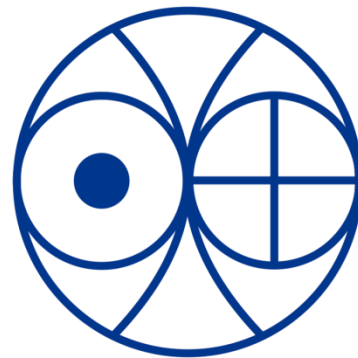


Role of eddies and N_2 fixation in shaping C:N:P proportions in the Bay of Bengal during spring

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Sampling in the Bay of Bengal during spring 2019

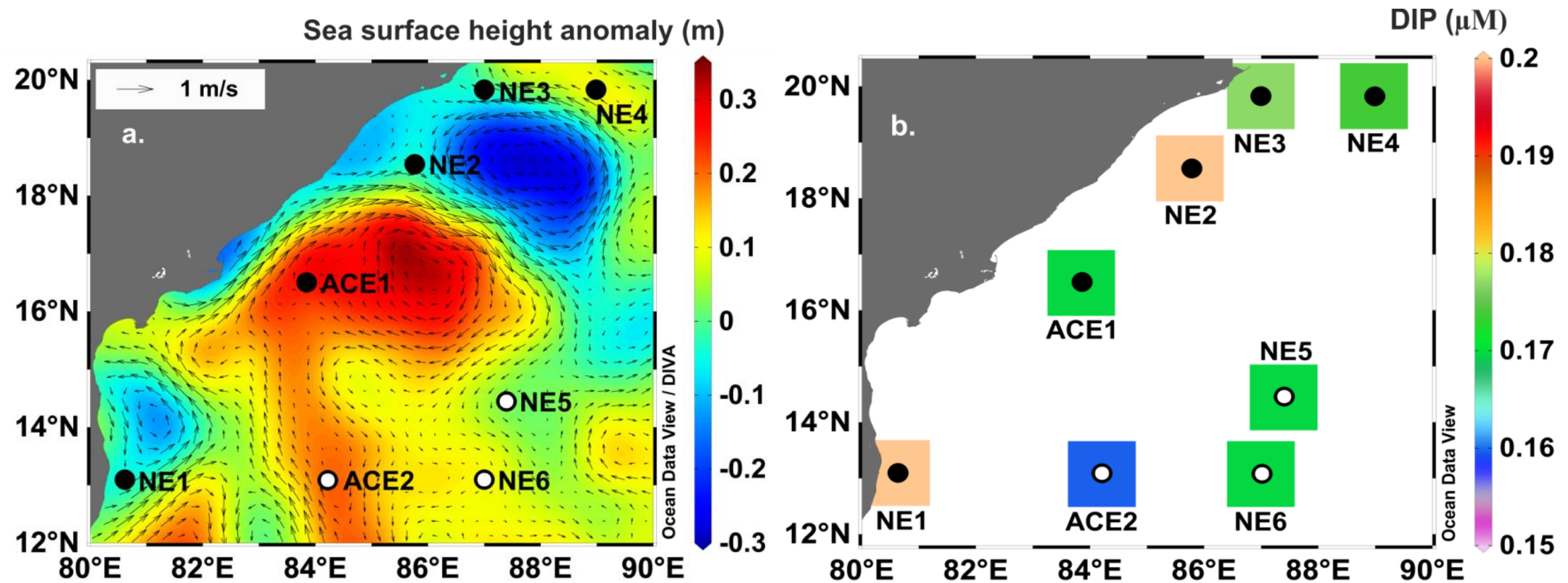
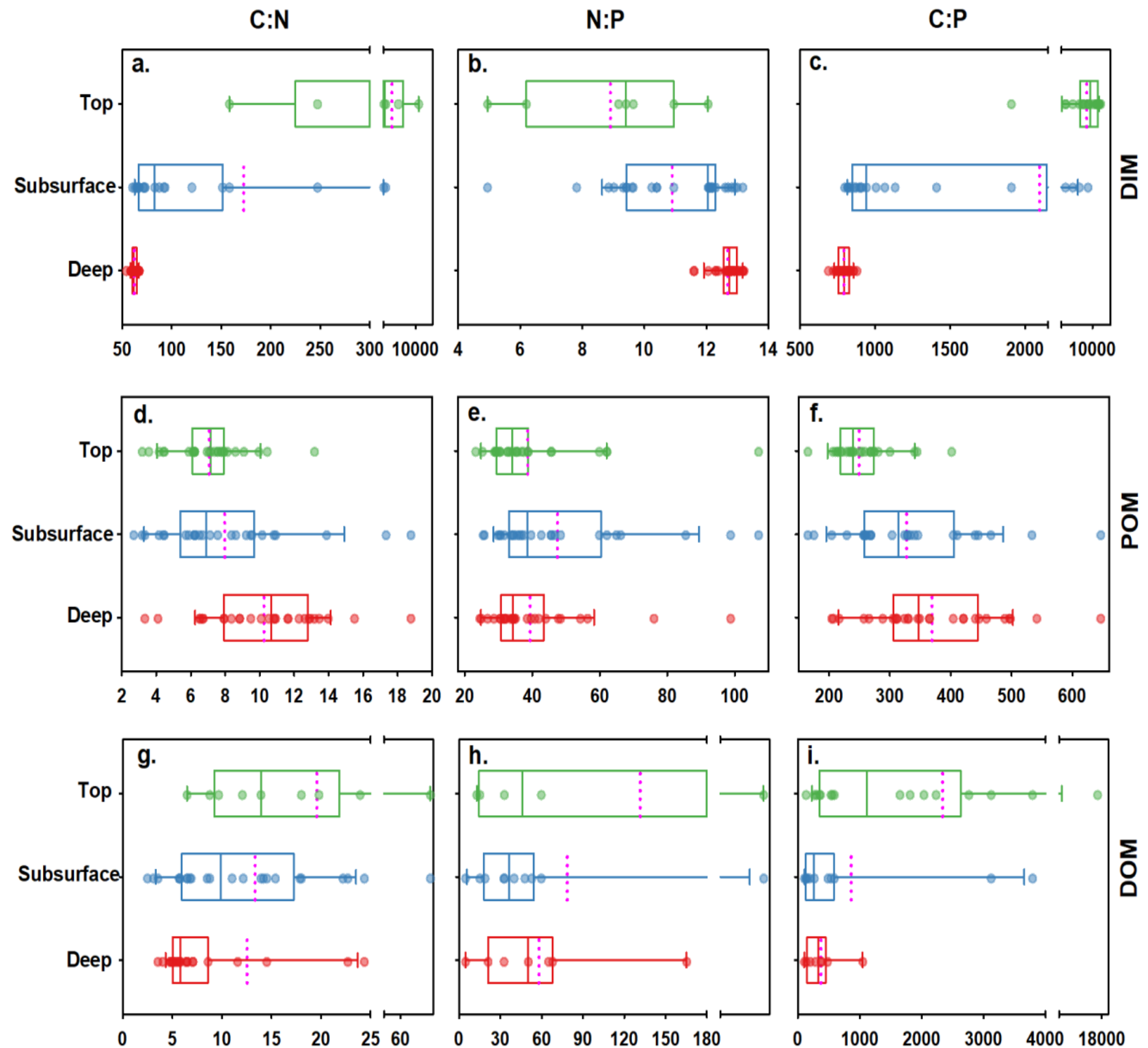


