

**Prof. Dr. Christoph HEINZE**

**CV**

**Contact details:**

Prof. Dr. Christoph Heinze, University of Bergen, Geophysical Inst. and Bjerknes Centre for Climate Research, Postboks 7803, 5020 Bergen, Norway, tel.: +47 97557119, email: christoph.heinze@uib.no

**Born:** April 5, 1958 in Köln, Germany

**Educational details:**

- 1999 Habilitation, University of Hamburg, Germany
- 1990 PhD, Dr. rer. nat., University of Hamburg and Max Planck Institute of Meteorology
- 1987 Diplom in Physical Oceanography, University of Hamburg
- 1978-1979 Conscientious objector, civil service at a community centre in Nürnberg, Germany
- 1977 Abitur at Hans-Sachs Secondary School in Nürnberg

**Positions held:**

- Since 2004 Professor in Chemical Oceanography, University of Bergen, Norway, leader of Research Group “Carbon and Biogeochemical Cycles“ at the Bjerknes Centre for Climate Research
- 2003 Group leader of “Model and Data“, Max Planck Institute for Meteorology, Hamburg
- 2001-2002 Senior researcher, National Environmental Research Institute, Department of Marine Ecology, Roskilde, Denmark
- 1993-2000 Senior researcher, Max Planck Institute for Meteorology, Hamburg; in 11/1994-4/1995 visiting research scientist at Lamont-Doherty Earth Observatory of Columbia University, Palisades, New York, USA
- 1991-1993 Post-Doc, University of Hamburg, Institute of Oceanography
- 1987-1990 PhD student at Max Planck Institute for Meteorology (K. Hasselmann)
- 1982-1985 Assistant student worker, German Hydrographic Office (DHI), Hamburg

**Research Interests**

Heinze is a biogeochemical ocean modeller with 25 years’ experience in the field. He has specialized in global three-dimensional modelling of marine biogeochemical cycles. His specific research interests are devoted to feedback processes between climate and biogeochemical cycles, the understanding, interpretation, and simulation of the marine sedimentary paleo-climate archive, and the quantification of the global carbon and silicon cycles.

**Publications:** 60 peer reviewed publications, h-index: 25 (Web of Science)

**Coordination of research projects (selection):**

- EVA, nationally coordinated project, Research Council of Norway, “Earth system modelling of climate Variations in the Anthropocene”, 2014-2017, 7 national partners, 50 million NOK
- CARBOCHANGE, EU FP7 large-scale integrating project, “Changes in carbon uptake and emissions by oceans in a changing climate”, 2011-2015, 28 intern. partners, 7 million EUR
- CARBOOCEAN, EU FP6 Integrated Project, “Marine carbon sources and sinks assessment”, 2005-2009, 35 international contractors, 14.5 million EUR.

**Functions and memberships (selection):**

- IPCC lead author, Assessment Report No. 4, WG 1, chapter 7, 2005-2007
- IPCC review editor, Assessment Report No. 5, WG1, chapter 6, 2012-2014
- Member of the GOOS (Global Ocean Observing System) Biogeochemistry Panel, since 2015
- Member of the Scientific Steering Committee of the IGBP core project SOLAS, 2010-2015
- Associate editor for the peer-reviewed journals *Biogeosciences* and *Earth System Dynamics*
- Member of the Climate Panel of the Norwegian Academy of Sciences, 2012-2013

**Rankings:**

- Most successful EU-project applicant of the University of Bergen (FunderFinder, Oct. 2011)
- Bjercknes Centre biogeochemistry group evaluated to have maximum publication impact among all geoscientific research groups in Norway during 2005-2009 (The Research Council of Norway, 2011)

