



**Scenario**  
DOCTORAL TRAINING PARTNERSHIP

**NERC**  
SCIENCE OF THE  
ENVIRONMENT

## **Advanced methods for assimilating satellite data in numerical weather prediction**

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Data assimilation, the process of initializing a computer model forecast using the latest observational data, has proven fundamental to the accuracy of modern day weather forecasting. Every day of the order of  $10^7$  observations are assimilated at the Met Office. These observations come from a myriad of different instruments onboard various platforms; including weather balloons, aircrafts and ships. However, observations from instruments onboard satellites have been shown to have the greatest impact on producing accurate forecasts. This is due to their extensive coverage, high sampling resolution and the information they provide about key model variables: temperature, humidity and winds. The problem is that satellite data often exhibit systematic errors, for example due to poor calibration, adverse environmental effects, or errors in the radiative transfer equations that relate the observations to the model variables. Systematic errors in the data violate the theory that is central to data assimilation and so for satellite data to be useful they must first be bias corrected. The methods currently in use for performing the bias correction rely on the assumption that the computer model assimilating the observational data itself is unbiased. Unfortunately this is rarely true and is becoming a limiting factor in the use of satellite data. This project will develop new mathematical techniques for performing bias correction that are able to distinguish and correct for biases in both the observations and model.



### **Training opportunities:**

This studentship is a joint project with the Met Office. The student will have the opportunity to spend time working at the Met Office over the lifetime of the project. The student will also have the opportunity to attend ECMWF training courses on data assimilation and advanced training courses at Reading organized by the Data

Assimilation Research Centre.

**Student profile:**

The candidate should have a good honours degree in a subject with strong mathematical content.

<http://www.reading.ac.uk/nercdtp>