The UK Air Quality Forecasting Contract
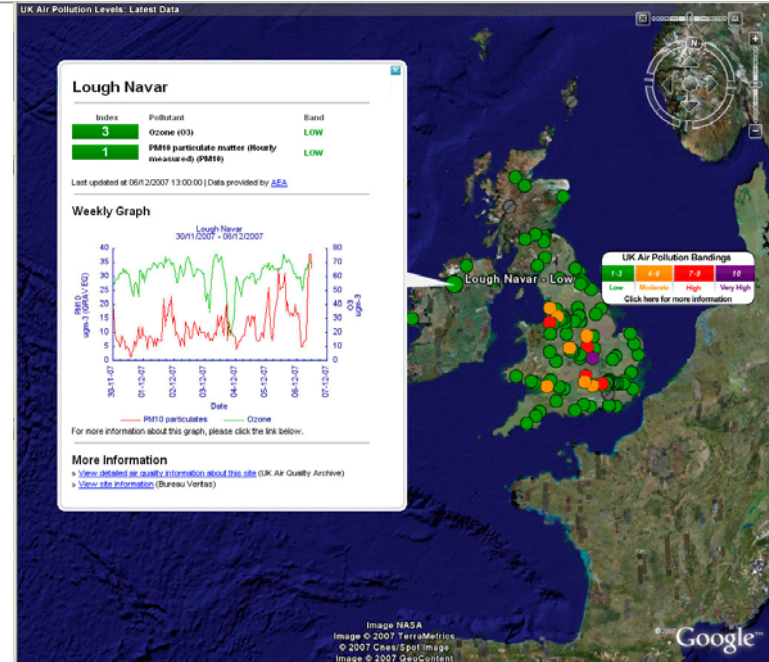## Paul Willis

UK National Air Quality Forecasting Seminar
16th July 2009

Today's Presentation

- **Project background.**

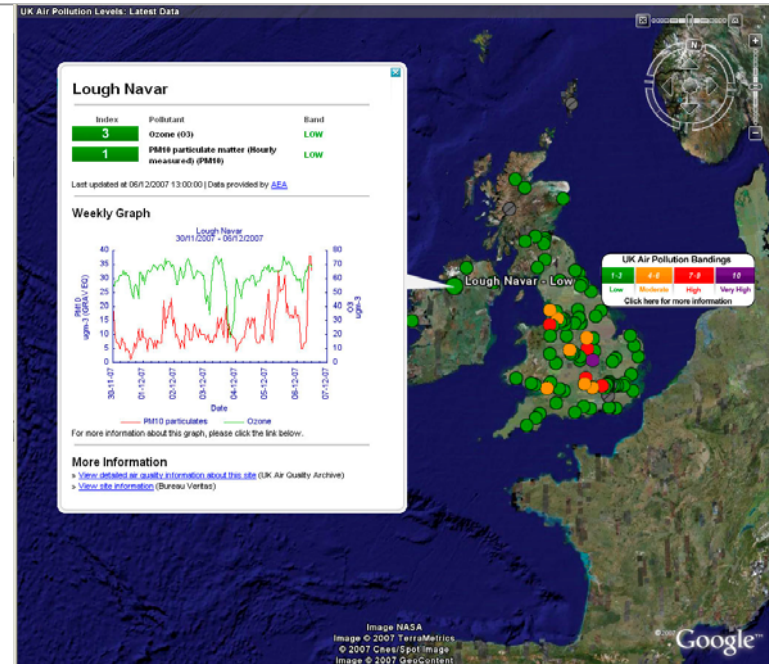- **Methodology.**

- **Future developments.**

1. Project Background

- **Defra and the Devolved Administrations require a daily UK Air Quality Forecast to both protect public health and to meet specific EC Directive Requirements.**

- **The Directive requires publication of:**
  - The likely geographical extent of periods of high concentrations.
  - The expected change in pollution (improvement, stabilisation or deterioration) and reasons for those changes.

