

NITROGEN FIXATION CAN SUPPORT A SUBSTANTIAL FRACTION OF PRIMARY PRODUCTION IN BRAZILIAN WATERS

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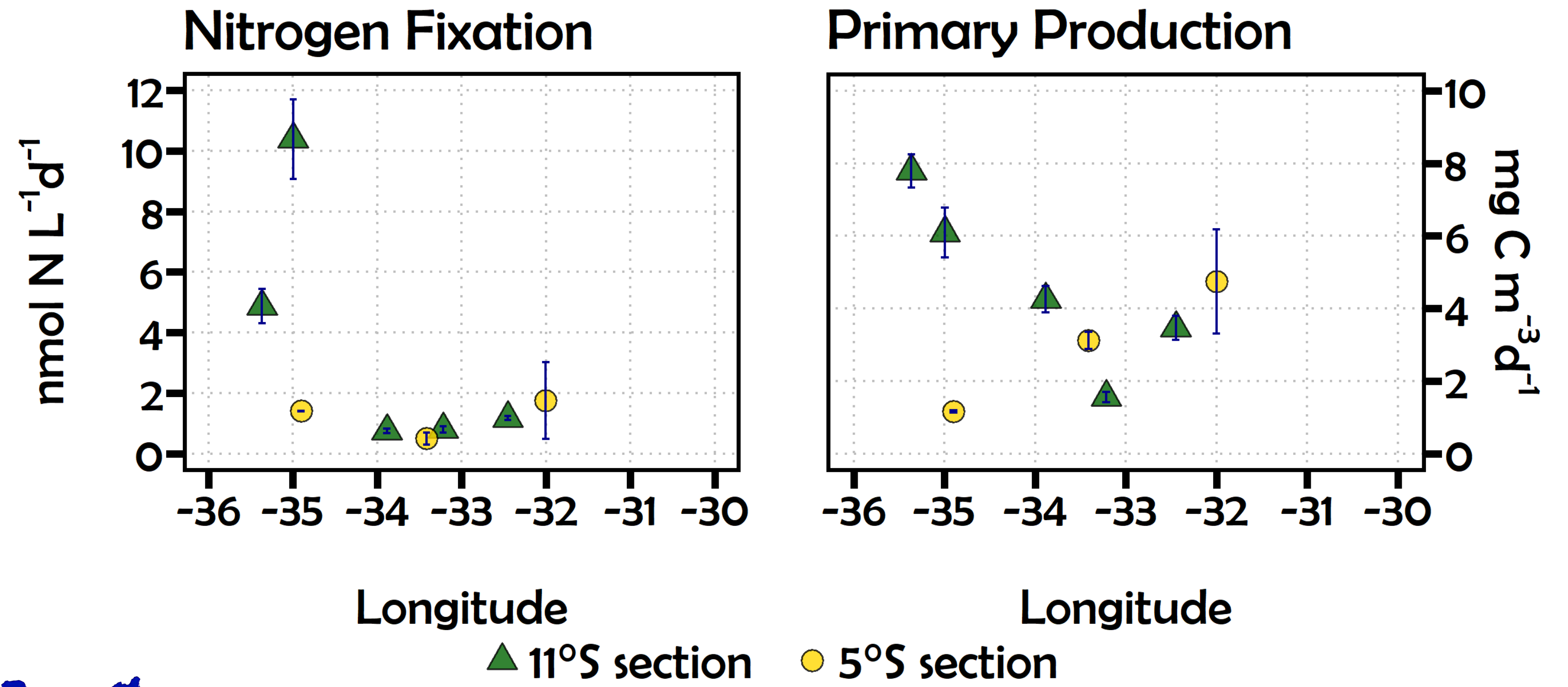
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AIMS

