

## Internship Vacancy

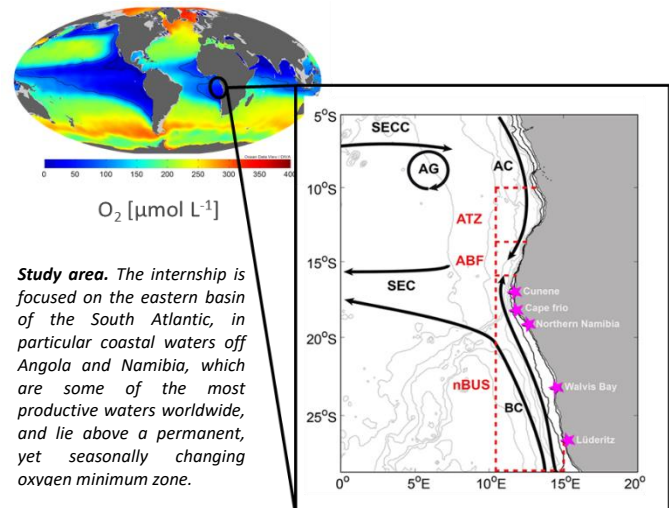
**Title:** Nitrous oxide dynamics in the eastern South Atlantic Ocean

**Type:** MSc internship

**Start:** From July 2023 onwards

### Short project description:

Production and emissions of climate-relevant trace gases from the marine environment is crucial for the Earth's atmosphere. Hence the investigation of their distribution and sea-air fluxes is pivotal for better understanding potential responses of the ocean and the overlying atmosphere to environmental changes such as warming and deoxygenation. Low-oxygen waters connected to coastal upwelling systems and the associated oxygen minimum zones (OMZ) are well-known source of the potent greenhouse gas nitrous oxide ( $\text{N}_2\text{O}$ ). Yet, the differences in distribution and exchange fluxes with the atmosphere between the wind-driven coastal upwelling regime off Namibia and the mixing-driven upwelling off Angola are still poorly constrained. During the R/V Meteor M189 cruise we conducted a comprehensive working program involving biogeochemistry and molecular ecology methods in order to investigate the distribution, formation pathways and air-sea gas exchange, with particular focus on the coupling between nitrogen and sulfur cycles within the OMZ. The focus of the internship is to investigate the dynamics of  $\text{N}_2\text{O}$  in the water column at several selected stations covering the Namibian Upwelling System and the Tropical Angola Upwelling System.



### Relevant literature:

Capone, D., and Hutchins, D. A.: Microbial biogeochemistry of coastal upwelling regimes in a changing ocean, *Nature Geoscience*, 6, 711–717, 2013.

Arévalo-Martínez, et al.:  $\text{N}_2\text{O}$  emissions from the northern Benguela upwelling system, *Geophysical Research Letters*, 46, 3317–3326, 2019.

Sabbaghzadeh, et al.: Meridional and cross-shelf variability of  $\text{N}_2\text{O}$  and  $\text{CH}_4$  in the Eastern-South Atlantic. *Journal of Geophysical Research: Oceans*, 126, e2020JC016878, 2021.

See also cruise reports under: <https://www.lfd.uni-hamburg.de/en/meteor/wochenberichte.html> (M189, 16.04.2023 - 13.05.2023)

### Methods (and training) covered during the internship:

- Headspace gas analysis
- Gas chromatography coupled to electron capture detection (GC-ECD)
- Measurements of inorganic nutrients  $\text{NO}_3^-$  and  $\text{NO}_2^-$
- Biogeochemical data analysis and air-sea gas exchange parameterizations

### Contact:

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