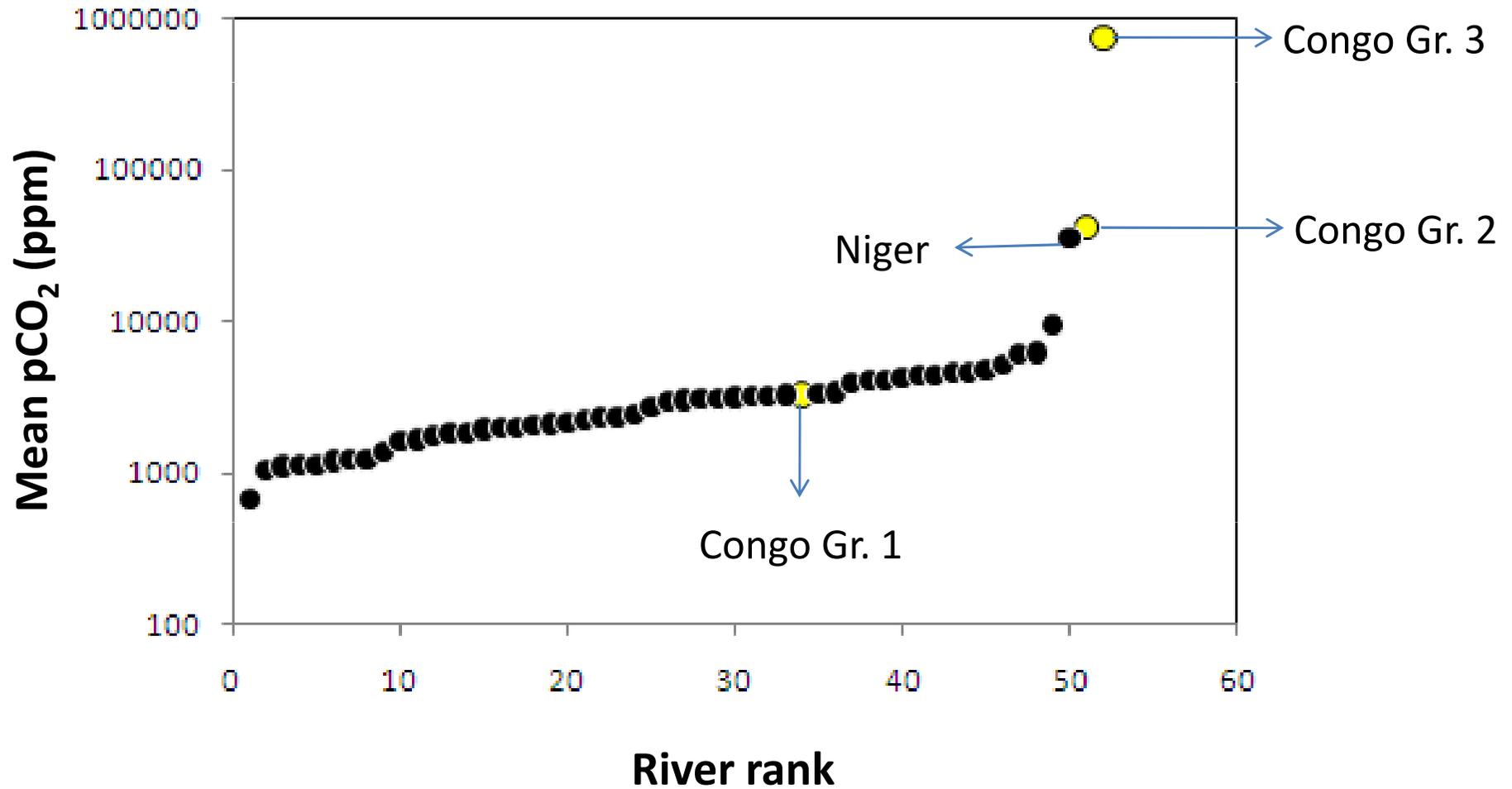
Dissolved O₂



	Group 1 = Main stem + Aruwimi	Group 2 = Lomami + Itimbiri + small rivers	Group 3 = small rivers (black waters)
Conductivity	± 80	± 20	± 50
pH	± 7.0	± 5.5	± 4.0
Alkalinity	Moderate	Low	No
pCO ₂	Slightly oversaturated	Highly oversaturated	Very highly oversaturated
TSM	High	Moderate	No suspended matter
%POC/TSM	Low	Moderate	Very high
NO ₃ ²⁻ vs NH ₄ ⁺	NO ₃ ²⁻ > NH ₄ ⁺	NO ₃ ²⁻ = NH ₄ ⁺	NO ₃ ²⁻ < NH ₄ ⁺
DOC and cDOM	Low	Low	Very high
O ₂ consumption	—————→		
δ ¹³ C-DIC	- 12	- 22	- 25
δ ¹³ C-DIC	- 28	- 29	-31
δ ¹³ C-DIC	- 27.5	-29.0	-29.5

pCO₂ in Rivers

(based upon pH and TA)



(data review from Cole & Caraco 2001 Mar. Freshw. Res.)

Data still pending:

