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Macronutrient Distribution in the Gulf of Thailand during the 2018 Southwest Monsoon Season

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Training Department, Samut Prakan, Thailand

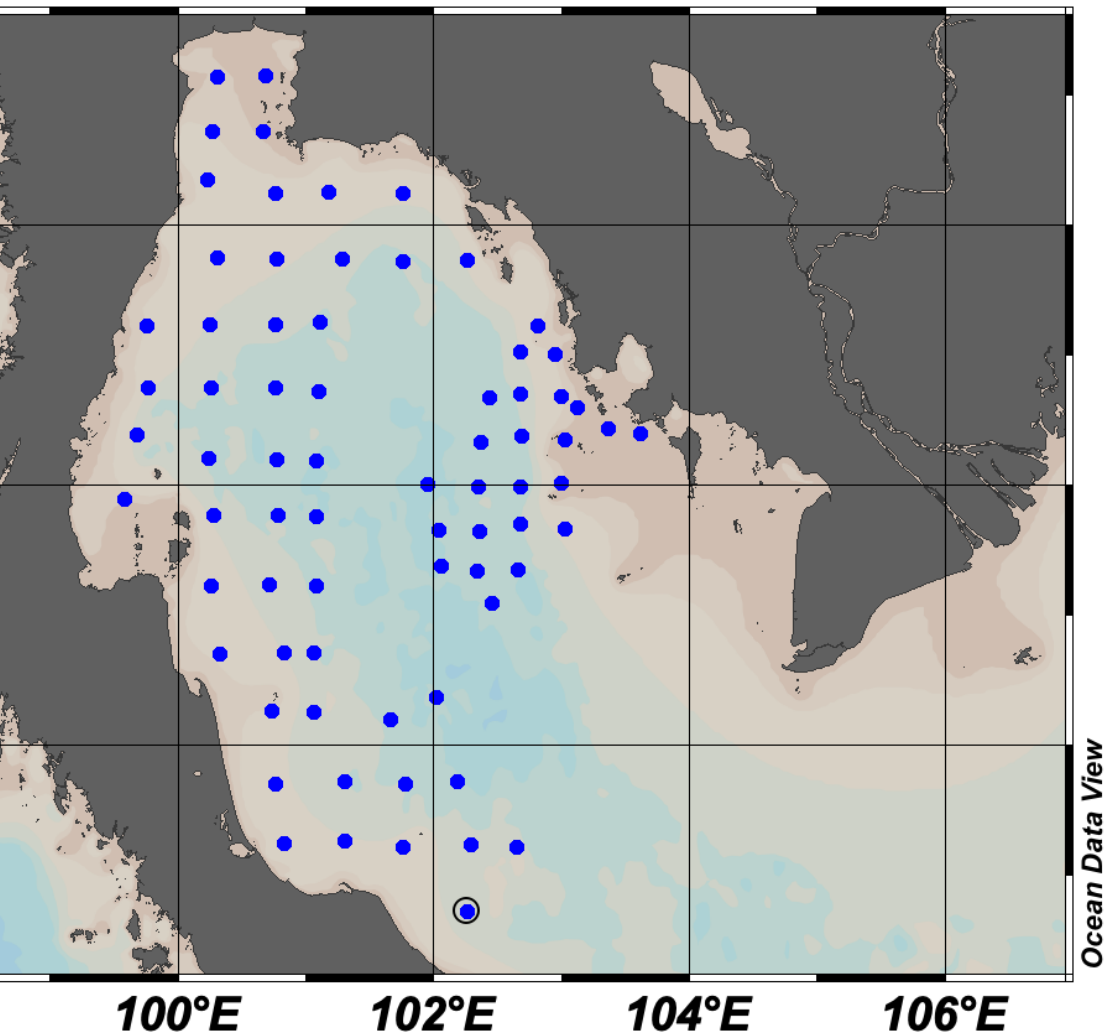
Macronutrient Distribution in the Gulf of Thailand during the 2018 Southwest Monsoon Season

