

# Dr. Karina von Schuckmann

Oceanographer specialised in ocean climate monitoring

Mercator Ocean in Toulouse, France

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**Research interest:** Understanding the role of the ocean – and its interaction within – in the Earth’ s climate system, its changes and underlying processes involved, and how they can be best observed (in situ, remote sensing), monitored (reanalyses and operational systems) and estimated (analyses approaches, ocean climate indicator development).

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## Current responsibilities

- Lead author of the IPCC (AR6) special report on the ocean and cryosphere in a changing climate
- Chair of Copernicus Marine Service Ocean State Report activity
- Chair of the CMEMS Ocean Monitoring Indicator activity
- Co-chair of WCRP/CLIVAR research focus “CONCEPT-HEAT” (<http://www.clivar.org/research-foci/heat-budget>)
- Steering team member of the CLIVAR research focus “Decadal variability and predictability of ocean and climate variability” (<http://www.clivar.org/about/research-foci#two>)
- Workpackage leader and management commite member (representative for France) COST ES1402 “ Evaluation of ocean synthesis” ([http://www.cost.eu/COST\\_Actions/essem/Actions/ES1402](http://www.cost.eu/COST_Actions/essem/Actions/ES1402))

## Awards and former responsibilities

- 2018 IMAREST DENNY Medal award
- Participation of IPCC scooping meeting (Dec 2016) for the Special report on oceans and cryosphere (AR6)
- PI of ISSI international working group: “Consistency of Integrated Observing Systems monitoring the energy flows in the Earth System” (<http://www.issibern.ch/workinggroups/monitorenergyflow/>)
- PI of project MISTRALS/ENVIMED MEDMaHb: “The Mediterranean Sea mass and heat budget: Understanding its forcing, uncertainties and time evolution.”

## Professional experience:

**From Oct. 2015-current: Oceanographer specialised in ocean climate monitoring; Mercator Océan, France**

- Lead of the annual Copernicus Marine Service Ocean State Report
- Lead of the Copernicus Marine Service Ocean Monitoring Indicator activity
- Physical Earth energy budget studies: mean state and variability
- Coordination lead of CMEMS reprocessing and reanalysis activities
- Lead author of the IPCC SROCC (AR6)

**Jul-Aug. 2015: Rol Madden Visitorship , NCAR UCAR Climate and Global Dynamics**

- Earth energy and mass budget studies at global and regional scale

**Sept. 2013- Sept. 2015: Researcher at Mediterranean Institute of Oceanography (MIO)**

- Global and regional energy budget studies
- R&D for in situ and remote sensing data
- Scientific coordination of 6th CLIVAR research focus, ISSI working group (<http://www.issibern.ch/workinggroups/monitorenergyflow/>), MISTRALS/ENVIMED MED-MaHb; Work-package leader for ESA (TIE-OHF) and COST (ES1402) initiatives.

**Jan 2007 – Aug. 2013: Researcher Ifremer, France**

- Analysis of 3-D global ocean variability and definition of ocean state indicators using Argo, as well as satellite observations; processing and validation of global ocean in situ data.
- Development and implementation of tools for data consistency, R&D on in-situ data quality control procedures; development of ocean climate indicators for EEA and MyOcean

**March 1998-Dec 2006: Researcher (half-time); GEOMAR, Kiel, Germany**

- Water mass & ocean transport analyses from in situ, remote sensing and numerical model data
- Processing and validation of ocean in situ data
- Assistance to teaching programs
- Seagoing field work

**SEA GOING FIELD EXPERIENCE**

A total of 9 month of research cruise experience of various research vessels. Responsibilities included: CTD (conductivity-temperature-depth) measurements and data processing, monitor and assist mooring works, assist preparation and deployment of instruments (e.g. Argo floats), salinometer measurements, IADCP (Lowered Acoustic Doppler Current Profiler) measurements and data processing.

