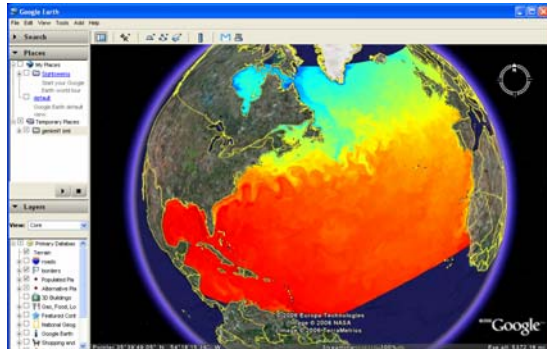


NERC-GODIVA: Grid for Ocean Diagnostics, Interactive Visualisation and Analysis

Keith Haines

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University of Reading
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Thanks to
Jon Blower, Chunlei Liu, Alistair Gemmell



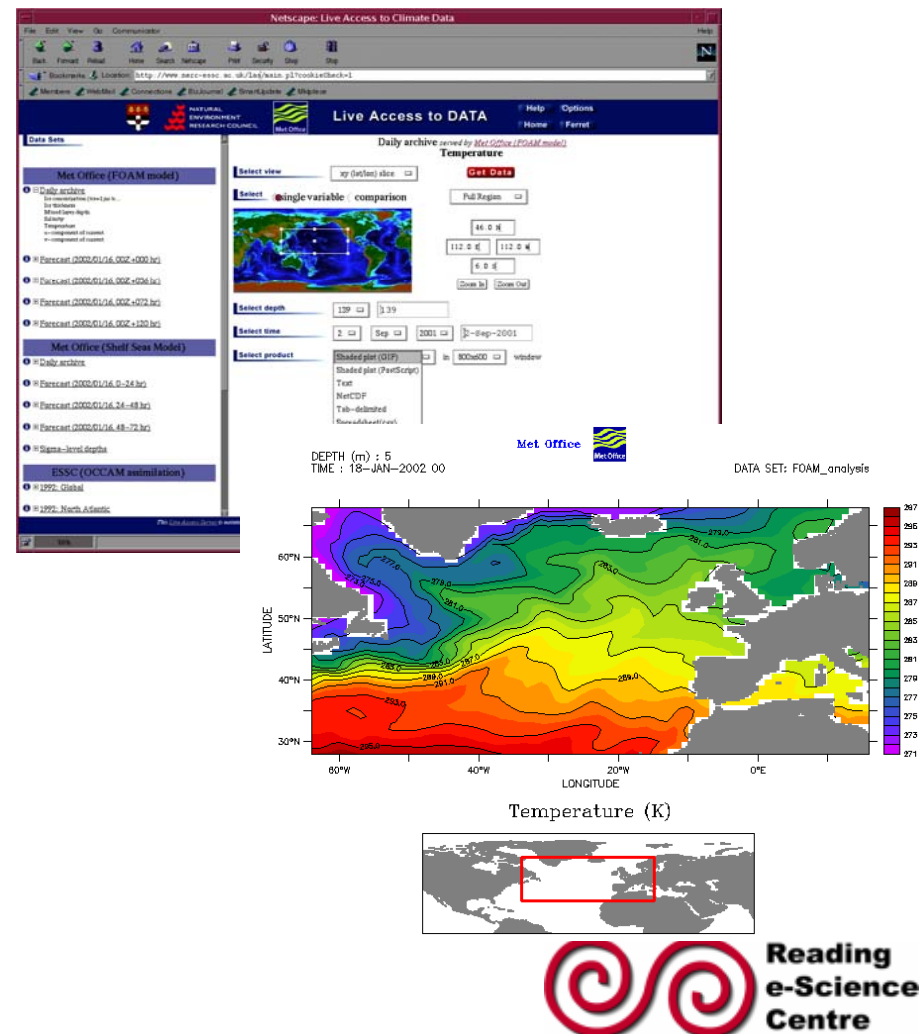
Background

- **Rapidly growing ocean/atmosphere/climate datasets**
 - Models with v. high resolution (multi-Gb snapshots)
 - Satellite data
- **Many groups to study same dataset remotely**
 - Grand Challenge models (1km atm, 8km ocean)
 - Operational model products, eg. Met Office
 - Satellite imagery
- **Diagnostic tools (eg. Matlab, IDL) unsuitable for rapidly exploring v. large datasets**

What did we expect to build?

