

Christopher J. Somes

## Curriculum Vitae

### CURRENT POSITION

Postdoctoral Researcher  
Marine Biogeochemical Modelling  
GEOMAR Helmholtz Centre for Ocean Research Kiel  
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### EDUCATION

*Ph.D.*, Oceanography, GEOMAR Helmholtz Centre/Kiel University, 2013

Title: Nitrogen Isotopes in the Global Ocean, Advisor: Andreas Oschlies

*M.Sc.*, Oceanography, Oregon State University, 2010

*B.Sc.*, Physics (Geophysics option), Oregon State University, 2006

*A.Eng.*, Software Engineering Technology, Oregon Institute of Technology, 2003

### RESEARCH INTERESTS

- Climate change feedbacks associated with the biological carbon pump in the past, present, and future ocean
- Anthropogenic impacts on ocean deoxygenation and marine ecosystems
- Nutrient (e.g. nitrogen, phosphorus, iron) co-limitation of marine phytoplankton growth
- Isotopic constraints/insights on ocean biogeochemical cycling and marine ecosystem dynamics
- Development of ocean biogeochemical, ecosystem, and Earth system models

### POSITIONS

2017-2019, Postdoctoral Project Leader, *GEOMAR Helmholtz Centre for Ocean Research Kiel*, “Impacts of nutrient pollutants on marine productivity, deoxygenation and sedimentary feedbacks in the Anthropocene: From the coastal to the global ocean”, Cluster of Excellence “The Future Ocean”, German Research Foundation (DFG), PI: **Christopher J. Somes**

2012-2017, Postdoctoral Researcher, *GEOMAR Helmholtz Centre for Ocean Research Kiel*, “Climate-Biogeochemical Interactions in the Tropical Ocean”, SFB 754, German Research Foundation (DFG), PI: Andreas Oschlies

2010-2012, Graduate Research Assistant, *IFM-GEOMAR, Leibniz Institute for Marine Sciences*, “Climate-Biogeochemical Interactions in the Tropical Ocean”, SFB 754, German Research Foundation (DFG), PI: Andreas Oschlies

2007–2010, Graduate Research Assistant, College of Oceanic and Atmospheric Sciences, *Oregon State University*, “Ocean Circulation, Oxygen and Nutrient Cycles During the

Last Glacial Period”, National Science Foundation, PI: Andreas Schmittner, Co-PI: Alan Mix

### PROFESSIONAL ACTIVITIES

2018-present, Review Editor, Frontiers of Marine Science, section Marine Biogeochemistry  
2013-present, Working Group Member, Climate Impacts on Top Ocean Predators (CLIOTOP), Integrated Marine Biosphere Research (IMBER)  
2013-present, Membership, The Oceanography Society  
2010-2014, Working Group Member, Nitrogen Cycling in the Oceans, Past and Present (NICOPP), Past Global Changes (PAGES)

### RESEARCH GRANT FUNDING

2017-2019, *Cluster of Excellence “The Future Ocean” from the German Research Foundation (DFG)*, PI: **Christopher J. Somes**, “Impacts of nutrient pollutants on marine productivity, deoxygenation and sedimentary feedbacks in the Anthropocene: From the coastal to the global ocean”  
Amount: €200,000

### JOURNAL PEER REVIEWS

Nature (2x)  
Earth and Planetary Science Letters (2x)  
Frontiers of Marine Science (1x)  
Geophysical Research Letters (3x)  
Journal of Advances in Modeling Earth Systems (1x)  
Paleoceanography (1x)  
Biogeosciences (1x)  
Aquatic Geochemistry (1x)

### SUBMITTED/IN PREP. MANUSCRIPTS

**Somes, C. J.**, A. Schmittner, A. Oschlies, Increased marine nitrogen inventory enhances atmospheric iron impact on the glacial soft-tissue biological carbon pump  
Lorrain, A., Pethybridge, H., Cassar, N., Receveur, A., Allain, V., Bodin, N., Bopp, L., Choy, C.A., Fry, B., Goni, N., Graham, B. S., Hobday, A., Logan, J., Menard, F., Menkes C., Olson, B., Point, D., Quay P., **Somes, C. J.**, Tremblay Boyer, L., Young Y., Tuna carbon isotopes reflect recent decadal changes in global phytoplankton communities

### ACCEPTED/IN PRESS MANUSCRIPTS

Pethybridge, H., C. A. Choy, J. Logan, V. Allain, A. Lorrain, N. Bodin, J. Young, F. Menard, R. Olson, **C. J. Somes**, C. Langlais, L. Duffy, A. J. Hobday, P. Kuhnert, C. Menkes, B. Fry (2018), A global meta-analysis of marine predator nitrogen stable isotopes: Relationships between trophic structure and environmental conditions, *Global Ecology and Biogeography*, doi:10.1111/geb12763

### LATEST PEER-REVIEW PUBLICATIONS

Glock, N., Z. Erdem, K. Wallman, **C. J. Somes**, V. Liebetrau, J. Schönfeld, S. Gorb, A. Eisenhauer (2018), Coupling of oceanic carbon and nitrogen facilitates spatially resolved