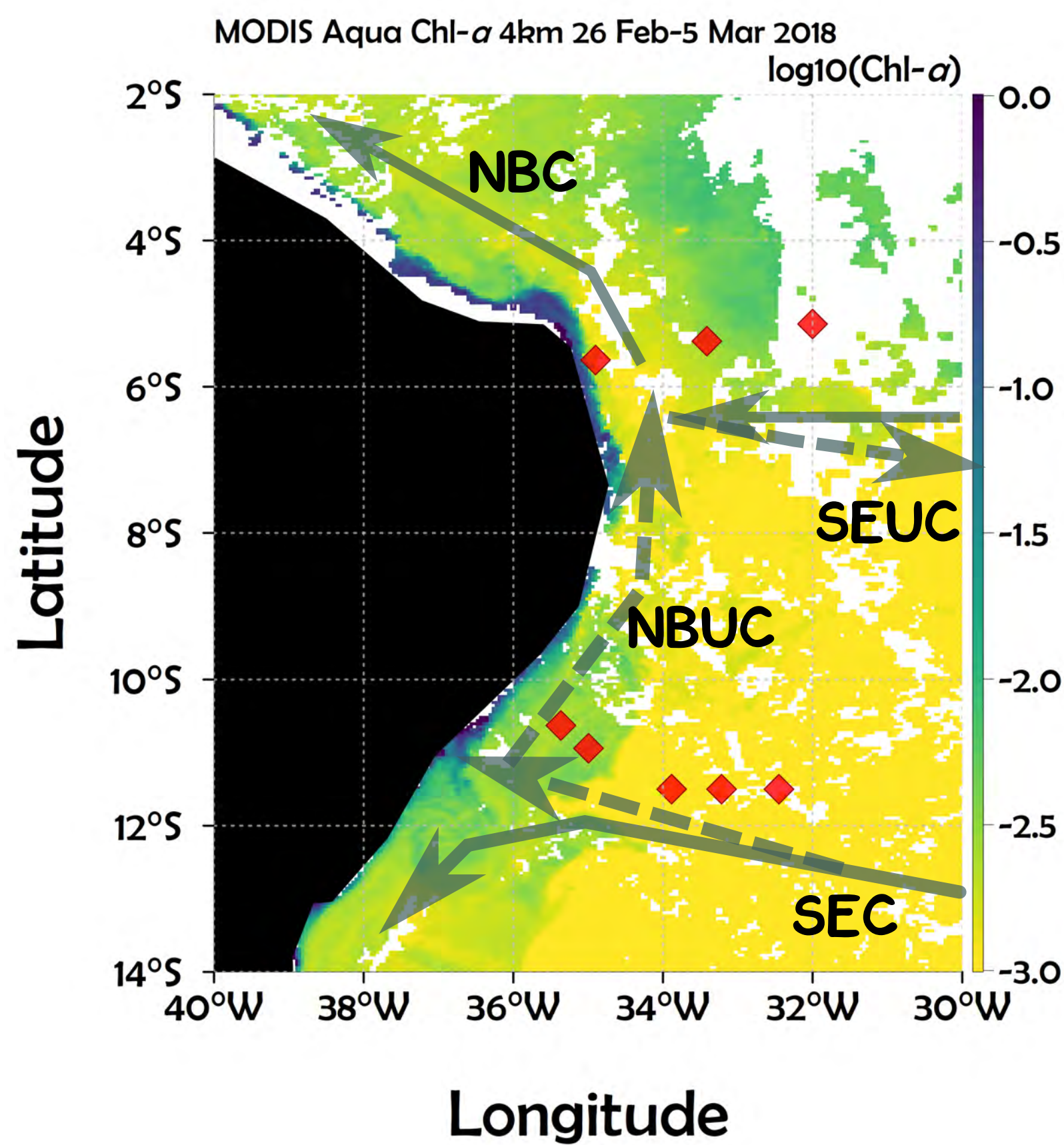
Investigate the persistence of Nitrogen Fixation in near-shore surface waters in Brazil, where Nitrogen Fixers are frequently found (1, 2)

Define how much of this Nitrogen Fixation supplies nitrogen to Primary Producers in these relatively nutrient-poor waters



N₂ Fixation depicted no clear pattern
On the contrary, Primary Production increased to the coast at 11°S and decreased at 5°S, matching the Chlorophyll-a seen by satellite

SAMPLING



8-day MODIS Aqua Chlorophyll-a composite and position of stations sampled between 2-10 March 2018 in Brazilian waters on board RV Meteor during M145 cruise

Chlorophyll-a in off-shore waters of this area was very low (note the range of the log10 scale)

