

## **Short report: Geophysical fluid dynamics; from mathematical theory to operational prediction programme**

### **Satellite at University of Reading**

A better understanding of the climate system is of great societal relevance, due to the need for reliable environmental forecasts and the looming climate crisis. Our ability to understand and forecast weather and climate processes rests on five pillars: on physics to find the relevant equations, on mathematics to guarantee well-posedness and to explore them qualitatively, on numerics to implement these equations and study them quantitatively, on data assimilation to infer parameters and initial conditions, and on statistics to assess predictions against observations.

The inaugural INI Satellite Programme, held at the University of Reading, brought together a well balanced mix of researchers with backgrounds ranging from pure mathematics, statistics, data science, to weather and climate science (working both in academia and for operational forecasting centres). The programme strongly benefited from Reading being an internationally recognised hub for research in weather and climate, owing to the University's Centre for Mathematics of Planet Earth, the Department of Meteorology, and close connections to ECMWF, the UK MetOffice, NCAS, and NCEO.

This created a vibrant, interdisciplinary atmosphere in which ideas from various areas were floated and discussed, with early career researchers adding an extra level of enthusiasm and sobriety. The month long programme was flanked by two workshops. The first focused more on the analysis of geophysical fluid dynamics, while the second was more applied in character.

Workshop and programme participation strongly overlapped, showing that both were well integrated. Early feedback from participants emphasised successful efforts by speakers to pitch their presentations for an interdisciplinary audience, yet at the same time placing jumping--off points for more in-depth discussions and collaborations.

Organisers