

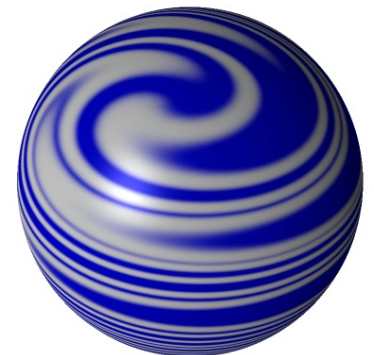
National Centre for Earth Observation: Opportunities for knowledge transfer

What is the NCEO ?

What will the main spin-off benefits be ?

How can industry interact with the NCEO ?

Alan O'Neill
Director, NCEO



Characteristics of the NCEO

- Measuring, understanding and forecasting the environment
- Making rigorous, quantitative use of EO
- Optimal combination of EO and models
- Breaking down the barriers to wider operational use of EO
- Delivering long term scientific, societal and commercial benefits



Models alone cannot answer any of these questions with confidence. EO with models can.

How strong are the natural sources and sinks of CO₂ and could the sinks become sources, making climate change worse?

How fast is the Arctic's ice cover disappearing and will it soon be ice free?

Where is air pollution coming from and will climate change make its health effects worse?

Where are stresses and strains in the Earth's crust building up, and can we forewarn of earthquakes, volcanic eruptions and tsunamis?

What are the main deficiencies with climate models, and how can we fix them?



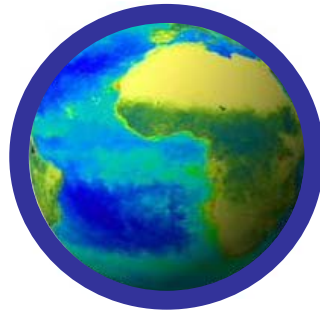
Why do forecasts of damaging storms and floods go wrong, and how can we make them better?

How fast is sea level rising around the world?

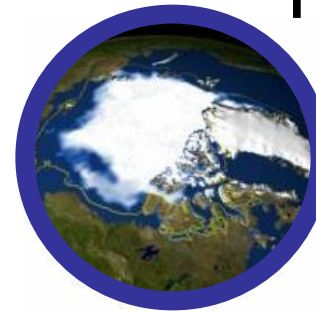
How has the Atlantic circulation varied during past decades and is there any sign of a slowdown ?

NCEO Science

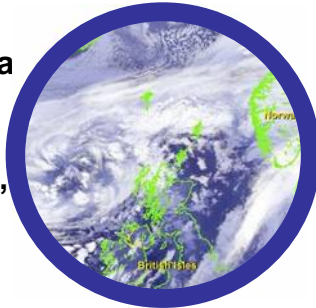
Monitoring, diagnosis and prediction of the global carbon cycle



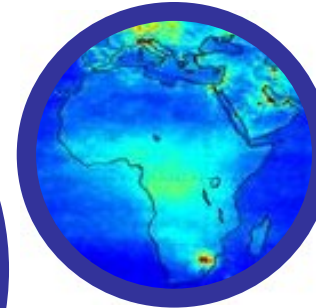
Cryosphere and polar oceans



Synergistic use of remote sensing data for high resolution predictions of hazardous weather, floods and water resources



Atmospheric composition: links to climate and pollution



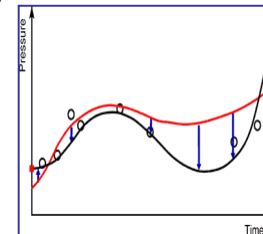
Dynamic Earth and geo-hazards



EO for climate diagnosis and prediction (Integrating Theme)



Data assimilation, treatment of uncertainty and observation impact (Cross Cutting Theme)



Graduate training

Capability and knowledge transfer

Research Opportunity Fund

EO informatics (Underpinning Theme)



