

**Alan O'Neill, Keith Haines, Sarah Dance, Stefano Migliorini,
Ross Bannister, Andrew Shaw**

Key messages

- The National Centre for Earth Observation's mission is to unlock the full potential of earth observations to monitor, diagnose and predict climate and environmental changes.
- NCEO at Reading leads this endeavour exploiting our world-class skills in Earth observation for climate, hazardous weather and data assimilation which in turn underpins the work of the Walker Institute.
- NCEO at Reading work with a network of 26 universities and institutes across the UK to deliver our observation science programme. We also work with the Met Office, European Space Agency and NASA.

What is Earth observation?

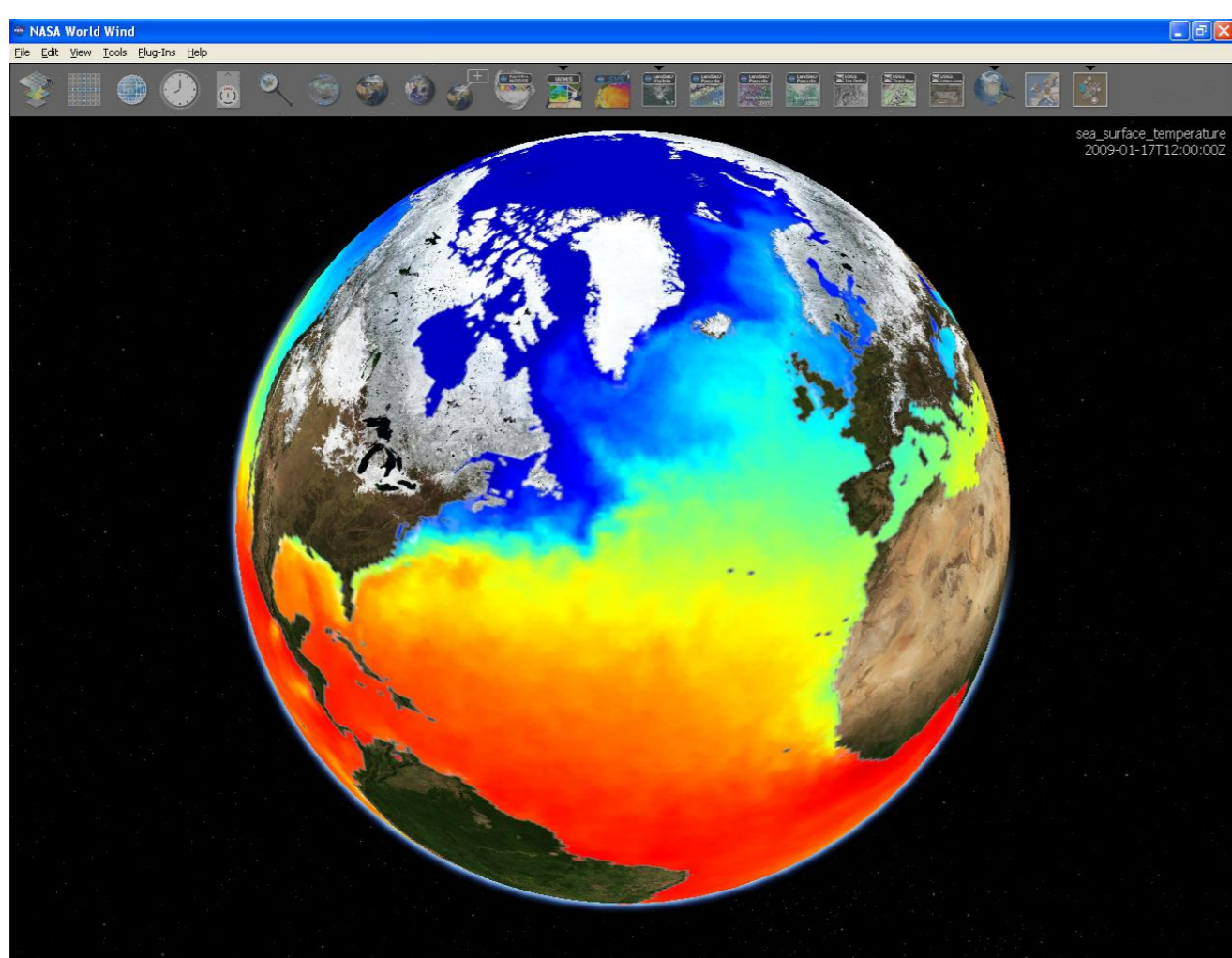
Earth observation is the use of satellites together with aircraft and ground-based instruments to measure, monitor and understand our planet. It gives us a unique perspective of the Earth and has revolutionised how scientists work.