Figure. Sea surface height anomaly (m) overlaid by geostrophic currents during (a) 5-10 April 2019. The coastal Bay and open ocean stations are shown with black closed symbols and white closed symbols respectively. (b) Surface DIP concentrations. **ACE: Anticyclonic eddy, NE: Non-eddy.**

Elemental proportions in top, subsurface and deep layer

Figure. Box-whiskers plots showing C:N, N:P and C:P ratios in **top layer** (surface to depth of chlorophyll maximum), **subsurface layer** (depth of chlorophyll maximum to 358 m), and **deep layer** (358 m to 2000 m). Pink dotted lines represent mean. Whiskers account for 5% and 95% of distribution, whereas boxes account for 25% and 75%. **DIM: dissolved inorganic matter (nutrients), POM: particulate organic matter, DOM: dissolved organic matter.**

Redfield Ratio:: 106C:16N:1P



- **DIN:DIP < 16** in top layer: N limitation for primary production
- **Low DIN and DIP** at **ACE1, ACE2** than **NE** stations
- No significant differences observed in POM concentrations and ratios at ACEs and NE stations
- **Negative correlation between POP and PON with POC:POP and POC:PON** suggests the **preferential remineralization of POP and PON** causes variation in ratios in subsurface and deep layers.
- C:N:P ratio was **249:39:1** in **POM** and **2338:146:1** in **DOM**, deviated greatly from the **Redfield Ratio**

