



**The Abdus Salam
International Centre for Theoretical Physics**



2066-22

**Workshop and Conference on Biogeochemical Impacts of Climate and
Land-Use Changes on Marine Ecosystems**

2 - 10 November 2009

Recent results from the Mekong River plume study

Voss M., Bombar D., Dippner J., Grosse J., Nhu Hai D.,
Korth F., Ngoc Lam N. and Liskow I.

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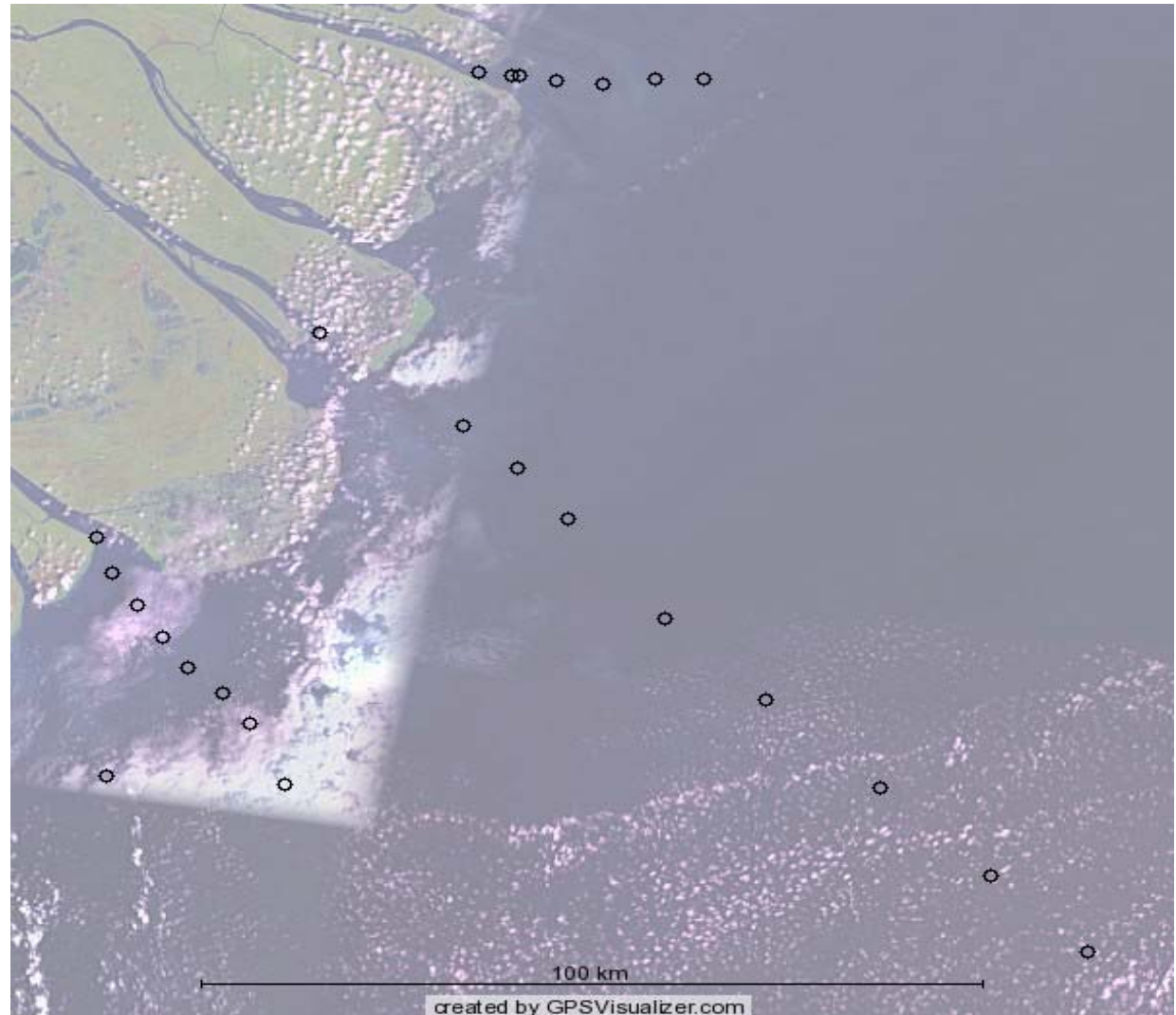
Recent results from the Mekong River plume study

