

TOSST Research Expeditions in the North Atlantic Ocean

Ricardo Arruda, Lorenza Raimondi, Patrick Duplessis, Nadine Lehmann, Irena Schulten, Masoud Aali, Yuan Wang, and Scott McCain



Research expeditions in numbers

- **12** graduate students.
- **>380** days at sea within **5** years.
- **12** research institutes / universities involved.
- **10** research vessels from **5** nationalities.
- **12** long term research cruises.
- Interdisciplinary expeditions covering over **10** major areas of earth sciences.

TOSST graduate students

- Out of the total of **23** graduate students in the TOSST program, **12** participated in research expedition (**52%**).



Universities and research Institutes involved



Research vessels

R/V Celtic Explorer



I/B Oden



R/V Atlantic Explorer



CCGS Amundsen



CCGS Hudson



R/V Marcus G. Langseth



R/V Endeavor



R/V Maria S. Merian



R/V Poseidon

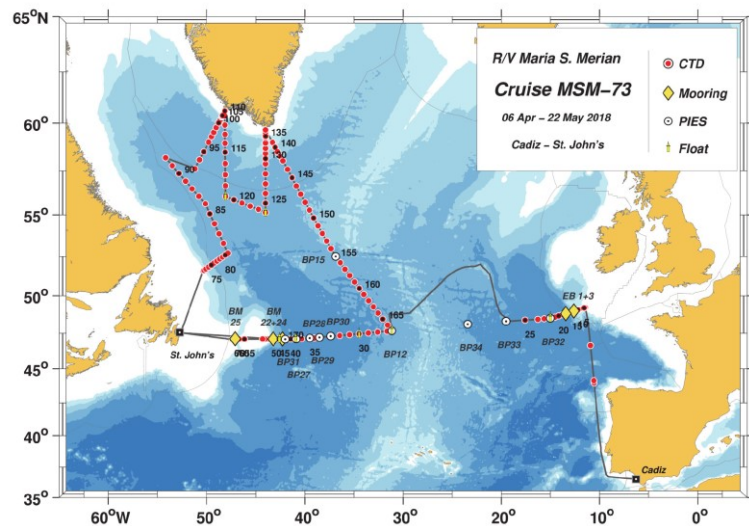


R/V Atlantis

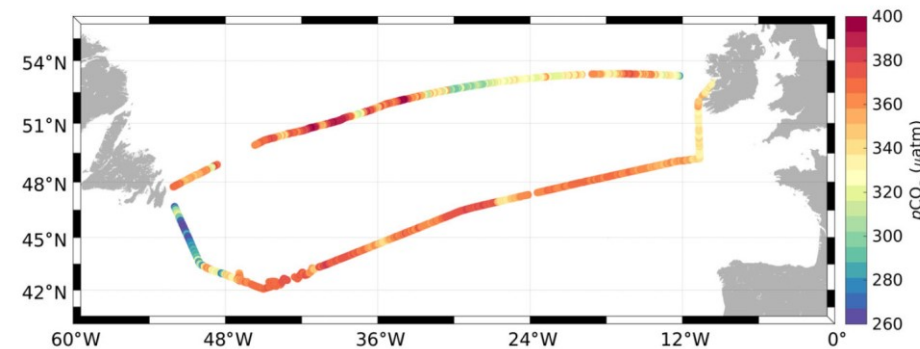


Research Expeditions

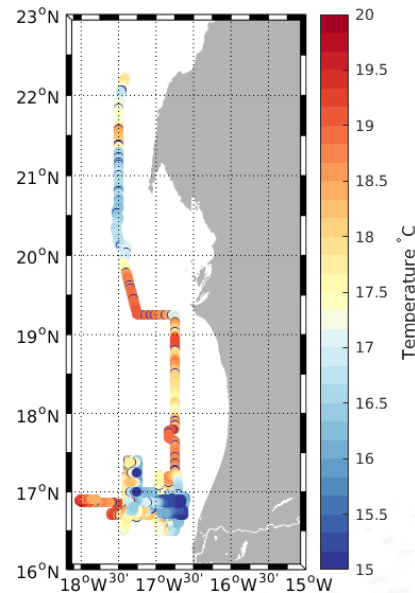
Cross-Atlantic and Labrador Sea



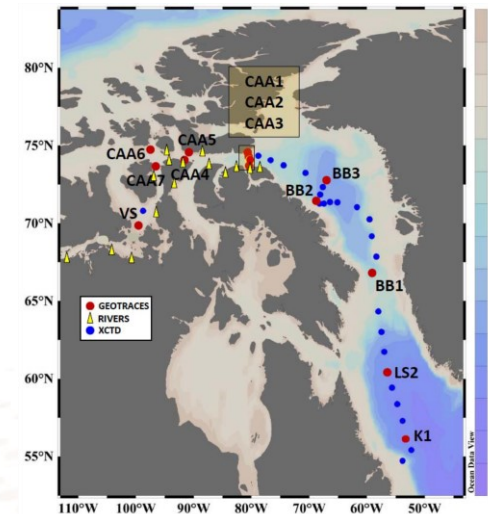
Cross-Atlantic



Mauritania Sea



Arctic Ocean – Davis Strait



Other locations:

