

A22 Operational Plan Information

Cruise Track Info:

- 1.) Transit from St. Thomas, USVI (18.3°N, 64.9° W) to the initial station of the hydrographic A22 line (12.6°N, 70° W). A test cast will occur on the transit to the first station, where a Core Argo float will also be deployed.
- 2.) From the first station, the cruise will proceed northeastward, between 70°W and 69.5°W, within the Netherlands Antilles (Aruba) EEZ until station #13 (15.2°N, 69.5°W)
- 3.) From station #13, trajectory bends eastward to station #21 (17.4°W 66°W) and contour Puerto Rico to the east (station #29).
- 4.) After contouring Puerto Rico, the cruise will follow along ~65W, from 18.5°N (station #31) until Bermuda EEZ. From there (32.6°N, 64.9°W; station 66), the cruise will then bend northwestward. The scientific stations will end at 40°N, 70 °W.
- 5.) Transit from the end of the A22 hydrographic line to Woods Hole, MA (41.5° N, 70.7° W).

Description of Operations:

An oceanographic transect in the Atlantic Ocean, between 70° W and 65° W, a repeat of the GO-SHIP Hydrographic Program section A22, is scheduled on R/V Thomas G. Thompson between April XX and May XX, 2021. A proposed cruise track is shown in Figure 1. The science portion of the current track closely follows the previous occupation in 2012, except with closer station spacing on the line's interior portion.

The operations will consist of: 1) 91 Rosette/CTD/LADCP/CHIPODS stations and a test cast during the transit time; 2) 9 Argo float deployments, here called Core Argo; 3) 4 BGC-Argo float deployments; 4) 2 Canadian Arvor floats; 5) 1 Deep SOLO float deployment.

91 stations and 1 test station are planned, with a spacing of approximately 30 nm, except over the shelf and boundary currents (stations 1-10; 22-27; 32-42; and 77 - 91), where spacing will range from ~2-20 nm. At every station, full depth Rosette/CTD/LADCP/FLBB/Transmissometer/CHIPODS casts will be done. The Rosette will be lowered to approximately 10 m from the bottom. During each station, we will collect up to 36 water samples for measurement of various water properties, such as CO₂-related parameters, dissolved CFCs, oxygen, salinity, nutrients, etc. CTD, LADCP, oxygen, fluorometer, and backscatter data will also be collected at each station. For stations outside foreign EEZ with Sargasso presence, we will also collect seaweed samples using a dip net. The collected water samples will be analyzed onboard or stored and shipped later to shore (US) for subsequent analysis.

We will monitor and collect data from the standard meteorological sensors (wind speed and direction, air temperature) mounted on the ship's meteo tower. We will also monitor the ship-mounted underway bathymetry from the multibeam (full swath not required).

For the deployment of the Rosette, chief and co-chief scientists/ODF personnel/students will communicate with the marine technicians/crew for winch operations. At the end of each cast, scientists and technicians will draw water samples from the Rosette Niskin bottles while the ship is underway.

Several different types of floats will be deployed (Table 1): 9 WHOI Argo Core floats, 1 WHOI Deep SOLO float, 4 UW biogeochemical (BGC) floats from the biogeochemical Argo project, and 2 Canadian Arvor floats (in the same station) will be deployed. All floats will be deployed at CTD stations, except the first Core Argo that will be deployed in the test station during transit. BGC floats will require slow steaming away from station during deployment. Tests and main preparation of the floats will be done at port during the mobilization. The co-chief scientist will be in charge of the deployment operations, and she, the chief-scientist and/or a CTD watchstander, will assist the marine technician with the deployment procedure from the aft deck of the vessel.

Table 1: Nominal location & Stations of A22 Float Deployments

Float Type	Station	Latitude	Longitude
BGC 01	18	16° 32' N	67° 21'W
BGC 02	49	23° 49' N	65° 48'W
BGC 03	59	28° 49' N	65° 28'W
BGC 04	69	33° 47' N	65° 60'W
ARVOR 01	18	16° 32' N	67° 21'W
ARVOR 02	18	16° 32' N	67° 21'W
DEEP 01	17	16° 16' N	67° 47'W
CORE 01	Transit/test	15° 12' N	67° 42'W
CORE 02	11	14° 09' N	69° 42'W
CORE 03	13	15° 12' N	69° 31'W
CORE 04	15	15° 44' N	68° 39'W
CORE 05	20	17° 04' N	66° 28'W
CORE 06	40	19° 41' N	65° 60'W
CORE 07	45	21° 50' N	65° 55'W
CORE 08	52	25° 19' N	65° 42'W
CORE 09	55	26° 49' N	65° 36'W



Figure 1: U.S. GO-SHIP A22 and A20 planned cruise tracks.