

GO-SHIP: Data and Programs

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1. Data download: <https://cchdo.ucsd.edu/>

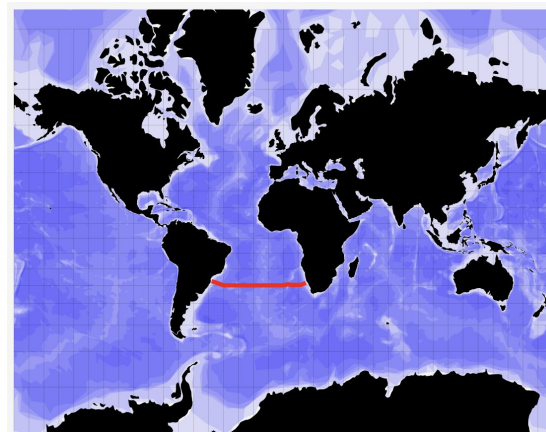
The screenshot shows the CCHDO website interface. At the top, there is a navigation bar with 'CCHDO', 'Home', 'Find Data', 'Submit Data', and 'Information'. A search bar is located on the right side of the navigation bar. Below the navigation bar, there is a 'Map Search' dropdown menu that is open, listing various data sources: Arctic Ocean Data, Atlantic Ocean Data, Pacific Ocean Data, Indian Ocean Data, Southern Ocean Data, GO-SHIP Data, SOCCOM Data, USHYDRO Data, WOCE Data, DIMES Data, ELLETT Data, Project Carina Data, HOT Data, BATS Data, Advanced Search, Derived Products, and Full Dataset Snapshots. The main content area is divided into two columns. The left column contains a 'Welcome to the CCHDO' message, a 'Search' section with a search box, and 'Additional Tools' including 'Argovis Ship-Based Profiles Collection' and 'Download Everything'. The right column contains a 'News' section with several articles, including 'Monthly Cruise Report & Data Updates' and 'GO-SHIP Award Announcement'.

Example:

a) Search A10 2011

b) Download ctd data: **CF netCDF:**
[3RO20110926_ctd.nc](https://cchdo.ucsd.edu/data/3RO20110926_ctd.nc)

c) Download documentation: **pdf:**
[a10_33RO20110926_do.pdf](https://cchdo.ucsd.edu/docs/a10_33RO20110926_do.pdf)



2. Check data

- a) Convert .nc ctd file to .mat files with the following scripts:
 - [script_nc_to_mat.m](#)
 - [read_nc_ctd.m](#)
 - [make_stas_nc.m](#)

- b) Station check:
 - Check if there are repeated ctd stations (more casts) and remove the wrong one.
 - There can be holes in the stations where the sensors have failed.
 - Check that the stations are in order west to east.

Summary

This cruise was a reoccupation of a longitudinal section nominally along 30S (WOCE Section A10, occupied in 2003 and 1993). Operations included CTDO/LADCP/rosette casts nominally at half-degree spacing. Underway data collected included upper-ocean currents from the shipboard ADCP, surface oceanographic and meteorological parameters from the ship's underway systems, and bathymetric data. Ancillary operations included surface drifter deployments and Argo float deployments.