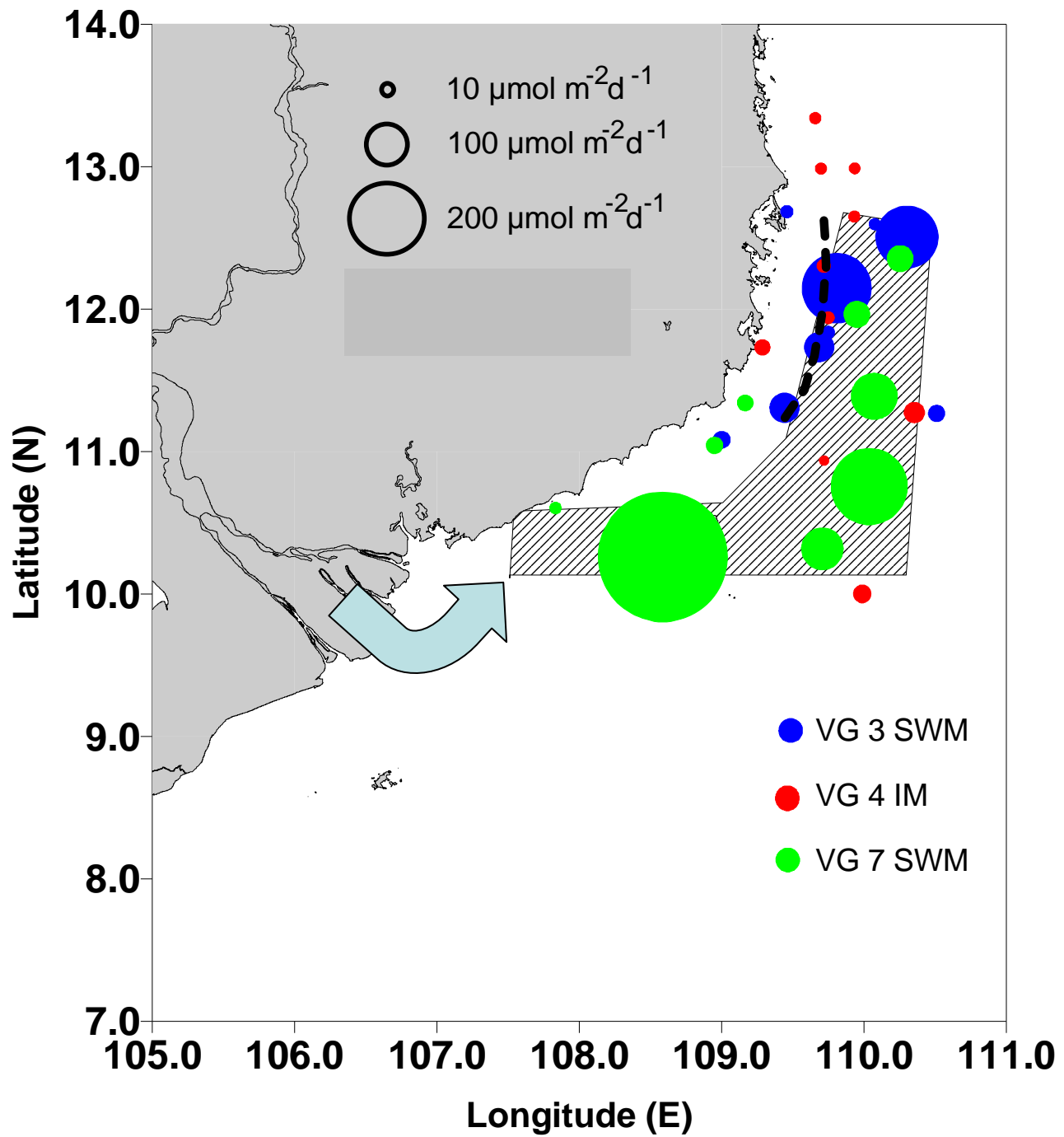
Maren Voss, Deniz Bombar, Joachim
Dippner, Julia Grosse, Doan Nhu Hai,
Frederike Korth, Nguyen Ngoc Lam,
Iris Liskow

Mekong estuary



True Colour Satellite
image (NASA)