- Jun 2004 – Aug 2004: F/S Meteor M62/2, Fortaleza (Brazil) – Recife (Brazil).
- Aug 2003 – Oct 2003: F/S Meteor M59/3, St. John' s (Canada) – Bremerhaven (Germany).
- Apr 2003 – May 2003: F/S Sonne S170, Port of Spain (Trinidad and Tobago) – Recife (Brazil).
- May 2002 – Jun 2002: F/S Meteor M53/2, Mindeleo (Capo Verde) – Recife (Brazil).
- May 2001 – Jun 2001: F/S Meteor M50/2, St. John' s – St. John' s (Canada).

- Nov 2000: F/S Sonne S151, Bridgetown (Barbados) – Recife (Brazil).
- Mar 2000 – Apr 2000: F/S Meteor M47/1, Salvador (Brazil) – Fortaleza (Brazil).

## Education

### **Sept. 2006 Doktor der Naturwissenschaften (Ph.D.), Christian Albrechts University / GEOMAR, Kiel, Germany**

Title: “Intraseasonal variability in the tropical Atlantic Ocean” (in English). Moored current measurements, ship-board measurements, satellite sea level observations, and results from a numerical model simulation have been used to study generation mechanisms of equatorial ocean waves. Those waves are known to have a great impact on tropical Atlantic climate variability. Advisor:

P. Brandt, F. Schott, J. Willebrandt.

### **Sept. 2006 Diploma, Christian Albrechts University / GEOMAR, Kiel, Germany**

Diploma in theoretical and physical oceanography with nuclear physics and geology as subsidiary subjects

## PUBLICATIONS

### **PUBLICATIONS (RANG-A)**

- von Schuckmann, K., A. Storto, S. Simoncelli, R. Raj, A. Samuelsen, A. de Pascual Collar, M. Garcia Sotillo, T. Szerkely, M. Mayer, D. Peterson, H. Zuo, G. Garric, M. Monier, 2018: Ocean heat content, in CMEMS Ocean State Report 2, Journal of Operational Oceanography, accepted.
- Storto, A., K. von Schuckmann, Jean-François Legeais, Tanguy Szerkely, Drew Peterson, Hao Zuo, Gilles Garric, 2018: Steric Sea level, in CMEMS Ocean State Report 2, Journal of Operational Oceanography, accepted.
- Dubois, K. von Schuckmann, S. Josey, A. Ceschin, 2018: Changes in the North Atlantic, in CMEMS Ocean State Report 2, Journal of Operational Oceanography, accepted.
- Cheng, L., K. Trenberth, J. Fasullo, T. Boyer, J. Abraham, K. von Schuckmann, J. Zhou, 2017: Taking the pulse of the planet, EOS, <https://eos.org/opinions/taking-the-pulse-of-the-planet>
- Bentamy, A., J.-F. Piollé, A. Grouazel; R. Danielson, S. Gulev; F. Paul, H. Azelmat, P.-P. Marhieu, K. Von Schuckmann, S. Sathyendranah, H. King, I. Ezau, J. Johannessen, C.-A. Clayson; R. Pinker; S. Grodsky; M. Bourassa, S. Smith, K. Haines, M. Valdivieso, C. Merchant, B. Chapron, A. Anderson, S. Josey, 2017: Towards Improved Estimation 1 of Turbulent Heat Flux over the Global Oceans, System for Remote Sensing of Environment, in press.
- Hansen, J., M. Sato, P. Kharecha, K. von Schuckmann, D.J. Beerling, J. Cao, S. Marcott, V. Masson-Delmotte, M.J. Prather, E.J. Rohling, J. Shakun, P. Smith, 2017: Young People’s Burden: Requirement of Negative CO<sub>2</sub> Emissions, Earth Syst. Dynam., 8, 577–616, <https://doi.org/10.5194/esd-8-577-2017>.