- **Forecasts are disseminated via the internet (www.airquality.co.uk), media bulletins and a freephone information service (0800 556677).**
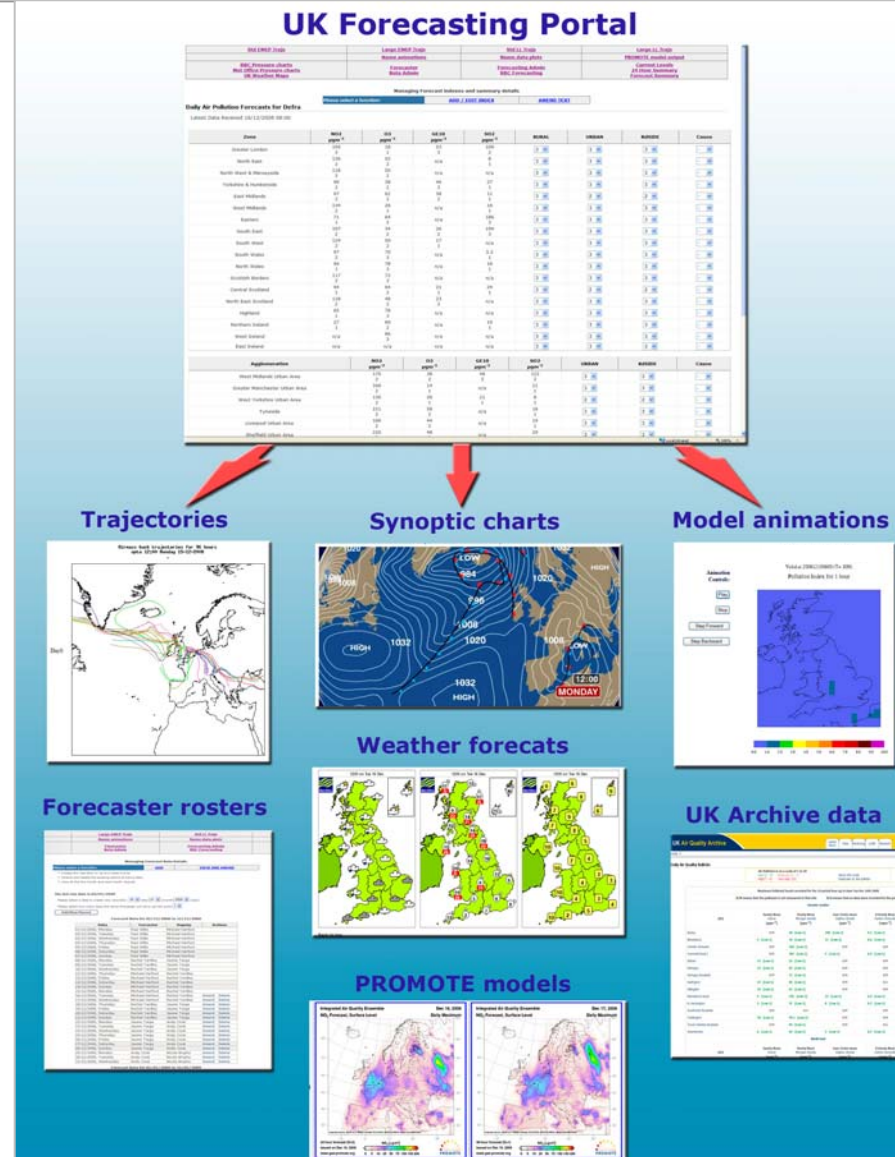
1. Project Background (cont'd)

- **A new 3-year contract was let to AEA to provide these daily forecasts from April 2009.**

