Sophia Moreton

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Summary

Strong background in Physical Oceanography, Geophysical Fluid Dynamics and programming using mainly Python, as well as Matlab and some Fortran, on Linux systems. I have an eager interest to develop my knowledge on the mathematical and numerical foundations of climate models, as well as to develop my understanding of ocean eddy dynamics. My PhD research project explores how ocean eddies impact large-scale ocean circulation and air-sea heat and momentum exchanges, with the ambition to be able to parameterise the interaction into coarser resolution climate models.

Education and Employment

Sep 2016- present **PhD in Physical Oceanography**
Within the School of Mathematical, Physical and Computational Sciences, University of Reading, UK
My title is ' Air-sea exchanges at the ocean mesoscale: a driver of ocean circulation?'

A CASE-funded Doctoral Training Programme partnered with industrial experience from the Met Office, UK. Alongside my research project I have taken MSc -level modules in:

- Introduction to Numerical Modelling with Dr Hilary Weller (distinction obtained)
- Fluid Dynamics of the Atmosphere and Oceans with Dr Robert Plant
- Numerical Modelling of the Atmosphere and Ocean with Prof. P. L. Vidale
- Statistics for Atmosphere and Oceans

I collaborate with theoretical oceanographer David Ferreira, University of Reading and Helene Hewitt and Malcolm Roberts. Both Helene and Malcolm are based at the Met Office, where Helene leads the Ocean Modelling group, and Malcolm leads a High-resolution Climate Modelling team (mainly CMIP6 HighResMIP and PRIMAVERA). I have validated and analysed HadGEM3–GC3.1 model data at high resolutions (up to $1/12^0$ in the ocean) and am currently running idealized ocean model experiments, and potentially ocean-atmosphere coupled experiments, to explore mesoscale eddy dynamics and their interaction with the atmosphere and large-scale circulation.

Apr 2019- Jan 2020 **Maternity Leave**

Mar 2016-Sep 2016 **Data Research Analyst** at SessionCam Norwich, a digital marketing company

Sep 2011- Jul 2015 **MSci Oceanography 2.1 (integrated Masters and undergraduate)**
National Oceanography Centre, Southampton, UK (1st in 4th year Masters overall)

- Physical oceanography and ocean modelling specialising in heat fluxes, fluid dynamics and ocean mixing
- Data analysis of satellite, observational and modelled climate and oceanic data using Matlab programming
- Achieved a First Class in 3rd and 4th year dissertation research projects
- May 2015 Geophysical fluid dynamics fieldtrip to the IUEM in Brest, France
- **2014-15 Advanced Masters Research project (Graded as: 1st):** Changes in surface heat fluxes and ocean mixing from 1994-2007 interannually on the size of the Western Pacific Warm Pool with implications for the current hiatus period.

- **2013-14 Dissertation project (Graded as: 1st):** Seasonal and inter-annual variations in the permanent thermocline east of the Bahamas forced by wind stress curl from Trade Winds.

2005 -2011 **GCSEs and A levels at Wymondham College, Norfolk, UK**

Technical skills

- Programming Languages: Matlab (at Southampton), Python (since 2016 at Reading) and some Fortran (MITgcm model)
- Operating systems: Linux, Windows
- Parallel computing using both ROSE/cylc through JASMIN at the Met Office, and MPI in order to run the MITgcm model using the RACC at Reading.

Numerical models I am familiar with:

- HadGEM3-GC3.1: fully coupled high-resolution configurations with either a $1/4^0$ or $1/12^0$ ocean and coupled to a 60 or 25 km atmosphere as part of PRIMAVERA (a European project evaluating high-resolution global models with Horizon 2020).
- MITgcm: a non-hydrostatic, finite volume ocean model which can be run with an atmosphere or sea ice component.

Publications

S. M. Moreton, D. Ferreira, M. J. Roberts, and H. T. Hewitt. Evaluating surface eddy properties in coupled climate simulations with eddy-present ' and eddy-rich ' ocean resolution. Ocean Modelling,147, 2020.

Conferences and Seminars

- 3-5th February 2020, DRAKKAR workshop, Grenoble (Malcolm presented my work)
- 7-12th April, 2019, EGU, Vienna (David presented my work as on Maternity leave)
- 21-24th January 2019, DRAKKAR workshop, Grenoble (talk)
- 13th June 2018, University of Oxford Seminar Series (talk), invited by David Marshall
- 17-18th February 2018, Mesoscale Ocean-Atmosphere Interaction workshop (poster), Portland, Oregon
- 13-16th February 2018, Ocean Sciences 2018 (poster), Portland, Oregon, US
- 6th December 2017, NOC Seminar Series (talk), Southampton, invited by Simon Josey
- 19th-21st September 2017, Understanding Change and Variability in the North Atlantic Climate System (ACSIS-OSNAP-RAPID), (poster), University of Oxford
- 11-12th September 2017, Challenger Ocean Modelling conference (talk), Met Office, Exeter
- 17-18th July 2017, Climate Dynamics workshop, Exeter (Malcolm presented my work)
- June 2017, UM User Workshop: Ocean (GO) and Sea Ice (GSI) configuration: current developments and future plans, Met Office, Exeter

Courses/ programmes

- 3 day Python Programming course, Met Office training school, 22.03.17 - 24.03.17
- Data Assimilation School at DA Research Centre, Reading. 14.02.17 - 17.02.17
- 4 day NERC Software Development course for Environmental Scientists, Institute for Environmental Analytics, Reading 15.12.16 - 16.12.16, 25.01.17 - 26.01.17

Interests

I enjoy being outdoors either sailing, road cycling, hiking or running as well as travelling: I took a year out after my Masters and before starting the PhD in order to travel around the world solo.