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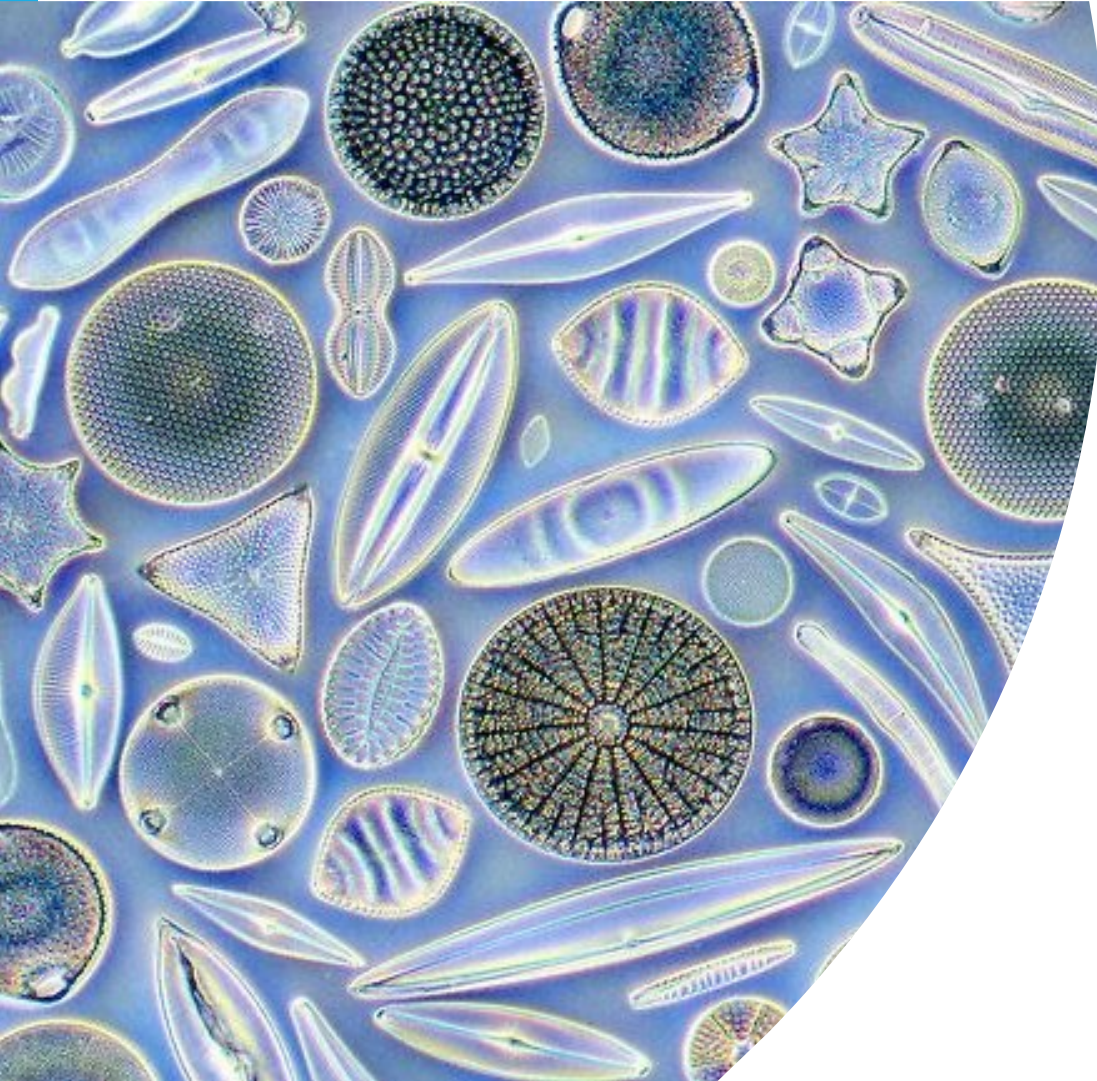
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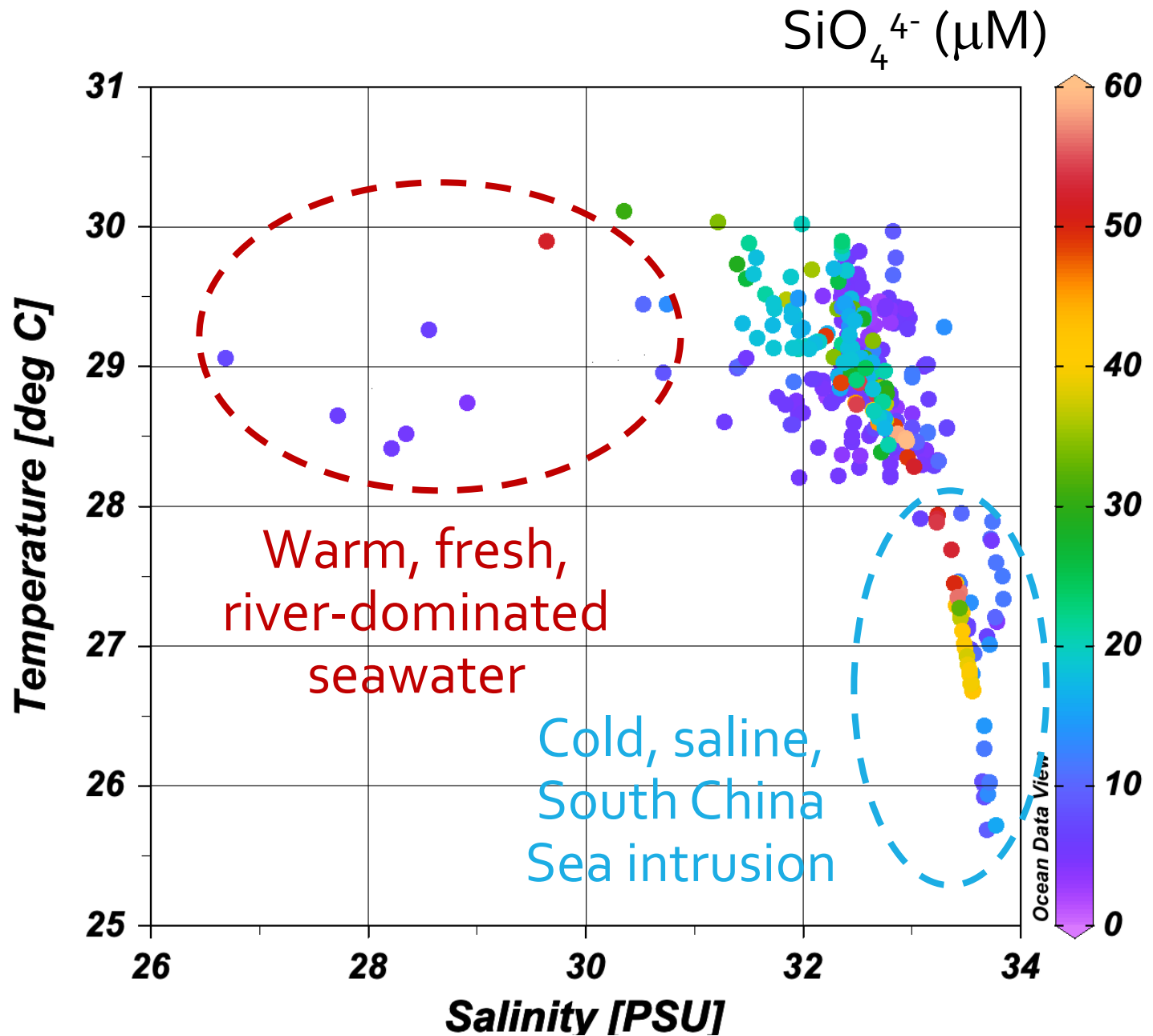


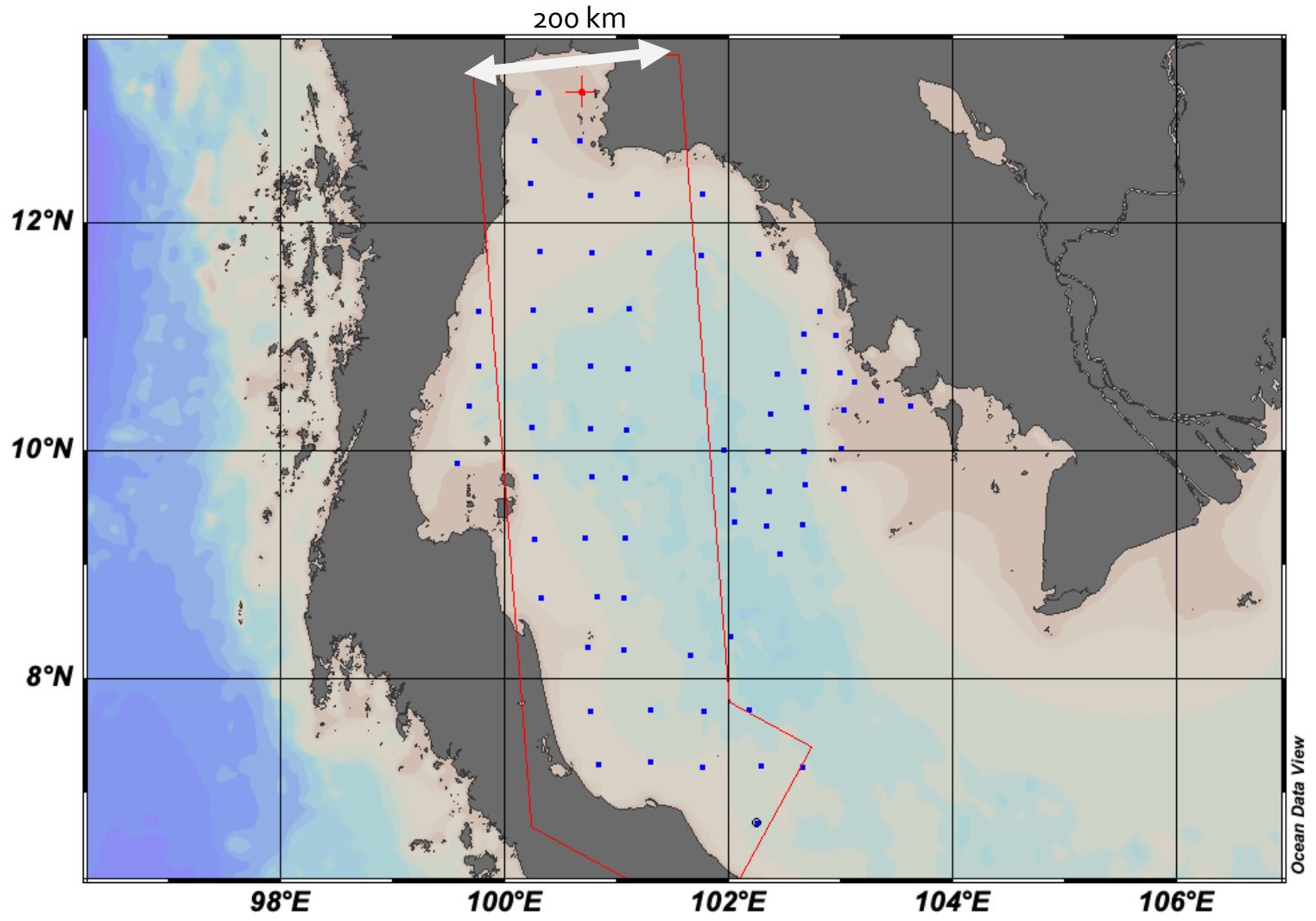
Inorganic
macronutrients
discussed in this talk:

