

DYNAMO Sub Surface Mooring Data



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1. Data Set Overview:

During DYNAMO, three surface/subsurface pairs of moorings were deployed by the R/V *Roger Revelle* during cruise leg 1 in mid-September 2011. The mooring sites are denoted D1, D2, and D3.

Time period: 3 September 2011 – 1 January 2012.

Physical location: The mooring locations and data periods were as follows:

D1	0°N, 78.9°E	11 Sep. 2011 – 20 Nov. 2011
D2	1.5°S, 78.8°E	11 Sep. 2011 – 21 Jan. 2012
D3	9.7°S, 78.5°E	11 Sep. 2011 – 6 Jan. 2012

Data source: Subsurface moored buoys.

2. Instrument Description

Temperature, salinity, and pressure were measured using a moored CTD

In the top ~100 m, Seabird MicroCAT SBE37-IMP was used to measure pressure, conductivity, and temperature. See the attachment for further details.

Subsurface temperatures below ~100 m were measured using HOBO U12-O15 temperature sensors with the following specifications:

Measurement range: -40° to 125°C (-40° to 257°F)

Accuracy: ± 0.25°C from 0° to 50°C (± 0.45°F from 32° to 122°F)

Resolution: 0.03°C at 25°C (0.05°F at 77°F)

Currents were obtained using Acoustic Doppler Current Profiler (ADCP) with frequencies of 75 kHz, 300 kHz, and 1200 KHz. See the attachment for specifications.

3. Data Collection and Processing

Salinity was derived using the conductivity. Subsurface temperature, salinity, and currents were averaged to hourly and daily mean temporal resolution. The data were transmitted in real time using an Iridium data transmission system. The original Matlab format data were provided by Barry Ma at UW/APL. These data were converted in to CF Compliant NetCDF. No additional quality control was done.

4. Data Format

There is one data file for each surface mooring. The data are in CF compliant NetCDF format.

```
dimensions:
    time = 3085 ;
    time_daily = 129 ;
    depth_levels = 17 ;
    site = 1 ;
variables:
    double site_lat(site) ;
        site_lat:units = "degrees_latitude" ;
        site_lat:long_name = "Site Latitude" ;
    double site_lon(site) ;
        site_lon:units = "degrees_longitude" ;
```

```

        site_lon:long_name = "Site Longitude" ;
double time(time) ;
    time:units = "seconds since 1970-1-1 0:00:00 0:00" ;
    time:notes = "Time for hourly time resolution data." ;
double time_daily(time_daily) ;
    time_daily:units = "seconds since 1970-1-1 0:00:00 0:00" ;
    time_daily:notes = "Time for daily time resolution data." ;
float t(depth_levels, time) ;
    t:units = "degree_Celsius" ;
    t:standard_name = "sea_water_temperature" ;
    t:long_name = "Hourly Sea Water Temperature" ;
float t_daily(depth_levels, time_daily) ;
    t_daily:units = "degree_Celsius" ;
    t_daily:standard_name = "sea_water_temperature" ;
    t_daily:long_name = "Daily Sea Water Temperature" ;
float s(depth_levels, time) ;
    s:units = "PSU" ;
    s:standard_name = "sea_water_salinity" ;
    s:long_name = "Hourly Sea Water Salinity" ;
float s_daily(depth_levels, time_daily) ;
    s_daily:units = "PSU" ;
    s_daily:standard_name = "sea_water_salinity" ;
    s_daily:long_name = "Daily Sea Water Salinity" ;
float pressure(depth_levels, time) ;
    pressure:units = "dbar" ;
    pressure:standard_name = "sea_water_pressure" ;
    pressure:long_name = "Hourly Sea Water Pressure" ;
float pressure_daily(depth_levels, time_daily) ;
    pressure_daily:units = "dbar" ;
    pressure_daily:standard_name = "sea_water_pressure" ;
    pressure_daily:long_name = "Daily Sea Water Pressure" ;
float pden(depth_levels, time) ;
    pden:units = "kg m-3" ;
    pden:standard_name = "sea_water_potential_density" ;
    pden:long_name = "Hourly Sea Water Potential Density" ;
float pden_daily(depth_levels, time_daily) ;
    pden_daily:units = "kg m-3" ;
    pden_daily:standard_name = "sea_water_potential_density" ;
    pden_daily:long_name = "Daily Sea Water Potential Density" ;

// global attributes:
    :Conventions = "CF-1.7" ;
    :title = "DYNAMO Sub-Surface Mooring \"D1\" Data: Dynamo Legacy
Collection" ;
    :institution = "University of Washington Applied Physics Laboratory" ;
    :contact = "Ren-Chieh Lien (rcl@uw.edu), Brandon Kerns
(bkerns@uw.edu)" ;
    :source = "Moored buoy surface observations" ;
    :history = "Brandon Kerns obtained the data from Ren-Chieh Lien and
Barry Ma in January 2018 and converted from Matlab format to netcdf format." ;
    :references = "" ;
    :comment = "DYNAMO moorings were deployed by the R/V Revelle during
mid September 2011. This file contains the subsurface ocean measurements are provided
at hourly and daily resolution." ;
}

```

5. Data Remarks

The data can be accessed using the myriad of software that is able to interact with NetCDF format files, including ncdump, ncview, Matlab, Python, IDL, and NCL.

Hourly and daily mean data are provided.

6. References

Chi, Nan-Hsun, Ren-Chieh Lien, Eric A. D'Asaro, and Barry B. Ma, 2014: The surface mixed layer heat budget from mooring observations in the central Indian Ocean during Madden–Julian Oscillation events. *J. Geophys. Res. Oceans*, **119**, 4638-4652. <https://doi.org/10.1002/2014JC010192>.