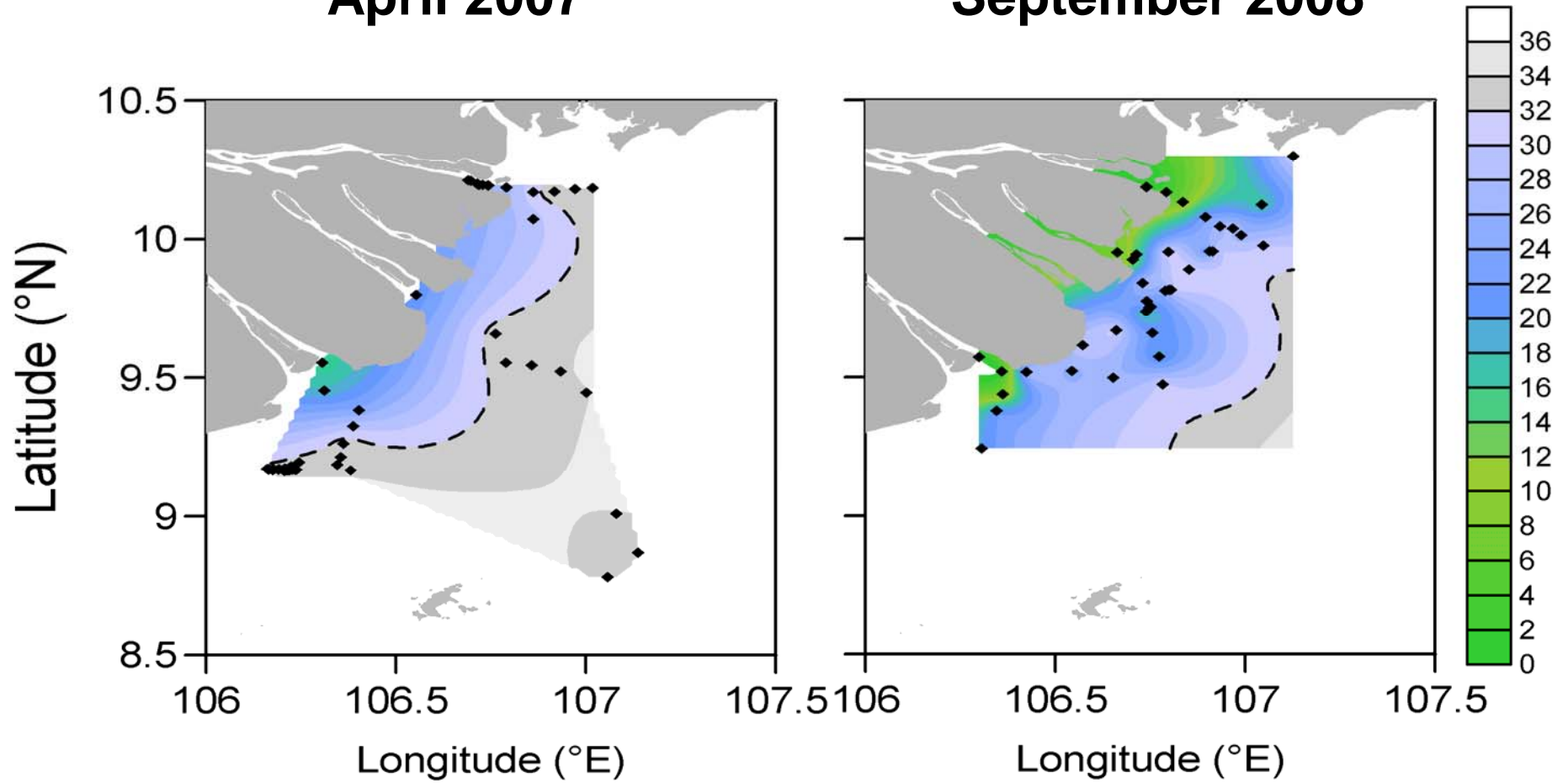




Salinity

April 2007

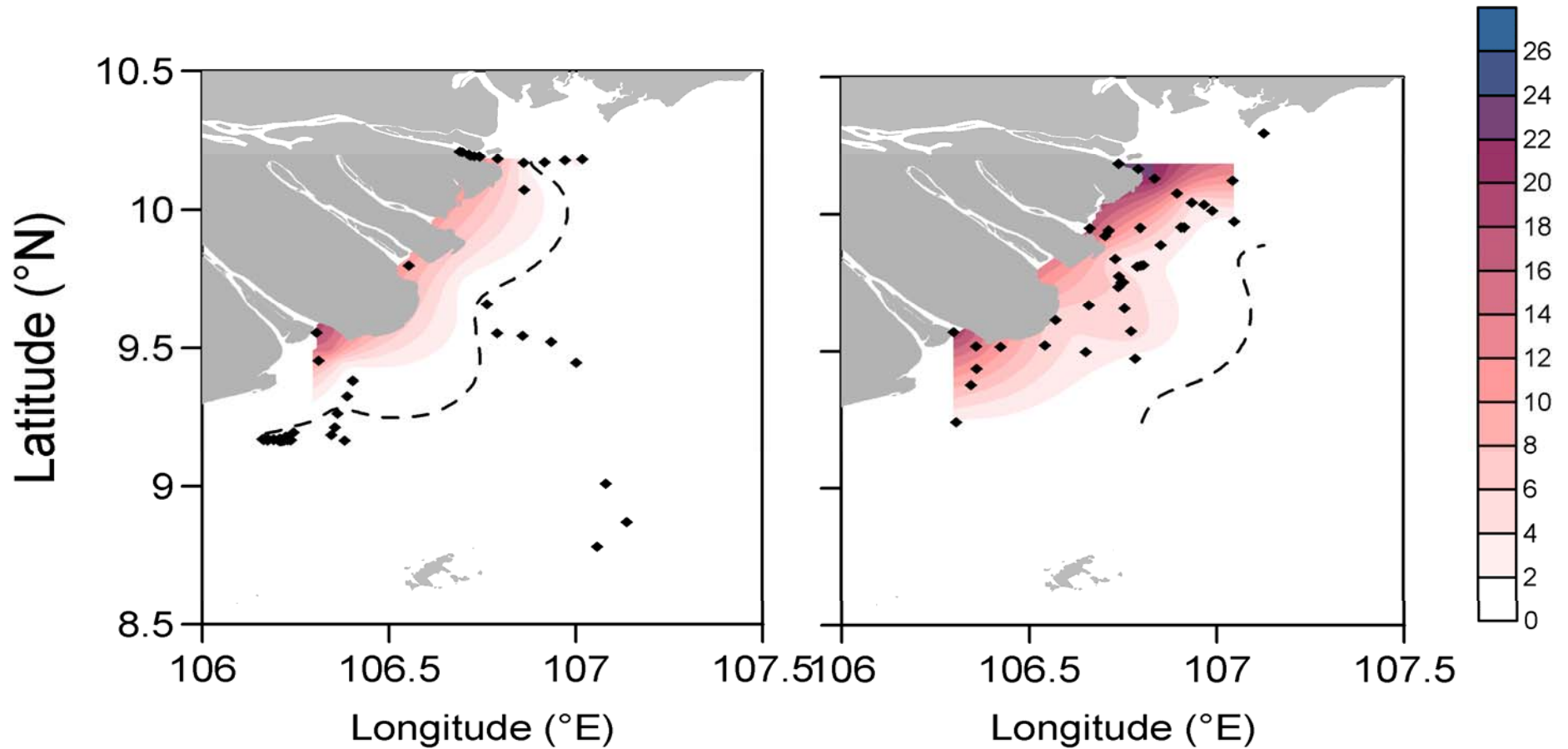
September 2008



$\text{NO}_3^- + \text{NO}_2^-$ ($\mu\text{mol L}^{-1}$)