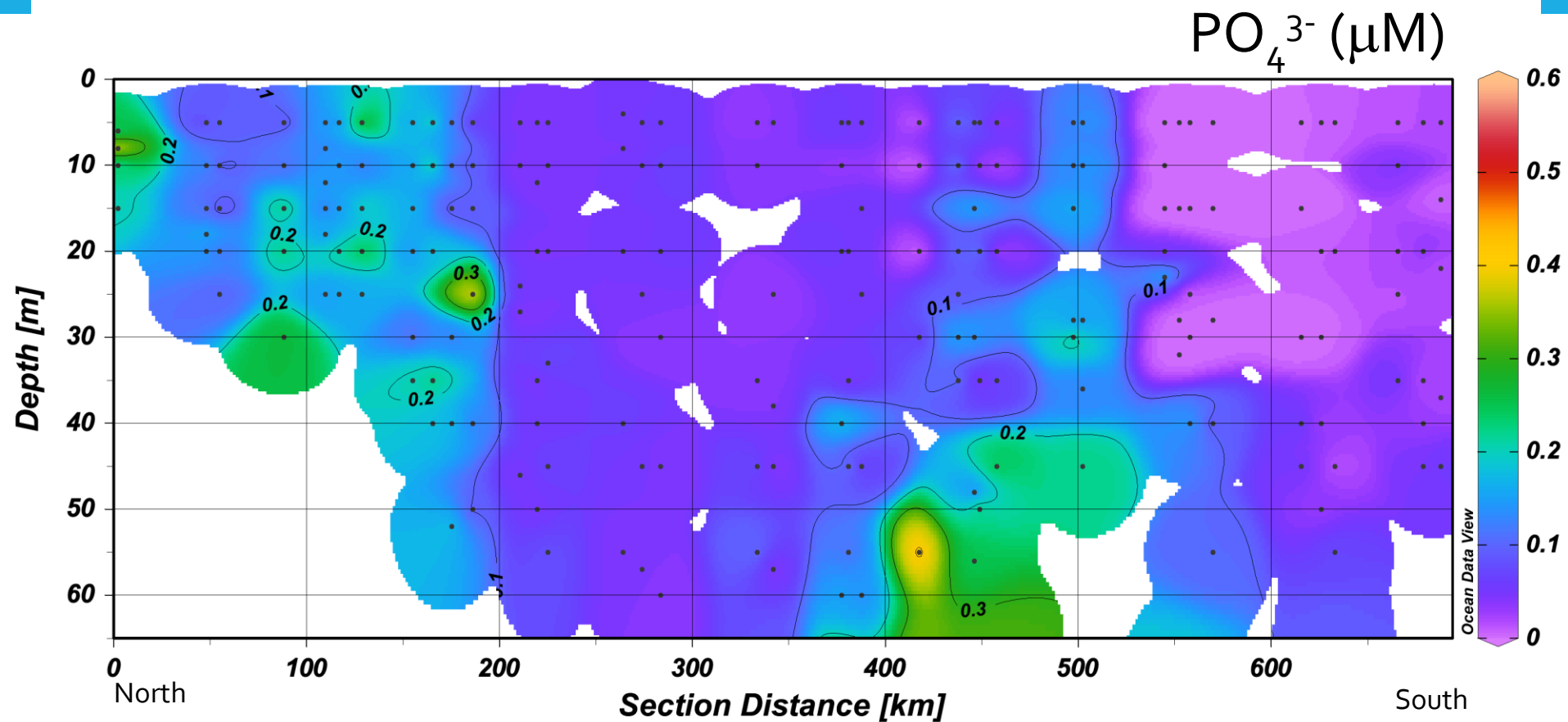
- Nitrate + nitrite
($\text{NO}_3^- + \text{NO}_2^-$)
- Ammonium (NH_4^+)
- Phosphate (PO_4^{3-})
- Silicate (SiO_4^{4-})



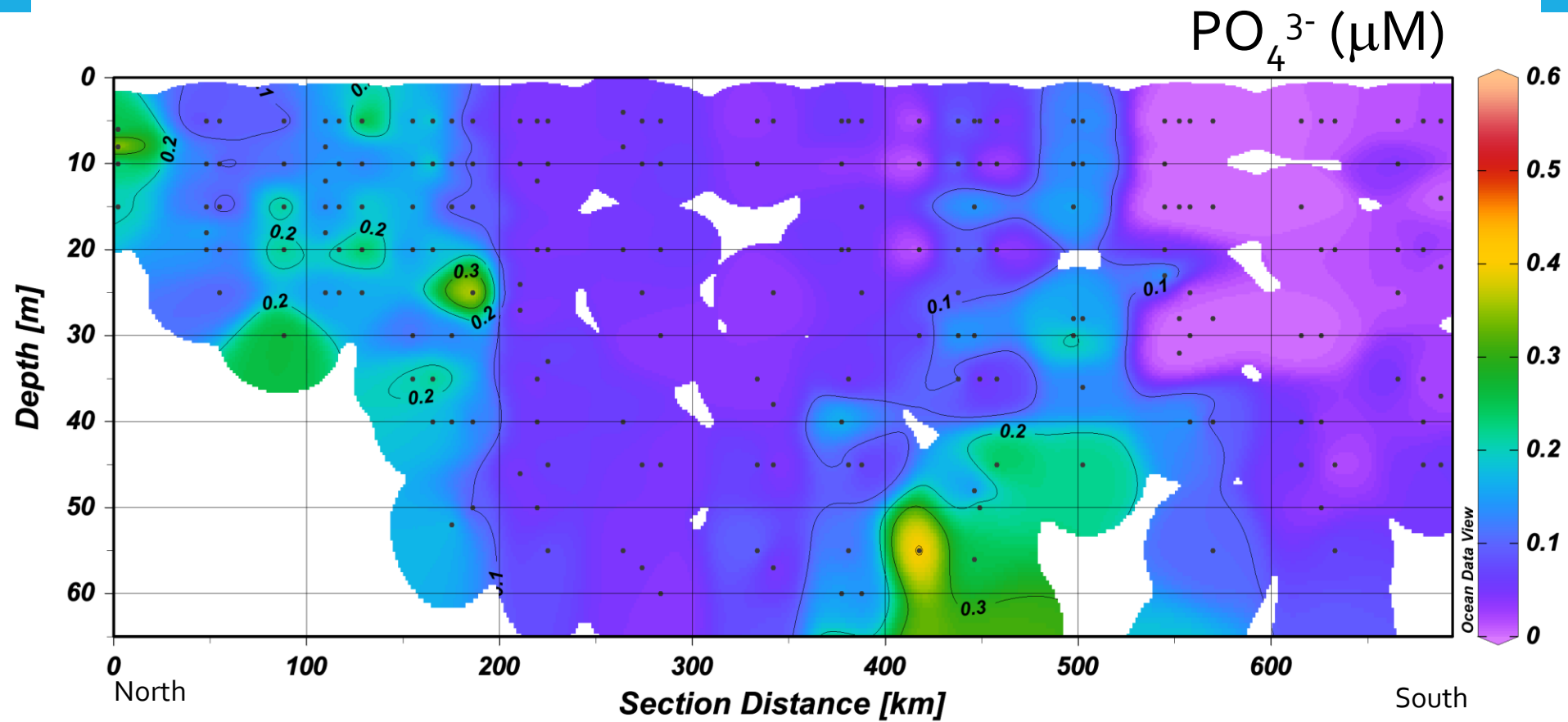
- Macronutrients are essential for phytoplankton growth.
- They play significant roles in controlling the primary productivity in aquatic environments.