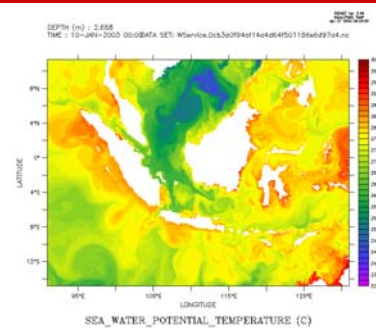
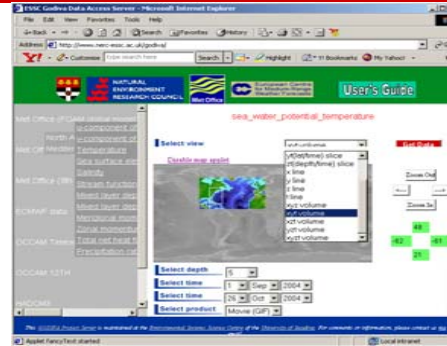
- **Two project strands**
 - **Distributed Ocean/Climate model database, including daily operational data**
 - **Remote visualisation of large Ocean/Climate data**
- **Legacy prototype software and web portal (US projects LAS and OpenDAP)**
- **Emerging Web Service standards: OpenGIS WMS, WCS, WFS....**
- **Specialist Visualisation Hardware SGI VizServer (Server side 3D rendering)**
- **CS interest in 3D rendering on commodity Graphics cards (Client side rendering with data streaming)**

Live Access Server from PMEL in US

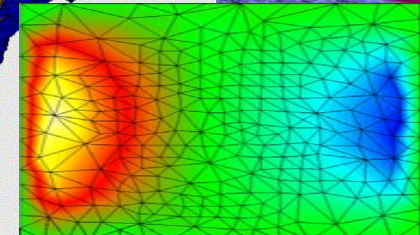
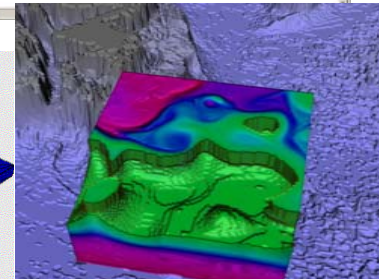
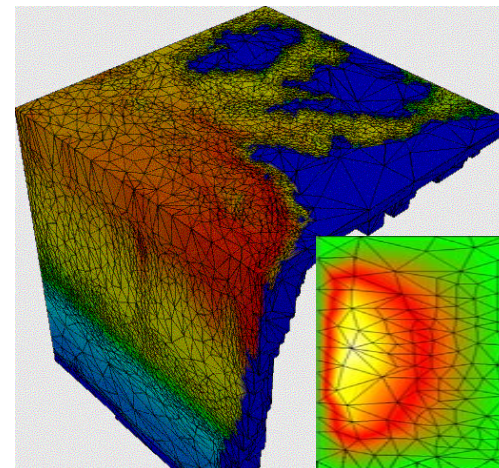
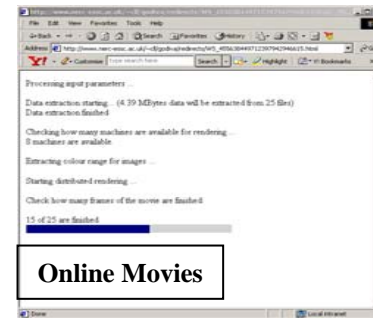


What did we actually build?