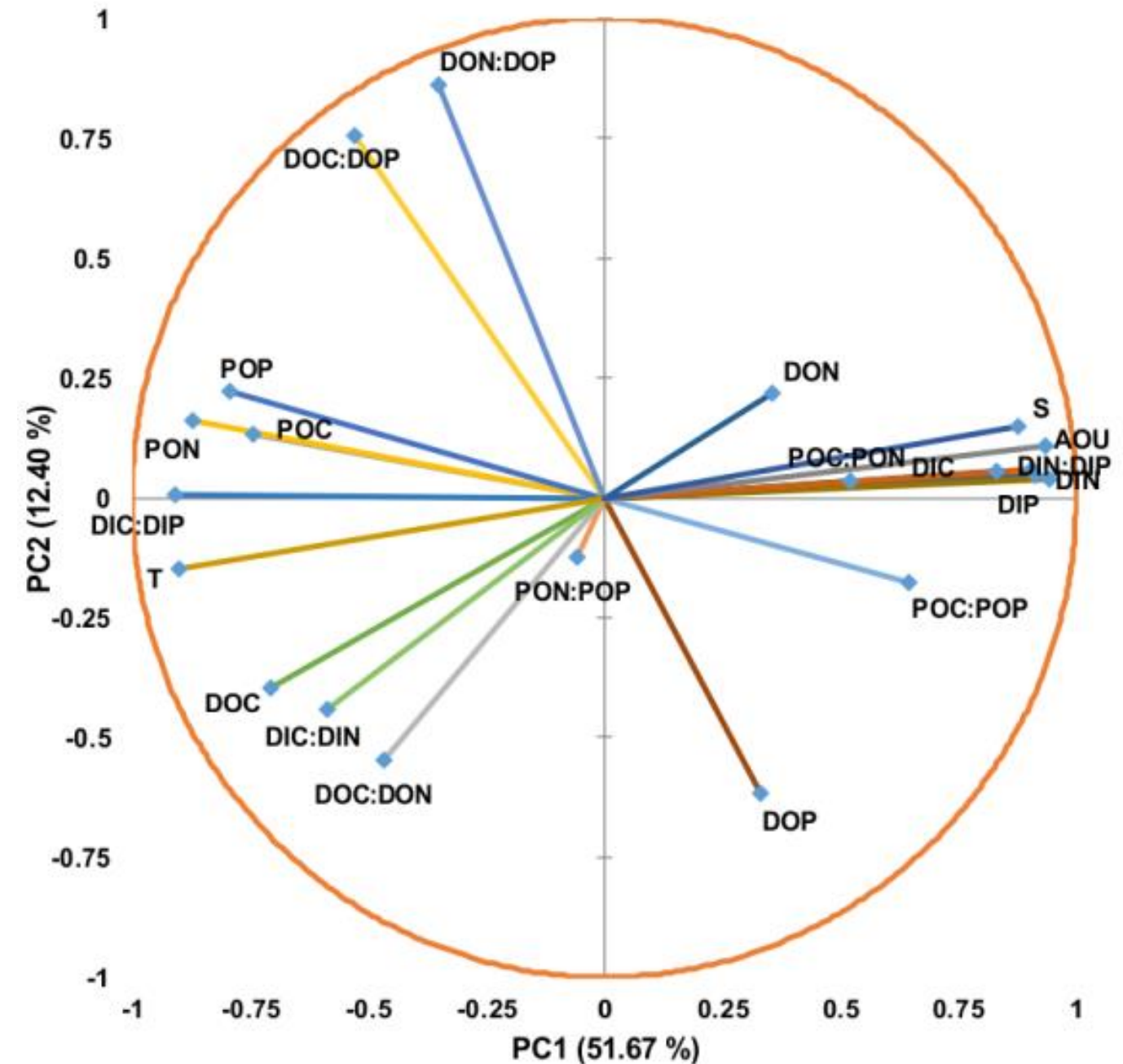


Figure. PCA analysis of temperature, salinity, apparent oxygen utilization dissolved inorganic nutrients, particulate organic matter, dissolved organic matter, elemental ratios, represented by coloured vectors.