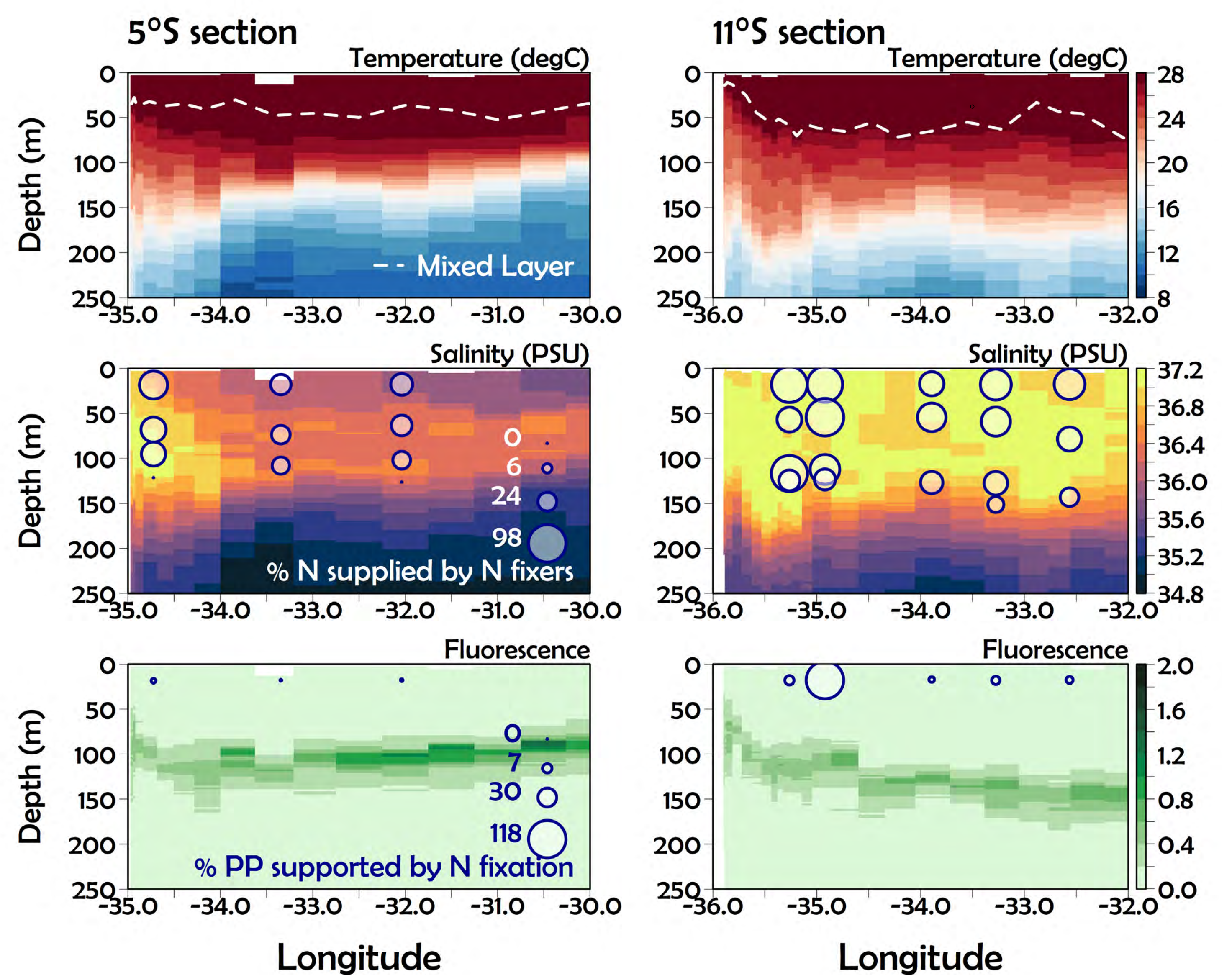
Arrows show a schematic and approximate position of main oceanic currents in this region

Nitrogen Fixation is persistent in Brazilian waters

This New Nitrogen supply locally exceeds the requirements of Primary Producers

SECTIONS

N₂ Fixation imprint in suspended particles is evident, as the $\delta^{15}\text{N}$ of particles was consistently lower than 4‰ (data not shown) in both transects



The highest Nitrogen Fixation rate measured (11°S section) exceeded Primary Producers Nitrogen requirements (118%)

At most depths, Nitrogen Fixation contributed >25% of nitrogen to the community

METHODS

Mixed layer depth estimated by the relative uniform region of potential density approach (3)

Dual tracer (¹⁵N₂ and ¹³C-bicarbonate) 24-h on deck incubations for measuring the rates of total Nitrogen (N₂) Fixation and Primary Production at surface (4, 5)

Suspended particles for defining $\delta^{15}\text{N}$ were sampled at 4 depths

$\delta^{15}\text{N}$ and N content used on a two-end member mass-balance based on deep Nitrate (4.5‰) and Nitrogen Fixers (-2‰) for estimating the % of N supplied by N fixers to the community (6)

Nitrogen Fixation converted to Carbon using Redfield C:N ratio (6.6) and compared to measured rates of Primary Production for estimating the % PP supported by Nitrogen Fixers

WHO TO THANK

We would like to thank all the funding agencies, science fellows, officers and crew of the RV Meteor, and technicians of external facilities who made this work possible at sea and in the lab

WHO TO READ

- (1) Carvalho et al (2008) Braz.J.Oceanogr 56.
- (2) Detoni et al (2016) GBC
- (3) Kara et al (2000) JGR-Oceans
- (4) Montoya et al (1996) AEM 62
- (5) Hama et al (1983) Mar.Biol. 73
- (6) Montoya et al (2002) LJO 47