

# Southern Ocean 2001 moorings: LOW PASS depth and pressure vs. time from ARSV Laurence M. Gould LMG0103, LMG0201A in the Southern Ocean from 2001-2002 (SOGLOBEC project)

Website: <https://www.bco-dmo.org/dataset/3256>

Version: 10 Nov. 2009

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## Project

» [U.S. GLOBEC Southern Ocean](#) (SOGLOBEC)

## Program

» [U.S. GLOBal ocean ECosystems dynamics](#) (U.S. GLOBEC)

| Contributors                         | Affiliation   | Role                      |
|--------------------------------------|---|---------------------------|
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## Dataset Description

"As part of the SO GLOBEC field program, the Woods Hole Oceanographic Institution (WHOI) deployed an array of instrumented subsurface moorings near Marguerite Bay during March 2001- March 2002 and a second array during March 2002-March 2003 (Figure 1). The moored measurements included pressure, temperature, conductivity, velocity, acoustic backscatter, and ice thickness. To monitor surface forcing during the moored array observations, two automatic weather stations (AWSs) were deployed on islands in Marguerite Bay and time series of wind, air temperature, pressure, and relative humidity were collected from May 2001 through March 2003.

The primary goals of this effort were to measure the temporal and spatial variability of currents and physical and biological water properties in the study area on time scales from hours to seasonal, improve our description and understanding of the regional general circulation, and identify and describe those physical processes that make this region well suited for krill production and survival." [from technical report [WHOI-2005-07.pdf](#) (10.2 MB)]

## Methods & Sampling

See [WHOI-2005-07.pdf](#) (10.2 MB)]

Rotation angle (rotangle): The basic coordinate system is x(east) and y (north); the x and y velocity

components are  $u$  and  $v$ . for some analysis, the coordinate and velocity are rotated into a local isobath coordinate system, where  $x_r$  and  $y_r$  are the rotated coordinates and  $u_r$  and  $v_r$  are the rotated velocity components.  $rotangle$  is the angle that the rotated  $x_r$  and  $u_r$  point in, measured in degrees counterclockwise from east. In the A1 case,  $rotangle = -152$  degrees. Thus, the  $x_r$  axis has been rotated 152 degrees clockwise (due to the negative sign on  $rotangle$ ) from  $x$  (east). The governing complex equation (as it is written in matlab) is:

$$u_r + i*v_r = \exp(i*\pi*rotangle/180)*(u + i*v) \text{ where } i = \text{sqrt}(-1).$$

## Data Processing Description

See [WHOI-2005-07.pdf](#) (10.2 MB)]

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## Data Files

| File  |
|---|
| <b>moor_so_lp_2001_pr.csv</b> (Comma Separated Values (.csv), 9.20 MB)<br>MD5:79a13edd3c2602844fe6cfc4d7ca3cb3<br>Primary data file for dataset ID 3256 |

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## Parameters

| Parameter  | Description  | Units           |
|------------|--|-----------------|
| year_start | starting year of mooring deployment  |                 |
| lat        | latitude, negative = South   | decimal degrees |
| lon        | longitude, negative = West   | decimal degrees |
| depth      | depth of instrument, negative = height above sea surf.   | meters          |
| hour_gmt   | time GMT in hours (0-23)   | whole hours     |
| minute_gmt | time GMT in minutes (0-59)   | whole minutes   |
| day_gmt    | day of month GMT (1-31)  |                 |
| month_gmt  | month of year GMT (1-12)   |                 |
| year       | year   |                 |
| mooring    | mooring identification   |                 |
| depth_w    | water depth  | meters          |
| yrday_gmt  | GMT day and decimal time, as 326.5 for the 326th day of the year, or November 22 at 1200 hours (noon).   |                 |
| press      | water pressure at measurement; depth reported as pressure; positive number increasing with water depth   | decibars        |
| rotangle   | The angle that the rotated coordinates, xr, and the rotated velocity components, ur, point - measured in degrees counterclockwise from east (see more in Acquisition section, above) | degrees         |

