

Mean respiration and excretion rates for micronekton from ARSV Laurence M. Gould and RVIB Nathaniel B. Palmer cruises LMG0104, LMG0203, NBP0104, and NBP0204 in the Southern Ocean from 2001-2002 (SOGLOBEC project)

Website: <https://www.bco-dmo.org/dataset/2369>

Data Type: Cruise Results

Version: 1

Version Date: 2002-12-05

Project

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

Program

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

| Contributors | Affiliation | Role |
|-----------------------------------|---|------------------------|
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| Allison, Dicky | Woods Hole Oceanographic Institution (WHOI BCO-DMO) | BCO-DMO Data Manager |

Abstract

Mean respiration and excretion rates for micronekton from ARSV Laurence M. Gould and RVIB Nathaniel B. Palmer cruises LMG0104, LMG0203, NBP0104, and NBP0204 in the Southern Ocean from 2001-2002 (SOGLOBEC project)

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Coverage

Temporal Extent: 2001 - 2002

Dataset Description

Mean respiration and excretion rates for micronekton Southern Ocean GLOBEC

Collection of specimens. Crustaceans were collected using either mouth-closing Tucker trawls (9.0 m² or 2.25 m² mouth area) or downward-looking, vertically deployed plummet nets (1 m² mouth area). Tucker trawls were equipped with either blind or thermal-turbulence-protecting cod-ends (Childress et al. 1978); plummet nets terminated in blind cod-ends only. Specimens were taken in the upper 1000m of the water column in the vicinity of the marginal ice zone during spring (November-December) 1983, fall (March) 1986, and winter (June-August) 1988 as part of the AMERIEZ (Antarctic Marine Ecosystem Research at the Ice Edge Zone) program to study ice edge biology. Sampling locations were all in the Scotia-Weddell Sea region but moved with seasonal movement of the pack ice edge. Thus, spring and winter collections were in the Scotia Sea in the vicinity of 60deg S, 40deg W; fall sampling took place further south, 65deg S, 46deg W. Collections were made on a

continuum from deep in the pack ice out to 300 km seaward of the ice edge in fall and winter. In spring, collections were made in the open water only. Station locations are given in Donnelly *et al.* (1990).

Oxygen consumption rates were determined by allowing individuals to deplete the oxygen in a sealed container filled with filtered (0.45 μm pore size) seawater. Temperature was maintained at 0.5 C (+/- 0.1 C) using a refrigerated water bath. Oxygen partial pressure (PO_2) was continuously monitored using a Clark polarographic oxygen electrode (Clark 1956) as an individual reduced oxygen levels to low (10 to 20 mm Hg) partial pressures. Electrodes were calibrated using air- and nitrogen-saturated seawater at the experimental temperature. The time required for consumption of oxygen to low levels varied from 12 to 18 h. Streptomycin and Neomycin (each 25 mg l^{-1}) were added to the seawater to minimize microbial growth. To control for possible oxygen consumption by microorganisms, an individual was removed after selected runs, its volume was replaced with fresh seawater, and oxygen consumption was again measured for 2 to 4 h. In all cases microbial oxygen consumption was negligibly low.

References:

Torres, Joseph J., *et al.*, 2007; The physiology of autumn and winter krill (*Euphausia superba*) in the waters of the Western Antarctic Peninsula Shelf. *GLOBEC International Newsletter*, **13**:1, 60-62.

Contact:

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jtorres@marine.usf.edu

Methods & Sampling

Sampling was conducted with two nets.

Data Processing Description

Oxygen consumption rates were determined by allowing individuals to deplete the oxygen in a sealed container filled with filtered (0.45 μm pore size) seawater. Temperature was maintained at 0.5 C (+/- 0.1 C) using a refrigerated water bath. Oxygen partial pressure (PO_2) was continuously monitored using a Clark polarographic oxygen electrode (Clark 1956) as an individual reduced oxygen levels to low (10 to 20 mm Hg) partial pressures. Electrodes were calibrated using air- and nitrogen-saturated seawater at the experimental temperature. The time required for consumption of oxygen to low levels varied from 12 to 18 h. Streptomycin and Neomycin (each 25 mg l^{-1}) were added to the seawater to minimize microbial growth. To control for possible oxygen consumption by microorganisms, an individual was removed after selected runs, its volume was replaced with fresh seawater, and oxygen consumption was again measured for 2 to 4 h. In all cases microbial oxygen consumption was negligibly low.