- Jordà, G., K. von Schuckmann, S. Josey, G. Caniaux, J. García-Lafuente, S. Sammartino, C. Naranjo, E. Özsoy, J. Polcher, G. Notarstefano, P. Poulain, S. Somot, F. Adloff, J. Salat, K. Schroeder, J. Chiggiato, G. Sannino, D. Macías-Moy, 2017: The Mediterranean Sea Heat and Mass Budgets. Estimations, Uncertainties and Perspectives, *Progress of Oceanography*, in press, <https://doi.org/10.1016/j.pocean.2017.07.001>.
- von Schuckmann, Karina, et al., 2016b: The CMEMS Ocean State Report, *Journal of Operational Oceanography*, Volume 9, <http://dx.doi.org/10.1080/1755876X.2016.1273446>.
- Dieng, H.B., A. Cazenave, B. Meyssignac, K. von Schuckmann and H. Palanisamy, 2017: Sea and land surface temperatures, ocean heat content, Earth' s energy imbalance and net radiative forcing over the recent years, *International Journal of Climatology*, doi: 10.1002/joc.4996.
- Macintosh, C. R., C. J. Merchant and K. von Schuckmann, 2016: Uncertainties in steric sea level change estimation during the altimeter era: concepts and practices, *Climate Dynamics*, Volume 38, Issue 1, pp 59–87, doi:10.1007/s10712-016-9387-x.
- Trenberth, K.E., J.T. Fasullo, K. von Schuckmann, L. Cheng, 2016: Insights into Earth' s energy imbalance from multiple sources, *Journal of Climate*, doi: <http://dx.doi.org/10.1175/JCLI-D-16-0339.1>.
- Chambers, D.P., A. Cazenave, N. Champollion, H. Dieng, W. Llovel, R. Forsberg, K. von Schuckmann, and Y. Wada, 2016: Evaluation of the Global Mean Sea Level Budget between 1993 and 2014, *Climate Dynamics*, Volume 38, Issue 1, pp 309–327, doi: : 10.1007/s10712-016-9381-3.
- Hansen, J., M. Sato, P. Hearty, R. Ruedy, M. Kelley, V. Masson-Delmotte, G. Russell, G. Tselioudis, J. Cao, E. Rignot, I. Velicogna, B. Tormey, B. Donovan, E. Kandiano, K. von Schuckmann, P. Kharecha, A.N. Legrande, M. Bauer, and K-W. Lo, 2016: Ice melt, sea level rise and superstorms: evidence from paleoclimate data, climate modeling, and modern observations that 2°C global warming could be dangerous, *Atmos. Phys.*, 16, 3761–3812, [www.atmos-chem-phys.net/16/3761/2016/](http://www.atmos-chem-phys.net/16/3761/2016/), doi:10.5194/acp-16-3761-2016
- von Schuckmann, K., A. Cazenave, D. Chambers, J. Hansen, S. Josey, Y. Kosaka, N. Loeb, P.-P. Mathieu, B. Meyssignac, M. Palmer, K. Trenberth, M. Wild, 2016a: An imperative to monitor Earth' s energy imbalance, *Nature Climate Change* 6, 138–144, doi:10.1038/nclimate2876
- Dieng, H.B., H. Palanisamy, A. Cazenave, B. Meyssignac, K. von Schuckmann, 2015: The Sea Level Budget Since 2003: Inference on the Deep Ocean Heat Content, *Surv Geophys.*, DOI 10.1007/s10712-015-9314-6
- Dieng, H.B., A. Cazenave, K. von Schuckmann, M. Ablain, and B. Meyssignac, 2015: Sea level budget over 2005–2013: missing contributions and data errors, *Ocean Sci.*, 11, 789–802, [www.ocean-sci.net/11/789/2015/](http://www.ocean-sci.net/11/789/2015/)doi:10.5194/os-11-789-2015
- Gaillard, F., T. Reynaud, V. Thierry, N. Kolodziejczyk, K. von Schuckmann, 2015: In-situ based reanalysis of the global ocean temperature and salinity with ISAS: variability of the heat content and steric height, *Journal of Climate*, doi: <http://dx.doi.org/10.1175/JCLI-D-15-0028.1>
- Cazenave, A., H.-B. Dieng, B. Meyssignac, K. von Schuckmann, B. Decharme and E. Berthier, 2014: The rate of sea level rise, *Nature Geoscience*, doi: 10.1038/NCLIMATE2159.