Monitoring hazardous weather

One consequence of climate change is that the frequency and strength of hazardous weather is likely to increase in future. Satellites are already invaluable tools for monitoring and forecasting tropical storms and other types of severe weather.

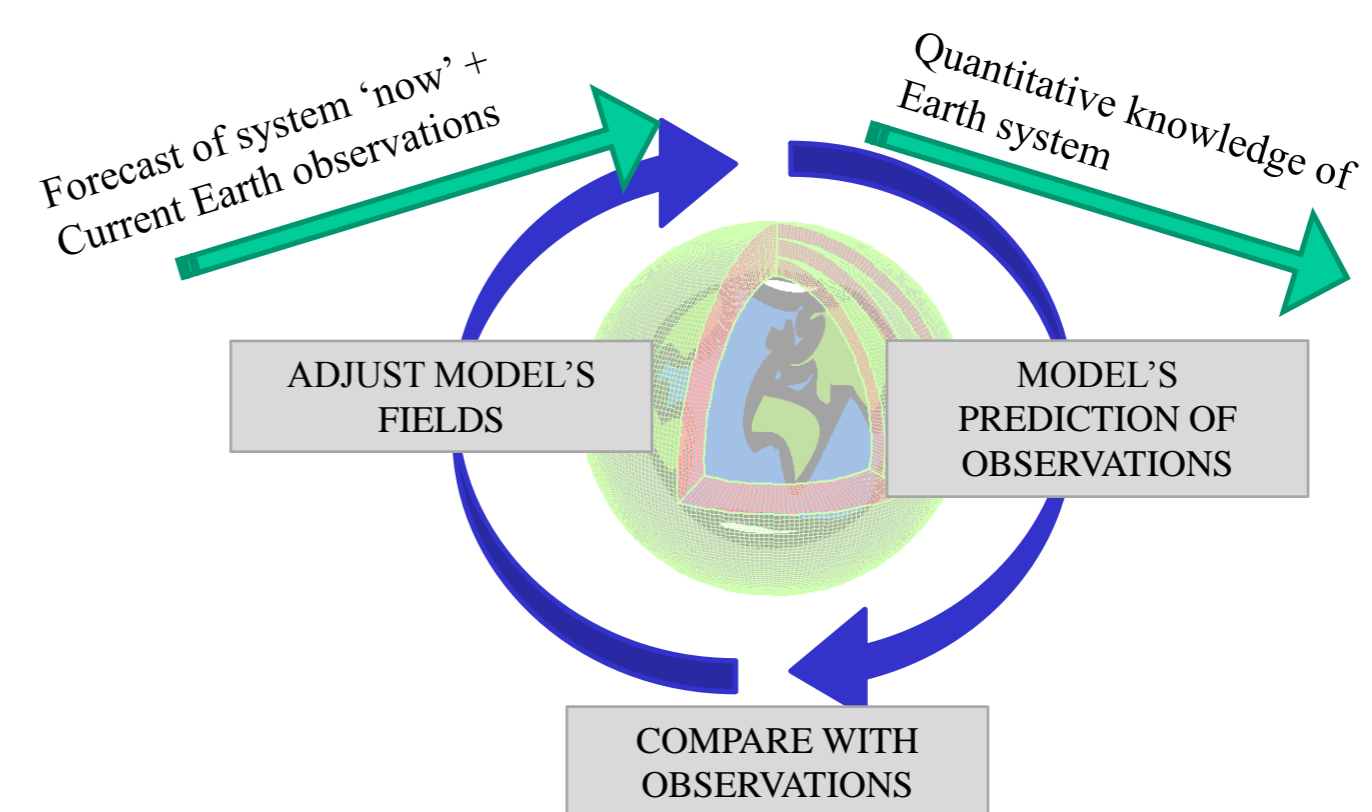
New physically based approaches to satellite sea surface temperature retrievals allow for higher accuracies. Maps of sea surface temperature are one of the primary tools for forecasting the frequency and intensity of hurricanes. These higher quality sea surface temperature data will allow for improved weather and climate predictions.



