

# **Curriculum Vitae Prof. Dr. Markus Meier**

**Name:** Hans Eberhard Markus Meier

**Date of birth:** 02.03.1963

**Place of birth:** Hamburg, Germany

**Citizenship:** German and Swedish

**Languages:** German, English, Swedish

**Current employment:** Head of the Department of Physical Oceanography and Instrumentation at the Leibniz Institute for Baltic Sea Research Warnemünde

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## **Main fields of current research**

- numerical modeling of the Baltic Sea and Arctic Ocean
- sea ice modeling
- ice-ocean model inter-comparison
- sub-grid scale parameterizations (e.g. turbulence, gravity driven dense bottom currents) in ocean circulation models
- variational data assimilation using the adjoint method
- water exchange through straits
- reconstruction of Baltic Sea climate of the 20th century, paleoclimate studies
- climate variability and climate sensitivity of the Baltic Sea and Arctic Ocean
- detection and attribution of climate change
- dynamical downscaling using regional climate models
- scenario simulations for the Baltic Sea and impact studies (e.g. Baltic ringed seal populations, flooding, coastal erosion, and spatial development)
- ensemble technique for climate change scenario simulations
- atmosphere-ice-ocean interaction
- heat and water cycles in uncoupled and coupled atmosphere-ice-ocean models
- performance of massively parallel ocean codes
- coupled physical-biogeochemical modeling to study the marine ecosystem in past and future climates
- measures against eutrophication

## **Degrees and merits**

- High School Certificate, Neumünster, Germany, November 1981

- Diploma in Physics (Experimental, Theoretical and Applied Physics, Astronomy, thesis at the Institute of Fundamental and Applied Nuclear Physics), University of Kiel, Germany, September 1989
- Doctor of natural science (Physical Oceanography, Physics and Theoretical Physics, thesis at the Department of Theoretical Oceanography, Institute of Marine Research), University of Kiel, July 1996
- Docent (associate professor) in physical oceanography, University of Göteborg, January 2005 (Docent lecture on “Användning av tredimensionella oceanmodeller för att simulera cirkulationen på olika tids- och rumsskalor - vad fungerar bra respektive mindre bra”)
- Professor at the Faculty of Science, Stockholm University, Stockholm University, April 2012
- Professor (chair) position for Physical Oceanography (W3) at the University of Rostock and head of the department Physical Oceanography and Instrumentation at the Leibniz Institute for Baltic Sea Research Warnemünde (IOW), Germany, October 2015

### **Scientific employments**

1986-1989: Teaching contracts at the Institute of Fundamental and Applied Nuclear Physics, University of Kiel

1989: Scientific employee at the Institute of Fundamental and Applied Nuclear Physics, University of Kiel

1991-1996: Ph.D. student at the Department of Theoretical Oceanography, Institute of Marine Research, Kiel

1996-1997: Scientific employee at the Department of Theoretical Oceanography, Institute of Marine Research, Kiel

1997: Teaching contract, University of Kiel

1997-2006: Scientific employee at the Rossby Centre, SMHI, responsible for the development of a 3D coupled ice-ocean model for the Baltic Sea and for the Arctic Ocean, Nordic Seas, and North Atlantic Ocean

July 2006 - August 2015: Head of the Oceanographic Research Unit at the Research Department at SMHI (scientifically and economically responsible for 16-19 scientists)

August 2006 - July 2012: 20% teaching and supervising as adjoint lecturer (“adjungerad lektor i meteorologi och oceanografi”) with affiliation at the Department of Meteorology at Stockholm University (MISU)

August 2012 - September 2015: 20% teaching and supervising as adjunct professor in oceanography with affiliation at the Department of Meteorology at Stockholm University (MISU)

October 2015 – November 2022: 20% scientific employee at the Research Department, SMHI, project coordinator

since October 2015: Head of the Department of Physical Oceanography and Instrumentation at the Leibniz Institute for Baltic Sea Research Warnemünde, and professor at Rostock University (4 hours per week teaching obligations)

### **Training courses**

Jun 2001: PRISM/COACH summer school on “Climate modelling in Europe” (Les Diablerets, Switzerland, one week)

May 2004: university teaching (“Högskolepedagogisk introduktionskurs”, Göteborg University, one week)

Nov 2006: project management and leadership course for members of steering groups (“Praktisk projektstyrning (PPS) Styrgrupp”, Tieto Enator, 1 day)

Jan/Feb 2007: leadership course (“Forma Ledarutveckling”, 4 days)

Feb 2010: media training course (“medie/budskapsträning”, 1 day)

Feb/May 2010: leadership course (“ledarutveckling, Ekebacka Konsult AB”, 4 days)

### **Invited visiting scientist**

Aug 1997: Department of Meteorology, Stockholm University, Stockholm, Sweden

Feb 2003: International Arctic Research Center, University of Alaska, Fairbanks, U.S.A.