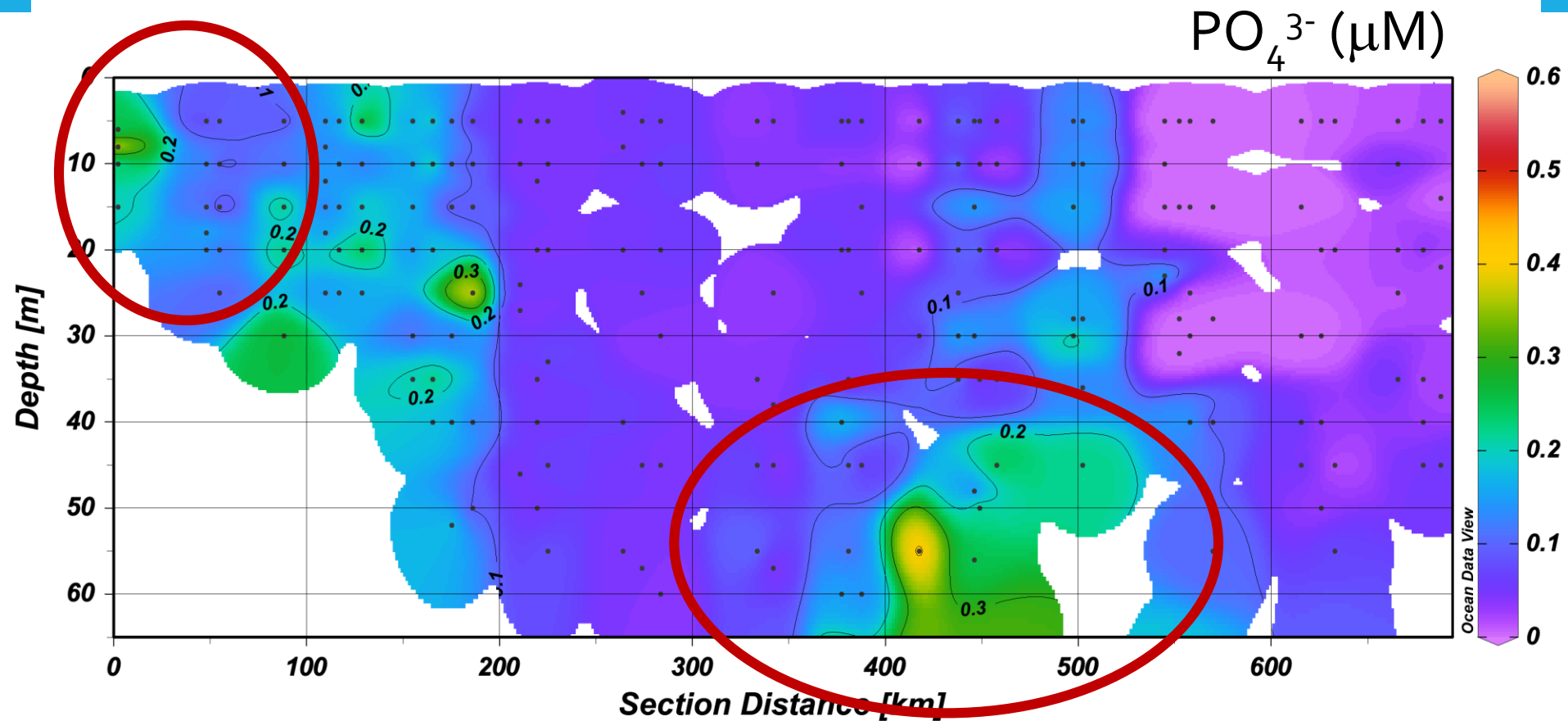




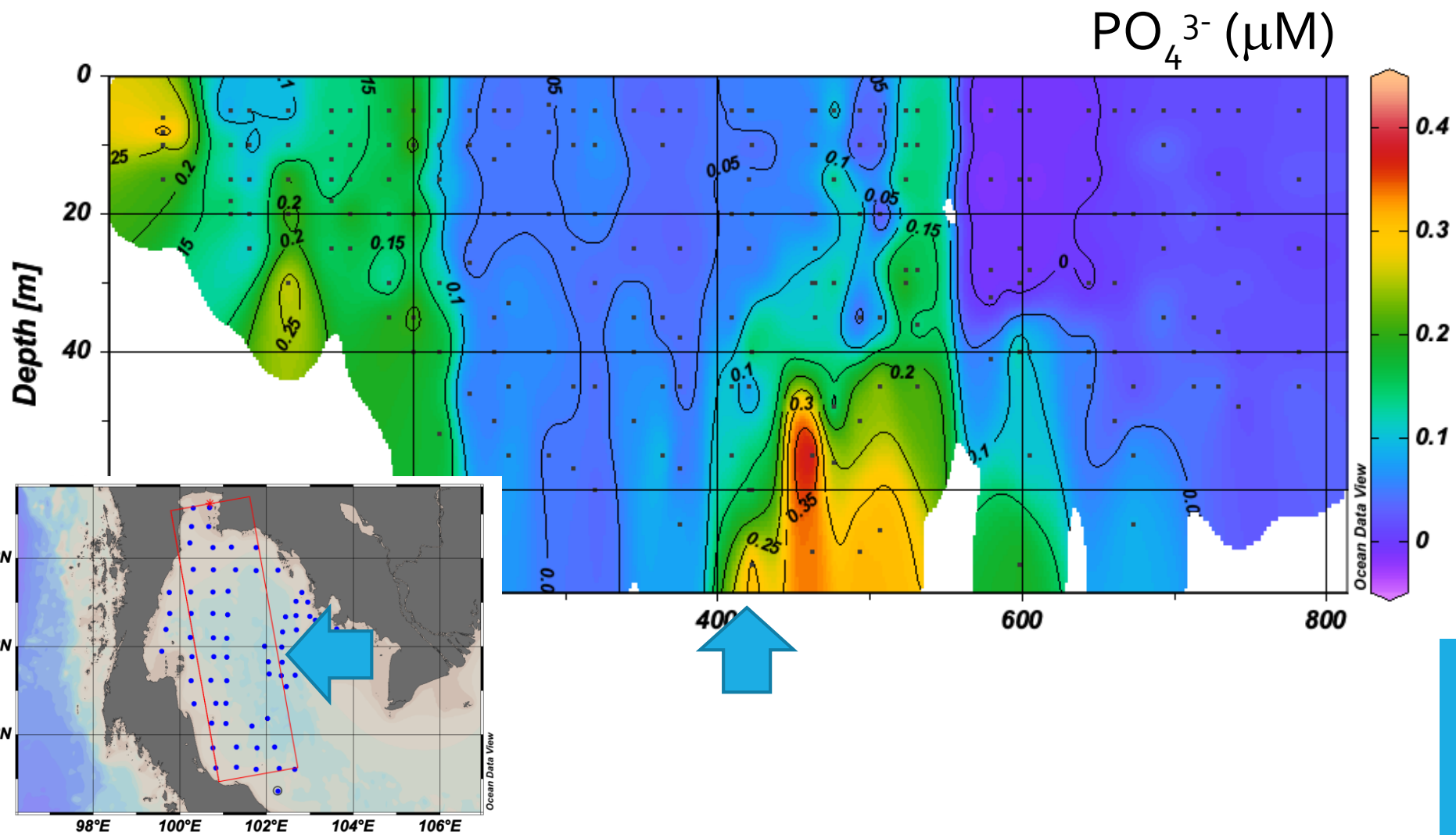
$[\text{PO}_4^{3-}]$ is mostly below 0.5 μM throughout the GoT.