- 3 different visualisation systems
 - Web portal with OpenGIS backend for distributed data + DB of Met Office Op. data
 - Remote steer/view of SGI VizServer
 - 3D graphics card demo for local data

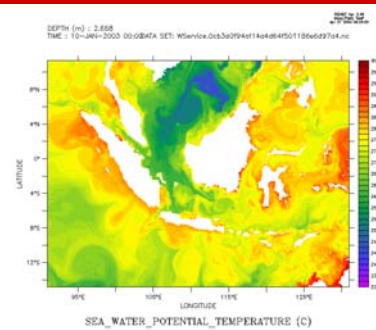
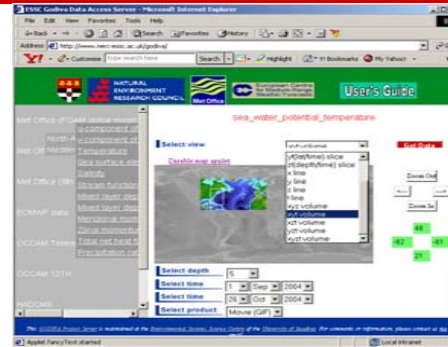


GODIVA1 view/download Services

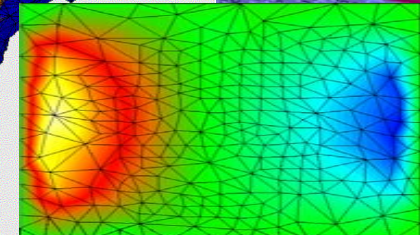
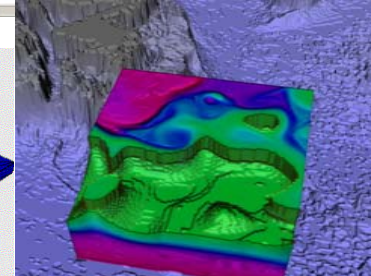
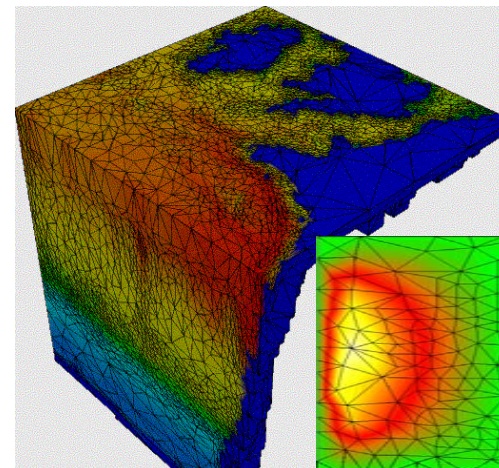
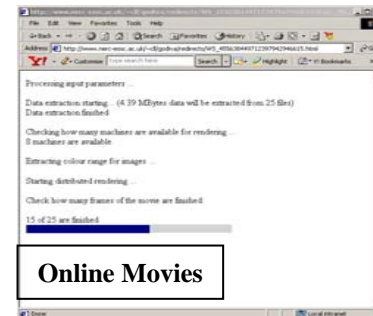


What did we actually build?

- 3 different visualisation systems
 - Web portal with OpenGIS backend for distributed data + DB of Met Office Op. data
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- Transformed by release of Google Maps/Earth API towards end of GODIVA
 - => Interactivity <=