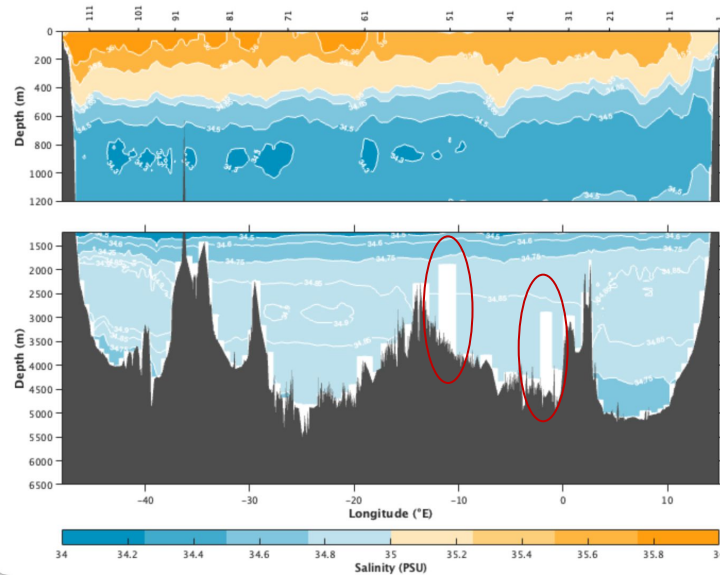
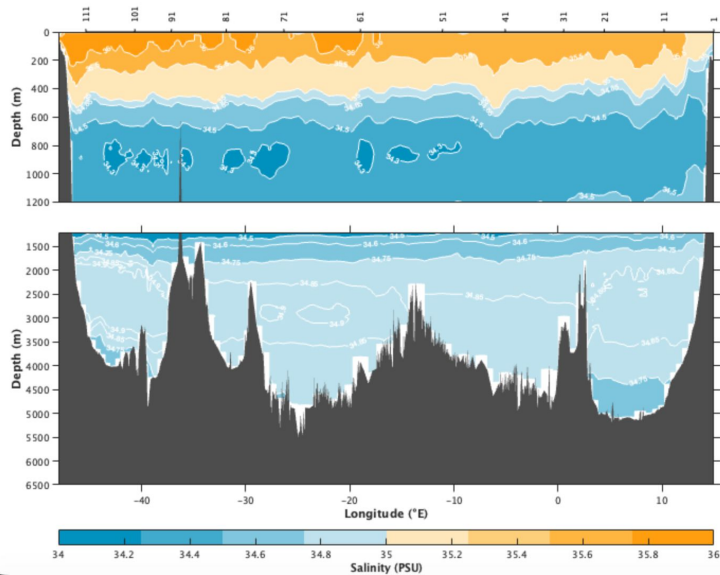
NOAA Ship Ronald H. Brown first departed Cape Town, South Africa on August 28, 2011 at 1000 UTC. A successful test cast to 462 meters was completed on August 30. After three days at sea, the ship returned to Cape Town on August 31 at 0700 UTC for repairs to the port thruster. After a 12-day delay, the ship was underway again on September 13 at 1200 UTC for sea trials, which were unsuccessful, so the ship returned to Cape Town for another 12-day delay. Finally, the ship departed on September 26, 2011 at 1000 UTC to begin the cruise after successful sea trials and a successful test cast to 400 meters. The cruise ended in Rio de Janeiro, Brazil on October 31, 2011.

A total of 120 stations were occupied during A10 and 122 CTDO/LADCP/rosette casts were collected, including a designated black carbon cast at station 35 and a second cast at station 51 after a winch failure. Fifteen Argo floats and ten surface drifters were deployed. CTDO data, LADCP data, and water samples (up to 24) were collected on most casts, in most cases to within 10 meters of the bottom.

Salinity, dissolved oxygen, and nutrient samples were analyzed for up to 24 water samples from each cast of the principal CTDO/LADCP/rosette program. Water samples were also measured for CFCs, pCO₂, Total CO₂ (DIC), Total Alkalinity, and pH. Additional samples were collected for ³He, Tritium, 13C/ ¹⁴C, DOC, DON, and POC.

3. Vertical sections

- a) Compute the total matrix of the stations: `A10_2011.m` & `get_stas_A10_2011.m`
- b) Plot the vertical sections: `example_vertical_section_salinity.m`

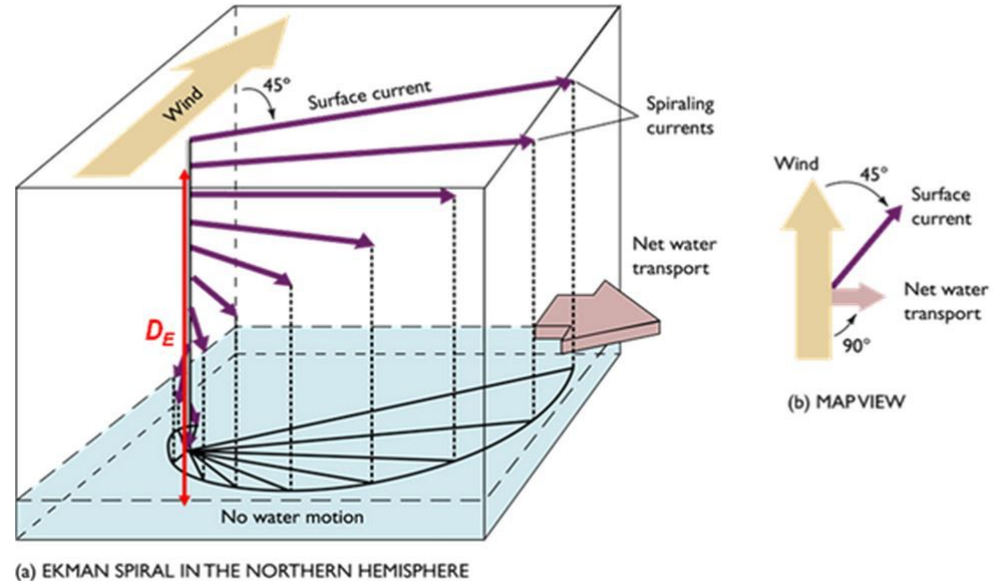


Note: gaps in the vertical section are due to stations with bad or missing data that have not been removed. Check and filter these stations before plotting.