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## Instruments

|   |  |
|---|--|
| <b>Dataset-specific Instrument Name</b> | Acoustic Doppler Current Profiler  |
| <b>Generic Instrument Name</b>          | Acoustic Doppler Current Profiler  |
| <b>Generic Instrument Description</b>   | <p>The ADCP measures water currents with sound, using a principle of sound waves called the Doppler effect. A sound wave has a higher frequency, or pitch, when it moves to you than when it moves away. You hear the Doppler effect in action when a car speeds past with a characteristic building of sound that fades when the car passes. The ADCP works by transmitting "pings" of sound at a constant frequency into the water. (The pings are so highly pitched that humans and even dolphins can't hear them.) As the sound waves travel, they ricochet off particles suspended in the moving water, and reflect back to the instrument. Due to the Doppler effect, sound waves bounced back from a particle moving away from the profiler have a slightly lowered frequency when they return. Particles moving toward the instrument send back higher frequency waves. The difference in frequency between the waves the profiler sends out and the waves it receives is called the Doppler shift. The instrument uses this shift to calculate how fast the particle and the water around it are moving. Sound waves that hit particles far from the profiler take longer to come back than waves that strike close by. By measuring the time it takes for the waves to bounce back and the Doppler shift, the profiler can measure current speed at many different depths with each series of pings. (More from WHOI instruments listing).</p> |

|   |   |
|---|---|
| <b>Dataset-specific Instrument Name</b> | MicroCat  |
| <b>Generic Instrument Name</b>          | CTD Sea-Bird MicroCAT 37  |
| <b>Generic Instrument Description</b>   | The Sea-Bird MicroCAT CTD unit is a high-accuracy conductivity and temperature recorder based on the Sea-Bird SBE 37 MicroCAT series of products. It can be configured with optional pressure sensor, internal batteries, memory, built-in Inductive Modem, integral Pump, and/or SBE-43 Integrated Dissolved Oxygen sensor. Constructed of titanium and other non-corroding materials for long life with minimal maintenance, the MicroCAT is designed for long duration on moorings. In a typical mooring, a modem module housed in the buoy communicates with underwater instruments and is interfaced to a computer or data logger via serial port. The computer or data logger is programmed to poll each instrument on the mooring for its data, and send the data to a telemetry transmitter (satellite link, cell phone, RF modem, etc.). The MicroCAT saves data in memory for upload after recovery, providing a data backup if real-time telemetry is interrupted. |

|   |   |
|---|---|
| <b>Dataset-specific Instrument Name</b> | Sea-Bird Seacat CTD   |
| <b>Generic Instrument Name</b>          | CTD Sea-Bird SEACAT   |
| <b>Generic Instrument Description</b>   | The CTD SEACAT recorder is an instrument package manufactured by Sea-Bird Electronics. The first Sea-Bird SEACAT Recorder was the original SBE 16 SEACAT developed in 1987. There are several model numbers including the SBE 16plus (SEACAT C-T Recorder (P optional)) and the SBE 19 (SBE 19plus SEACAT Profiler measures conductivity, temperature, and pressure (depth)). More information from Sea-Bird Electronics. |

|   |   |
|---|---|
| <b>Dataset-specific Instrument Name</b> | ice profiler  |
| <b>Generic Instrument Name</b>          | Ice Profiling Sonar   |
| <b>Generic Instrument Description</b>   | The ASL Environmental Sciences (e.g. IPS4 or IPS5) ice profiler is an upward looking sonar device deployed on a mooring for measuring ice keel drafts. The distance between the instrument and the bottom of the ice is measured by sonar at an operating frequency of 420 kHz with a beam width of 1.8 degrees and sampling rate of up to 2Hz. Water depth is measured by a pressure sensor and ice draft is calculated by the difference. |