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Data Files

| File |
|---|
| mean_rates_rs.csv (Comma Separated Values (.csv), 6.59 KB) MD5:be86e35b1659b32908a15e90f5bf1078 |
| Primary data file for dataset ID 2369 |

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Parameters

| Parameter | Description | Units |
|----------------------|--|--------------------------------|
| species | Species name. | text |
| season | Season of the year (fall or winter). | text |
| number | Number of individuals in the calculation of the mean, four cruises represented. | integer |
| size_class | Size of the animal. | unitless |
| WetMass | Mean wet mass of individuals in milligrams, four cruises represented. | mg |
| WetMass_stdev | Standard deviation of WetMass. | mg |
| H2O | Mean percent water in animals, four cruises represented. | percent |
| H2O_stdev | Standard deviation of H2O. | percent |
| Ash | Mean percent Ash in animal, four cruises represented. | percent |
| Ash_stdev | Standard deviation of Ash. | percent |
| O2_consumed | Mean O2 consumed per individual per hour, four cruises represented. | uL O2 per individual per hour |
| O2_consumed_stdev | Standard deviation of O2_consumed. | uL O2 per individual per hour |
| VO2 | Mean oxygen consumed per mg wet weight per hour, four cruises represented. | uL O2 per mg wet weight per hr |
| VO2_stdev | Standard deviation of VO2. | uL O2 per mg wet weight per hr |
| N_excrete | Mean of micrograms nitrogen excreted per individual per hour, four cruises represented. | ug per individual per hour |
| N_excrete_stdev | Standard deviation of N_excrete. | ug per individual per hour |
| N_excrete_mass | Mean of micrograms nitrogen excreted per milligram of wet mass per hour, four cruises represented. | ug N per mg wet mass per hour |
| N_excrete_mass_stdev | Standard deviation of N_excrete_mass. | ug N per mg wet mass per hour |
| OtoN | mean oxygen to nitrogen ratio, four cruises represented | unitless |
| OtoN_stdev | Standard deviation of OtoN. | unitless |

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Instruments

| | |
|---|--|
| Dataset-specific Instrument Name | Tucker Trawl |
| Generic Instrument Name | Tucker Trawl |
| Dataset-specific Description | Tucker trawls (9.0 m ² or 2.25 m ² mouth area) were equipped with either blind or thermal-turbulence-protecting cod-nets (Childress et al. 1978) |
| Generic Instrument Description | The original Tucker Trawl, a net with a rectangular mouth opening first built in 1951 by G.H. Tucker, was not an opening/closing system, but shortly thereafter it was modified so that it could be opened and closed. The original had a 183 cm by 183 cm flexible rectangular mouth opening 914 cm long net with 1.8 cm stretched mesh for the first 457 cm and 1.3 cm mesh for last 457 cm. 152 cm of coarse plankton or muslin netting lined the end of the net. Tucker designed the net to collect animals associated with the deep scattering layers, principally euphausiids, siphonophores, and midwater fish. (from Wiebe and Benfield, 2003). Currently used Tucker Trawls usually have 1-m ² openings and can have a single net or multiple nets on the frame. |