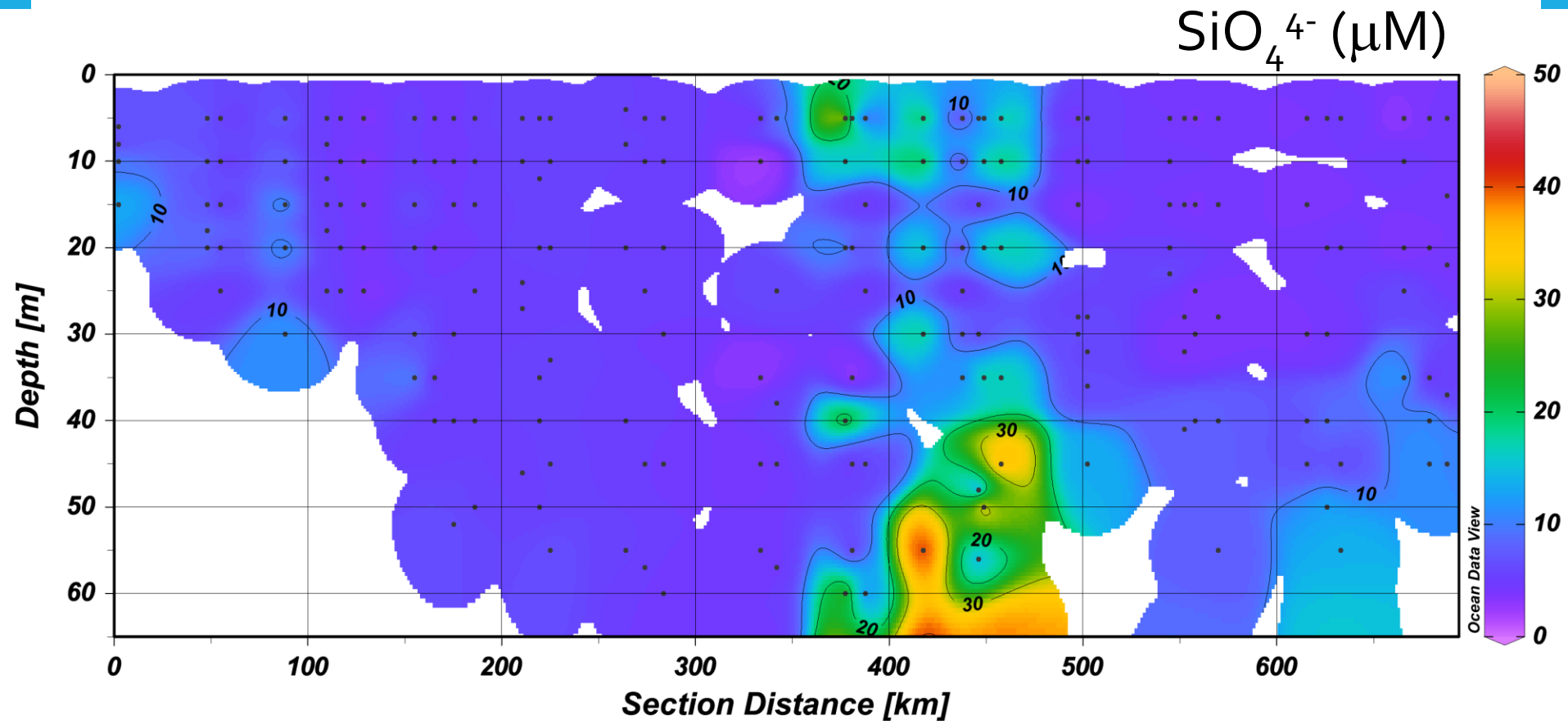


$[\text{PO}_4^{3-}]$ is mostly uniform throughout the upper water column.

