Expedition & Outreach Details
Sea2SchoolAU Education Coordinator: Joline Lalime

ANTARCTIC BOTTOM WATER PRODUCTION IN THE PAST: RECORDS FROM MARINE SEDIMENTS

January 25th 2023 – March 12th 2023
aboard, Research Vessel (RV) Investigator

LED BY: Dr Alix Post, Geoscience Australia and Dr Helen Bostock, the University of Queensland
TEAM: Prof. Zanna Chase, Dr Taryn Noble and Dr Linda Armbrecht, the University of Tasmania and Dr Kathy Gunn, CSIRO, as well as, students and other research staff from the various universities and organisations.

Outreach Overview – February 2023

The Sea2SchoolAU Education Program will deliver outreach (ship-to-shore) experiences to students during which I will be moving around the ship providing a virtual tour, interviewing researchers, highlighting the research on deck and in labs on the day and interviewing crew, highlighting the skills and experience required to efficiently run the ship. We will be exploring subjects such as the interconnectedness of the Antarctic and Australian ecosystems and ocean currents, oceanography, sedimentology, ecology and impact of Climate Change. There is state-of-the-art scientific equipment on board and of course an exceptionally skilled crew operating the RV Investigator.

Teachers can book a time (30 minutes – 1 hour) on particular days throughout February to participate with their class in the outreach sessions. There will be different days for Primary and Secondary schools to support the provision of the most appropriate level of information.

I will also be creating resources aligning the research to the Australian Curriculum (e.g. oceanography; climate change; ecosystems), and a Women in STEM series. These resources will be available free after the expedition on various websites.

The CSIRO RV Investigator uses WebEx to communicate during outreach experiences. Schools do not need to download any specialised program and a login code will be provided closer to the Outreach dates.

Please note that due to the availability of the outreach to schools throughout Australia and New Zealand, there may be several classes on at the same time. Scientists or crew interviewed, and research explored on the day will be dependent on the research completed in days prior to the session, sea-state and the amount of sea-ice. However, the aim is to showcase research relevant to the subject matter the students are studying.

The full expedition is from **January 25th – March 12th, 2023,** and can be followed on the **Sea2SchoolAU** Facebook page, Instagram and TikTok. **CANYONS_Voyage** also has a Facebook page, Twitter, blog and Podcast on Spotify.

Contact **Joline Lalime**, through Email: **sea2schoolau@gmail.com**

Important Details required:

1. Teacher Name
2. School Name & Location
3. School Year of Class(es)
4. Number of Students (approximate)
5. Date and Time (2 preferences)

Other useful information:

6. Unit the students are learning about in Term 1, 2023
7. Questions prepared by the students (this can come later)

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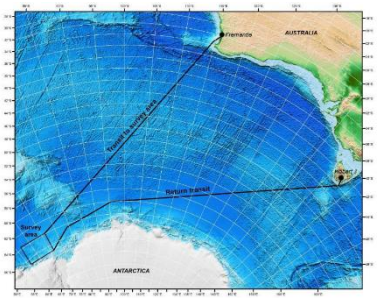
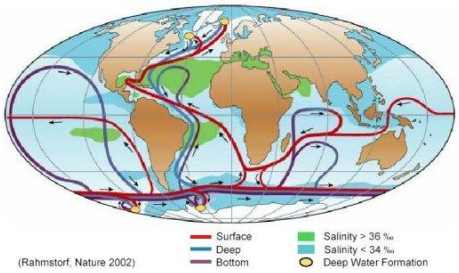
Overview for Teachers:

Key Questions of Expedition
• Understanding the ice-ocean interactions and world ocean circulation? • How have these processes changed over time? • What have been/ are the Climate Change impacts? • What benthic (bottom dwelling) ecosystems are in this region? • Understanding interconnectedness between Antarctic and Australian ecosystems and ocean currents?

Detail:



1. This project will provide the first long-term geoscience datasets from the Cape Darnley region for understanding past changes in the formation of the globally important Antarctic Bottom Water (AABW).
2. Basically, AABW is formed during winter when sea ice freezes, leaving behind highly concentrated and therefore dense saltwater. This dense saltwater, which also has high oxygen concentrations, then sinks to the bottom of the ocean.
3. This region off Cape Darnley was recently established as one of only four regions around the Antarctic margin to produce AABW, an important part of the ocean thermohaline circulation and regulator of global climate.
4. Thermohaline circulation is part of ocean circulation due to differences in density which in turn is dependent on temperature and salinity. The figure below illustrates this concept.



5. Recent increases in global temperatures and ice melt have led to a decline in the formation of AABW over several decades. Understanding changes in AABW production is significant for predicting future oceanographic and climatic change, and potential impacts to local marine ecosystems.
6. The geological record (core samples taken from the bottom of the ocean) can provide insight into the links between AABW production, ocean warming, and ice sheet instability, to inform our understanding of the impacts of future climate change in the Antarctic region.
7. The seafloor will be mapped to identify appropriate locations to collect sediment cores providing records of past changes in AABW production off Cape Darnley.
8. The presence and distribution of hydrocorals in the region will be investigated. If present, their carbonate skeletons will be analysed to understand water mass variability providing data to compliment the sediment core.
9. A CTD instrument (Conductivity, Temperature & Depth) will provide a greater understanding of ocean water's characteristics through the entire water column.
10. A combination of sedimentological, geochemical and biological research, will provide evidence of the nature and timing of past changes in AABW formation.