Report on the Rupert Ford Memorial Award for early career researchers, 2014
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I applied to be considered for the Society's Rupert Ford Award in July 2014 to enable me to travel to study at the Alfred Wegener Institute (AWI) in Bremerhaven, Germany.

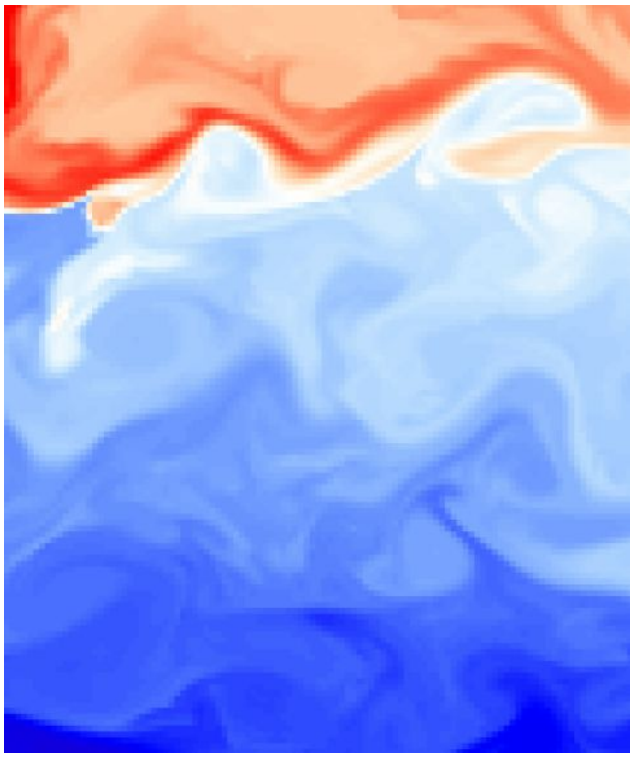
The Award exists to fund early career researchers to travel to other institutions in order to interact, learn and collaborate with other scientists. The Award is named after the late meteorologist Rupert Ford whose own travels were influential on his output before his career was tragically cut short when he was the same age that I am now, 33.

In my case, I had been researching the use of the Massachusetts Institute of Technology General Circulation Model (MITgcm) for approximately 9 months when I applied for the Award. I was fortunate enough to have travelled to MIT itself in January of 2014 to learn directly from the people who are responsible for writing and maintaining the MITgcm code and it became very clear to me during this trip that travelling to study directly with other researchers can hugely accelerate the learning process. Indeed I felt that I gained more in ten days or so at MIT than I would have done in ten weeks in my usual routine; both in terms of academic knowledge and in getting to know my colleagues on less formal footing. Therefore, when the opportunity arose to apply for my own personal funding to learn more about the MITgcm, I jumped at the chance.

The MITgcm is a computer simulation framework for modelling fluid dynamics on the Earth and is even used for studies of the geophysics other planets! In my case, I am particularly interested in its high resolution capabilities, that is, simulation resolutions where turbulent eddies start to become resolved. In most ocean models, due to computational constraints, ocean circulation calculations are usually performed at resolutions too low for eddies to be seen. The MITgcm is written in such a way that it can be run in either global or regional resolutions. The use of a relatively small region of the global ocean enables much higher resolutions (smaller grid spacings) to be used and hence make high resolution calculations possible within a useful time frame.

The MITgcm is open source (mitgcm.org) and has a widely used and free email list where researchers can gain assistance from - and share knowledge with - other users. The MITgcm is therefore very much in the spirit of shared knowledge and experience, as exemplified by the Rupert Ford Award.

The Figure shows an example of the 'eddy permitting' capabilities of the MITgcm in a simulation run by the author. It shows uninterpolated, simulated surface ocean temperatures for an arbitrary ocean configuration at 0.1 degree resolution, which corresponds to a grid spacing of approximately 11km. The red (blue) colours show higher (lower) temperatures and one can clearly see the swirling eddies superimposed on top of the north-south temperature gradient, the latter being due to the study region lying in the Southern Hemisphere.



During my time at AWI, I worked closely with Dr Martin Losch who has considerable experience in the development of high resolution configurations of the MITgcm. The knowledge gained during my time there enabled me to make my code considerably more physically plausible in terms of the underlying numerical parameters that I had been using to simulate eddies before my visit. This not only greatly assisted with the fidelity of the work that I was carrying out at the time but also gave me an important reminder as to why certain underlying parameters in any model of geophysical circulation should be critically analysed. The neglection of this analysis is classic example of something that all modellers should be constantly aware of and is sometimes referred to as the “black box mistake” and the interested reader is referred to the excellent work of J. D. Salt (Journal of Simulation, 2, 155-161, 2008) for a more detailed discussion.

As early career researchers, we are often (quite rightly) encouraged to travel to conferences and workshops in order to present our work to our own academic community and to gain recognition for work done; ultimately through publication of peer-reviewed papers. Because of this, there is often more emphasis on the end results of research rather than how, and by whom, it is carried out. The ability to travel to MIT and to AWI, through the Rupert Ford Award, has enabled me to begin to gain a more rigorous understanding of the physical and computational basis of the MITgcm, improve my critical thinking ability and has also enabled me to get to know some of the people responsible for the day-to-day management of the model itself.

I would very much encourage other early career researchers to seek out opportunities such as this and I feel that it is quite apt that I first met my host for the research visit funded by this Award at MIT when we were both there on seemingly unconnected research visits to MIT at the time.

My warmest thanks go out to the friends, colleagues and family of Rupert Ford who made this award possible and I look forward to taking my meteorological career forward in the years to come.