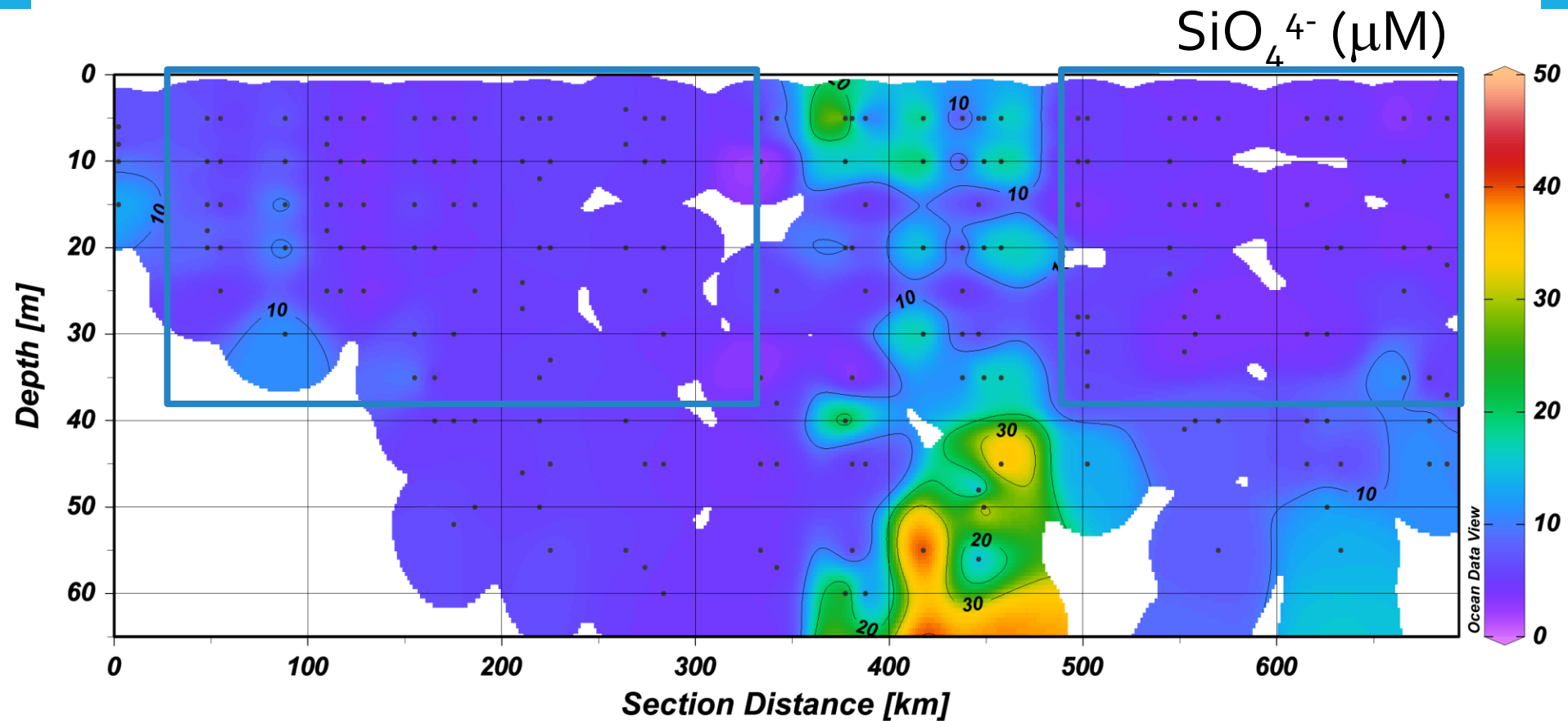


Higher [PO_4^{3-}] are found near the river mouths and mid-Gulf where water from the South China Sea enters the GoT.



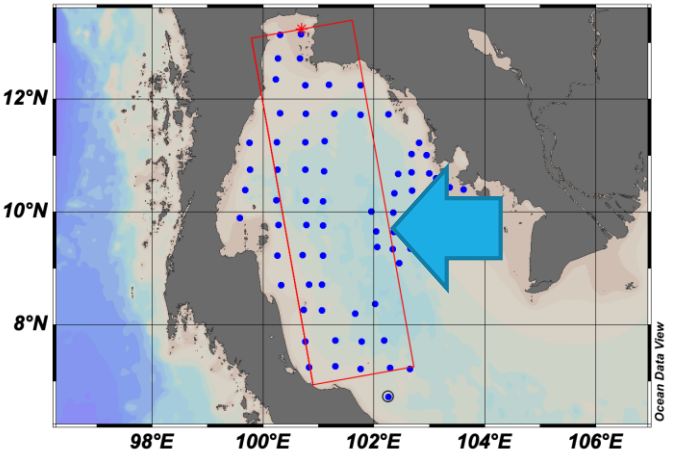
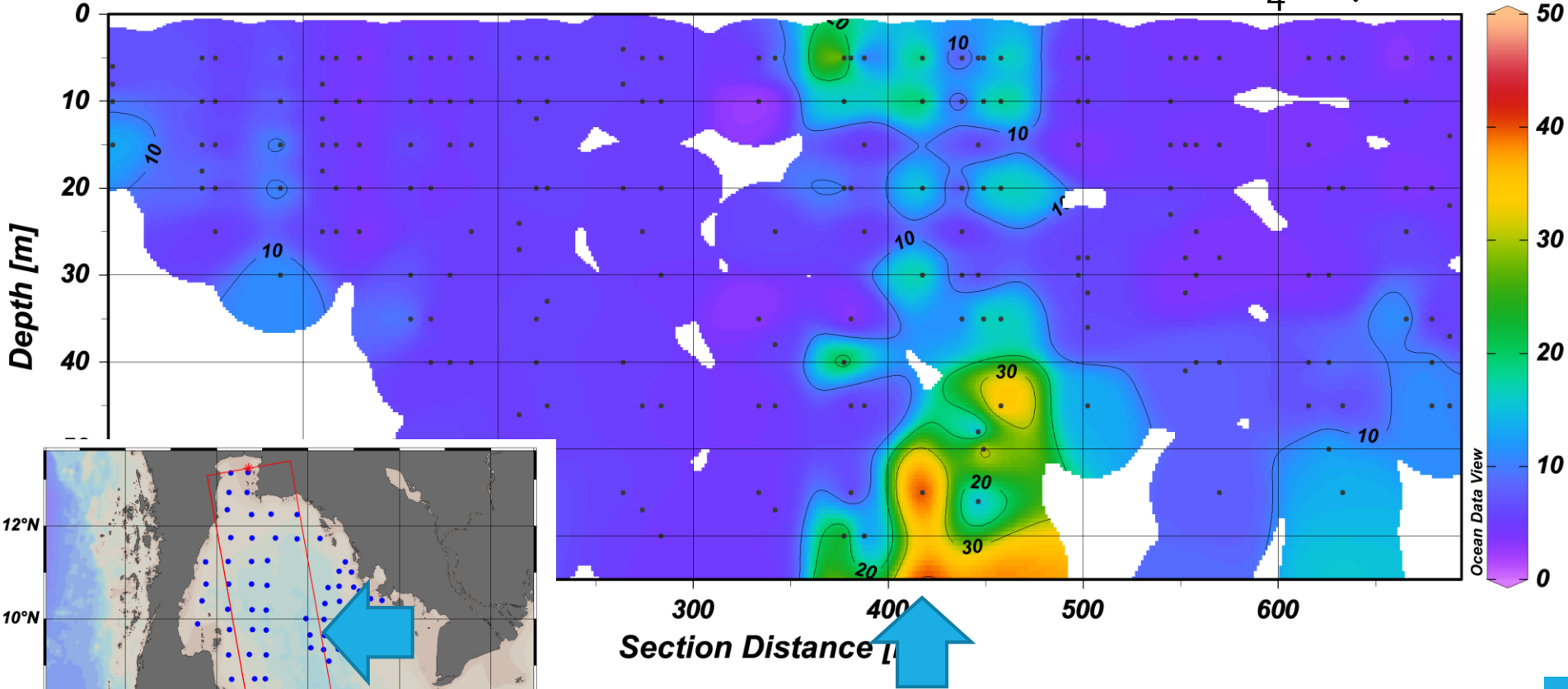


Uniform [SiO₄⁴⁻] throughout the upper water column perhaps from mixing.