- Dieng, H.B., O. Henry, K. von Schuckmann, B. Meyssignac, A. Cazenave, H. Palanisamy and J.-M. Lemoine, 2014: Effect of La Nina on the global mean sea level and north Pacific ocean mass over 2005-2011, *J. Geod. Sci.*, 4, 19–27, DOI 10.2478/jogs-2014-0003
- von Schuckmann, K., J.-B. Sallée, D. Chambers, P.-Y. Le Traon, C. Cabanes, F. Gaillard, S. Speich, M. Hamon, 2014: Consistency of the current global ocean observing systems from an Argo perspective, *Ocean Sci.*, 10, 547–557, 2014, [www.ocean-sci.net/10/547/2014/](http://www.ocean-sci.net/10/547/2014/), doi:10.5194/os-10-547-2014
- Hansen, J., P. Kharecha, M. Sato, V. Masson-Delmotte, F. Ackerman, D. Beerling, P. J. Hearty, O. Hoegh-Guldberg, S.-L. Hsu, C. Parmesan, J. Rockstrom, E. J. Rohling, J. Sachs, P. Smith, K. Steffen, L. Van Susteren, K. von Schuckmann, J. C. Zochos, 2013: Scientific Prescription to Avoid Dangerous Climate Change to Protect Young People, Future Generations, and Nature, *PLOS ONE*, 8, e81648, doi:10.1371/journal.pone.0081648.
- Abraham, J.P., M. Baringer, N.L. Bindoff, T. Boyer, L.J. Cheng, J.A. Church, J.L. Conroy, C.M. Domingues, J.T. Fasullo, J. Gilson, G. Goni, S.A. Good, J. M. Gorman, V. Gouretski, M. Ishii, G.C. Johnson, S. Kizu, J.M. Lyman, A. M. Macdonald, W.J. Minkowycz, S.E. Moffitt, M. Palmer, A. Piola, F. Reseghetti, K.E. Trenberth, I. Velicogna, K. von Schuckmann, S.E. Wijffels, J.K. Willis, 2013: Monitoring systems of global ocean heat content and the implications for climate change, a review, *Rev. Geophys.*, 51, 450–483, doi:10.1002/rog.20022.
- Rhein, M. et al., 2013 : Chapter 3 : Oceans, IPCC WGI Fifth Assessment Report.
- Cabanes, C., A. Gourazel, K. von Schuckmann, M. Hamon, G. Reverdin, C. Coatanoan, F. Gaillard, S. Pouliquen, P.-Y. Le Traon, 2012: The CORA database: Validation and Diagnostics of global ocean in situ measurements, *Ocean Sci.*, 9, 1–18, 2013, doi:10.5194/os-9-1-2013.
- Christiansen, T., G. Coppini, S. Masina, P. Di Pietro, P.-Y. Le Traon, K. von Schuckmann, M. Vichi, P. Lowe, D. Johns, 2012 : Oceans and marine environment, in *Climate change, impacts and vulnerability in Europe*, report of European Environmental Agency.
- Souza, J.A.C., A. de Moraes Paiva and K. von Schuckmann, 2013: New estimates for the heat flux across the Polar Front: spatial and temporal variability in recent years, *Antarctic Science*, doi:10.1017/S0954102012001113.
- Hansen, J., M. Sato, P. Kharecha, and K. von Schuckmann, 2011: Earth' s energy imbalance and implications, *Atmos. Phys.*, 11, 13421–13449, [www.atmos-chem-phys.net/11/13421/2011/](http://www.atmos-chem-phys.net/11/13421/2011/), doi:10.5194/acp-11-13421-201
- von Schuckmann, K. and P.-Y. Le Traon, 2011: How well can we derive global ocean indices from Argo data?, *Ocean Science*, 7, 783–791, [www.ocean-sci.net/7/783/20](http://www.ocean-sci.net/7/783/20).
- Palmer, M., K. Haines, J. Antonov, P. Barker, N. Bindoff, T. Boyer, M. Carson, C. Domingues, S. Gilles, P. Gleckler, S. Good, V. Gouretski, S. Guinehut, E. Harrison, M. Ishii, G.C. Johnson, S. Levitus, S. Lozier, J. Lyman, A. Meijers, K. von Schuckmann, D. Smith, S. Wijffels and J. Willis, 2009: Future observations for monitoring global ocean heat content. *Community White Paper OceanObs' 09*.
- von Schuckmann, K., F. Gaillard and P.-Y. Le Traon, 2009: Global hydrographic variability patterns during 2003-2008. *Journal of Geophysical Research*, 114, doi:10.1029/2008JC005237.
- von Schuckmann, K., Brandt, C. Eden and F. Schott, 2008: Generation of tropical instability waves in the Atlantic Ocean. *Journal of Geophysical Research*, 113, doi:10.1029/2007JC004712.

