Dr Anna Katavouta – C.V.

Ocean Modelling Scientist, National Oceanography Centre, Liverpool Website: <u>https://katavouta.github.io</u> Research unique identifier: ORCID 0000-0002-1587-4996

Research Statement

I am an early career scientist interested in understanding the role of fundamental processes, such as ocean circulation and carbonate chemistry, on the climate response to carbon emissions, as well as using this understanding to assess emerging trends in ocean conditions in terms of regional-scale variability. My research approach combines numerical models (idealised and realistic), observations and theory to address the changing ocean and its role within the Earth system.

Work Experience	
08/2019 - present	Ocean Modelling Scientist , National Oceanography Centre, Liverpool, UK. Investigating the climate-change impacts in shelf seas, with particular interest in the Indonesian seas and the Indonesian Throughflow.
05/2020 - present	Secondment (part-time, 50%) at the University of Liverpool, UK. <i>Investigating ocean carbon and air-sea/cloud feedbacks operating in the climate system.</i>
09/2016 - 08/2019	Postdoctoral Research Associate in Ocean Sciences , Department of Earth, Ocean and Ecological Sciences, University of Liverpool, UK. <i>Investigating the role of the ocean on the climate response to emissions.</i>
Education	
2010 - 2016	PhD in Oceanography , Dalhousie University, Halifax, Canada. Thesis: <i>"Non-linear coupling of scales of ocean variability and implications for downscaling".</i>
2008 - 2010	MSc in Earth and Atmospheric Sciences (specialised in Oceanography), University of Alberta, Edmonton, Canada. Thesis: " <i>Sea-ice data assimilation for the Canadian East Coast</i> ".
2003 - 2008	Ptychio (BSc Hons) in Physics , University of Patras, Patras, Greece. Thesis: "Simulating and forecasting erythemal radiation time series using <i>Artificial Neural Networks</i> ".

Teaching and Mentoring Experience

2022 – present	Co-supervising an undergraduate research project on Indian Ocean warming, University of Liverpool.
2022 – present	Contributing to the supervision and advising PhD student Elisavet Baltas, University of Cambridge.
2017 – 2022	Mentoring and contributing to the supervision of PhD student Katherine Turner, University of Liverpool.
2022 – present, 2017 & 2018	Computer-lab support , University of Liverpool. Key Skills for Environmental Data Analysis, for the second-year students and for honours-projects students in the School of Environmental Sciences.
2017	Guest Lecturer , Liverpool John Moores University. Module: Earth Systems, for the first-year students in the Geography Programme. Lectures on <i>"Seawater Properties and Ocean Circulation"</i> .
2017	Guest Lecturer , University of Liverpool. Module: Global Carbon Cycle, for the third-year students in the Ocean Science Programme. Lectures linked with a practical on " <i>Modelling the Carbon Cycle</i> ".

Selected Services for the UN Ocean Decade

2022 – present I am on the **steering committee** and help lead the recently endorsed **UN Ocean Decade Action "Future Coastal Ocean Climates" (FLAME)** hosted by CoastPredict, which acts as an international coordinator and focal point for understanding the impacts of climate change on the global coastal ocean (<u>https://projects.noc.ac.uk/flame/</u>).

Funding and Bursaries

05/2020 - 04/2023	NERC standard grant : <i>Asymmetries in ocean heat and carbon uptake, and effects on marine hazards</i> , NE/T007788/1. Named Researcher Co-I.
June 2012	Student Travel Award from the Canadian Meteorological and Oceanographic Society (CMOS) to attend the 46 th CMOS Congress in Montreal, Canada.
June 2010	Student Travel Award from the Canadian Meteorological and Oceanographic Society (CMOS) to attend the 44 th CMOS Congress in Ottawa, Canada.

Awards

2010 - 2011	Kathy Ellis Memorial Book Prize . Presented annually to the graduate student who achieves the highest average in the Oceanography core courses at Dalhousie University.
June 2010	J. Gordin Kaplan Graduate Student Award . Awarded to doctoral and master's students in support of approved travel expenses related to research.
Jan. 2010	Dr Roy Dean Hibbs Memorial Graduate Scholarship . Awarded based on strong academic performance with an emphasis on research accomplishments at the University of Alberta.