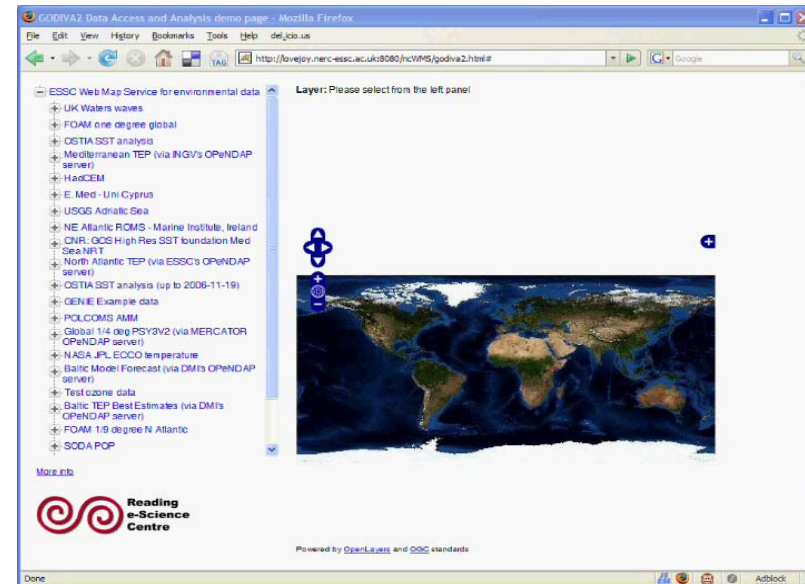
GODIVA1 view/download Services



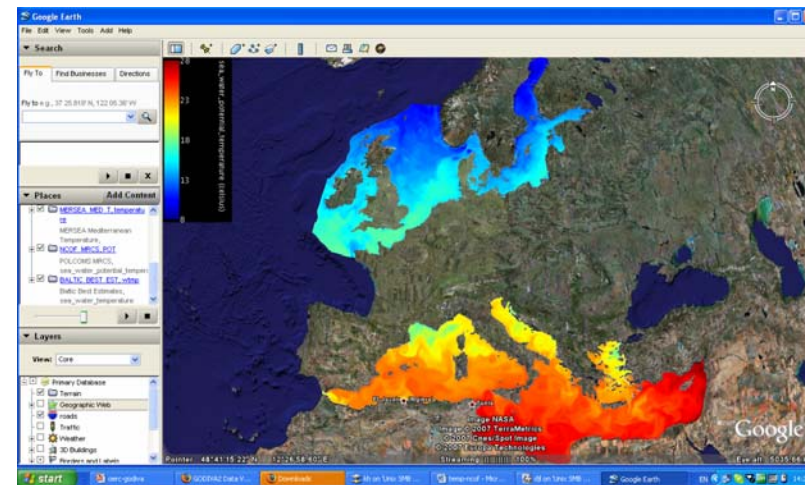
GODIVA2 Infrastructure

- File Store of daily Met Office Ocean Analyses since Sept 2001 in netCDF – 3 Tb
- Interface to European Operational data
- GODIVA2 portal using OpenLayers (OpenGIS version of Google Maps) + Google Earth
- Web Map Service API **ncWMS**
- Web Coverage Server API
- Strong R&D
 - Databases
 - Vector WMS displays
 - Statistical presentations
 - OceanDIVA
 - Catalogue Service integration