Data assimilation – unlocking observations of the Earth

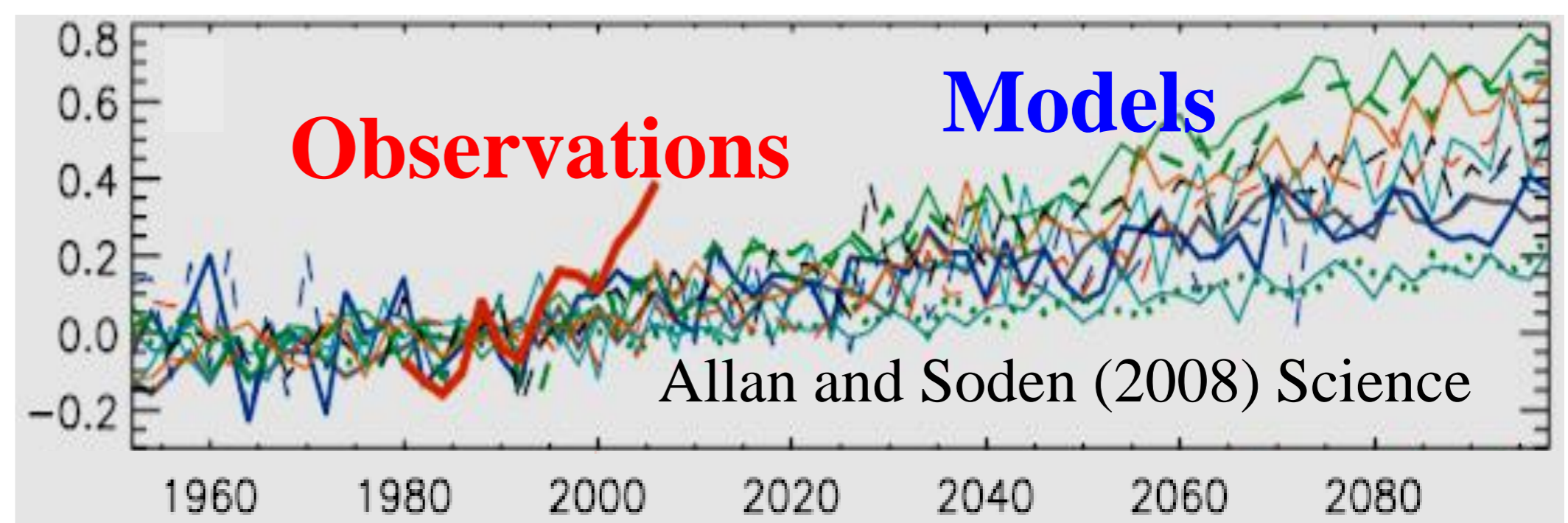
Making meaningful predictions of future states of the Earth system requires accurate knowledge of its state at the present time. The present state is inferred by uniting observations with the output from evolving Earth system models using the method of **data assimilation**. The observations help to ensure that the system is close to reality at locations where the observations are made, and the models help to fill-in gaps in the observation coverage and to ensure that the state is consistent with the underlying physical laws that govern the system.

Data assimilation is used routinely to set the initial conditions for weather and ocean forecasting models, and is finding new applications in pollution forecasting and climate prediction. In particular, climate predictions at seasonal and interannual time scales are more accurate when uncertainty associated to initial conditions is estimated through data assimilation.



Is the water cycle speeding up?

Recent evidence from satellite observations show tropical rainfall changing faster than climate model predict. Is the water cycle speeding up faster than climate models suggest due to global warming? This change will bring major consequences for rainfall projections through the coming centuries.



Rainfall changes (mm/day): Tropical Convective region

Find out more...

Contact: **Alan O'Neill**, alan.oneill@nceo.ac.uk
<http://www.nceo.ac.uk>