



# The Ship of Opportunity Program

## NOAA's Atlantic Oceanographic and Meteorological Laboratory

The map above shows the shipping lanes throughout the global oceans.

Ships at sea need real-time, accurate and detailed marine forecasts to operate safely and effectively. Marine forecasts depend on continuous ocean observations, and more than 90% of data collected at sea for marine weather forecasts are from cargo ships. Commercial mariners play a crucial role in providing data that NOAA uses to produce these forecasts by collaborating with scientists to outfit their ships (at no cost to the vessel or vessel owner) with small instruments that measure atmospheric and oceanic data.

The Ship of Opportunity Program is a global partnership between the maritime industry and NOAA. It is administered by the UN World Meteorological Organization and the International Oceanographic Commission.

The Atlantic Oceanographic and Meteorological Laboratory (AOML) manages this program for NOAA.

### The Maritime Industry Partners with NOAA to Provide Data for Accurate Marine Forecasts

50  
SHIPS

Collect  
Ocean Data

12k  
SHIPS

Collect  
Meteorological  
Data

50+  
YEARS

Of Data  
Collected  
From Ships

## Ship of Opportunity Applications for Weather Forecasting

The National Weather Service (NWS) uses these data to create publicly available free forecasts. These include not only the marine forecasts that are critical for mariners, but products including marine, aviation, fire, weather, hydrologic, tropical, public and climate forecasts. By aiding NOAA and the National Weather Service to create these forecasts, ships of opportunity perform a global, vital public service.

For mariners, these data are the basis for the National Weather Service's Marine and Coastal Weather Services Branch products. They provide warnings in relation to high Seas, NAVTEX safety information, coastal waters, storm surges, tsunamis, tides, and hurricanes. The NWS also provides text and graphic-based reports on marine and hazardous weather, surface conditions, and global wind and currents.

### How Data Collected from Ships of Opportunity Informs Hazard Forecasts



NAVTEX  
Maritime Safety  
Information



Hazardous  
Weather



High Winds  
and Seas



Hurricanes  
and Typhoons



Storm Surge,  
Currents and  
Tides



Validation for  
Satellite  
Observations

For further information pertaining to ship recruitment please contact: Zach Barton  
(305) 361-4548 or Zach.Barton@noaa.gov  
[www.aoml.noaa.gov/phod](http://www.aoml.noaa.gov/phod) (Ocean Observations)



## Ocean Observations Supported by Deployments from Ships

### Thermosalinographs

ThermoSalinoGraphs (TSG) are instruments that measure salinity and sea surface temperature every 10 seconds, or approximately 100m along the ship track. TSGs are simple instruments; they can be automatically operated, are easy to maintain and calibrate, and their data can be transmitted in real-time. Thermosalinograph observations are critical to initialize weather and climate forecast model results and to validate satellite observations. They are also used to help determine pCO<sub>2</sub> (particulate carbon dioxide) in the water. This helps to determine how and where ocean acidification is happening so we can plan and adapt to it.

Contact Gustavo Goni at [Gustavo.Goni@noaa.gov](mailto:Gustavo.Goni@noaa.gov) for more information regarding TSGs.

### XBTs

EXpendable BathyThermographs (XBTs) are temperature probes that provide vital observations to estimate the heat contained in the upper ocean and in surface currents, which drive sea surface temperatures, a critical ocean variable in determining the location of high and low atmospheric pressure systems. There are two types, regular XBTs and High-Density XBTs. The first can be operated automatically with an instrument launcher, and the second (due to the frequency of observations of 1 point every 2 minutes) requires the temporary installation of an automatic launching system on a stern railing, which will never interfere with normal ship operations, and may require a scientist technician aboard the ship to deploy. The installation will take a few hours and requires vessels to be at a US port to load the equipment onto the ship.

These observations are collected and transmitted in real time and are available to data centers worldwide for weather and climate studies and forecasts. AOML currently maintains 9 high-density transects in the Atlantic Ocean. Other institutions operate similar transects in the Pacific and Indian oceans with the support of AOML.

Contact Gustavo Goni at [Gustavo.Goni@noaa.gov](mailto:Gustavo.Goni@noaa.gov) for more information regarding XBT's.

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(305) 361-4548 or [Zach.barton@noaa.gov](mailto:Zach.barton@noaa.gov)  
[www.aoml.noaa.gov/phod](http://www.aoml.noaa.gov/phod) (Ocean Observations)

### Global Drifter Program

Global drifters measure sea surface temperature and near surface currents and are used in forecasts and for climate monitoring and prediction. A drifter has two parts—a buoy that collects and transmits data to satellites, and a 15-meters drouge. After deployment the drouge extends to measure currents. Some drifters also include sea level pressure, wind speed, direction, and salinity sensors. The drifters are packaged for easy deployment. A crew member simply removes the plastic wrap and tosses the drifter over the side of the ship with its paper wrappings. The paper dissolves, the drouge automatically opens, and the drifter begins transmitting data to passing satellites.

Contact Rick Lumpkin at [Rick.Lumpkin@noaa.gov](mailto:Rick.Lumpkin@noaa.gov) for more information regarding the Drifter program.

### Argo Floats

Argo floats allow for continuous monitoring of the state of the ocean climate and the possibility of extreme weather. Argo floats measure temperature and salinity profiles in the upper 2000m of the ocean by descending for 10 days and then ascending to transmit the data via satellite. This global array provides 120,000 measurements per year. Deployment of Argo floats does not require onboard scientists.

Contact Molly Baringer at [Molly.Baringer@noaa.gov](mailto:Molly.Baringer@noaa.gov) for more information regarding the Argo program.



M/V Oleander participates in the Ships of Opportunity Program.  
Image Credit: NOAA