**Selected publications in the peer reviewed literature:**

- Heinze, C., B. Hoogakker, and A. Winguth, 2016, Ocean carbon cycling during the past 130,000 years – a pilot study on inverse paleoclimate record modelling, *Clim. Past Discuss.*, *Climate of the Past*, 12, 1949-1978, doi:10.5194/cp-12-1949-2016.
- Eyring, V., P.J. Gleckler, C. Heinze, R.J. Stouffer, K.E. Taylor, V. Balaji, E. Guilyardi, S. Joussaume, S. Kindermann, B. N. Lawrence, G.A. Meehl, M. Righi, and D.N. Williams, 2016, Earth Syst. Dynam. Discuss., doi:10.5194/esd-2016-26. Accepted for publication in *Earth System Dynamics*.
- Schwinger, J., N. Goris, J. Tjiputra, I. Kriest, M. Bentsen, I. Bethke, M. Ilicak, K. Assmann, and C. Heinze, 2016, Evaluation of NorESM-OC (versions 1 and 1.2), the ocean carbon-cycle stand-alone configuration of the Norwegian Earth System Model (NorESM1), *Geosci. Model Dev.*, 9, 2589–2622, doi:10.5194/gmd-9-2589-2016
- Séférian, R., M. Gehlen, L. Bopp, L. Resplandy, J.C. Orr, O. Marti, J.P. Dunne, J.R. Christian, S.C. Doney, T. Ilyina, K. Lindsay, P.R. Halloran, C. Heinze, J. Segschneider, J.Tjiputra, O. Aumont, and A. Romanou, 2016, Inconsistent strategies to spin up models in CMIP5: implications for ocean biogeochemical model performance assessment, *Geosci. Model Dev.*, 9, 1827-1851, doi:10.5194/gmd-9-1827-2016.
- Heinze, C., S. Meyer, N. Goris, L. Anderson, R. Steinfeldt, N. Chang, C. Le Quéré, and D.C.E. Bakker, 2015, The ocean carbon sink – impacts, vulnerabilities, and challenges, *Earth System Dynamics*, 6, 327–358.
- Sitch, S., P. Friedlingstein, N. Gruber, S. D. Jones, G. Murray-Tortarolo, A. Ahlström, S. C. Doney, H. Graven, C. Heinze, C. Huntingford, S. Levis, P. E. Levy, M. Lomas, B. Poulter, N. Viovy, S. Zaehle, N. Zeng, A. Arneth, G. Bonan, L. Bopp, J. G. Canadell, F. Chevallier, P. Ciais, R. Ellis, M. Gloor, P. Peylin, S. Piao, C. Le Quéré, B. Smith, Z. Zhu, and R. Myneni, 2015, Trends and drivers of regional sources and sinks of carbon dioxide over the past two decades, *Biogeosciences*, 12, 653-679.
- Wanninkhof, R., G.-H. Park, T. Takahashi, C. Sweeney, R. A. Feely, Y. Nojiri, N. Gruber, G. McKinley, A. Lenton, C. Le Quéré, C. Heinze, J. Schwinger, H. Graven, S. Khatiwala, and S. C. Doney, 2013, Global Ocean Carbon Uptake: Magnitude, Variability and Trends, *Biogeosciences*, 10, 1983-2000.
- Regnier, P., P. Friedlingstein, P. Ciais, F.T. Mackenzie, N. Gruber, I.A. Janssens, G.G. Laruelle, R. Lauerwald, S. Luyssaert, A.J. Andersson, S. Arndt, C. Arnosti, A.V. Borges, A.W. Dale, A. Gallego-Sala, Y. Goddérís, N. Goossens, J. Hartmann, C. Heinze, T. Ilyina, F. Joos, D.E. LaRowe, J. Leifeld, F.J. R. Meysman, G. Munhoven, P. A. Raymond, R. Spahni, P. Suntharalingam, and M. Thullner, 2013, Anthropogenic perturbation of the carbon fluxes from land to ocean, *Nature Geoscience*, 6(8), 597-607.
- Heinze, C., I. Kriest, and E. Maier-Reimer, 2009, Age offsets among different biogenic and lithogenic components of sediment cores revealed by numerical modeling, *Paleoceanography*, 24, PA4214, 17p., doi:10.1029/2008PA001662.
- Watson, A.J., U. Schuster, D.C.E. Bakker, N.R. Bates, A. Corbière, M. González-Dávila, T. Friedrich, J. Hauck, C. Heinze, T. Johannessen, A. Körtzinger, N. Metzl, J. Olafsson, A. Olsen, A. Oschlies, X.A. Padin, B. Pfeil, J. M. Santana-Casiano, T. Steinhoff, M. Telszewski, A.F. Rios, D.W.R. Wallace, and R. Wanninkhof, 2009, Tracking the variable North Atlantic sink for atmospheric CO<sub>2</sub>, *Science*, 326, 1391-1393.
- Heinze, C., M. Gehlen, and C. Land, 2006, On the potential of <sup>230</sup>Th, <sup>231</sup>Pa, and <sup>10</sup>Be for marine rain ratio determinations - a modeling study, *Global Biogeochemical Cycles*, 20, GB2018,

doi:10.1029/2005GB002595.