Role of N₂ fixation on the elemental proportions

- Low N₂ fixation rates (below detection limit to 17 $\mu\text{mol N m}^{-2} \text{d}^{-1}$ (Saxena et al. 2021, under preparation)).
- Contribution of N₂ fixation to export N:P is ranged from **0.1 to 0.4 %**.
- N:P in subsurface nutrients corresponded to that in export flux indicates the remineralization of export organic matter contributes significantly to subsurface nutrients.

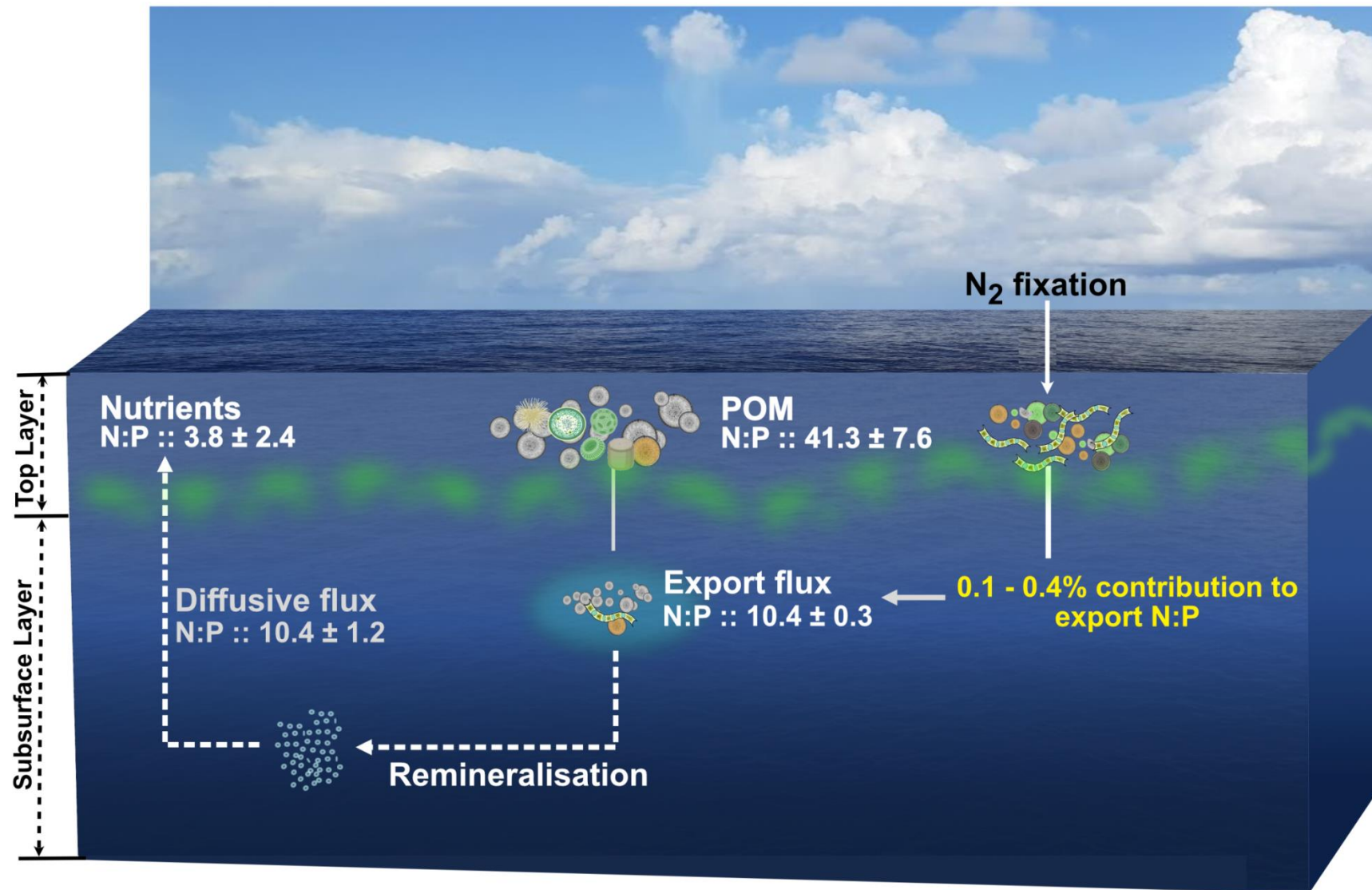


Figure. A schematic representing N:P ratio in the Bay of Bengal during spring 2019. POM: particulate organic matter.