April 2007

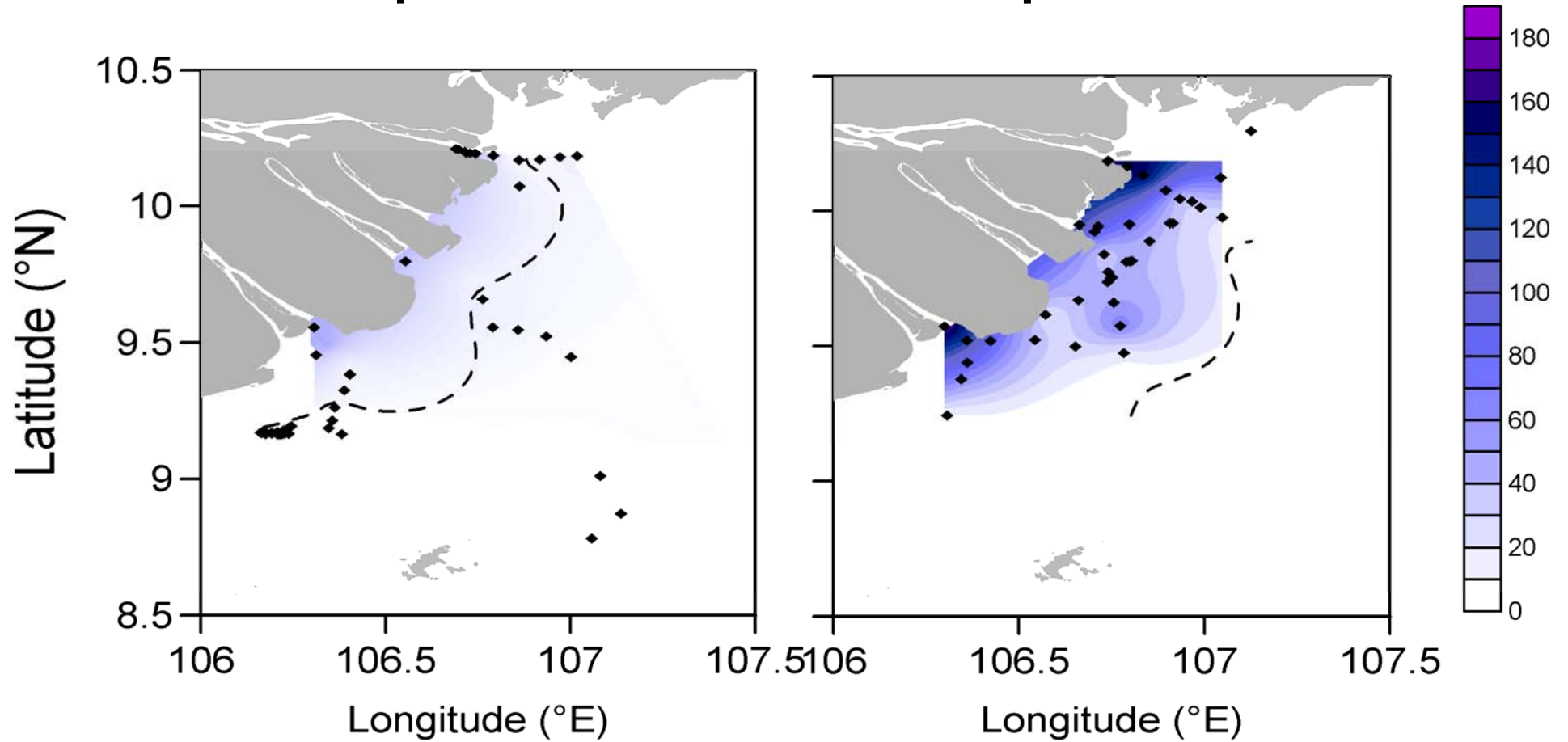
September 2008



Si(OH)₄ (μmol L⁻¹)

