

O2N2_NCP_toolbox

A toolbox containing Matlab code, sample calculations and data for performing NCP calculations based on ship-based O2/N2 sampling and N2' (N2-prime) calculations.

Cite as:

Izett, R. 2021. O2N2 NCP Toolbox (version 2021.05). doi: <https://doi.org/10.5281/zenodo.4024925>

Please refer to the toolbox master doi for the newest release of this toolbox
(<https://doi.org/10.5281/zenodo.4024925>)

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Note 1:

The codes and data contained in this toolbox are provided as support to the following publications. If using this code, data or the underlying approaches presented in this toolbox, kindly cite the Zenodo repository, and the corresponding manuscripts:

Izett, R.I. & Tortell, P.D. Accepted 2021. $\Delta\text{O}_2/\text{N}_2'$ as a tracer of mixed layer net community production: Theoretical considerations and proof-of-concept. *Limnology & Oceanography: Methods*. doi:10.1002/lom3.10440.

Izett et al. Submitted. $\Delta\text{O}_2/\text{N}_2'$ as a new tracer of marine net community production: Application and evaluation in the Subarctic Northeast Pacific and Canadian Arctic Ocean.

Note 2:

This toolbox contains code written and provided by others. Please note the following references:

1) Gas toolbox for calculating air-sea fluxes:

Manning, CC and DP Nicholson (2016). gas_toolbox: MATLAB code used in Manning et al. GTWS-7 proceedings. Zenodo. DOI: 10.5281/zenodo.45293

and corresponding paper:

Manning, C.C., R.H.R. Stanley, D.P. Nicholson, and M.J. Squibb (2016). Quantifying air-sea gas exchange using noble gases in a coastal upwelling zone. *J. Phys. Conf. Ser.* (In Proceedings of the 7th International Symposium on Gas Transfer at Water Surfaces)

2) GSW Oceanographic Toolbox:

McDougall, T.J. and P.M. Barker, 2011: Getting started with TEOS-10 and the Gibbs Seawater (GSW) Oceanographic Toolbox, 28pp., SCOR/IAPSO WG127, ISBN 978-0-646-55621-5.

3) For gas solubility codes written by Roberta Hamme, please see:

<https://web.uvic.ca/~rhamme/download.html>

Repository contents

This repository consists of a toolbox of Matlab scripts to calculate NCP from O₂ and N₂ data. Contents include:

A) o2n2ar_1d_model

- code for performing simulations using a 1D mixed layer gas model (details in Izett & Tortell, 2021)
- code for calculating N₂' (N₂-prime) from simulated (Izett & Tortell, 2021) and real datasets (Izett et al., submitted)
- example data / forcing file to replicate one set of results from Izett & Tortell (2021)
- output from model simulations described in Izett & Tortell (2021)

B) Izett-et-al_example-calculations

- example code for calculating O₂ gas transfer velocity, N₂' and NCP according to procedures described in Izett et al. (submitted)

C) Izett-et-al_field-data

- supplementary data from Izett et al. (submitted)

D) o2n2_ncp

- function for calculating NCP from underway O₂/N₂ measurements, following descriptions in Izett et al. (submitted)

E) ancillary_scripts

- scripts required to run the other scripts listed above
- add this folder to your Matlab path before running any other code provided here