- Particulate phosphorus and nitrogen
- Major elements
- Pigments (Chl*a* and carotenoids) and primary production
- ^{13}C -PLFA in suspended matter, sediments and soils
- ^{14}C -DOC, ^{14}C -DIC
- Direct pCO_2 , N_2O and CH_4 analyses
- PARAFAC analysis of excitation-emission fluorescence matrices

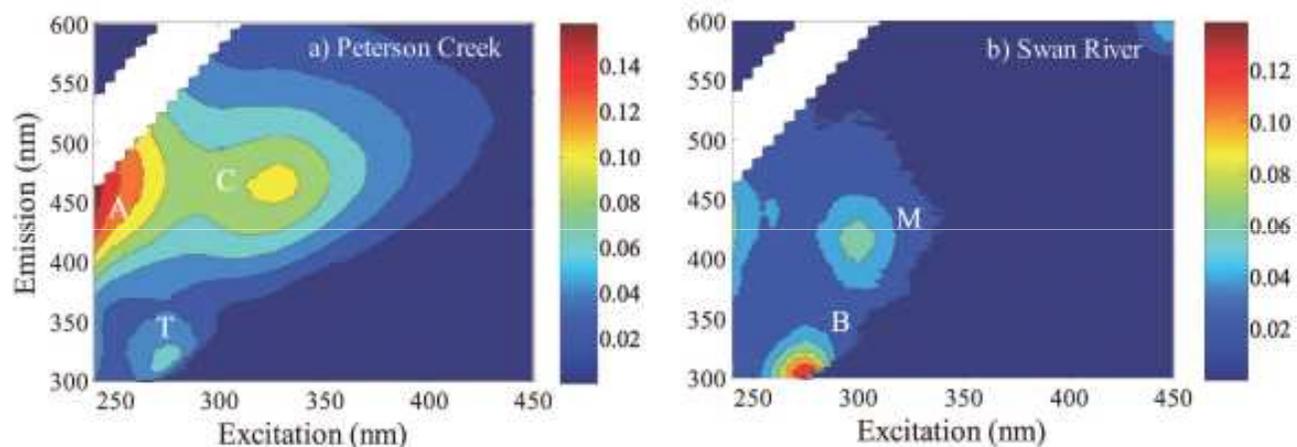


Fig. 1. Example of two riverine EEMs showing the position of the five primary fluorescence peaks in optical space: (a) Peterson Creek, Juneau, Alaska and (b) Swan River, Perth, Australia (Fellman unpubl.). The white area in the upper left corner of each EEM is where excess scatter is removed from the EEM. Fluorescence intensities are in Raman units. From Fellman et al. (2010) L&O

