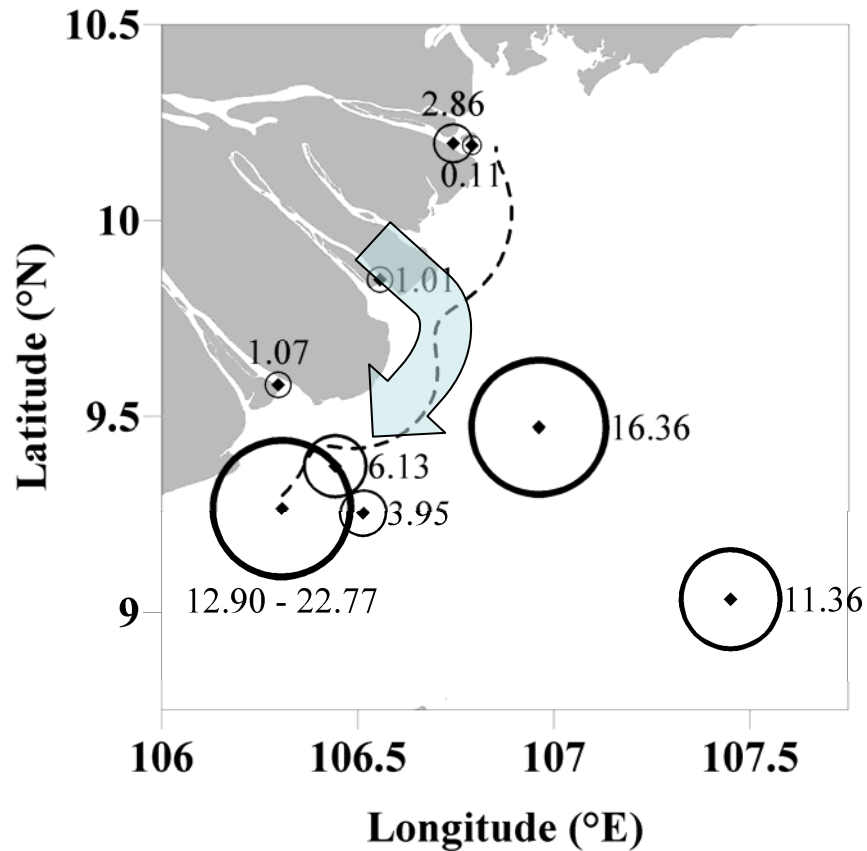
April 2007

September 2008

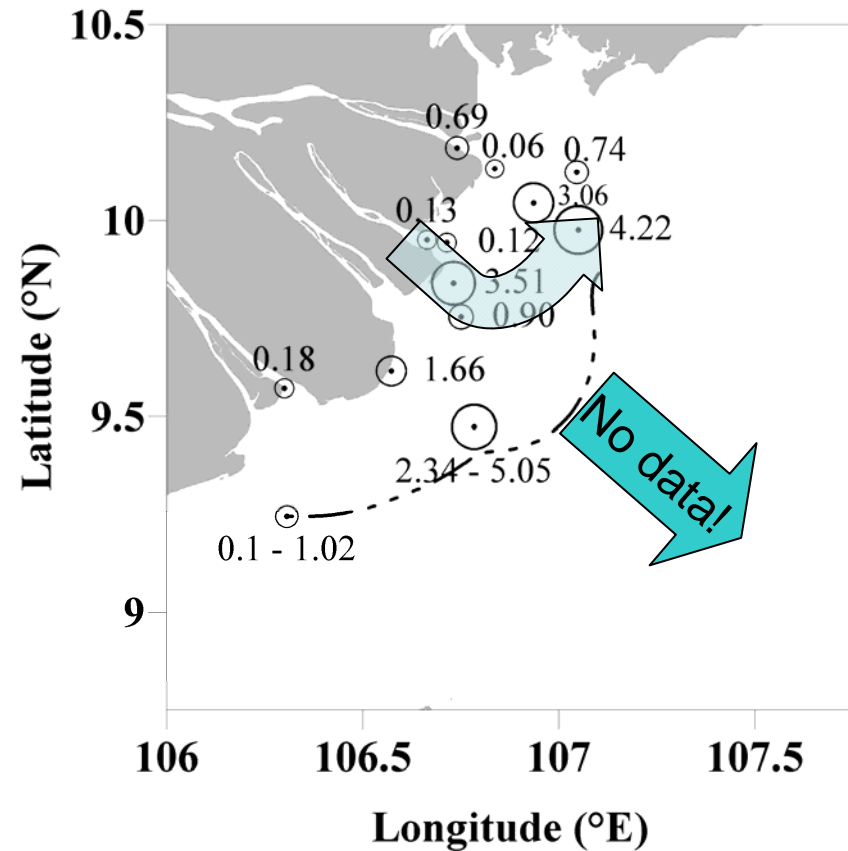


Nitrogen fixation rates ($\text{nmol l}^{-1}\text{h}^{-1}$)

