

## MIRAI MR17-05C BACKSCATTERING PROFILES (bb)

Last Modified: 2019-09-17

[ReadMe](#) [Observation Data](#)

Cruise ID: [MR17-05C](#)

BACKSCATTERING PROFILES (bb): Processed (PI)

Data Policy: [JAMSTEC](#)

Observation Items:

Science Keywords:

#### Data Information

Vertical profiles of the optical backscattering coefficient (bb) were obtained from measurements with two complementary HoboLabs HydroScat-6 backscattering meters. Each HS-6 provided measurements in 6 spectral bands, with one band common to both instruments (550 nm). Backscattering data were processed with a method described originally by Maffione and Dana (1997) with refinements presented in Reynolds et al. (2016, doi: 10.1002/lno.10341). Initial data processing to engineering units of the volume scattering function at a fixed backscattering angle of 140 deg. (vsf\_140) were done with HoboLabs HydroSoft software ver. 2.95 utilizing precruse manufacturer's calibrations, with subsequent calculations carried out using custom-written software.

The vsf of seawater at 140 deg. was subtracted to yield the particle vsf, vsfp\_140, and these data were corrected for signal attenuation (so-called "sigma-correction") using the relationships:

corrected vsfp\_140 = vsfp\_140 \* sigma ,

sigma = k1 exp(Kexp \* Kbb) ,

where k1 and Kexp are instrument-specific calibration factors. The parameter Kbb was estimated from the relation  $K_{bb} = a_p + a_{CDOM} + 0.4b_p$  using independent determinations of absorption coefficient by particles ( $a_p$ ), absorption coefficient by colored dissolved organic matter (aCDOM), and the particle scattering coefficient ( $b_p$ ).

For each wavelength, a value of 1.13 was used for the "chi" parameter that converts the corrected vsfp\_140 to the particle backscattering coefficient (Dana and Maffione 2002). The total backscattering coefficient, bb, was then calculated as a sum of particle backscattering and pure seawater backscattering. The values of pure seawater volume scattering function and backscattering coefficient used in data processing were calculated from the relationships presented by Buiteveld et al. (1994). For each station, profiles of pure water scattering (i.e. salinity S = 0) were first calculated at each depth using CTD temperature profiles and assuming a depolarization ratio of 0.039. Scattering by pure seawater was then calculated from CTD salinity profiles using a multiplicative adjustment factor for salinity of  $[1+0.3S/37]$ . For reference, the temperature and salinity values are included in the backscattering data files.

#### Cruise Report

[http://www.godac.jamstec.go.jp/catalog/data/doc\\_catalog/media/MR17-05C\\_all.pdf](http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/MR17-05C_all.pdf)

#### For Using Data

##### Principal Investigator

Rick A. Reynolds (Scripps Institute of Oceanography)

##### Use Constraints

See [Terms and Conditions](#) about constrain of use.

##### Data Citation

Nishino, S., 2017, R/V Mirai Cruise Report MR17-05C, 209pp., JAMSTEC, Yokosuka, Japan.

Upon consultation in advance with the chief of investigation and the person(s) in charge of research issues who gathered that data, we request that the text of the results material contain a statement to the effect that it was obtained during the R/V Mirai cruise of MR17-05C, the Chief Scientist, Shigeto Nishino (JAMSTEC), and the following Principal Investigators (PIs) for gathering the data.

Chief Scientist

Shigeto Nishino

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PI

Toru Hirawake (Hokkaido University)

Please also mention that this cruise was supported by the Arctic Challenge for Sustainability (ArCS) Project, which was funded by the Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT), and the Global Change Observation Mission-Climate (GCOM-C) mission of Japan Aerospace Exploration Agency (JAXA).

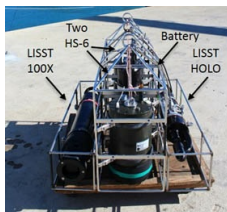
#### Instrument

Instrument:

HoboLabs HydroScat-6 backscattering meters (S/N HS697074, HS091246)

Instrument Information:

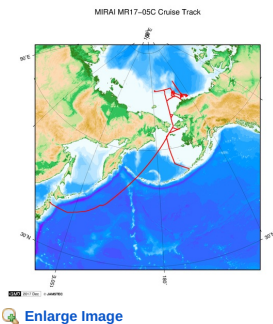
Hydroscat-6 measures volume scattering function at backscattering angle of 140 deg at 6 wavelength.



#### Data Format

Profile data were subsequently split into down and upcasts, and averaged into depth bins. Both downcast and upcast data of the derived spectral backscattering coefficients are submitted here. The filename contains a 5 digit code consisting of XXXYY, where XXX is the SIO station number and YY is the SIO event number. The file entitled "SIO\_StationLog\_MR17-05C.txt" lists times and locations of these stations, as well as the corresponding station name common to the entire cruise ("Station Alias"). This information is also embedded in the header of each data file.

#### Related Information



#### MR17-05C

Ship Name: MIRAI  
Period: 2017-08-24 - 2017-10-01  
Chief Scientist: Shigeto Nishino (JAMSTEC)  
Project Name: [Arctic Ocean Climate System Reaserch]  
Proposal ▶ Arctic Challenge for Sustainability (ArCS)  
Title:

#### Update History

2019-09-17	An observation data was registerd.
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#### Information of the Ships

NATSUSHIMA  
KAIYO  
YOKOSUKA  
MIRAI  
KAIREI  
CHIKYU  
KAIMEI  
SHINSEI MARU  
HAKUHO MARU

#### Information of the Submersibles

KAIKO  
SHINKAI 2000  
SHINKAI 6500  
DEEP TOW  
HYPER-DOLPHIN  
URASHIMA  
YOKOSUKA DEEP TOW  
6K Camera DEEP TOW  
6K Sonar DEEP TOW  
KM-ROV  
POWER GRAB SAMPLER (SHELL)  
POWER GRAB SAMPLER (CLOW)  
BMS

#### Go to a Cruise Information

Cruise ID:

#### Go to a Dive Information

Dive ID:

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**JAMSTEC**  
JAPAN AGENCY FOR MARINE-EARTH SCIENCE AND TECHNOLOGY

国立研究開発法人  
海洋研究開発機構

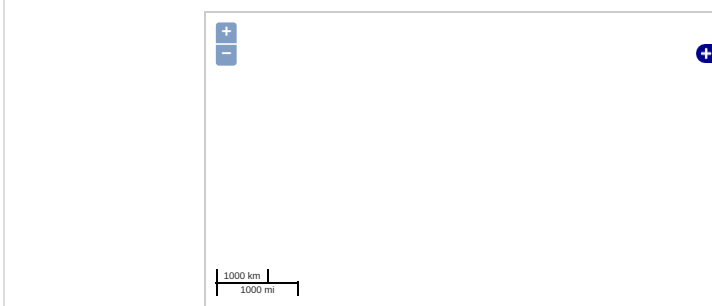
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### Observation Map



— ... Observation Line — ... Navigation ● ... Observation, Dive Point, Hole

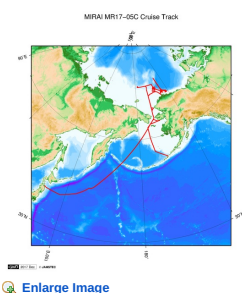
Imagery reproduced from ...

### Data List

[Add to Basket](#)

- ☐ File names
- ☐ SIO\_StationLog\_MR17-05C.txt
- ☐ bb.zip

### Related Information



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Ship Name: MIRAI  
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