

Nitrate nitrogen and oxygen isotope data from the underway acquisition system from R/V Aurora Australis and R/V Southern Surveyor cruises in the Southern Ocean from 1997 to 1999 (CAREER project)

Website: <https://www.bco-dmo.org/dataset/3595>

Version: 26 February 2012

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Project

» [CAREER: Nitrate Isotopes and Biogeochemistry; A Plan for coupling](#) (CAREER)

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Data Files

File
Underway.csv (Comma Separated Values (.csv), 9.67 KB) MD5:44f0ef55ddf82ebc85dedb7aa0264601 Primary data file for dataset ID 3595

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Parameters

Parameter	Description	Units
cruise_ID	Cruise identifier	dimensionless
start_date	start date of dataset	YYYYMMDD
end_date	end date of data set	YYYYMMDD
date	date of sample	YYYYMMDD
lat	latitude	decimal degrees
lon	longitude	decimal degrees
time	Time of cast	HHMM
NO3	Nitrate	micromoles/liter
d15N_NO3	delta 15N of dissolved nitrate relative to atmospheric N2	per mil

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Deployments

AU9701

Website	https://www.bco-dmo.org/deployment/58734
Platform	R/V Aurora Australis
Report	http://data.aad.gov.au/aadc/voyages/display_voyage.cfm?voyage_id=81
Start Date	1997-09-09
End Date	1997-09-22

AU9901

Website	https://www.bco-dmo.org/deployment/58746
Platform	R/V Aurora Australis
Report	http://data.aad.gov.au/aadc/voyages/display_voyage.cfm?voyage_id=92
Start Date	1999-07-13
End Date	1999-10-07

SS9902

Website	https://www.bco-dmo.org/deployment/58747
Platform	R/V Southern Surveyor
Report	http://www.marine.csiro.au/maru/marlin_admin.survey_details?srv_id=623&src_id=8&rscr=plst
Start Date	1999-02-06
End Date	1999-02-14

AU9804

Website	https://www.bco-dmo.org/deployment/58745
Platform	R/V Aurora Australis
Report	http://data.aad.gov.au/aadc/voyages/display_voyage.cfm?voyage_id=91
Start Date	1998-10-29
End Date	1998-12-27

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Project Information

CAREER: Nitrate Isotopes and Biogeochemistry; A Plan for coupling (CAREER)

Coverage: Subantarctic waters, Antarctic Zone, and Ross Sea

Nitrate is a ubiquitous form of biologically available nitrogen in the environment. Based on previous method development in the principal investigator's laboratory, CAREER graduate students and undergraduates investigate the nitrogen (N) and oxygen (O) isotopes of nitrate as 'tracers' of the N cycle, focusing on the marine environment. Research centers on two projects: (1) lab culture, in vitro assay, and field incubation studies of the coupled N and O isotope dynamics of nitrate assimilation and denitrification, two of the critical reactions in the N cycle; and (2) incorporation of the N and O isotopes of nitrate into numerical models of ocean circulation and biogeochemistry. These projects, in the context of the oceanic data sets generated in the principal investigator's laboratory, allow for the quantification of biogeochemical processes the signals of which are otherwise complicated by their simultaneous occurrence and by ocean circulation.

Oceanic data used in this project includes Nitrogen and delta 15N of dissolved nitrate relative to atmospheric N₂ (dN15_NO3) collected during five cruises in the Southern Ocean -- in September, 1997, March, 1998, and August, 1998, February, 2001, and November 2006. During the last two cruises, samples of Oxygen isotopic composition (18O/16O) of nitrate (d18O_NO3) were also collected.

Related files and references:

DiFiore, P. J., D. M. Sigman, T. W. Trull, M. J. Lourey, K. Karsh, G.Cane, and R. Ho (2006), Nitrogen isotope constraints on subantarctic biogeochemistry, J. Geophys. Res., 111, C08016, doi:10.1029/2005JC003216.

DiFiore, P. J., D. M. Sigman, and R. B. Dunbar (2009), Upper ocean nitrogen fluxes in the Polar Antarctic Zone: Constraints from the nitrogen and oxygen isotopes of nitrate, Geochem. Geophys. Geosyst., 10, Q11016, doi:10.1029/2009GC002468.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0447570
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NSF Antarctic Sciences (NSF ANT)	ANT-0453680

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