- **Other aspects of the contract are also covered through today's seminar, including the need to:**
  - Keep abreast of advances in forecasting air quality and advise Defra and the DAs on possible approaches to improve the forecasts.
  - Enhance understanding of the value and role of air quality forecasting in air quality management and public information services.
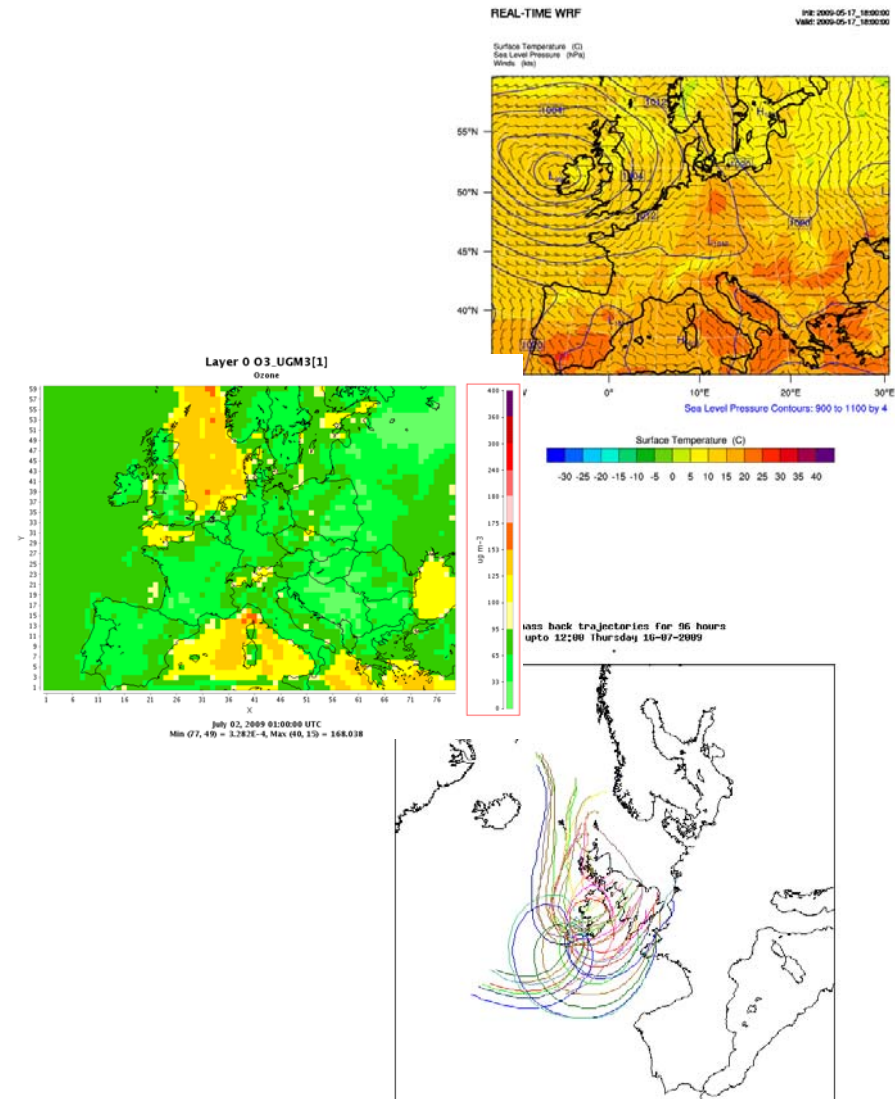
2. Methodology

- **AEA's approach is to use a team of air quality experts to compile the forecasts based on a portfolio of inputs.**

- **The team use a daily forecasting protocol and a web-based portal to deliver forecasts 365 days a year.**

