

Ice optical properties: transmittance and albedo from ARSV Laurence M. Gould LMG0106, LMG0205 in the Southern Ocean from 2001-2002 (SOGLOBEC project)

Website: <https://www.bco-dmo.org/dataset/3124>

Data Type: Cruise Results

Version: 1

Version Date: 2009-05-15

Project

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

Program

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

Contributors	Affiliation	Role
Martinson, Doug	Lamont-Doherty Earth Observatory (LDEO)	Principal Investigator
Perovich, Don	Cold Regions Research and Engineering Laboratory (CRREL)	Co-Principal Investigator
Smith, Raymond	University of California-Santa Barbara (UCSB-NCEAS)	Co-Principal Investigator
Copley, Nancy	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Abstract

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Coverage

Spatial Extent: N:-65.5233 E:-68.485 S:-68 W:-71.5167

Temporal Extent: 2001-08-07 - 2002-09-08

Dataset Description

Project #:OG-241-0: **Optical Environment of the Western Antarctic Peninsula Region**

An Analytical Spectral Devices Ice-1 spectroradiometer was used to measure albedos and transmittances. This instrument has an effective spectral range from 380 nm to 860 nm. It is a dual channel instrument with separate detectors to simultaneously measure incident and transmitted irradiance. Fiber optics probes are used to transmit the from the cosine collectors to two highly sensitive CCD detector arrays. Limited daylight and harsh weather constrained the number of optical measurements. In 2001, optical measurements were made on 7 August, 8 August, 11 August, and 18 August. In 2002, optical measurements were made on 25 August, 26 August, 7 September, and 8 September. In 2002 vertical profiles of upwelling irradiance were made at several sites. *(from the data cdrom)*

Related datasets:

[ice thickness](#), [snow pits](#), [sea ice](#), [ice properties](#)

Methods & Sampling

From 2001 cruise report: The optics of the different sea ice types found in the region. When weather and day light permitted, snow and ice albedo and transmission measurements were taken. At only one site was the surface frozen where we could measure the combined snow and ice albedo and transmission and then shovel the area and re-measuring to subtract out the snow component. This will allow us to sort out what component the snow and ice have individually in the transmission of light into the ice and water column for the organisms to grow. Our measurements were hampered due to blowing snow which we experienced nearly every day and the fact that we needed to be stopped near solar noon as the sun angle is low this time of year, so only a limited number of optics measurements were performed.

From 2002 cruise report: We also measured the optics of the sea ice using a scanning spectral radiometer. This instrument measures the light levels in 0.5 nanometer increments from 380 to 800 nanometers (visible light through the near infrared). With this instrument we made optical measurements on seven different ice floes. We performed these measurements through the undisturbed snow and ice, and would then shovel off the area to obtain measurements of just the sea ice with no snow cover. We first measured snow and bare ice albedo, then upwelling irradiance at 1 cm increments as we lowered the sensor down through the snow cover. We then would drill a hole in the ice and measure upwelling irradiance at 2 cm to 5 cm increment down through the ice sheet both before and after removing the snow cover. Additionally, the transmission of light through both snow covered sea ice and bare ice was measured.

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Data Files

File
ice_optics.csv (Comma Separated Values (.csv), 1.40 MB) MD5:ab936375f15cfd5e39b25c5dfbaf9486 Primary data file for dataset ID 3124

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Parameters

Parameter	Description	Units
year	year, reported as YYYY, e.g. 1995	
cruise_id	cruise designation; name	
event	event or operation number	
date_local	local month, day and year	
month_local	month of year, local time , i.e. 01-12	
day_local	day, local time e.g. 22.	

yrday_local	local day and decimal time, as 326.5 for the 326th day of the year, or November 22 at 1200 hours (noon).	
snow_depth	snow thickness	centimeters
ice_thick	ice thickness	centimeters
freebd	freeboard: the distance from sea level to the ice surface	centimeters
comments	free text comments	
lat	latitude, in decimal degrees, North is positive, negative denotes South	decimal degrees
lon	longitude, in decimal degrees, East is positive, negative denotes West	decimal degrees
coverage	whether ice is covered with snow or shoveled bare for measurement	
wavelength	wavelength	nanometers
albedo	the ratio of diffusely reflected to incident electromagnetic radiation	unitless
trans	light transmission, as percent	
trans45R	light transmission readings were taken by rotating the underwater detector 45 degrees clockwise	percent
trans45L	light transmission readings were taken by rotating the underwater detector 45 degrees counterclockwise	percent
trans90R	light transmission readings were taken by rotating the underwater detector 90 degrees clockwise	percent
sky_condition	sky condition as in amount of cloudiness	
time_local	time of day, local time, using 2400 clock format	

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Deployments

LMG0106

Website	https://www.bco-dmo.org/deployment/57639
Platform	ARSV Laurence M. Gould
Report	http://www.ccpo.odu.edu/Research/globec/cruises01/lmg0106_menu.html
Start Date	2001-07-21
End Date	2001-09-01

LMG0205

Website	https://www.bco-dmo.org/deployment/57644
Platform	ARSV Laurence M. Gould
Report	http://www.ccpo.odu.edu/Research/globec/main_cruises02/lmg0205/report_lmg0205.pdf
Start Date	2002-07-29
End Date	2002-09-18

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Project Information

U.S. GLOBEC Southern Ocean (SOGLOBEC)

Website: 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
NSF Antarctic Sciences (NSF ANT)	ANT-9910122
NSF Antarctic Sciences (NSF ANT)	ANT-9910179

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