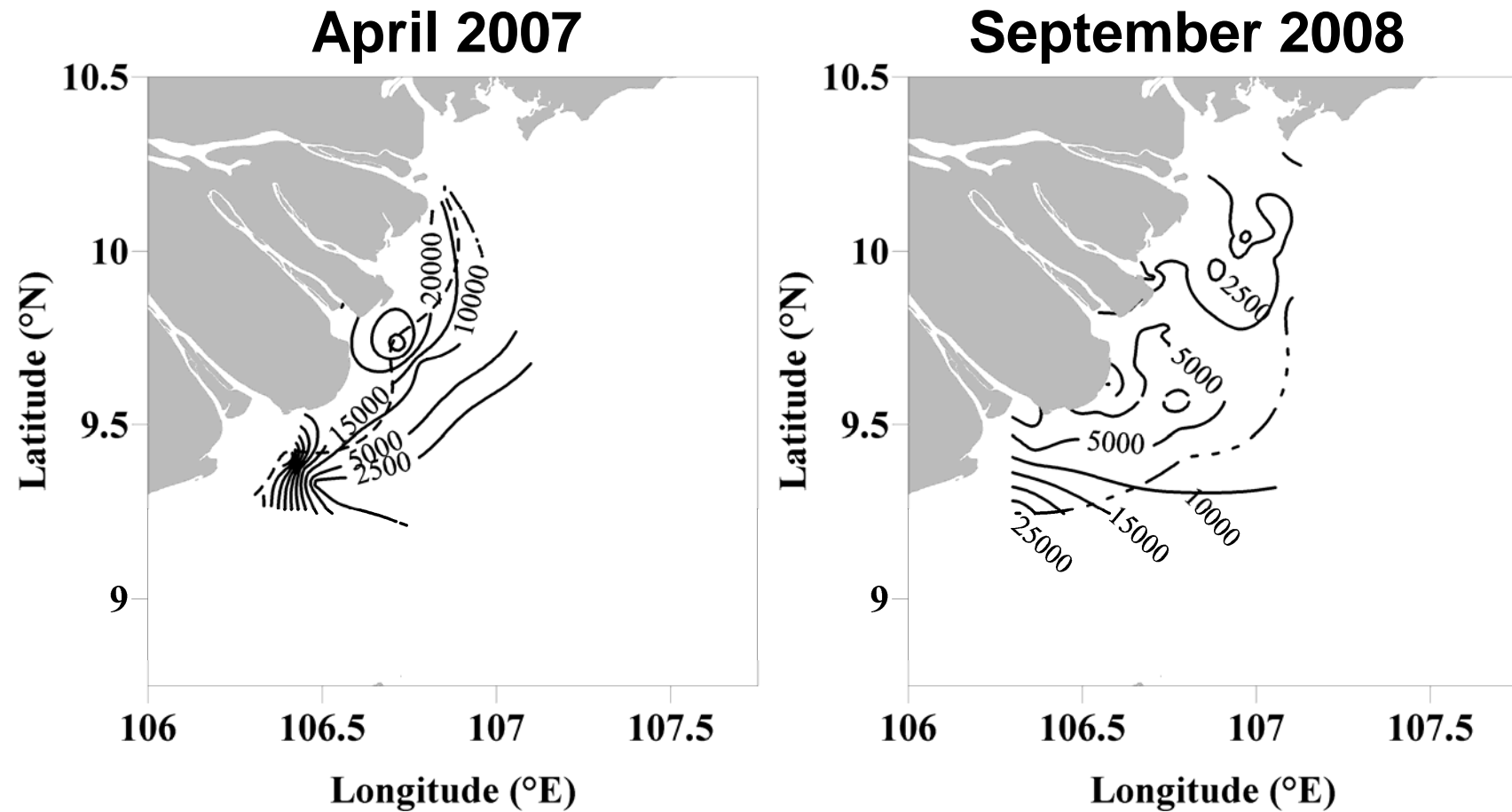
April



September

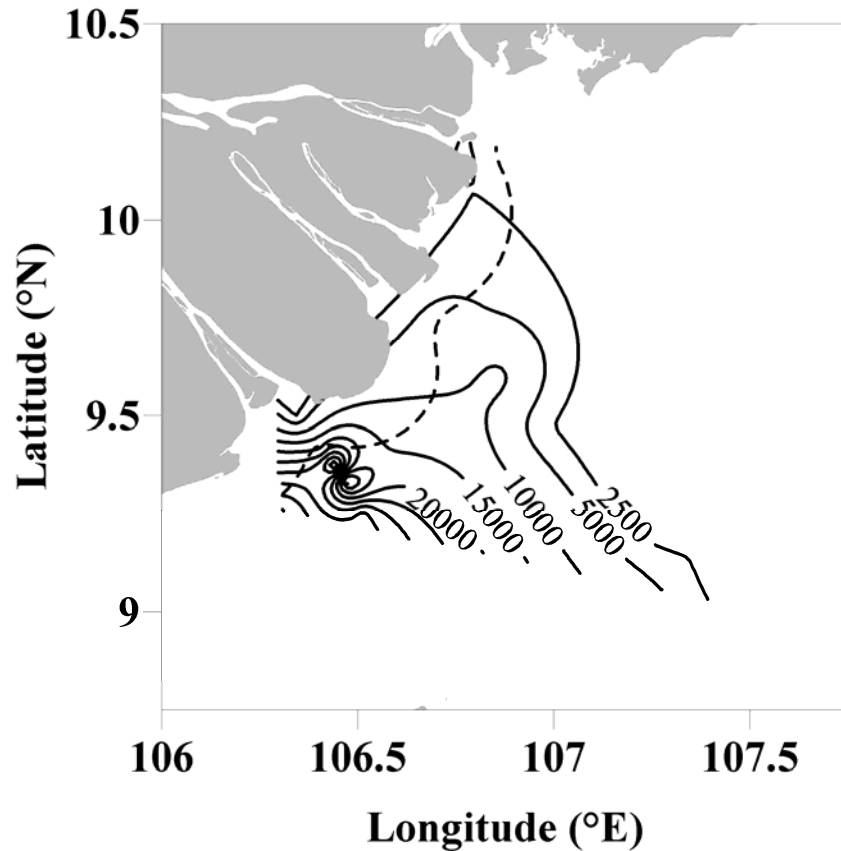


asymbiotic Diatoms (cells L⁻¹)