- **The inputs include:**
  - UK optimised AQ forecasting models.
  - Pan-European model results.
  - Latest UK & European monitoring data.
  - Weather forecasts.
  - Satellite imagery.
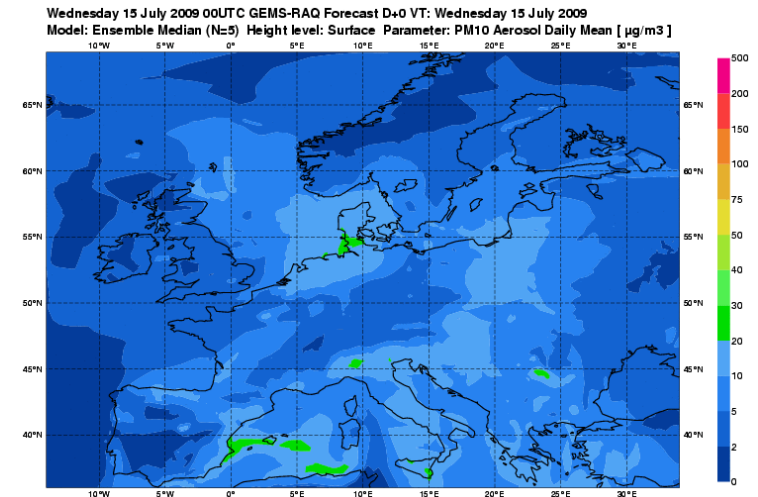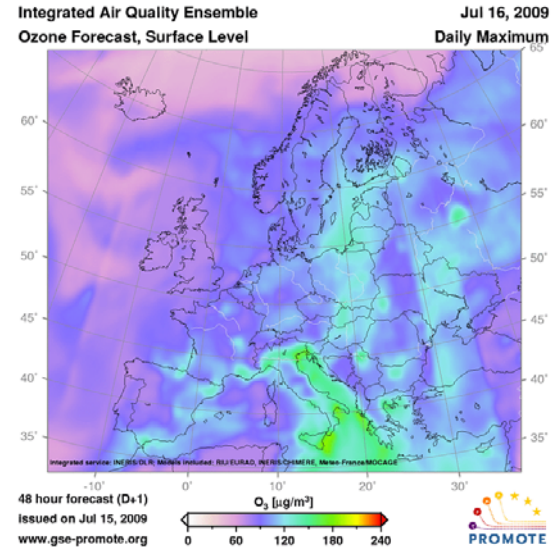 - Expert judgement based on analyses of historical air pollution episodes.

UK Air Quality Forecast Models

- **AEA currently uses the WRF meteorological model coupled with the CMAQ Chemical Transport Model (CTM) in order to produce daily air quality forecasts for Ozone, PM_{10}, $PM_{2.5}$, NO_2, SO_2 and CO. $PM_{2.5}$ is not yet formally part of the UK AQ Forecasting service.**