- Gehlen, M., L. Bopp, N. Emprin, O. Aumont, C. Heinze, and O. Ragueneau, 2006, Reconciling surface ocean productivity, export fluxes and sediment composition in a global biogeochemical ocean model, *Biogeosciences*, 3, 521–537.
- Heinze, C., 2004, Simulating oceanic CaCO<sub>3</sub> export production in the greenhouse, *Geophysical Research Letters*, 31, L16308. Cited: 91<sup>gs</sup>/39<sup>wos</sup>
- Heinze, C. and N. Dittert, 2005, Impact of paleocirculations on the silicon redistribution in the world ocean, *Marine Geology*, 214, 201-203.
- Heinze, C., A. Hupe, E. Maier-Reimer, N. Dittert, and O. Ragueneau, 2003, Sensitivity of the marine biospheric Si cycle for biogeochemical parameter variations, *Global Biogeochemical Cycles*, 17, No. 3, 1086.
- Ragueneau, O., P. Tréguer, A. Leynaert, R. F. Anderson, M. A. Brzezinski, D. J. DeMaster, R. C. Dugdale, J. Dymond, G. Fischer, R. François, C. Heinze, E. Maier-Reimer, V. Martin-Jézéquel, D. M. Nelson, and B. Quéguiner, 2000, A review of the Si cycle in the modern ocean: recent progress and missing gaps in the application of biogenic opal as a paleoproductivity tracer, *Global and Planetary Change*, 26, 317-365.
- Heinze, C., E. Maier-Reimer, A. M. E. Winguth, and D. Archer, 1999, A global oceanic sediment model for long-term climate studies, *Global Biogeochemical Cycles*, 13, 221-250.
- Henderson, G. M., C. Heinze, R. F. Anderson, and A. M. E. Winguth, 1999, Global distribution of the <sup>230</sup>Th flux to ocean sediments constrained by GCM modelling, *Deep-Sea Research I*, 46, 1861-1893.
- Heinze, C. and T. J. Crowley, 1997, Sedimentary response to ocean gateway circulation changes, *Paleoceanography*, 12, 742-754.
- Heinze, C., 2001, Towards the time dependent modeling of sediment core data on a global basis, *Geophysical Research Letters*, 28, 4211-4214.
- Heinze, C., and W. S. Broecker, 1995, Closing-off the Southern Ocean surface, *Paleoceanography*, 10, 49-58, DOI: 10.1029/94PA02353.
- Heinze, C., and K. Hasselmann, 1993, Inverse multi-parameter modelling of paleo-climate carbon cycle indices, *Quat. Res.*, 40, 281-296, doi:10.1006/qres.1993.1082.
- Heinze, C., E. Maier-Reimer, and K. Winn, 1991, Glacial pCO<sub>2</sub> reduction by the World Ocean - experiments with the Hamburg Carbon Cycle Model, *Paleoceanogr.*, 6, 395-430.

### Invited presentations:

Since 2005 I have given 23 invited presentations. The following are invited contributions to peer-reviewed, internationally established conferences and international advanced schools:

- ***How well do we know ocean carbon stocks, the process of C sequestration into the deeper oceans and the role of ocean acidification?*** Plenary talk, 3<sup>rd</sup> Carbon from Space Workshop (ESA, CEOS, GCP) Reconciling the land, ocean and atmosphere components of the Carbon Cycle, Exeter, UK 26-28 Jan 2016.
- ***Marine CO<sub>2</sub> modelling and inversions***, plenary talk, Model-Data Fusion for Carbon Cycle Studies International Seminar, 18 February 2014, Lund University, Lund, Sweden.
- ***Modelling the ocean carbon cycle - lessons from the past and entering new territory for the future***, Seminar for Worldwide Universities Network (WUN), Bergen, 16 May 2012, video seminar broadcast to 16 Universities in Europe and North America.
- ***CCDAS for Oceans (keynote)***, COCOS GEO Carbon Conference, Rome, Italy, 24-26 Oct. 2011.
- ***Ocean carbon uptake under changing climate***, 6<sup>th</sup> EU-Japan Workshop on Climate Change Research, Brussels, Belgium, 10-11 October 2011.