NCEO

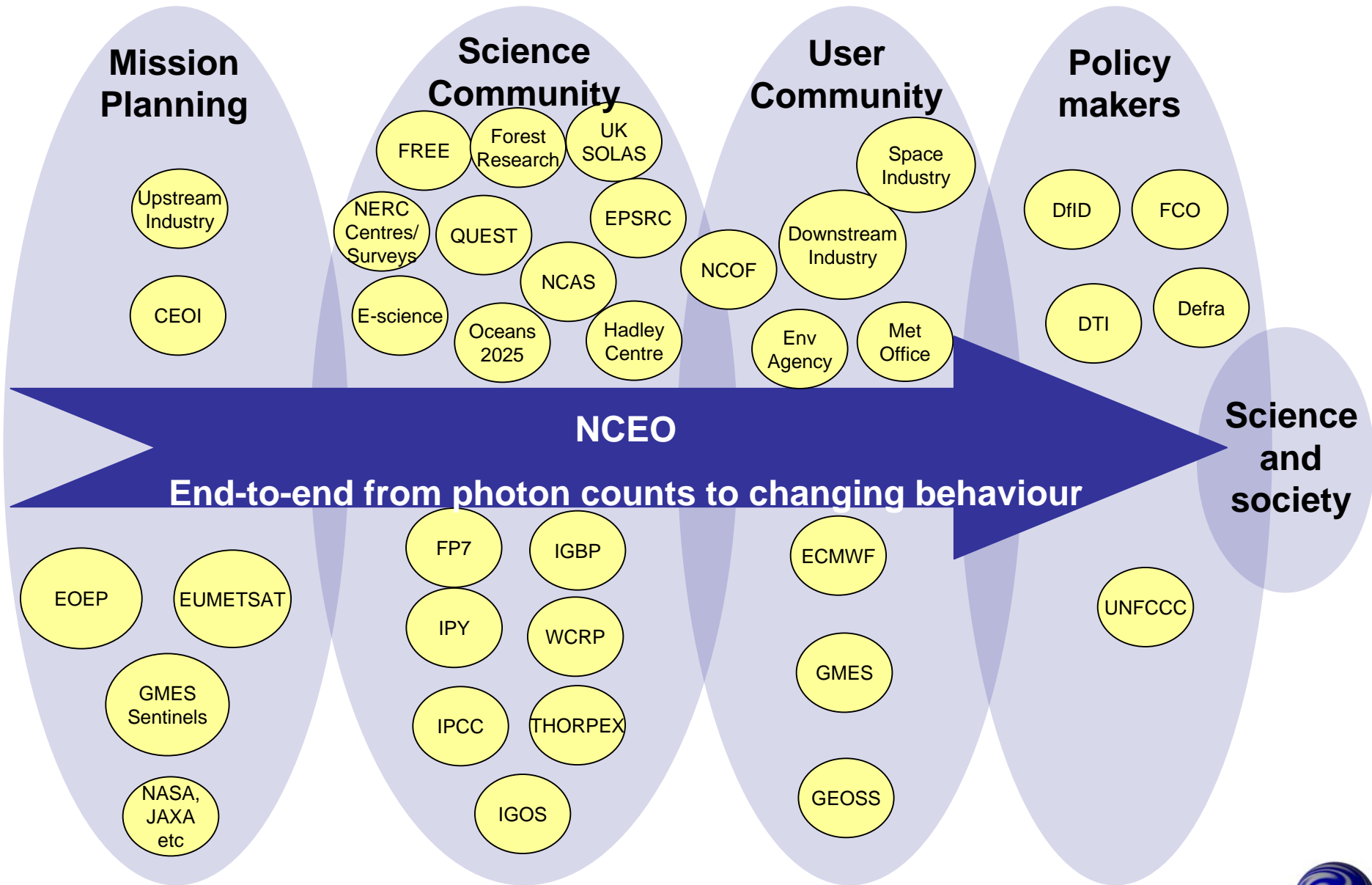


The bottom line...

- NCEO will help increase improve our capacity to predict the environment
- It will improve the quality of predictions and increase the range of environmental parameters than can be predicted
- In the long term this will deliver huge commercial returns and benefits to society



NCEO Stakeholders



Knowledge Transfer Opportunities

- Mission selection, definition and design
 - Partnering with industry to analyse the impact of new observations and optimise the design of missions
- New operational services
 - Providing calibration, validation and model integration to make EO data more operationally useful
- Environmental policy
 - Identifying new issues; monitoring and improving policies
- Public understanding of science
 - Providing material with high graphic impact to demonstrate environmental issues



Mechanisms for Interaction

- KT is embedded in the NCEO science Themes
- Close cooperation with operational agencies will be extended through joint programmes and staff exchanges
- Themes will support industry in projects for mission identification and definition
- Themes will collaborate with industry in commercialisation and KT programmes
- The central NCEO KT theme will provide a point of contact and facilitate communications with potential collaborators