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Deployments

LMG0104

| | |
|--------------------|--|
| Website | https://www.bco-dmo.org/deployment/57637 |
| Platform | ARSV Laurence M. Gould |
| Report | http://www.ccpo.odu.edu/Research/globec/cruises/gould0103_0104.doc |
| Start Date | 2001-04-20 |
| End Date | 2001-06-05 |
| Description | <p>Methods & Sampling Collection of specimens. Crustaceans were collected using either mouth-closing Tucker trawls (9.0 m² or 2.25 m² mouth area) or downward-looking, vertically deployed plummet nets (1 m² mouth area). Tucker trawls were equipped with either blind or thermal-turbulence-protecting cod-ends (Childress et al. 1978); plummet nets terminated in blind cod-ends only. Specimens were taken in the upper 1000m of the water column in the vicinity of the marginal ice zone during spring (November-December) 1983, fall (March) 1986, and winter (June-August) 1988 as part of the AMERIEZ (Antarctic Marine Ecosystem Research at the Ice Edge Zone) program to study ice edge biology. Sampling locations were all in the Scotia-Weddell Sea region but moved with seasonal movement of the pack ice edge. Thus, spring and winter collections were in the Scotia Sea in the vicinity of 60°½ S, 40°½ W; fall sampling took place further south, 65°½ S, 46°½ W. Collections were made on a continuum from deep in the pack ice out to 300 km seaward of the ice edge in fall and winter. In spring, collections were made in the open water only. Station locations are given in Donnelly et al (1990).</p> <p>Processing Description Oxygen consumption rates were determined by allowing individuals to deplete the oxygen in a sealed container filled with filtered (0.45 µm pore size) seawater. Temperature was maintained at 0.5 C (+/- 0.1 C) using a refrigerated water bath. Oxygen partial pressure (PO₂) was continuously monitored using a Clark polarographic oxygen electrode (Clark 1956) as an individual reduced oxygen levels to low (10 to 20 mm Hg) partial pressures. Electrodes were calibrated using air- and nitrogen-saturated seawater at the experimental temperature. The time required for consumption of oxygen to low levels varied from 12 to 18 h. Streptomycin and Neomycin (each 25 mg l⁻¹) were added to the seawater to minimize microbial growth. To control for possible oxygen consumption by microorganisms, an individual was removed after selected runs, its volume was replaced with fresh seawater, and oxygen consumption was again measured for 2 to 4 h. In all cases microbial oxygen consumption was negligibly low.</p> |

LMG0203

| | |
|--------------------|--|
| Website | https://www.bco-dmo.org/deployment/57642 |
| Platform | ARSV Laurence M. Gould |
| Report | http://www.ccpo.odu.edu/Research/globec/main_cruises02/lmg0203/menu.html |
| Start Date | 2002-04-07 |
| End Date | 2002-05-20 |
| Description | <p>Methods & Sampling Collection of specimens. Crustaceans were collected using either mouth-closing Tucker trawls (9.0 m² or 2.25 m² mouth area) or downward-looking, vertically deployed plummet nets (1 m² mouth area). Tucker trawls were equipped with either blind or thermal-turbulence-protecting cod-ends (Childress et al. 1978); plummet nets terminated in blind cod-ends only. Specimens were taken in the upper 1000m of the water column in the vicinity of the marginal ice zone during spring (November-December) 1983, fall (March) 1986, and winter (June-August) 1988 as part of the AMERIEZ (Antarctic Marine Ecosystem Research at the Ice Edge Zone) program to study ice edge biology. Sampling locations were all in the Scotia-Weddell Sea region but moved with seasonal movement of the pack ice edge. Thus, spring and winter collections were in the Scotia Sea in the vicinity of 60°½ S, 40°½ W; fall sampling took place further south, 65°½ S, 46°½ W. Collections were made on a continuum from deep in the pack ice out to 300 km seaward of the ice edge in fall and winter. In spring, collections were made in the open water only. Station locations are given in Donnelly et al (1990).</p> <p>Processing Description Oxygen consumption rates were determined by allowing individuals to deplete the oxygen in a sealed container filled with filtered (0.45 µm pore size) seawater. Temperature was maintained at 0.5degC (+/- 0.1degC) using a refrigerated water bath. Oxygen partial pressure (PO₂) was continuously monitored using a Clark polarographic oxygen electrode (Clark 1956) as an individual reduced oxygen levels to low (10 to 20 mm Hg) partial pressures. Electrodes were calibrated using air- and nitrogen-saturated seawater at the experimental temperature. The time required for consumption of oxygen to low levels varied from 12 to 18 h. Streptomycin and Neomycin (each 25 mg l⁻¹) were added to the seawater to minimize microbial growth. To control for possible oxygen consumption by microorganisms, an individual was removed after selected runs, its volume was replaced with fresh seawater, and oxygen consumption was again measured for 2 to 4 h. In all cases microbial oxygen consumption was negligibly low.</p> |