- **Modelling the global marine carbon cycle 'end-to-end', plenary presentation**, International Workshop Exploring knowledge gaps along the global carbon route: A hitchhiker's guide for a boundless cycle (organised by P. Regnier), near Brussels, Belgium, 3-7 October 2011.
- **The ocean carbon cycle and climate - what we may learn from the paleorecord and how to prepare for entering unknown territory in the future (keynote)**, 3<sup>rd</sup> Bi-Annual Symposium Future Ocean, Christian-Albrechts-Universität zu Kiel, Kiel, Germany, 13-16 September 2010.
- **The oceanic carbon sink – processes, time scales, and impacts**, GIFT-Workshop (*Geophysical Information For Teachers*) during EGU General Assembly, Vienna, Austria, 13-15 Apr. 2008.
- **The changing oceanic carbon sink in a warming high CO<sub>2</sub> world**, 'EU International Symposium on IPCC and EC Research *Future climate, impact, and responses – The IPCC 4<sup>th</sup> Assessment Report & EC Integrated Climate Research*', 19-20 Nov. 2007, Brussels, Belgium.
- **Ocean biogeochemical feedbacks to climate change and rising atmospheric CO<sub>2</sub> concentrations**, Seminar for *Worldwide Universities Networks (WUN)*, Bergen, 19 March 2007, Video-Seminar, broadcast live to 16 universities in Europe and North America.
- **Was there a higher glacial rain ratio CaCO<sub>3</sub>:POC than today?** Workshop "Modelling the response of marine ecosystems to increasing levels of CO<sub>2</sub>", AMEMR (Advances in Marine Ecosystem Modelling Research), supported by UK Natural Environment Research Council, organised by Plymouth Marine Laboratory, 12-14 February 2007, Plymouth, UK.
- **Marine biological carbon cycle climate feedbacks - do they matter or not? (keynote)**, ASLO Summer Meeting 2005, American Society of Limnology and Oceanography, 19-24 June 2005, Santiago De Compostela, Spain.

#### **Organisation of international Conferences:**

**10<sup>th</sup> International Carbon Dioxide Conference**, member of science committee, Interlaken, Switzerland, to be held 20–25 August 2017.

**SOLAS Open Science Conference**, member of SOLAS Scientific Steering Organising Committee, Kiel, Germany, 7-11 September 2015.

**IMBER Open Science Conference**, member of the local organising committee, Bergen, Norway 23-27 June 2014.

**Workshop (EU Coordination Action COCOS) "Combining water column data with sediment trap and satellite observations for improved marine carbon export estimates"** Co-convenor (chair) and local host, Bergen, Norway 23-26 June 2010

**EGU General Assembly 2008, session BG3.1 "Reducing uncertainties in the quantification of the oceanic sink for anthropogenic carbon (CARBOOCEAN)"**. Co-convenor (chair), Vienna, Austria 16 April 2008

**"The GHG Cycle in the Northern Hemisphere", Open Science Conference**, member of scientific committee, Sissi-Lassithi, Crete, Greece, 14-17 November 2006.

**"37th International Liège Colloquium on Ocean Dynamics", 'Gas transfer at water surfaces'**, Member of international scientific committee, Liège, Belgium, 2-6 May 2005

#### **Major contributions to the early careers of excellent researchers:**

Supervision of Master-Students: Lise Bjerke (finished Dec. 2015), Peter Landschützer (finished Dec. 2010).

Supervision of PhD students: Anne Morée (ongoing), and Christophe Bernard (2006-2009, post-doc 2010-2011). Co-supervision of Svetlana Milutinovich (2006-2011).

Supervision/mentoring of post-doctoral researchers: Shuang Gao (since 2014), Nadine Goris (since 2011), Jörg Schwinger (since 2010), Caroline Roelandt (2009-2013), Karen Assmann (2005-2010), Christophe Sturm (2006-2008), Jerry Tjiputra (since 2007) – all Bergen, Jørgen Bendtsen (Roskilde, 2001-2003), Axel Hupe (Hamburg, 2000)