GODIVA2 GIS portal



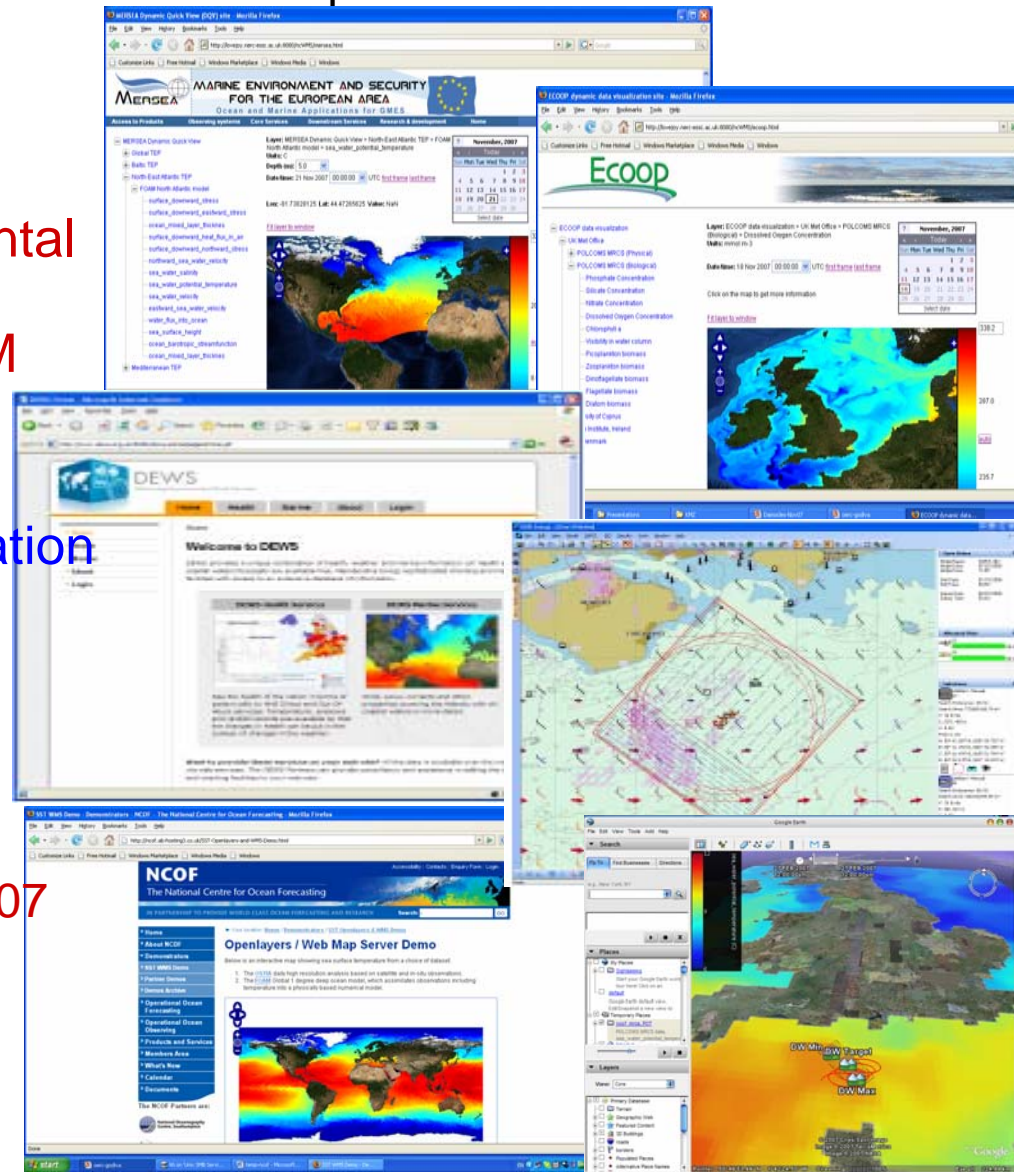
N. Sea tidal surge Nov 9th



Infrastructure Applications

- EU Projects MERSEA, ECOOP (Operational Oceanography)
- UK NCOF Consortium (MetO, POL, PML, NOCS)
- DTI-DEWS Delivering Environmental Web Services
- Industry links BMT, Lost Wax, IBM
- NERC DataPortal, DataGrid
- National Centre for Earth Observation NCEO (Informatics Theme)
- Defra EO week
- International interest
 - 2 NOAA G2 installations
 - 2 Australian G2 installations
 - 70 ncWMS downloads since sept07
- Google Oceans
- Earth System Atlas (US)