- quantitative reconstruction of nitrate inventories, *Nature Communications*, 9:1217, doi:10.1038/s41467-018-03647-5
- Muglia, J., **Somes, C. J.**, Nickelson, L., Schmittner (2017), A., Combined effects of atmospheric and seafloor iron fluxes to the glacial ocean, *Paleoceanography*, 32, [https://doi:10.1002/2016PA003077](https://doi.org/10.1002/2016PA003077)
- Landolfi, A., **Somes, C. J.**, Koeve, W., Zamora, L. M. and Oschlies, A. (2017), Oceanic nitrogen cycling and N<sub>2</sub>O flux perturbations in the Anthropocene. *Global Biogeochemical Cycles*, 31, 1236-1255, doi:10.1002/2017GB005633
- Somes, C. J.**, A. Schmittner, J. Muglia, and A. Oschlies (2017), A three-dimensional model of the marine nitrogen cycle during the Last Glacial Maximum constrained by sedimentary isotopes. *Frontiers of Marine Science*, 4:108. doi:10.3389/fmars.2017.00108
- Schmittner, A. and **Somes, C. J.** (2016), Complementary constraints from Carbon (<sup>13</sup>C) and Nitrogen (<sup>15</sup>N) on the efficiency of the glacial ocean's soft-tissue biological pump, *Paleoceanography*, 31, 669-693, doi:10.1002/2015PA002905

### SELECTED PEER-REVIEW PUBLICATIONS

- Somes, C. J.** and A. Oschlies, On the influence of “non-Redfield” dissolved organic nutrient dynamics on the spatial distribution of N<sub>2</sub> fixation and the size of the marine fixed nitrogen inventory (2015), *Global Biogeochemical Cycles*, 29, 973-993, doi:10.1002/2014GB005050
- Somes, C. J.**, A. Landolfi, W. Koeve, and A. Oschlies (2016), Limited impact of atmospheric nitrogen deposition on marine productivity due to biogeochemical feedbacks in a global ocean model, *Geophysical Research Letters*, 43, 4500-4509, doi:10.1002/2016GL068335
- Galbraith, E. D., M. Kienast, T. Kiefer, J.-E. Tesdal, D. Bianchi, **C. J. Somes**, and the NICOPP working group members (2013), The acceleration of oceanic denitrification during deglacial warming, *Nature Geosciences*, 6, 579-584, doi:10.1038/ngeo1832
- Navarro, J., M. Coll, **C. J. Somes**, R. J. Olson (2013), Trophic niche of squids: Insights from isotopic data in marine systems worldwide, *Deep Sea Research II*, 95, 93-102, doi:10.1016/j.dsr2.2013.01.031
- Somes, C. J.**, A. Schmittner, A. Mix, R. M. Letelier, E. D. Galbraith, M. Lehmann, M. Altabet, J. P. Montoya, M. Eby, and A. Bourbonnais (2010), Simulating the global distribution of nitrogen isotopes in the ocean, *Global Biogeochemical Cycles*, 24, GB4019, doi:10.1029/2009GB003767

### SELECTED SPEAKER INVITATIONS

- Marine Chemistry and Geochemistry Seminar, *Woods Hole Oceanographic Institute*, 27 March 2018: **Somes, C. J.**, “Isotopic constraints on global marine nitrogen cycling in the modern and glacial ocean”, Invited by Dr. Bernhard Peucker-Ehrenbrink
- CLIOTOP Nitrogen Isotope Workshop, 17 February 2014, *Honolulu, Hawaii*: **Somes, C. J.**, "Nitrogen Isotopes in an Earth System Climate Model", Invited by Dr. Robert Olson.
- Environmental Physics Seminar, 18 July 2011, *ETH Zürich*, Department of Biogeochemistry and Pollutant Dynamics: **Somes, C. J.**, A. Schmittner, A. Oschlies, "Using nitrogen

isotopes and excess P to constrain the fixed nitrogen budget in the past and present oceans", Invited by Prof. Nicolas Gruber.

NICOPP Workshop: Sedimentary  $\delta^{15}\text{N}$  - data synthesis, analysis and modeling, 8 July 2011, *Halifax, Nova Scotia, Canada*: **Somes, C. J.**, A. Schmittner, A. Oschlies, "Using nitrogen isotopes and excess P to constrain the fixed nitrogen budget in the past and present oceans", Invited by Prof. Eric Galbraith.

Ocean Ecosystems Dynamics and Biogeochemistry Group Seminar, 4 April 2010, *University of California, Irvine*, **Somes, C. J.** and A. Schmittner, "Simulating the global distribution of nitrogen isotopes in the ocean", Invited by Prof. J. Keith Moore

### **CONFERENCE SESSION CONVENER**

Ocean Sciences Meeting, 2018, 14 February, Portland, Oregon, USA, "Understanding Controls on Marine Nitrogen Cycling: From Microbes to the Global Ocean", Conveners: A. Landolfi, **C. J. Somes**, W. Koeve, Qixing (Jimmy) Ji

### **STUDENT SUPERVISION**

Wanxuan (Ben) Yao, co-advisor, Ph.D student (GEOMAR-Kiel University)  
Marie-Theresia Verwalga, primary advisor, M.Sc. student (GEOMAR-Kiel University)

### **TEACHING EXPERIENCE**

Co-Lecturer, Fundamentals in Marine Biogeochemical Modelling, MNF-bioc-335, Winter Semester 2017

Laboratory Assistant, Introduction to Biological Modelling, Summer Intensive Course (3x: 2013, 2014, 2016), Instructors: Prof. Andreas Oschlies and Dr. Markus Pahlow

### **AWARDS**

Laurel Scholarship (Graduate Tuition), 2x: 2006-2007, 2007-2008, College of Oceanic and Atmospheric Sciences, Oregon State University