NBP0104

| | |
|--------------------|--|
| Website | https://www.bco-dmo.org/deployment/57638 |
| Platform | RVIB Nathaniel B. Palmer |
| Report | http://www.ccpo.odu.edu/Research/globec/cruises01/nbp0104_menu.html |
| Start Date | 2001-07-22 |
| End Date | 2001-08-31 |
| Description | <p>Methods & Sampling Collection of specimens. Crustaceans were collected using either mouth-closing Tucker trawls (9.0 m² or 2.25 m² mouth area) or downward-looking, vertically deployed plummet nets (1 m² mouth area). Tucker trawls were equipped with either blind or thermal-turbulence-protecting cod-ends (Childress et al. 1978); plummet nets terminated in blind cod-ends only. Specimens were taken in the upper 1000m of the water column in the vicinity of the marginal ice zone during spring (November-December) 1983, fall (March) 1986, and winter (June-August) 1988 as part of the AMERIEZ (Antarctic Marine Ecosystem Research at the Ice Edge Zone) program to study ice edge biology. Sampling locations were all in the Scotia-Weddell Sea region but moved with seasonal movement of the pack ice edge. Thus, spring and winter collections were in the Scotia Sea in the vicinity of 60°½ S, 40°½ W; fall sampling took place further south, 65°½ S, 46°½ W. Collections were made on a continuum from deep in the pack ice out to 300 km seaward of the ice edge in fall and winter. In spring, collections were made in the open water only. Station locations are given in Donnelly et al (1990).</p> <p>Processing Description Oxygen consumption rates were determined by allowing individuals to deplete the oxygen in a sealed container filled with filtered (0.45 µm pore size) seawater. Temperature was maintained at 0.5°½ C (½°½ C) using a refrigerated water bath. Oxygen partial pressure (PO₂) was continuously monitored using a Clark polarographic oxygen electrode (Clark 1956) as an individual reduced oxygen levels to low (10 to 20 mm Hg) partial pressures. Electrodes were calibrated using air- and nitrogen-saturated seawater at the experimental temperature. The time required for consumption of oxygen to low levels varied from 12 to 18 h. Streptomycin and Neomycin (each 25 mg l⁻¹) were added to the seawater to minimize microbial growth. To control for possible oxygen consumption by microorganisms, an individual was removed after selected runs, its volume was replaced with fresh seawater, and oxygen consumption was again measured for 2 to 4 h. In all cases microbial oxygen consumption was negligibly low.</p> |

NBP0204

| | |
|--------------------|--|
| Website | https://www.bco-dmo.org/deployment/57643 |
| Platform | RVIB Nathaniel B. Palmer |
| Report | http://globec.whoi.edu/so-dir/reports/nbp0204/nbp0204b.html |
| Start Date | 2002-07-31 |
| End Date | 2002-09-18 |
| Description | <p>Also see NBP0204 Cruise Data Report</p> <p>Methods & Sampling Collection of specimens. Crustaceans were collected using either mouth-closing Tucker trawls (9.0 m² or 2.25 m² mouth area) or downward-looking, vertically deployed plummet nets (1 m² mouth area). Tucker trawls were equipped with either blind or thermal-turbulence-protecting cod-ends (Childress et al. 1978); plummet nets terminated in blind cod-ends only. Specimens were taken in the upper 1000m of the water column in the vicinity of the marginal ice zone during spring (November-December) 1983, fall (March) 1986, and winter (June-August) 1988 as part of the AMERIEZ (Antarctic Marine Ecosystem Research at the Ice Edge Zone) program to study ice edge biology. Sampling locations were all in the Scotia-Weddell Sea region but moved with seasonal movement of the pack ice edge. Thus, spring and winter collections were in the Scotia Sea in the vicinity of 60°½ S, 40°½ W; fall sampling took place further south, 65°½ S, 46°½ W. Collections were made on a continuum from deep in the pack ice out to 300 km seaward of the ice edge in fall and winter. In spring, collections were made in the open water only. Station locations are given in Donnelly et al (1990).</p> <p>Processing Description Oxygen consumption rates were determined by allowing individuals to deplete the oxygen in a sealed container filled with filtered (0.45 µm pore size) seawater. Temperature was maintained at 0.5°½ C (±0.1°½ C) using a refrigerated water bath. Oxygen partial pressure (PO₂) was continuously monitored using a Clark polarographic oxygen electrode (Clark 1956) as an individual reduced oxygen levels to low (10 to 20 mm Hg) partial pressures. Electrodes were calibrated using air- and nitrogen-saturated seawater at the experimental temperature. The time required for consumption of oxygen to low levels varied from 12 to 18 h. Streptomycin and Neomycin (each 25 mg l⁻¹) were added to the seawater to minimize microbial growth. To control for possible oxygen consumption by microorganisms, an individual was removed after selected runs, its volume was replaced with fresh seawater, and oxygen consumption was again measured for 2 to 4 h. In all cases microbial oxygen consumption was negligibly low.</p> |

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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-9910100 |

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