- **96 hour air mass back-trajectories are automatically obtained from HYSPLIT each day for UK and cross-channel locations. To assist with source attribution of pollutants during long-range transport episodes.**
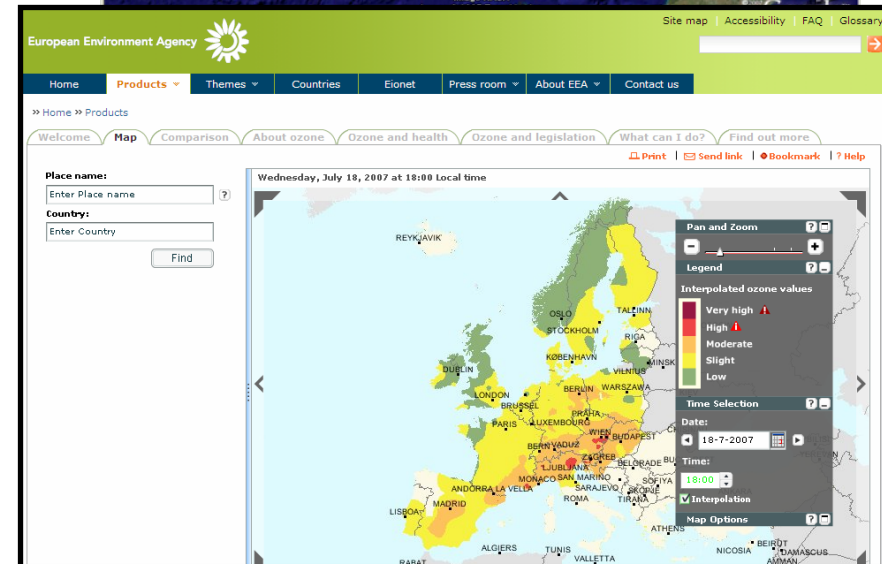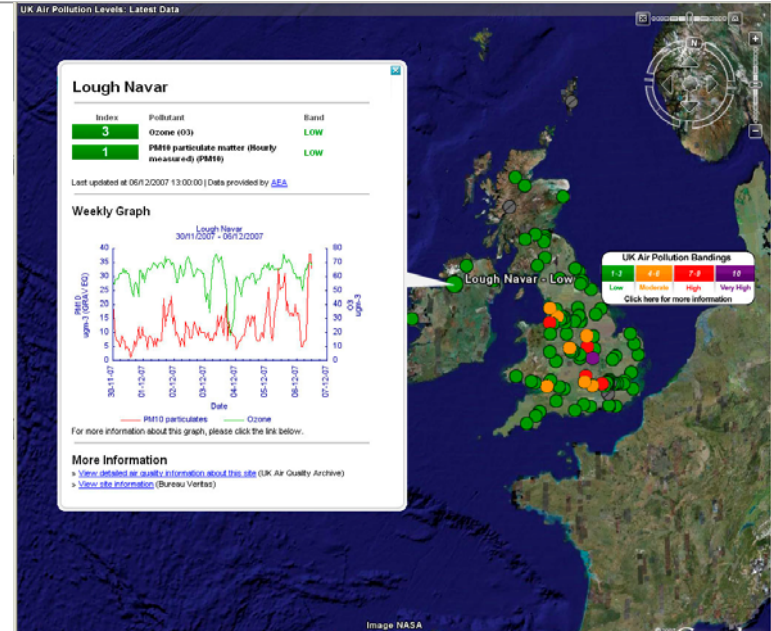
Other European Models / Ensembles

- **The UK forecast is compared daily for consistency with the forecasts produced by other European groups.**

- **Especially important for pollutants with a significant long-range component such as Ozone and PM_{10}.**

- **But there maybe UK specific emissions or other factors to consider.**

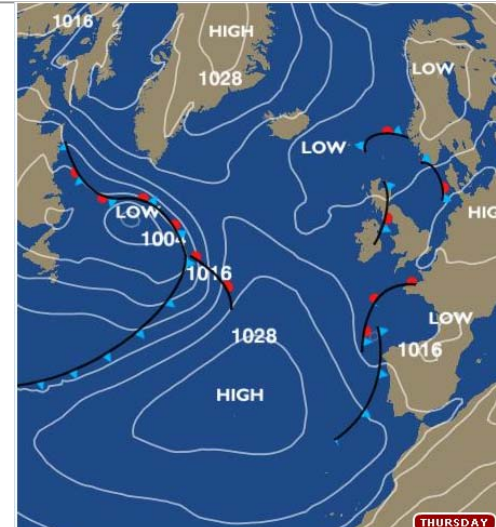- **PROMOTE and GEMS ensemble forecasts are the most useful.**

UK & European Current Air Quality Data

- **Used to supplement models by providing a reality check against current levels.**

- **May indicate any unexpected divergence from forecasts which require more investigation.**

- **Plans to develop automated assimilation into the CTM runs to further optimise model performance.**