4. Compute Ekman Transport

Ekman transport is defined as the movement of ocean water caused by wind friction, resulting in water displacement at approximately 90° angles to the wind direction due to the Coriolis effect.

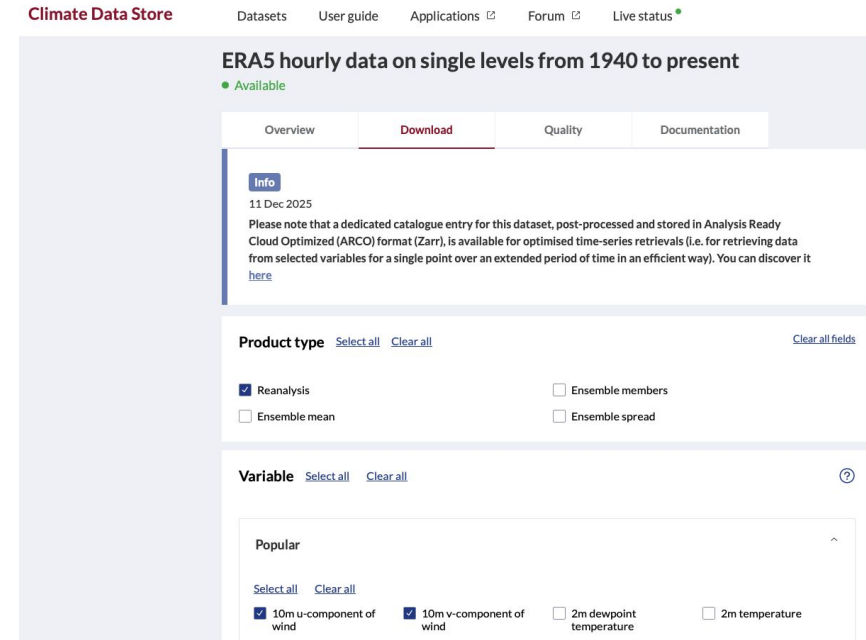
It plays a crucial role in wind-driven ocean currents and influences biogeochemical processes by generating upwelling and downwelling.



4. Compute Ekman transport

- Download wind reanalysis data e.g. ERA5 reanalysis:
<https://cds.climate.copernicus.eu/datasets/reanalysis-era5-single-levels?tab=overview>
you need to create an account
- We use the wind data during the time of the cruise: Sep - Oct 2011
- Download 10m u-component and 10m v-component of wind.
- Select latitude -30 and longitude range of the section: -48 to 15
- Ekman transport ≈ 0.3 Sv

Script: [compute_ekman.m](#)



The screenshot shows the Climate Data Store interface for the dataset "ERA5 hourly data on single levels from 1940 to present". The page includes a navigation bar with links for Datasets, User guide, Applications, Forum, and Live status. The main content area has tabs for Overview, Download, Quality, and Documentation. An "Info" section dated 11 Dec 2025 provides details about the dataset's format and availability. Below this, there are sections for "Product type" and "Variable" selection. The "Product type" section has checkboxes for "Reanalysis" (checked), "Ensemble mean", "Ensemble members", and "Ensemble spread". The "Variable" section has a "Popular" filter and checkboxes for "10m u-component of wind" (checked), "10m v-component of wind" (checked), "2m dewpoint temperature", and "2m temperature".

5. Compute Initial Geostrophic Transport

- a) Run the following scripts to compute the initial transport of the transatlantic section:
`circ3s_A10_2011.m`, `mk_circ2_A10_2011.m` & `get_stas_A10_2011.m`
- b) Error in `mk_geovel` → the problem is in the data, not the script

Do not modify the scripts. When `mk_geovel` throws an error, the cause is incorrectly stored station data (e.g., `DYNH` contain `NaN`). Identify the failing station pair from the error message and fix the underlying `.mat` file.

- c) Missing `DYNH` data → fix by averaging neighbouring stations

*Station 48 (average `DYNH` from stations 47 and 49).
Station 69 (average `DYNH` from stations 68 and 70).*

- d) Run the scripts again. Output → `trans_massa_A10_2011.mat` & `vel_A10_2011.mat`