- Arctic Ocean: From Svalbard to the North Pole.
- BATS time series.
- Gulf of Maine.
- New Jersey shelf.
- Quebec City to Kugluktuk.
- Nova Scotia shelf.

Measurements and sampling Interdisciplinarity

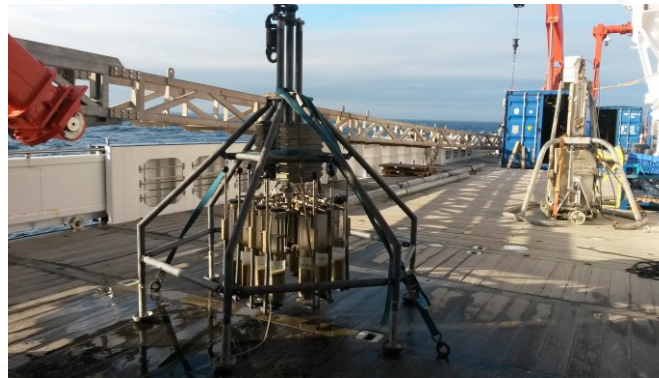
Geophysical and geological



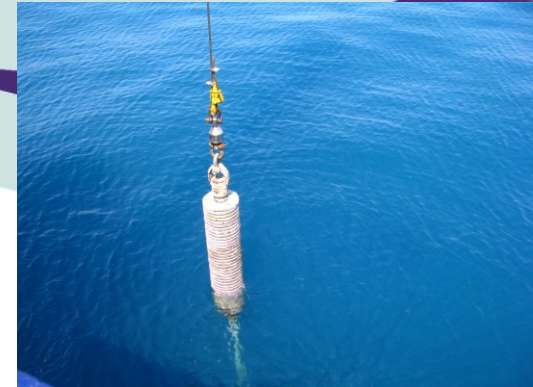
Air gun



Box corer



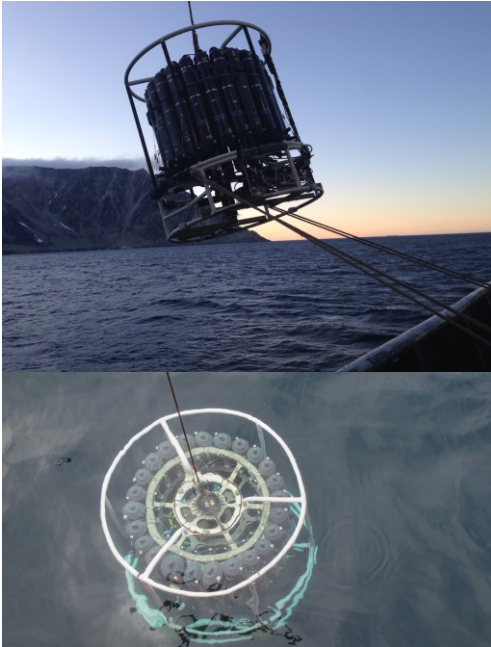
Multi corer



Gravity core / VanSheer

Measurements and sampling Interdisciplinarity

Chemical / Biogeochemical



Rosette water sampling



Biogeochemical drifter



Phytoplankton



Air sampling



Container Laboratory – Carbon



Oxygen measurements

Photo credit: Lisa Hoffman

Measurements and sampling

Interdisciplinarity

Other areas:

- **Physical Oceanography.**
- **Biological Oceanography.**
- **Atmospheric Sciences.**
- **Marine Biology.**
- **Glaciology.**
- **Microbiology.**



Satellite data aid during a research cruise

Importance of research expeditions

- We highlight the importance of multi-disciplinary expeditions and at-sea experiences for professional as well as for personal development of early career scientists.
- Collaboration between disciplines, research institutes and countries (of which TOSST graduates' research is an example) are fundamental in order to increase the quality, quantity and variety of observations in the North Atlantic Ocean.



Thank You!