Selected and most recent Conference Presentations

- European Geosciences Union General Assembly 2022, Vienna, Austria: "Ventilation controls of ocean heat and carbon uptake: similarities and differences in the response to carbon emissions".
- **Ocean Sciences meeting 2022** (virtual): "Ocean carbon cycle feedbacks in CMIP6: contributions from different basins and role of the Atlantic Overturning Circulation".
- European Geosciences Union General Assembly 2020, online: "Carbon-concentration and carbon-climate feedbacks in CMIP6 models, and their comparison to CMIP5 models".
- **Ocean Sciences meeting 2020**, San Diego, USA: "*Effect of tides on the circulation and hydrography in the Indonesian Seas: Comparison of a model with and without tidal forcing*".
- European Geosciences Union General Assembly 2019, Vienna, Austria: 1. "The role of ocean physics in controlling the climate response and carbon cycle feedback to carbon emissions" & 2. "Timescales of the ocean thermal and carbon response to carbon forcing".
- **Ocean Sciences meeting 2018,** Portland, USA: "Dependence of surface warming due to carbon emissions on ocean ventilation: Experiments using idealised ocean models".
- European Geosciences Union General Assembly 2017, Vienna, Austria: 1. "Downscaling ocean conditions with application to the Gulf of Maine & Scotian Shelf", 2. "Mechanistic controls of surface warming by ocean heat and carbon uptake, Experiments using idealised models" & 3. "Interaction between the tidal and seasonal variability of the Gulf of Maine & Scotian Shelf".

Journal Reviewer: *Biogeosciences, Climate Dynamics, Geophysical Research Letters, Journal of Climate, JGR-Oceans, Journal of Physical Oceanography, and Nature Communications.*

Selected Invited Visits and Talks

- March 2022, Princeton University, USA: "Controls of global and basin-scale ocean carbon cycle feedbacks on centennial timescale". Invited virtual seminar.
- Jan 2019, Max Planck Institute of Meteorology, Hamburg, Germany: "The role of ocean in a changing climate: a carbon cycle feedback framework". Invited by Dr Tatiana Ilyina (co-leader of the WCRP Grand Challenge on Carbon Feedbacks in the Climate System).
- August 2018, University of Bern, Bern Switzerland: "Ocean ventilation control of the surface warming dependence on carbon emissions". Invited by Prof Thomas Frölicher (lead author of the IPCC Special Report on the Oceans and Cryosphere).

Selected Summer Schools & Workshops

Feb 2022	Co-organising the first "Future Coastal Ocean Climates" (FLAME)
(upcoming)	workshop that seeks to bring together an international community of scientists to discuss and develop strategies for addressing climate-change impacts on the coastal ocean.

- June 2021 **CMIP6 Data Hackathon** part of the Met Office Climate Data Challenge Hackathon series during 2021. Participation from 100 UK early career researchers from a wide range of environmental disciplines. My participation led to an ongoing collaboration for addressing the effects of climate change on the Biological Carbon Pump (doi:10.1073/pnas.2204369119).
- August 2018Awarded a place in the 17th Oeschger Centre for Climate Change
Research (OCCR) Summer School: "Earth system variability through time".
Participation in this summer school is highly competitive and is limited to a
maximum of 70 young researchers from all fields of climate research.

Publications

- Polton J.A., J. Harle, J. Holt, A. Katavouta, D. Partridge, J. Jardine, S. Wakelin, J. Rulent, A. Wise, K. Hutchinson, D. Byrne, D. Bruciaferri, E. O'Dea, M. De Dominicis, P. Mathiot, A. Coward, A. Yool, J. Palmieri, G. Lessin, G. Mayorga-Adame, V. Le Guennec, A. Arnold, & C. Rousset (in review). Reproducible and Relocatable Regional Ocean Modelling: Fundamentals and practices, *Geosci. Model Dev. Discuss.*, https://doi.org/10.5194/gmd-2022-217.
- **20.** Turner K.E., D.M. Smith, **A. Katavouta**, & R.G. Williams (**in review**). Reconstructing ocean carbon storage with CMIP6 models and synthetic Argo observations, *Biogeosciences Discuss.*, https://doi.org/10.5194/bg-2022-166.
- **19.** Turner K.E., R.G. Williams, **A. Katavouta** & D.J. Beerling (**in review** *Climate Dynamics*). Controls of the climate response to negative emissions in a simplified climate model.
- **18.** Williams R.G., C. Paulo, V, Roussenov, **A. Katavouta** & A.J.S. Meijers (**in review** *Philosophical Transactions of the Royal Society A*). The role of the Southern Ocean in the global climate response.
- Wilson J.D., O. Andrews, A. Katavouta, F. de Melo Viríssimo, R.M. Death, M. Adloff, C.A. Baker, B. Blackledge, F.W. Goldsworth, A.T. Kennedy-Asser, Q. Liu, K.R. Sieradzan, E. Vosper, R. Ying (2022). The biological carbon pump in CMIP6 models: 21st century trends and uncertainties, *Proceedings of the National Academy of Sciences*, 119, e2204369119, https://doi.org/10.1073/pnas.2204369119.
- Mitchell D.M., E.J. Stone, O.D. Andrews, J.L. Bamber, R.J. Bingham, J. Browse, M. Henry, D.M. MacLeod, J.M. Morten, C.A. Sauter, C.J. Smith, J. Thomas, S.I. Thomson, J.D. Wilson, and the rest of the Bristol CMIP6 Data Hackathon participants (including **A. Katavouta**) (2022). The Bristol CMIP6 Data Hackathon, *Weather*, 77, https://doi.org/10.1002/wea.4161.

