

**Dataset title:**

N2 fixation rates in the water column

**Chief Scientist on cruise:**

Cécile Guieu & Sophie Bonnet

**Data Originator(s):**

Olivier Grosso, Caroline Lory, Sophie Bonnet

**Institute(s):**

M.I.O. Aix-Marseille Université, Univ. Toulon, CNRS, IRD UMR235  
(UM110) Marseille, France

**Contact email(s):**

sophie.bonnet@mio.osupytheas.fr

**Additional contributors:**

Jean-Michel Grisoni

**Project:**

TONGA

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**Dataset abstract:**

N2 fixations rates were quantified in the Western Tropical South Pacific accross trophic and trace metal gradients to investigate the role of trace metals from shallow underwater volcanoes on such activities. This includes samples collected on depth profiles taken at 12 stations, including 2 volcanoes and 2 mooring stations

**Sampling protocol/ collection details:** A dual labelling method was used to measure both inorganic carbon (primary production) and N<sub>2</sub> fixation rates (adapted from Montoya et al., 1996). Seawater was sampled from go flo bottles attached to a Trace Metal Clean Rosette at 12 stations and 6 depths/station in triplicate 2.25 L (1/2 gallon) acid-washed polycarbonate bottles. For N<sub>2</sub> fixation rates determination, bottles were spiked with 2.5 mL of 15N<sub>2</sub> (99 atom%, Eurisotop) and incubated under in situ-simulated conditions for 24h in on-deck incubators. After incubation, each sample was filtered on precombusted (450°C, 4h) GF/F filters and stored in precombusted glass vials at -20°C until analysis onshore.

**Analytical protocol/ method:** Filters were dried at 60°C for 24 h before analysis of 15N/14N ratios and particulate N (PN) determinations using an elemental analyzer coupled to a mass spectrometer (EA-IRMS, Integra CN, SerCon Ltd) as described in Bonnet et al. (2011).

The protocol is adapted from Montoya, J. P., Voss, M., Kahler, P., & Capone, D. G. (1996). A Simple, High-Precision, High-Sensitivity Tracer Assay for N (inf2) Fixation. Appl. Environ. Microbiol., 62(3), 986-993 & Bonnet, S., Grosso, O., & Moutin, T. (2011). Planktonic dinitrogen fixation along a longitudinal gradient across the Mediterranean Sea during the stratified period (BOUM cruise). Biogeosciences, 8(8).