# Fishing gear as a data collection platform: Opportunities to fill gaps in ocean observation networks

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## Fishing gear as a data collection platform

While open oceans are observed by automatic data collection devices, there is a lack of sub-surface physical oceanographic data in coastal and shelf-seas. Commercial fishing gears can act as platform for sensors, which measure physical oceanographic data during fishing operations. While fishermen are catching fish, they can also catch bottom data and then profiles when the net goes down and up.

Quantification and comparison of the existing sub-surface data coverage with fishing activities show that integration with fishing could contribute to filling gaps in existing ocean observation systems in coastal and shelf-seas. Figure 1 maps the mean number of measurements taken by the current sub-surface ocean observation network and the mean of monthly number of fishing events in 2017 and 2018 in Alaska.

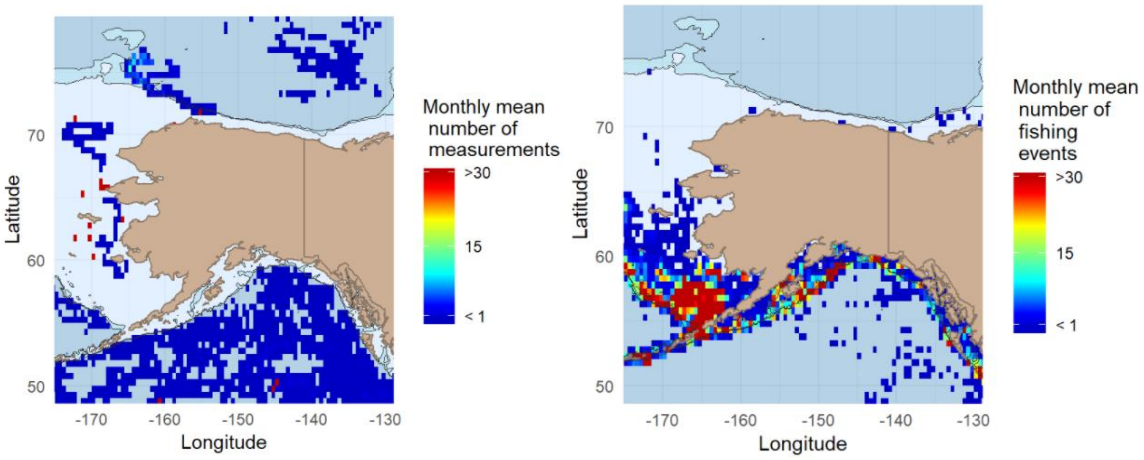


Figure 1: LEFT: Mean monthly number of sub-surface observations. RIGHT: Mean monthly number of fishing events. Data sources: EMODnet Physics, Argo, JCOMMOPS, DBCP, Ocean Sites, IOOS, and Global Fishing Watch.

The pattern shown in Alaska is repeated in most shelf and coastal regions around the world. It is counterintuitive that the holes in our ocean observation networks are close to shore where the majority of maritime activity takes place. These edge zones are subject to more influences and rapid changes compared with the deep ocean such as boundary currents and frontal mixing zones; and therefore, require more in-situ data to accurately monitor and model.

Due to the interdisciplinary use cases for fishing industry operations, fisheries management, as well as operational oceanography there are challenges associated with data standards and management of this type of oceanographic data. Additionally, balancing the needs for industry confidentiality with the FAIR principles for oceanographic is key to the future development and scale-ability of this collaborative approach to ocean observation.

We make the case that fishery data has the potential to complement existing ocean observing systems in areas where oceanographic data is lacking and needed most, in order to meet the needs of ocean data and forecasts users.

## The fishing for data network

There is an emerging network of international scientific and industry programs that have used the approach of collecting oceanographic data with fishing gear as a platform (Figure 2). Results from these

programs demonstrate that collection of ocean data via fishing gear can be successfully implemented by a diverse range of vessel types, locations, and fisheries. Data is now beginning to be assimilated operationally into models.