Nov 2005: Institute of Oceanology, University of Gdansk, Gdynia, Poland

### **Editorial tasks:**

- 2009-2022: Topic Editor of the EGU journal Ocean Science (<http://www.oceanscience.net/index.html>)
- winter/spring 2012: Member of the Guest Editorial Board of the AMBIO special issue “ECOSUPPORT - Different Ecosystem Drivers Under Future Climate Scenarios in the Baltic Sea” (Volume 41, Number 6, September 2012)
- 2016-2017: Guest Editor of the Special Issue on the 10th Baltic Sea Science Congress in Estuarine, Coastal and Shelf Science, Volume 195, Pages 1-124 (5 August 2017): Understanding the Baltic Sea. Edited by **H.E. Markus Meier**, Laimdota Kalniņa and Anda Ikauniece.
- 2017: Guest Editor of the Special Issue on the 1st Baltic Earth Conference on “Multiple drivers for Earth system changes in the Baltic Sea region” in Nida, Curonian Spit, Lithuania, 13-17 June 2016, in Earth System Dynamics.
- 2018-2019: Guest Editor of the HyMeX Special Issue on “Hydrological cycle in the Mediterranean” in the EGU journals Atmospheric Chemistry and Physics, Hydrology and Earth System Sciences, Ocean Science, Natural Hazards and Earth System Sciences, Geoscientific Model Development, Atmospheric Measurements Techniques

- 2018-2019: Guest Editor of the Special Issue on the 2nd Baltic Earth Conference on “The Baltic Sea Region in Transition” in Helsingør, Denmark, 11-15 June 2018, in *Frontiers in Earth Science*
- 2019-2021: Lead Guest Editor of the Special Issue of the Baltic Earth Assessment Reports project in *Earth System Dynamics*
- 2019-2020: Guest Editor of the Special Issue “Understanding the Indian Ocean System: past, present and future” in *Ocean Science*
- 2021-2022: Guest Editor of *Oceanologia* for a thematic Baltic Earth issue “Marginal Seas”

#### **Referee for research councils:**

- Member of the Changing Arctic Ocean Moderating Panel, Natural Environment Research Council (NERC), Great Britain
- Natural Sciences and Engineering Research Council of Canada (NSERC)
- Helmholtz Association of National Research Centres, Germany
- Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (FORMAS)
- Member of the evaluation panel of the Swedish Research Council (VR)
- Swedish Environmental Protection Agency (SEPA)
- The Netherlands Organisation for Scientific Research (NWO, the Dutch Research Council)
- Estonian Science Foundation
- Intergovernmental Panel on Climate Change (IPCC), fourth and fifth assessment reports (AR4, AR5)
- Canadian Foundation for Climate and Atmospheric Sciences (CFCAS)
- University of Alaska Coastal Marine Institute (CMI)
- National Council for Science, Higher Education and Technological Development in the Republic of Croatia
- Oceanic and Atmospheric Research (OAR) Awards Board, 2021 OAR Outstanding Scientific Paper Awards review
- German Research Foundation (DFG)
- German Ministry of Education and Research (BMBF)

#### **Referee for international scientific journals:**

- *Science*
- *Nature communications*
- *Geophysical Research Letters*
- *Environmental Research Letters*

- Environmental Research Communications
- Journal of Geophysical Research - Oceans
- Tellus
- Climate Dynamics
- Continental Shelf Research
- Monthly Weather Review
- International Journal of Climatology
- Ocean Sciences
- Journal of Marine Research
- Journal of Marine Systems
- Boreal Environmental Research
- Ocean Dynamics
- Climate Research
- Journal of Sea Research
- AMBIO
- Nordic Hydrology
- Estuarine, coastal and shelf science
- Oceanologia
- Geophysica
- Marine Ecology Progress Series
- Global and Planetary Change
- International Review of Hydrobiology
- International Journal of Earth Sciences
- Environmental Modeling and Assessment
- Climate of the Past
- Ocean Engineering
- History of Oceanography Yearbook
- Great Lakes Research
- Climatic Change
- Eos (newsletter of the American Geophysical Union, AGU)
- Geoscientific Model Development
- Ocean Modelling
- Limnology and Oceanography
- Ecological Engineering
- Ecological Applications
- Journal of Environmental Management

- Progress in Oceanography
- Meteorologische Zeitschrift
- Climate report for the Hamburg region, Germany
- Biogeosciences
- Environmental Science and Technology
- Deep-Sea Research Part II
- Journal of Advances in Modelling Earth Systems
- Scientific Reports
- Marine Pollution Bulletin
- Pure and Applied Geophysics

### **Awards:**

Oct 2011: the project ECOSUPPORT received the Bonus+ Award 2011 for the best public engagement activity or product for the GEODOME stakeholder decision support by scientific communication (2000 Euro)