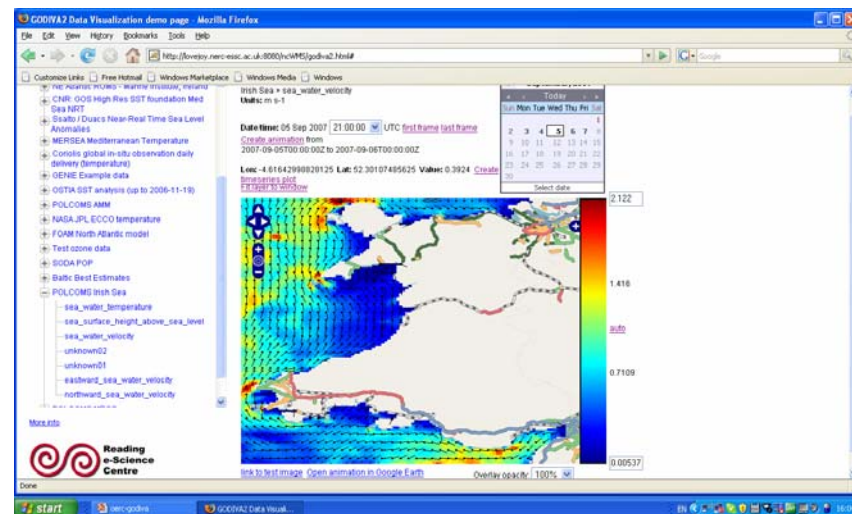
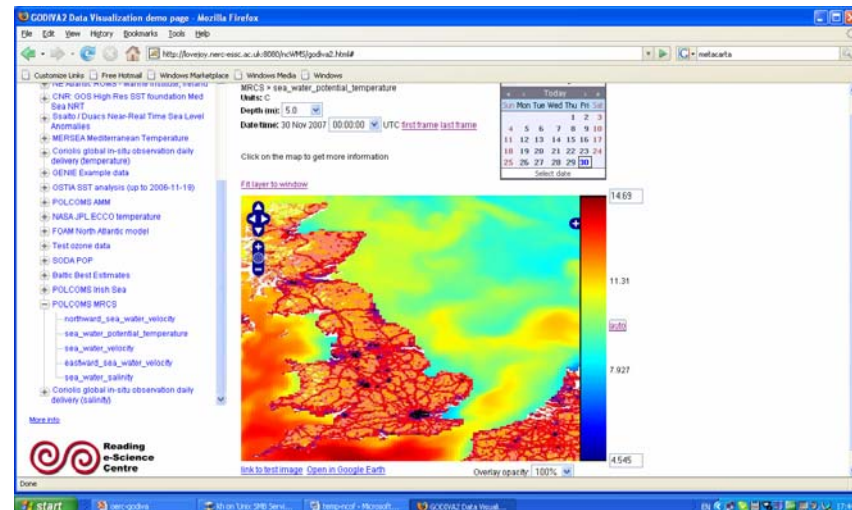
Operational Portals



Sustaining Infrastructure

- e-Science Centre Core support for key personnel => Innovation
- EU funding for UK Op. Ocean Services
- Currently maintenance done in the margins
 - Scalability and Hardware
 - Don't want to become a data centre
 - Competition for support
- Other UK support difficult
- Active R&D of software and promotion
- Good tools = Incentives for data providers to standardize (Lesson for Data Centres!)
- NCEO could provide longer term support but...
- Likely to need separate initiative eg. Digital Earth program?

Sustaining through Innovation



Sustainability Lessons

- Work with User community / Be a User
- Constantly innovate and **Deliver**
 - Keep users interested
 - Keep ourselves interested
- Modular Easy-to-use software
 - Web 2.0 : Other peoples data is key
 - Incentives to standardize data
- Strong Promotion : Personal Ownership (Jon Blower ReSC Tech. Dir.)
- Innovation : 2 strands
 - New Technical Capability eg Data–Model Services (Errors/Uncertainty)
 - New Science Communities eg. Arctic IPY
- Vision => Many new ideas
 - Tools still not sufficient for Geo-data needs
- Tension between maintaining an Infrastructure and Innovating (common issue in the UK)

Sustaining through Innovation