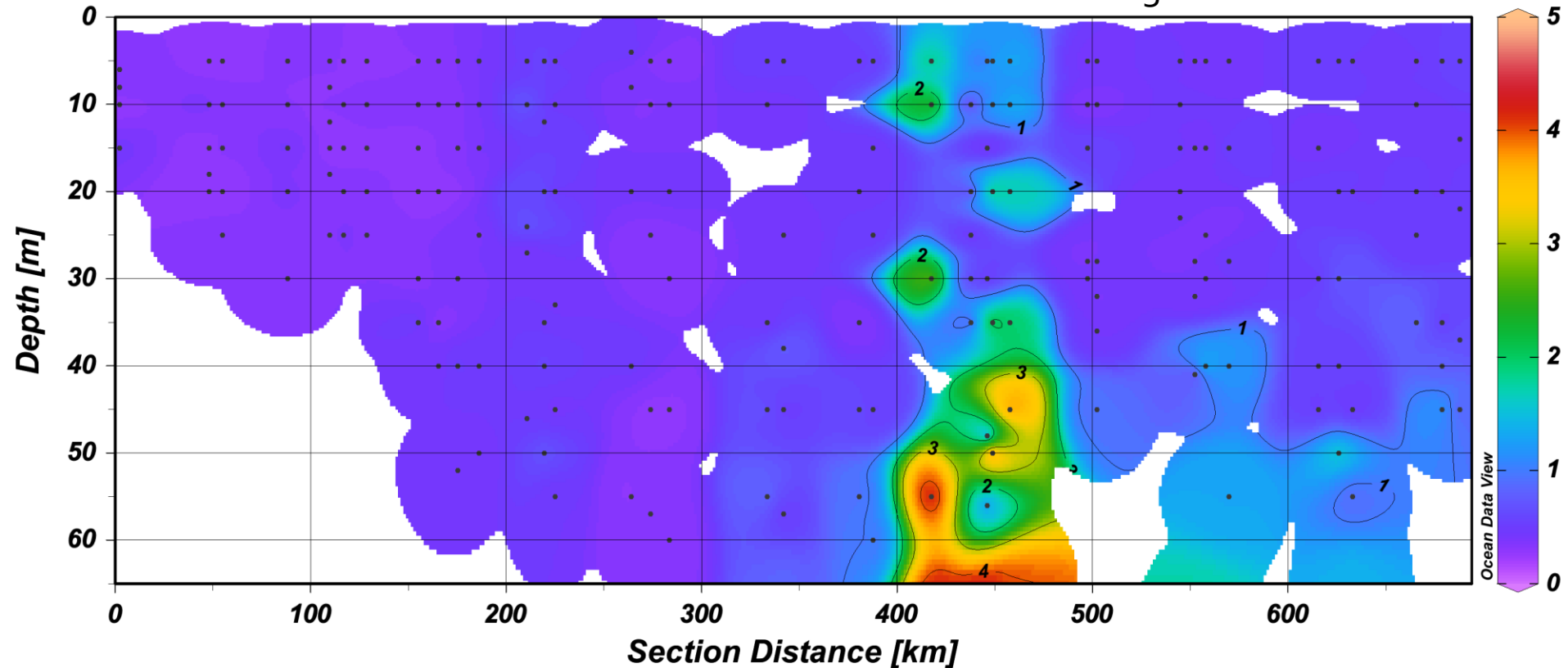
Rapid uptake of SiO₄⁴⁻ near shore by phytoplankton notably diatoms depletes SiO₄⁴⁻ in the upper water column.

SiO_4^{4-} (μM)



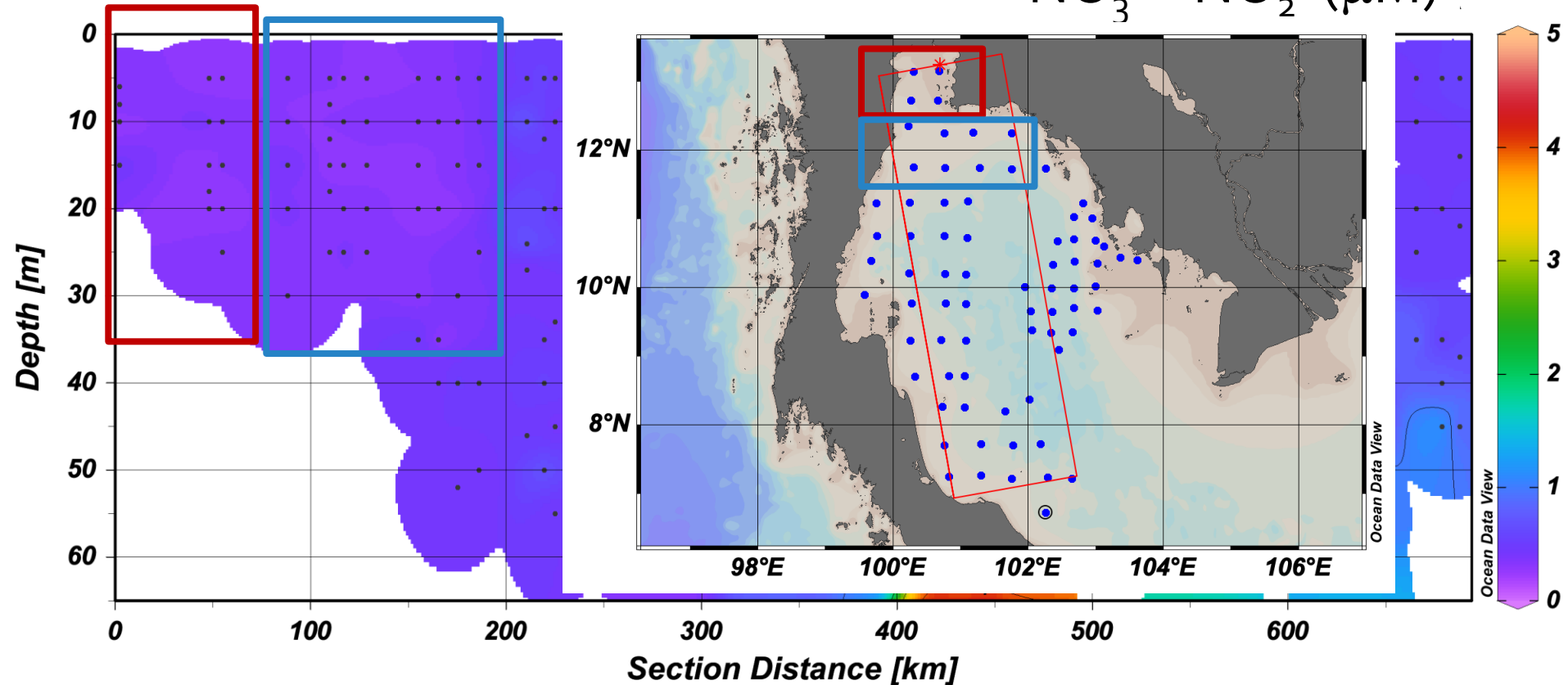
Intrusion of nutrient-rich water from the SCS

$\text{NO}_3^- + \text{NO}_2^-$ (μM)