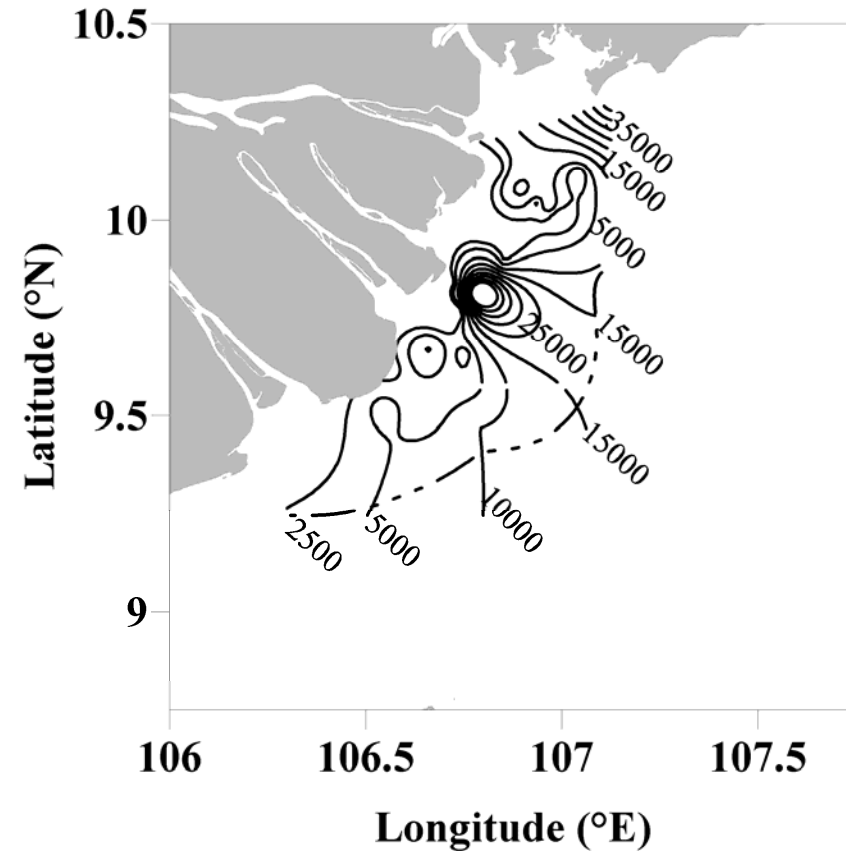


potentially symbiotic Diatoms (cells L⁻¹)