Spares

- Details of NCEO Themes

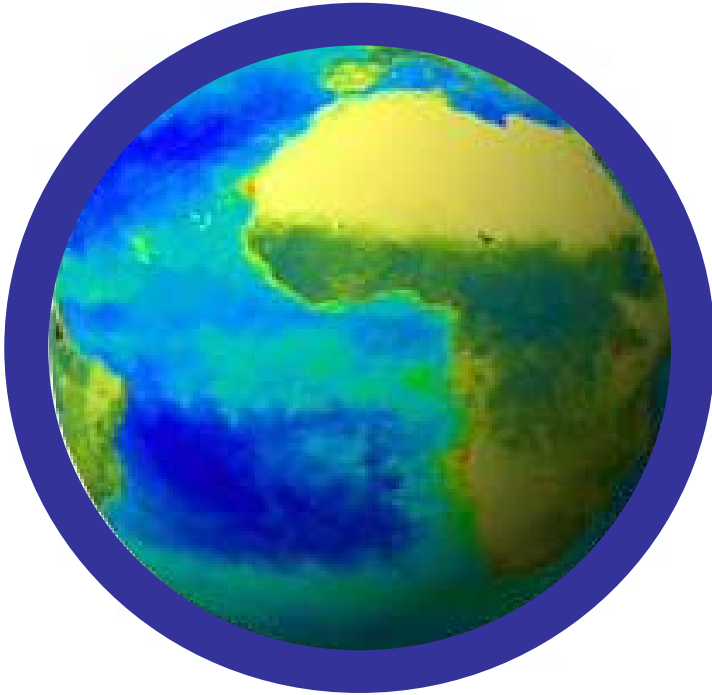
Theme 1: EO for climate diagnosis & prediction



- Exploiting EO to improve national capability for climate prediction over timescales from months to decades
- Reducing and quantifying uncertainty



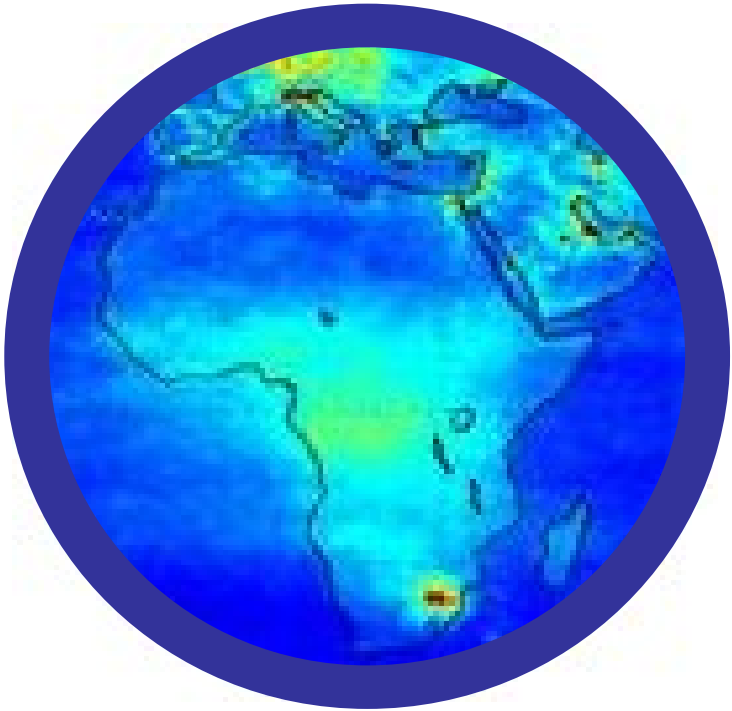
Theme 2: Global Carbon Cycle



- Understanding the feedbacks between physical and biological processes involving the carbon cycle
- Improving representation of carbon feedbacks in climate models
- Predicting changes in carbon fluxes at the Earth's surface