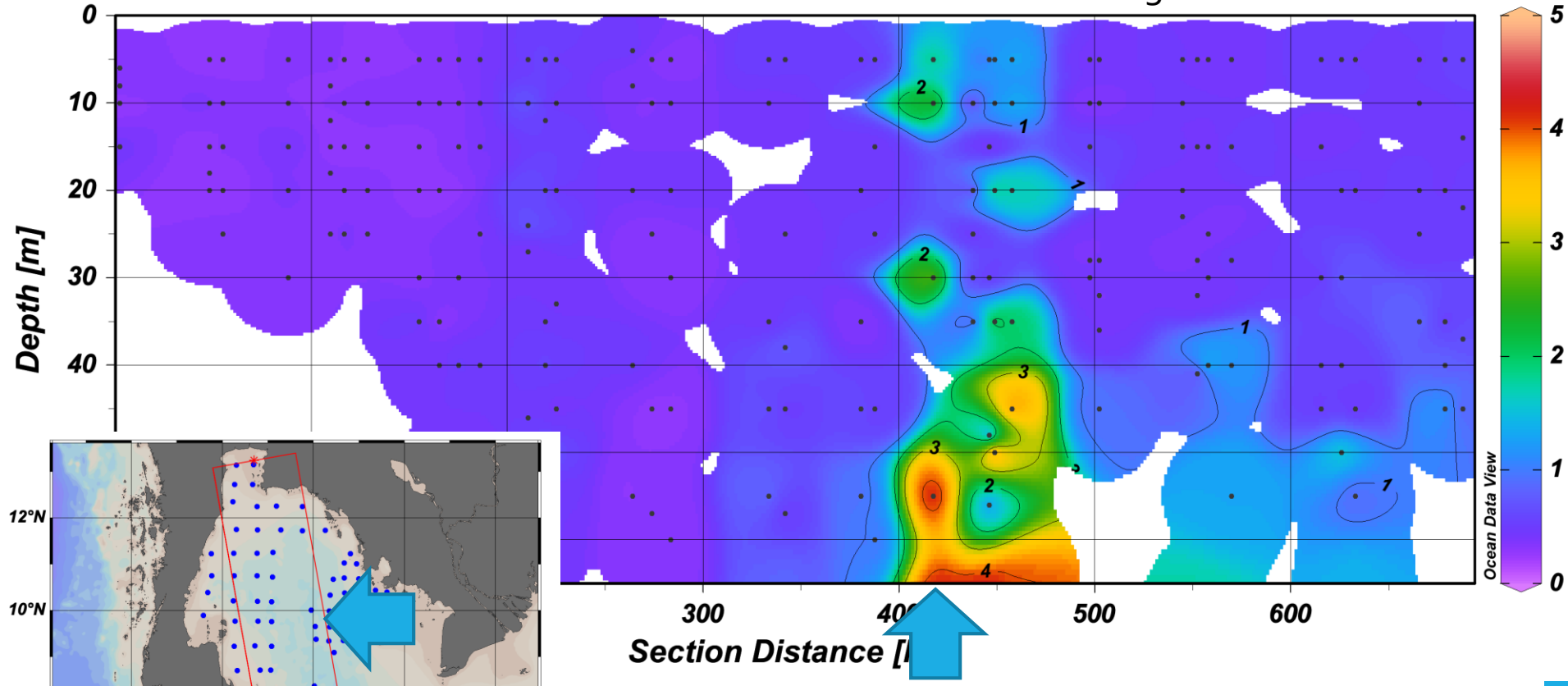
$[\text{NO}_x^-]$ is mostly uniform throughout the upper water column especially in the upper GoT.

$\text{NO}_3^- + \text{NO}_2^-$ (μM)

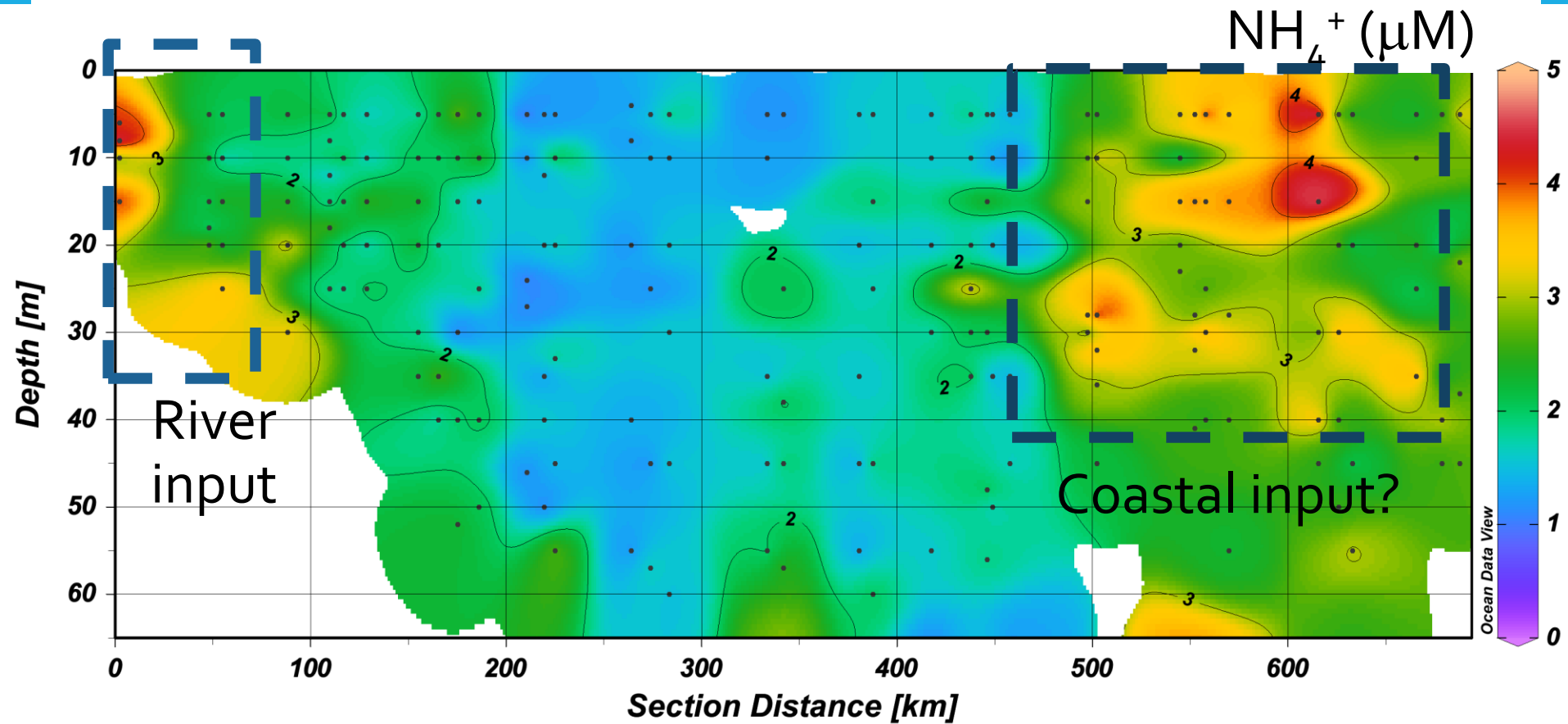


$[\text{NO}_x^-]$ is mostly uniform throughout the upper water column especially in the upper GoT -> Rapid uptake by phytoplankton

$\text{NO}_3^- + \text{NO}_2^-$ (μM)



Intrusion of nitrate-rich water from the SCS.



Nearshore Offshore Nearshore

Conclusion

- Depletion of macronutrients in the surface water indicates rapid phytoplankton uptake.
- Lack of vertical structure for nutrient concentrations may suggest physical mixing largely at play.
- Mid-gulf elevation of nutrients (nitrate, phosphate, and silicate) might be caused by mixing with the nutrient-rich South China Sea water mass.