- von Schuckmann, K., 2006: Intraseasonal variability in the southwestern and central tropical Atlantic Ocean, Ph.D. Thesis (en Anglais). Kiel University, 140 pp. [http://e-diss.uni-kiel.de/diss\\_1873/](http://e-diss.uni-kiel.de/diss_1873/).
- Schott, F., M. Dengler, P. Brandt, K. Affler, J. Fischer, B. Bourlés, Y. Gouriou, R. Molinari, M. Rhein, 2003: The zonal currents and transports at 35°W in the tropical Atlantic. *Geophysical Research Letter*, 30, 1349-1352.

#### **PUBLICATIONS (RANG-B):**

- von Schuckmann, K., 2015: A prospectus for the CLIVAR research focus CONCEPT– HEAT (CONSistency between planetary energy balance and ocean HEAT storage), CLIVAR FluxNews issue 7, [fluxhttp://www.clivar.org/documents/fluxnews-issue-february-2015](http://www.clivar.org/documents/fluxnews-issue-february-2015)
- Bentamy, A. and K. von Schuckmann, TIE-OHF: towards improved estimates of ocean heat flux, CLIVAR FluxNews issue 7, [fluxhttp://www.clivar.org/documents/fluxnews-issue-february-2015](http://www.clivar.org/documents/fluxnews-issue-february-2015)
- von Schuckmann, K., P.-P. Mathieu, K. Haines and S. Gulev, 2013: Joint CLIVAR-ESA scientific consultation workshop, CLIVAR FluxNews issue 6, [http://www.sail.msk.ru/newsletter/fluxnews\\_2013\\_6.pdf](http://www.sail.msk.ru/newsletter/fluxnews_2013_6.pdf)
- von Schuckmann, K., M. Drévilion, N. Ferry, S. Mulet and M. H. Rio, 2010: Global Ocean indicators, *Mercator Ocean Quarterly Newsletter*, 37, 20-29.
- Cabanes, C., C. de Boyer Montégut, C. Coatanon, N. Ferry, C. Pertuisot, K. von Schuckmann, L. Petit de la Villeon, T. Carval, S. Pouliquen and P.-Y. Le Traon, 2010: CORA (CORIOLIS Ocean Database for re-Analyses), a new comprehensive and qualified ocean in-situ dataset from 1900 to 2008 and its use in GLORYS, *Mercator Ocean Quarterly Newsletter*, 37, 15-19.
- von Schuckmann, K., F. Gaillard and P.-Y. Le Traon, 2009: Estimating Global Ocean indicators from a gridded hydrographic field during 2003-2008. *Mercator Ocean Quarterly Newsletter*, 33, 3-10.