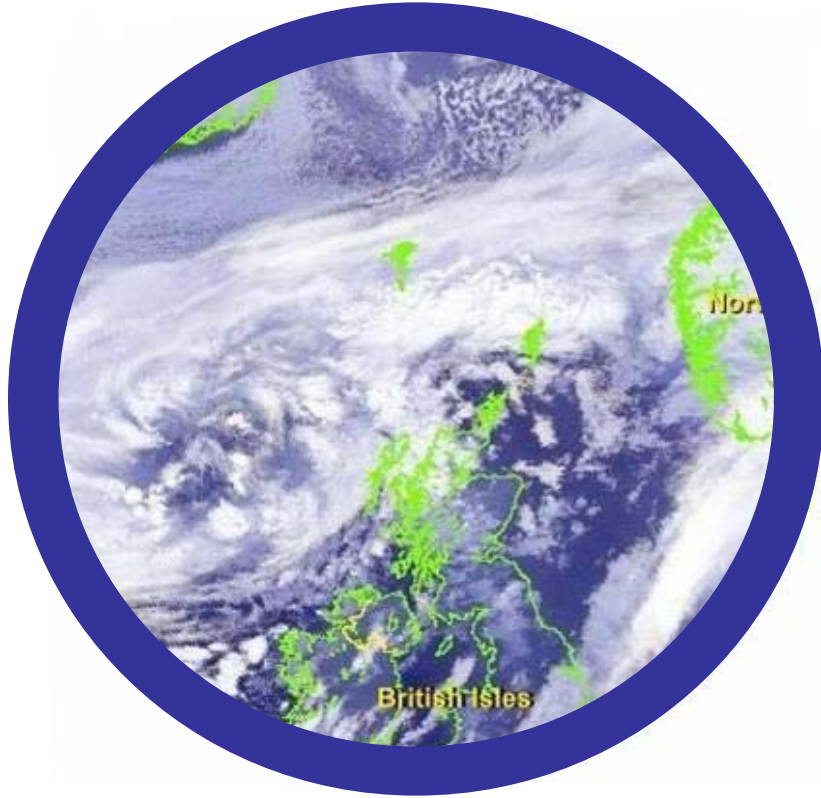
Theme 3: Atmospheric composition



- Developing an integrated approach to the analysis of satellite measurements
- Providing new information on atmospheric composition and aerosols
- Supporting air-pollution forecasting and testing climate models



Theme 4: Hazardous weather, floods and water resources



- Developing capability to forecast hazardous weather and hydrological consequences
- Understanding multiscale dynamics
- Developing novel assimilation techniques for highly non-linear processes



Theme 5: Cryosphere and polar oceans



- Using new EO data to quantify changes in the mass balance of the cryosphere
- Developing new models to represent the relevant processes in coupled climate prediction models
- Determining the impact of polar melt on the circulation of the ocean



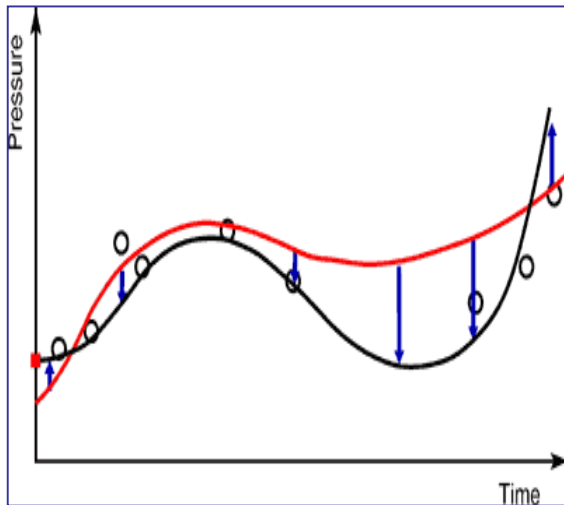
Theme 6: Dynamic earth and geo-hazards



- Using global satellite measurements of the Earth's surface and volcanic gas emissions
- Advance knowledge of processes responsible for earthquakes, tsunamis and volcanoes
- Developing better warning systems



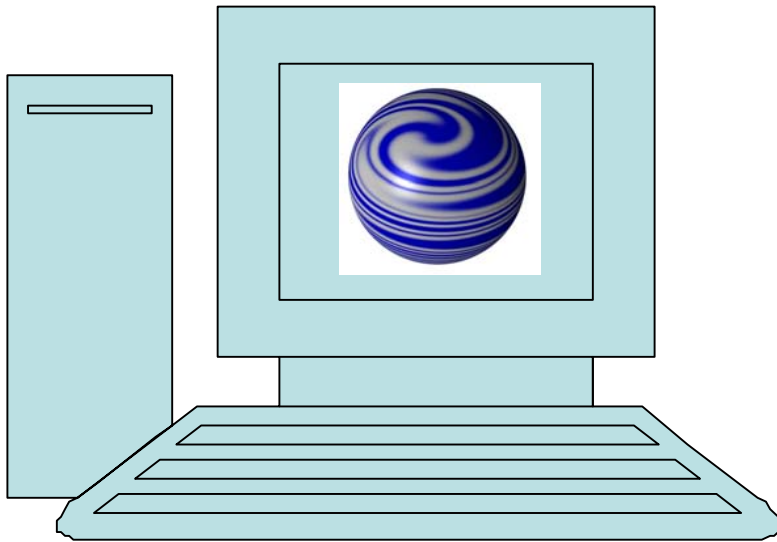
Theme 7: Data assimilation & uncertainty



- Developing the theory of data assimilation, including methods to treat data and model uncertainty
- Underpinning applications in NCEO and partner agencies
- Promoting collaboration with groups funded by the EPSRC on research into the underpinning theory



EO Informatics



- Exploiting and developing e-science and new data informatics technologies
- Making EO data and derived products from multiple data centres more easily accessible
- Ensuring proper archiving of data in line with NERC policy