Apr 2021: selected for the Reuters list of the world's top climate scientists identifying and ranking 1,000 climate academics (no. 934, 131 publications, 5,541 citations)

### **Grants (see detailed list below)**

#### **Additional assignments:**

2000-2001: Member of the evaluation group for ocean modeling at SMHI (Bengtsson et al., 2001)

2001: Member of the second evaluation group for ocean modeling at SMHI

2002-2005: External expert and advisor of the EU funded Centre of Excellence for Baltic Development, Education and Research (BALTDER), Institute of Oceanology, University of Gdansk, Gdynia, Poland

2005: Member of the writing team of chapter 2 (Past and current climate change, detection and attribution) and chapter 3 (Projections of future climate change) of the BALTEX Assessment of Climate Change for the Baltic Sea Basin (BACC)

2006-2015: Member of the steering group of the Research Department at the Swedish Meteorological and Hydrological Institute

2007-2018: Chair of the BALTEX/Baltic Earth Working Group on the "Added Value of Regional Coupled Atmosphere-Ocean Models" ([http://www.baltex-research.eu/organisation/bwg\\_rcm.html](http://www.baltex-research.eu/organisation/bwg_rcm.html)). The working group will conduct working group meetings, organizing workshops open for all interested scientist on the topic, and setting up international collaborations and projects financed by the EU, BONUS or national funding agencies.

2009-2011: Coordinator of the international BONUS+ project "ECOSUPPORT" with 11 involved partners, about 1.6 mio Euro, 2009-2011,

2011-2016: Lead author for the North Sea Region Climate Change Assessment (NOSCCA), chapter 3.2: Projected changes in the North Sea

2011-2014: Lead author for the Assessment of Climate Change in the Baltic Sea Region II (BACC II), chapter 13: Projected Change - Marine Physics

2011-2012: Member of the Working Group on Drafting a Science Plan for a scientific research network following BALTEX Phase II (PostBALTEX).

2012-2015: Member of the OSPAR Intersessional Correspondence Group on Eutrophication Modelling

2013: Member of the Swedish Research Council Review Panel (NT-8)

2013-2018: Chair of the Baltic Earth Working Group on Baltic Sea scenario simulations

2013-2014: Chair of the Interim Science Steering Group of the BALTEX successor program "Baltic Earth" (<http://www.baltex-research.eu/>)

since 2014: Chair of the Science Steering Group of "Baltic Earth" (<http://www.balticearth.eu/>)

2015-2016: Member of the writing team of the Baltic Earth science plan

since 2015: Member of the Faculty of Mathematics and Natural Sciences at Rostock University

2015: Member of the steering group of the coastal ocean modellers within the strategy group of coastal research of the Consortium of German Marine Research (Die nationale Arbeitsgruppe Küstenozeanmodellierung in der Strategieguppe Küstenforschung Konsortium Deutsche Meeresforschung)

since 2016: Member of the Interdisciplinary Faculty at Rostock University, Department of Maritime Systems

2016-2022: Board Member of the scientific committee of the HLRN (Wissenschaftlicher Ausschuss des Norddeutschen Verbundes für Hoch- und Höchstleistungsrechnen)

since 2016: Representative of the Leibniz Institute for Baltic Sea Research Warnemünde within the German Climate Consortium (Deutsches Klima-Konsortium e.V., DKK)

2018-2022: Coordinator of the Baltic Earth Assessment Reports (BEAR) Project and Lead Author of the third Assessment of Climate Change for the Baltic Sea Region

since 2019: member of the European Geoscience Union (EGU)

since November 2018: Coordinator of the German monitoring program at the Leibniz Institute for Baltic Sea Research Warnemünde

since February 2019: Co-Chair of the HELCOM-Baltic Earth Expert Network on Climate Change (EN-CLIME) representing Baltic Earth, coordination of primary climate parameters

since November 2021: Co-Chair of the Scientific Council of the Leibniz Institute for Baltic Sea Research

April 2022 – October 2022: Member of the Task Group 1 of the JPI Oceans and JPI Climate Knowledge Hub on Sea Level Rise

## **Research Highlights**

Our paper on “Hypoxia in future climates: A model ensemble study for the Baltic Sea.”, *Geophys. Res. Lett.*, 38, L24608, 2011, was highlighted by *Nature Climate Change*, see A. Brown, 2012: Low oxygen outlook. *Nature Climate Change*, 2, 75 (doi:10.1038/nclimate1406, published online 27 January 2012)

Our paper on “Modeling the combined impact of changing climate and changing nutrient loads on the Baltic Sea environment in an ensemble of transient simulations for 19612099.”, *Climate Dynamics*, 2012, doi: 10.1007/s00382-012-1339-y. (published online 25 April 2012) was highlighted by *Nature Climate Change*, see B. Wake, 2012: Climate and Baltic Sea nutrients, Vol. 2, p. 394 (doi:10.1038/nclimate1567, published online 25 May 2012)