|   |   |
|---|---|
| <b>Dataset-specific Instrument Name</b> | SBE 26 SeaGauge   |
| <b>Generic Instrument Name</b>          | Sea-Bird SBE 26 Wave and Tide Recorder  |
| <b>Generic Instrument Description</b>   | The Sea-Bird Electronics SBE 26 SEAGAUGE is a wave level and tide recorder with a pressure sensor, accurate clock, precision thermometer and optional SBE 4M conductivity sensor. Pressure data are integrated to give sea level or are burst recorded at rates up to 4 Hz to characterize waves. The standard pressure sensor is a 20 meter (45 psia) Quartzonix, with a temperature-compensated quartz element. Optionally, the SBE 26 can be configured with a Paroscientific Digiquartz pressure sensor with a temperature-compensated quartz element in 13 ranges, from 1 to 6800 meters (15 to 10,000 psia). more information from Sea-Bird Electronics |

|   |                                |
|---|--------------------------------|
| <b>Dataset-specific Instrument Name</b> | Vector Averaging Current Meter |
| <b>Generic Instrument Name</b>          | Vector Averaging Current Meter |
| <b>Generic Instrument Description</b>   | Vector Averaging Current Meter |

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## Deployments

### LMG0103

|                    |   |
|--------------------|---|
| <b>Website</b>     | <a href="https://www.bco-dmo.org/deployment/57635">https://www.bco-dmo.org/deployment/57635</a>   |
| <b>Platform</b>    | ARSV Laurence M. Gould  |
| <b>Report</b>      | <a href="http://www.ccpo.odu.edu/Research/globec/cruises01/mooringcruise/lmg0103_menu.html">http://www.ccpo.odu.edu/Research/globec/cruises01/mooringcruise/lmg0103_menu.html</a> |
| <b>Start Date</b>  | 2001-03-18  |
| <b>End Date</b>    | 2001-04-13  |
| <b>Description</b> | <b>Methods &amp; Sampling</b><br>A- and B-line mooring deployment   |

### LMG0201A

|                    |   |
|--------------------|---|
| <b>Website</b>     | <a href="https://www.bco-dmo.org/deployment/57640">https://www.bco-dmo.org/deployment/57640</a>   |
| <b>Platform</b>    | ARSV Laurence M. Gould  |
| <b>Report</b>      | <a href="http://www.ccpo.odu.edu/Research/globec/main_cruises02/lmg0201a/LMG02-01A_Report.pdf">http://www.ccpo.odu.edu/Research/globec/main_cruises02/lmg0201a/LMG02-01A_Report.pdf</a> |
| <b>Start Date</b>  | 2002-02-06  |
| <b>End Date</b>    | 2002-03-03  |
| <b>Description</b> | <b>Methods &amp; Sampling</b><br>A- and B-line mooring recovery and C-line deployment   |

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## Project Information

**U.S. GLOBEC Southern Ocean (SOGLOBEC)**

**Website:** [http://www.ccpo.odu.edu/Research/globec\\_menu.html](http://www.ccpo.odu.edu/Research/globec_menu.html)

**Coverage:** Southern Ocean

The fundamental objectives of United States Global Ocean Ecosystems Dynamics (U.S. GLOBEC) Program are dependent upon the cooperation of scientists from several disciplines. Physicists, biologists, and chemists must make use of data collected during U.S. GLOBEC field programs to further our understanding of the interplay of physics, biology, and chemistry. Our objectives require quantitative analysis of interdisciplinary data sets and, therefore, data must be exchanged between researchers. To extract the full scientific value, data must be made available to the scientific community on a timely basis.

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## Program Information

### U.S. GLOBAL ocean ECosystems dynamics (U.S. GLOBEC)

**Website:** <http://www.usglobec.org/>

**Coverage:** Global

U.S. GLOBEC (GLOBAL ocean ECosystems dynamics) is a research program organized by oceanographers and fisheries scientists to address the question of how global climate change may affect the abundance and production of animals in the sea.

The U.S. GLOBEC Program currently had major research efforts underway in the Georges Bank / Northwest Atlantic Region, and the Northeast Pacific (with components in the California Current and in the Coastal Gulf of Alaska). U.S. GLOBEC was a major contributor to International GLOBEC efforts in the Southern Ocean and Western Antarctic Peninsula (WAP).

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## Funding

| Funding Source                                   | Award                       |
|--|-----------------------------|
| <a href="#">NSF Antarctic Sciences (NSF ANT)</a> | <a href="#">ANT-9910092</a> |

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