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Using climate data across disciplines

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Widening Reach in the

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SUMMARY (100 word abstract)

Conceived, designed, and hosted a three-day data hackathon open to all UK researchers in a range of disciplines who traditionally had not applied their skillset to climate science, to produce cutting-edge research. Over 100 ECRs took part in the 3 day event, learning new techniques, ways to share and work remotely, and meeting new academics outside their discipline. The outputs from the hackathon are currently 4 peer-reviewed, open access papers, and presentation of the results at the [COP26](#) delegation in 2021, as well as a central body of 'big data' coding tools and tailored data hackathon techniques.

What did you do?

Brought together ten expert climate scientists from across the UK to lead ten different research questions related to climate science. These were then advertised to all UK academics, targeting ECRs, and there were over a hundred researcher's applying. In the 3 day event, participants went through a set of introduction lectures, social events, but mainly group work surprised under one of the ten projects, with technical coding and data backup from a centralised Bristol team. By the end, each group had a different set of results, based on climate data which were used. They knew how to use a centralised platform of data analysis, designed specifically to widen the reach of climate science into these other disciplines.

Why did you do it?

Climate data is measured in hundreds of petabytes, and can be extremely daunting for those outside the field. Many academics have said that climate science is an old boys club, with no chance of being part of that club unless you are trained in climate science, and big data analysis. This hackathon was designed to break down that barrier, bringing in a wide range of experts in other disciplines, which included marine biologists, health experts, number theorists, and food security experts, to name but a few. Those participants have gone away with new contacts in the field, training by some of the best climate scientists in the UK, and most importantly, the confidence to use such a daunting data set in their own research.

How did you do it?

The logistics of this event were extremely difficult, because they required access to a lot of code sharing across many different operating systems, with many different setups. To overcome this, the UK central atmospheric data facilities were used, which all academic institutes can access. This allowed for a common set of coding scripts, and a centralised data format, so that all ECRs could learn the same way. Each of the ten leading academics were asked to design a question around this platform, and central UoB data science expertise were on hand throughout the event to help with technical problems.

What barriers / challenges did you have to overcome?

With 100 different participants, the range of skill sets was immense. This was utilised by showing each participant what their strength was, and how it could be fed into the wider group projects. At the same time, they could learn techniques that they didn't have before. Examples of this were ECRs who had no computer programming knowledge, ECRs who were unfamiliar with the data formats we use, and ECRs who were very siloed in the way they currently did research. Creating a bespoke analysis platform, in Python, that researchers could access from across the UK was a real challenge, but it was felt to be important to give all ECRs equal access and opportunity for this event.

What does it mean for you and your research?

As a climate impacts researcher myself, this new found skill set for many ECRs in the UK will undoubtedly help grow our climate change evidence base, which is essential for the upcoming UK climate risk assessments. Those reports have traditionally not reached enough academics outside the core climate discipline, and this data hackathon is an excellent first step towards that. I now have an even better understanding of some of the more remote impacts of climate change. For instance, on the flights of birds called Arctic Terns, which are often impacted by changing wind and temperature patterns. Such insights will allow me to advise, and draw on, a very diverse set of scientists in this area.

How might your findings / approach help other researchers?

The hackathon can help in two principal ways. The first is that the event was designed to be as flexible as possible to the science question being asked, and in doing so a gold standard for how to set up, collaborate, and run a data hackathon was developed. Information, code, and best practises for widening the reach of the science were given on the website <https://cmip6moap.github.io>, and written up as a peer-reviewed paper in Weather by the steering committee that I formed, for the entire science community to use. For instance, the exoplanet community have already started discussions about taking our blueprint forward for a hackathon in their community. The second way the hackathon has helped others is by introducing them to so many other scientists in related disciplines. Traditionally, these researchers would not meet, but this platform has allowed for that to happen. The technique of working remotely, and across institute, has meant that many of the less well funded universities have had access to tools and facilities that they wouldn't have otherwise. This has been especially important in COVID times, where remote working is so important.

Additional Information

While the idea and design for this initiative was mine. I wanted to highlight the excellent institutes that I needed to lean on heavily to achieve this. The four main ones were, the UK Met Office Academic Partnership, The Jean Golding Institute, JASMIN, and the Cabot Institute. Without them, this would not have been possible.

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