April 2007



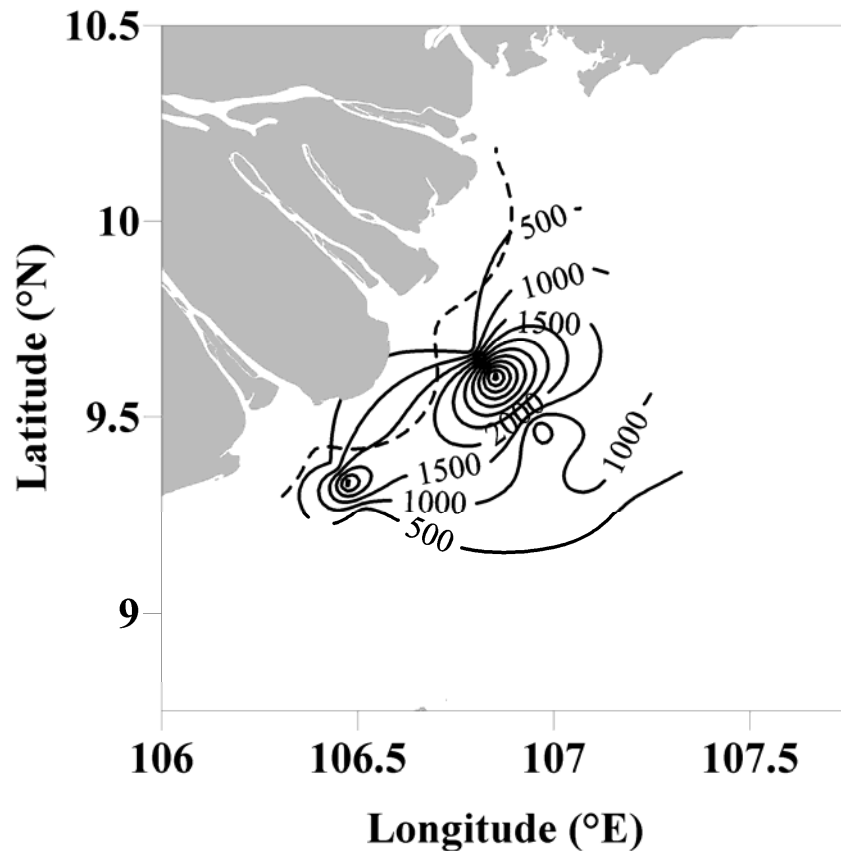
September 2008



filamentous Cyanobacteria trichomes L⁻¹

April 2007

September 2008

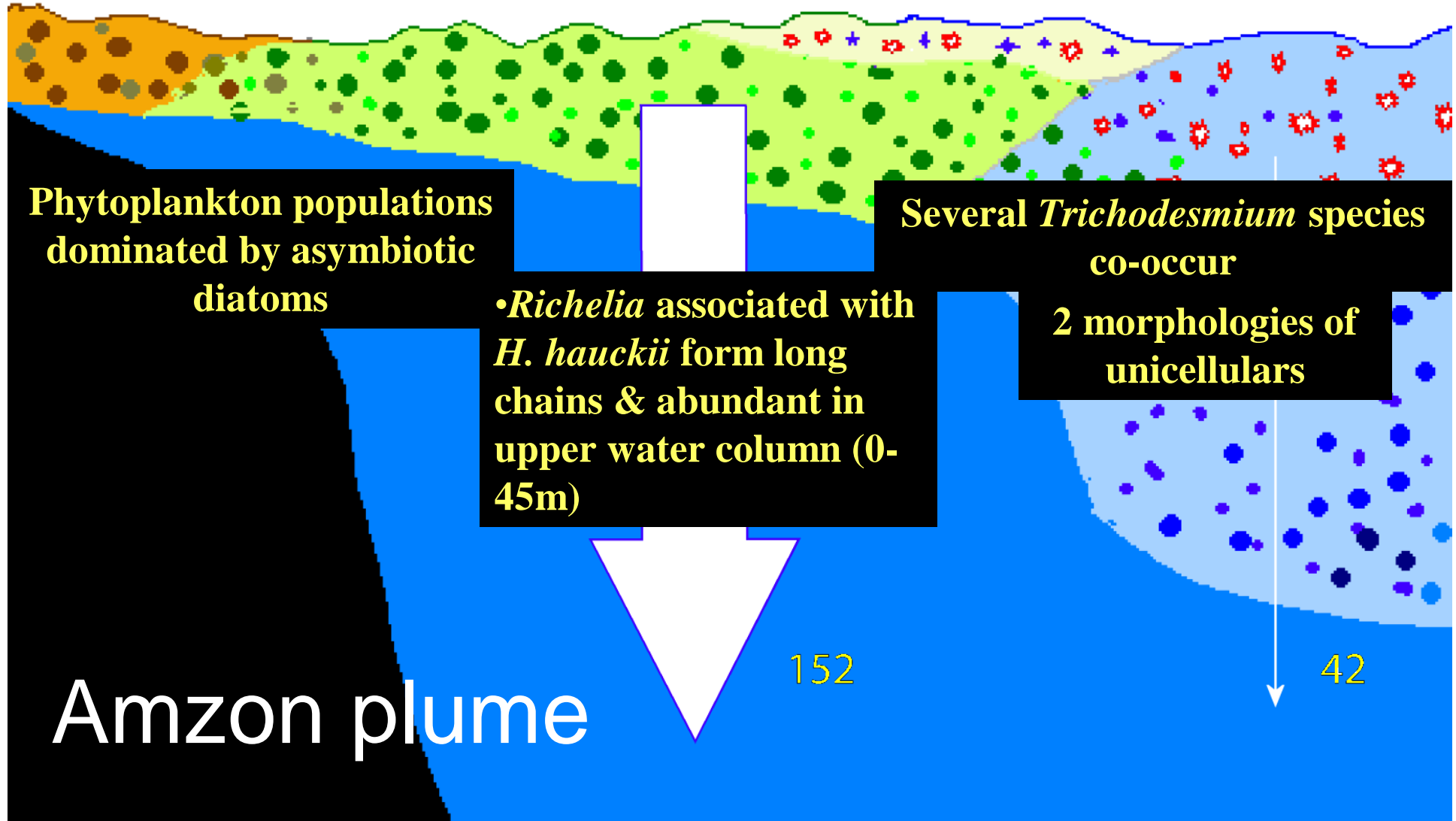


- Not found
- Possibly to the limited spatial resolution of sampling

Coastal
Sal: 28.95
Fe: 2.20
P: 67
DIC: 2009

Mesohaline
Sal: 32.50
Fe: 1.61
P: 28
DIC: 1984

Oceanic
Sal: 35.97
Fe: 1.36
P: 35
DIC: 2013



comparison

Salinity range	< 14	24.3-29.5	14-23	31-34.9	32-33.5	>33.5	35.6-36.6
Mek	low		meso		trans	ocean	
Amaz		low-sal		meso			ocean
Si	151 ± 255	10.9 ± 7.5	32 ± 9	4 ± 3.4	8.1 ± 1.5	3.5 ± 1.9	1.4 ± 0.7
PO4	0.8 ± 0.1	0.05 ± 0.05	0.7 ± 0.2	0.03 ± 0.02	0.1 ± 0.03	0.03 ± 0.07	0.037 ± 0.023
NO3	19.8 ± 2.4	0.11 ± 0.16	10.7 ± 4.2	0.06 ± 0.03	0.3 ± 0.1	0.3 ± 0.4	0.06 ± 0.04
N fix μmol m ⁻² d ⁻¹		25 ± 48		1000 ± 2000			157 ± 199
N fix nmol l ⁻¹ h ⁻¹	0.26 ± 0.29		0.1 ± 5.1		5.8 ± 22.8	4 ± 16.4	

Summary

- River plumes support various nitrogen fixing species along a gradient from nutrient rich to poor conditions.
- The change in nutrient ratios set the conditions for growth of the different nitrogen fixers.
- Tropical river plumes may differ in the zonations along the salinity gradient
- The input of new nitrogen into the systems seems to be substantial but is not yet quantified on a larger scale

Future studies are necessary

- Better sampling resolution to find out about the river plume extension in the high discharge season incl. upstream sampling
- Measure potential limiting trace metals (like Fe)
- What may happen when the Mekong is more damed, receives more nutrients, looses more mangrove forests?

Thank you