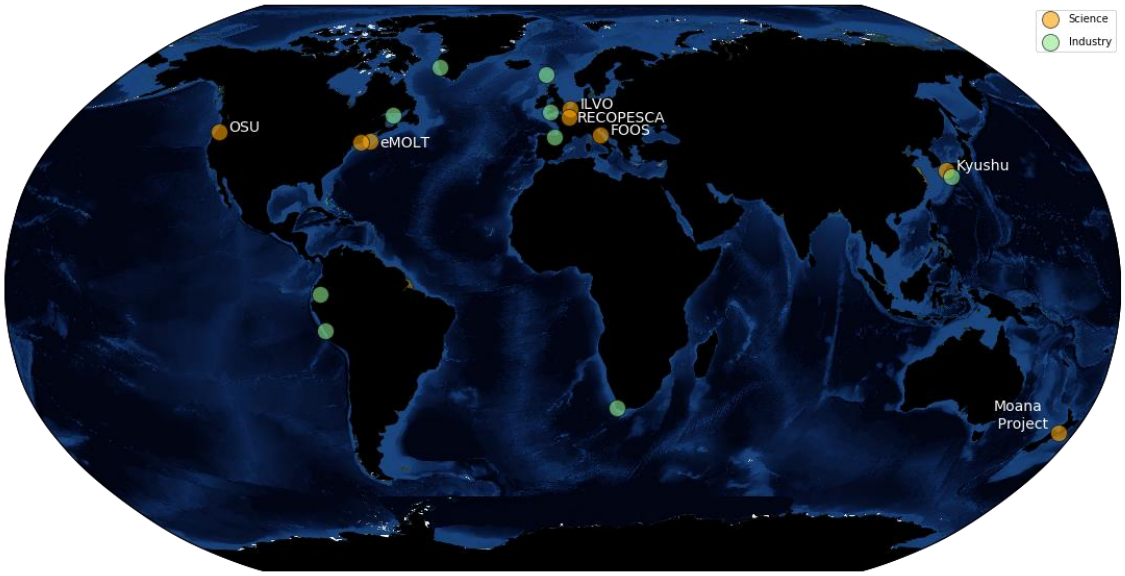


Figure 2: An emerging network of both science and industry lead initiatives in shelf seas around the world.

**Berring Data Collective**

Berring Data Collective (BDC) is an initiative both outfitting vessels and working to promote communication and data standardization between existing programs. Establishing standards, common data management and centralized distribution pathways is key to getting fishing gear as a widely accepted ocean observation platform (Figure 3).

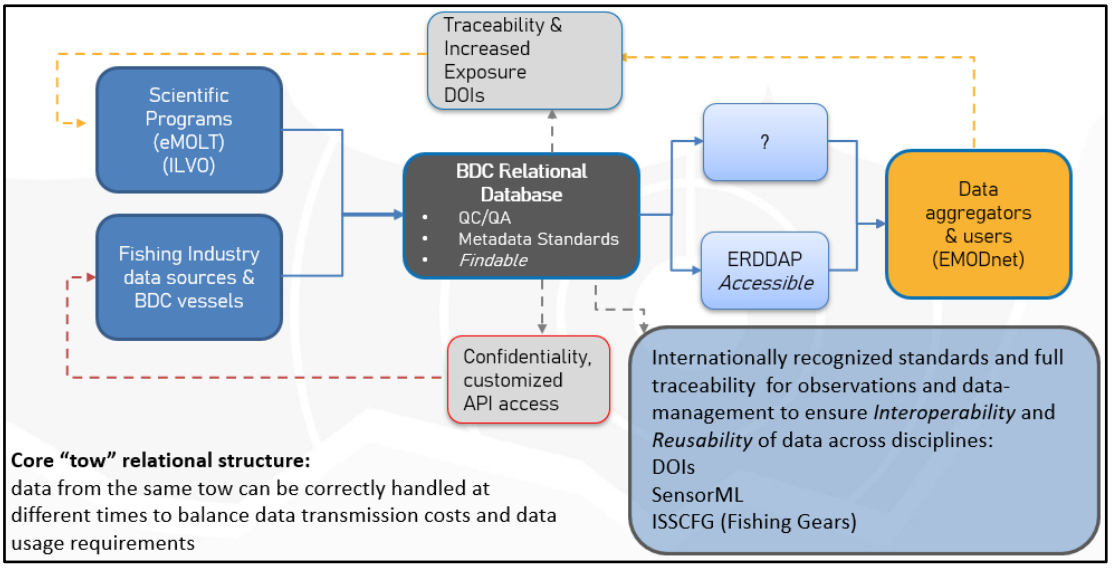


Figure 3: Schematic of the data flow of oceanographic data collected with fishing gear as a platform.

The current centralized data management structures and accompanying data standards are presented, which have been developed in conjunction with EMODnet Physics. Due to the uses for fishing industry operations, there are challenges with data standards and management of this data. Balancing the needs for industry confidentiality with the FAIR principles is key to the future development and scale-ability of this approach to ocean observation. An emerging network of scientific and industry programs is collecting data with fishing gear. We present progress on knowledge sharing, standardization, and data flow for this emerging collaborative approach to ocean observation.