FRDC Project 2022-007

Trials of oceanographic data collection on commercial fishing vessels

Our oceans are changing and we need measurements to model the future

Recently, marine heatwaves have hit Australian waters leading to temperatures well above normal. These higher temperatures may impact fish populations, and currently we do not know how deep they extend or how they affect fished species.

As part of an FRDC co-funded pilot project, we are working with fishers to collect real-time ocean observations where they matter most. Just like weather stations help increase the accuracy of atmospheric weather forecasting, getting more ocean observations helps us improve ocean models, and help the fishing industry optimise its resources by gaining a better understanding of the relationship between catches and sea temperature.

Sensor attaches to commercial fishing gear

Our technology partner, Zebra-Tech, has developed a compact, low-cost temperature sensor (the Moana sensor) that can be attached to many types of commercial fishing gear. It operates with minimal human intervention and communicates directly to a solar powered deck box.

Fishers collect ocean temperatures

Fishers have always been ocean experts. The Moana sensor puts ocean data collection back into the hands of those who work on, and depend upon, the sea.

We need subsurface marine measurements within Australia's EZZ to understand how the ocean is changing below the surface. International ocean observing programmes such as Argo (www.argo.net) provide some deepwater data offshore but our subsurface coastal waters are not well monitored. Fishing vessels operate in areas where we have few subsurface ocean measurements, and where environmental change is having a huge impact.

There are ~6500 active fishing vessels in Australian waters. This network of fishing vessels can collectively provide cost-effective, real-time subsurface data in our vast EEZ.

What are we asking fishers to do?

We are looking for participants who want to deploy small self-contained temperature sensors on their fishing gear Australia-wide. Participating fishers install the sensor on fishing gear and a standalone, solar-powered deck unit on the vessel. After the installation, the system needs no intervention.

What do fishers get in return?

You will be able to access your individual vessel temperature data. Sensor measurements will be made available online as downloadable files, sent via email within 24 hours, and may be made available via an elogbook platform in the future.

You can compare sensor data with your catch information and understand relationships between catch and temperature.

The data will benefit Australian fisheries & fishers

Small and lightweight: the sensor measures 14.5 cm by 4 cm.

We are working to further the understanding of the link between water temperature at depth and fish distribution and abundance. The fishing industry can provide very valuable ocean observations on an unprecedented scale, which can be used to answer a range of questions. We can use the data in near real time to improve our ocean forecast models. In the longer term, we hope the data will assist in standardising catch rates in our fisheries stock assessment models. Furthermore, better ocean data will improve our understanding of general ocean warming, marine heatwave events, temperature impacts on the relative or total abundance of species, species range shift, and the impact of this on fisheries productivity.

FRDC fishwell UNSW SYDNEY IMOS AODN Australian Ocean Data Network ZEBRA-TECH LTD

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Frequently Asked Questions

Can I attach the sensor to any type of fishing gear?

We can attach the sensors to longlines, netting, pots, and trawling equipment. We have a range of protective housings and brackets to simplify sensor mounting.

What does it cost?

There is no fee for the first 20 vessels to participate in the trial. The deck unit transmits using the mobile network and the data transmission cost is covered by the project.

What data are collected?

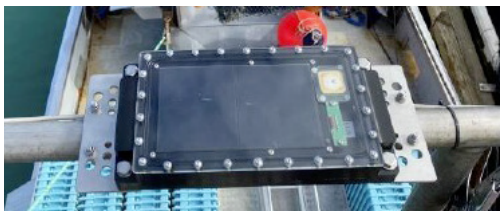
The only information collected and shared will be temperature, depth, time and position at regular intervals during your fishing operations. Detailed vertical temperature profile measuring every 1m depth between the surface and 200m, every 4m between 200m and 1000m on the way up and down, and data every 5 mins while at a constant depth (such as in a pot, or on a line).

What about catch information?

No catch information is collected or shared. This is your private information and we do not have access to it.

How are the data offloaded?

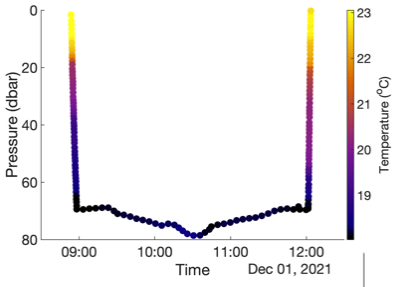
When the Moana sensor comes out of the water, it automatically offloads its data via Bluetooth to a small, standalone, weather-proof, deck unit. You do not need to do anything during this process. Data are then automatically transferred to our secure, cloud-based servers.



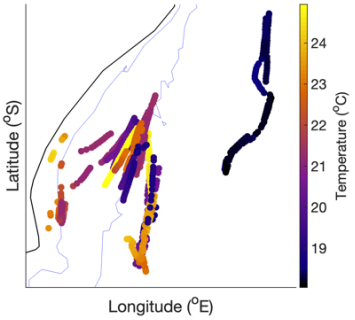
The deck unit.

Where are the measurements stored?

Data are stored on our UNSW database for processing before being publicly share, under the Creative Commons License 4.0, on the Australian Ocean Data Network (AODN; https://portal.aodn.org.au/)



Measurements collected by the sensor are emailed back to the vessel that collected them within 24 hours as a plot and in spreadsheet format.



Will you send details of my fishing to others?

We will share the temperature, depth, time and position data collected publicly on the AODN under the Creative Commons License 4.0. Data sharing can be delayed in time, or aggregated if there are sensitivity issues.

If you are concerned about your fishing location being shared, please speak with us before installing the sensor and deck unit.

How long will the sensor be on my vessel?

The trial period will last for 6-12 months. If additional funding is sourced for ongoing data management and the trial is successful, we can continue the program. The sensor's battery lasts for two years, after which you will need to send it back to us for battery change and sensor recalibration.

Contact details

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