

PROGRAM SCHEDULE

[Navigate the Schedule](#)[Search Abstracts](#)[Schedule at a Glance](#)[OSM WEB SITE](#)[EVENT HOME PAGE](#)[REGISTRATION](#)[LOGIN](#)

Presenter: Zhou Liang (Florida State University)

Description:

Dissolved organic nitrogen (DON) is the dominant form of bioavailable nitrogen in the euphotic zone of subtropical gyres, where nitrate (NO_3^-) concentrations are low. However, the spatial distribution of DON production and consumption in the surface ocean remains poorly resolved due to the relatively narrow range in euphotic zone DON concentrations. Recently, the stable isotopic composition ($\delta^{15}\text{N}$) of DON has been used to identify DON production and consumption in the surface ocean, making isotopic measurements a more sensitive indicator of DON cycling than concentration measurements alone. Here we report DON concentration and $\delta^{15}\text{N}$ measurements in the upper ~300 m from a zonal transect along ~30°S in the South Pacific (GO-SHIP P06-2017), including samples in the Western South Pacific (154°E-170°W), in the oligotrophic South Pacific Subtropical Gyre (110°W -170°W), and overlying the Oxygen Deficient Zone (ODZ) in the east (78°W-110°W). We observed small variations in surface DON concentrations. Surface DON in Western South Pacific, oligotrophic South Pacific Subtropical Gyre and above the ODZ are $4.6 \pm 1.0 \mu\text{M}$, $4.3 \pm 0.7 \mu\text{M}$, and $4.8 \pm 0.5 \mu\text{M}$, respectively. $\delta^{15}\text{N}$ of DON in the euphotic zone is lower in the west and higher in the east, consistent with distributions of nitrogen fixation and denitrification, respectively, in the South Pacific. Similar decreasing trend in DON $\delta^{15}\text{N}$ in the euphotic zone and subsurface nitrate $\delta^{15}\text{N}$ was observed from the east to the west in the South Pacific, suggesting the $\delta^{15}\text{N}$ in subsurface

nitrate could be imprinted in the DON d15N in the euphotic zone. Low surface ocean DON d15N in the Western South Pacific (2.4 ± 1.8 ‰) and oligotrophic South Pacific Subtropical Gyre (2.6 ± 1.6 ‰) compared with surface ocean DON d15N above ODZ (5.4 ± 2.3 ‰) infer significant low-d15N nitrogen is added to the western South Pacific and oligotrophic South Pacific Subtropical Gyre, potentially from N₂ fixation. Additionally, high DON d15N at $\sim 180^\circ$ was consistent with entrainment of subsurface NO₃⁻ into surface waters due to shallow bathymetry. Together, these observations suggest that DON production and consumption processes operate on timescales adequately fast to produce isotopic gradients across the South Pacific. Comparisons of surface ocean DON d15N with subsurface nitrate d15N constrain the locations and timescales of these processes.

Full list of Authors

- Dario Marconi (Princeton University)
- Daniel Sigman (Princeton University)
- Angela Knapp (Florida State University)

Dissolved Organic Nitrogen Concentration and d15N Distribution along a Zonal Transect in the South Pacific

Category

Scientific Session > CT - Chemical Tracers, Organic Matter and Trace Elements > CT05 The Marine Nitrogen Cycle

Presentation Preference: Either

Supporting Program: None

Student or Profesional? I am a Student