- **15**. **Katavouta A**., J.A Polton, J.D. Harle & J.T. Holt (2022). Effect of tides on the Indonesian Seas circulation and their role on the volume, heat and salt transports of the Indonesian Throughflow, *Journal of Geophysical Research: Oceans*, 127, e2022JC018524, https://doi.org/10.1029/2022JC018524.
- Katavouta A. & R.G. Williams (2021). Ocean carbon cycle feedbacks in CMIP6 models: contributions from different basins, *Biogeosciences*, 18, 3189–3218, https://doi.org/10.5194/bg-18-3189-2021.
- Williams R.G., A. Katavouta & V. Roussenov (2021). Regional Asymmetries in Ocean Heat and Carbon Storage due to Dynamic Redistribution in Climate Model Projections, *Journal of Climate*, 34(10), 3907-3925, https://doi.org/10.1175/JCLI-D-20-0519.1.
- Williams R.G., P. Ceppi & A. Katavouta (2020). Controls of the Transient Climate Response to Emissions by physical feedbacks, heat uptake and carbon cycling, *Environmental Research Letters*, 15 0940c1, https://doi.org/10.1088/1748-9326/ab97c9.
- Arora V.K., A. Katavouta, R.G. Williams, C.D. Jones, V. Brovkin, P. Friedlingstein, J. Schwinger, L. Bopp, et al., (2020). Carbon-concentration and carbon-climate feedbacks in CMIP6 models, and their comparison to CMIP5 models, *Biogeosciences*, 17, 4173–4222. https://doi.org/10.5194/bg-17-4173-2020.
- Williams R.G., A. Katavouta & P. Goodwin (2019). Carbon-Cycle Feedbacks Operating in the Climate System, *Current Climate Change Reports*, 5, 282-295. https://doi.org/10.1007/s40641-019-00144-9.
- **9**. **Katavouta A.,** R.G. Williams & P. Goodwin (2019). The effect of ocean ventilation on the Transient Climate Response to Emissions, *Journal of Climate*, 32, 5085-5105. https://doi.org/10.1175/JCLI-D-18-0829.1.
- 8. Goodwin P., R. G. Williams, V. M. Roussenov, & **A. Katavouta** (2019). Climate sensitivity from both physical and carbon cycle feedbacks, *Geophysical Research Letters*, 46, 7554–7564. https://doi.org/10.1029/2019GL082887.
- 7. Katavouta A., R.G. Williams, P. Goodwin & V.M. Roussenov (2018). Reconciling Atmospheric and Oceanic Views of the Transient Climate Response to Emissions, *Geophysical Research Letters*, 45. 6205-6214. https://doi.org/10.1029/2018GL077849.
- 6. Goodwin P., **A. Katavouta**, V.M. Roussenov, G.L. Foster, E.J. Rohling & R.G. Williams (2018). Pathways to 1.5°C and 2°C warming based on observational and geological constraints, *Nature Geoscience*, 11, 102-107. https://doi.org/10.1038/s41561-017-0054-8.
- Chegini F., Y. Lu, A. Katavouta & H. Ritchie (2018). Coastal upwelling off Southwest Nova Scotia simulated with a high-resolution baroclinic ocean model, *Journal of Geophysical Research*, 123, 2318-2331. https://doi.org/10.1002/2017JC013431.
- 4. Katavouta A. & K.R. Thompson (2016). Downscaling ocean conditions with application to the Gulf of Maine, Scotian Shelf and adjacent deep ocean, *Ocean Modelling*, 104, 54-72. https://doi.org/10.1016/j.ocemod.2016.05.007.
- **3.** Katavouta A., K.R. Thompson, Y. Lu & J.W. Loder (2016). Interaction Between the Tidal and Seasonal Variability of the Gulf of Maine and Scotian Shelf Region, *Journal of Physical Oceanography*, 46(11), 3279-3298. https://doi.org/10.1175/JPO-D-15-0091.1.
- 2. Katavouta A. & P.G. Myers (2014). Sea-ice concentration multivariate assimilation for the Canadian East coast in a coupled sea ice-ocean model, *Atmosphere-Ocean*, 52, 418-433. https://doi.org/10.1080/07055900.2014.954096.
- 1. Katavouta A. & K.R. Thompson (2013). Downscaling Ocean Conditions: Experiments with a quasi-geostrophic model, *Ocean Modelling*, 72. https://doi.org/10.1016/j.ocemod.2013.10.001.