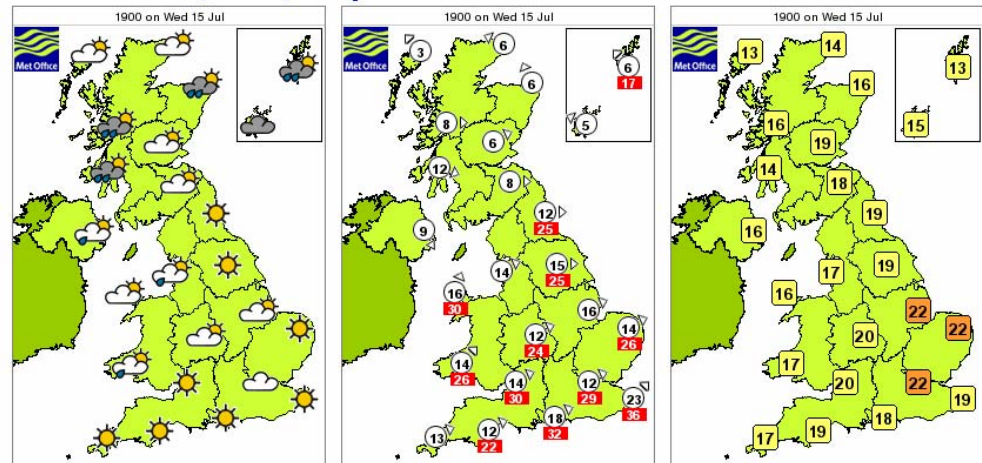- **Can be used for near real-time model validation.**

Weather Forecasts

- **Latest weather forecasts may be 12 hours or more after those used to initiate the model runs so divergence from an earlier forecast is not unexpected.**

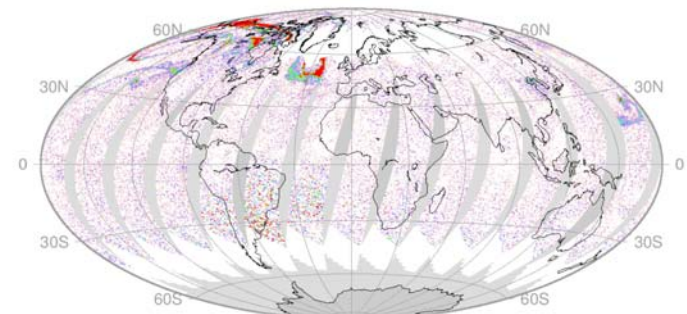- **Again, a reality check and validation of the meteorological and CTM outputs.**

Satellite Imagery

- **Useful for identifying the likely source of a pollution episode, or tracking the progress of any unusual events towards the UK.**
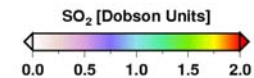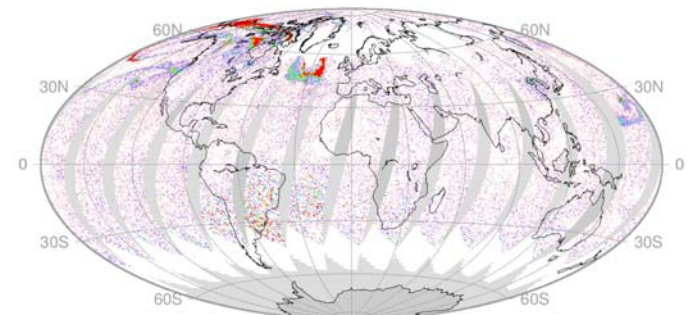
Satellite Imagery

- **Useful for identifying the likely source of a pollution episode, or tracking the progress of any unusual events towards the UK.**
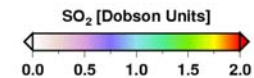

Ostrov Matua — Pyroclastic Flow

GOME-2 / MetOp   Jun 25, 2009
SO$_2$ Vertical Column Density

One-day Composite
Lv2 Version: GDP-4.3
http://wdc.dlr.de

SO$_2$ [Dobson Units]
0.0   0.5   1.0   1.5   2.0

DLR

Future Developments

- **Launch of the UK Air Quality Forecasting Forum today.**

- **We can work more closely together to ensure consistency and accuracy of national, regional and other forecasts issued in the UK.**

- **On-line forum will be set up to share ideas and all interested parties are invited to participate and meet regularly to discuss progress.**

  - **Enhanced graphical representations of the forecast outputs are currently being discussed with Defra and the DAs.**

  - **More detailed forecast accuracy statistics will be published on-line for public access.**

  - **Consideration of other models and developments to enhance the UK AQ Forecasting Service.**

Any Questions?

Paul Willis
paul.willis@aeat.co.uk
0870 190 6602