

Know and Respond AQ Alert Service



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SCOTTISH AIR QUALITY DATABASE AND WEBSITE ANNUAL SEMINAR
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Outline: Know and Respond AQ Alert Service

- Introduction.
- The Website.
- How does it work – AQ Forecasting.
- Questions.

- Know and Respond is in the final stages of development and will provide early warning of air pollution episodes free to the public in Scotland.
- Alerts can be received by SMS, email or “Text to Speech” services.
- Alerts will be issued if “Moderate” or worse levels of pollutants are expected - as defined by the UK AQ Index. Moderate pollutant levels can affect susceptible members of the population.
- People will be able to sign up on a simple web page.

Know and Respond Information



Air Quality in Scotland

www.scottishairquality.co.uk

Thursday, November 12, 2009

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Introduction

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Login/sign on

Username, email or mobile:

Password:

Known & Respond

What is Know and respond?

Know and Respond is a free service that sends registered users an alert message if air pollution in this area is forecast to be moderate, high or very high. The description of the level of pollution is based upon the [Air Quality Banding System](#).

How does it work?

Every day at 4pm, our air quality forecasters at AEA Technology issue a detailed pollution forecast for the following 24 hours. Under the scheme, anyone who lives or works in the Scotland can sign up to receive free air pollution alerts by mobile phone text message, voicemail or email. You will get an Known & Respond alert whenever air pollution levels are forecast to be MODERATE, HIGH or VERY HIGH, it's your choice.

The alerts can be adapted to suit your needs. You can choose whether to receive the alert on the evening before a high pollution day or on that morning.

[For more information](#) of air quality to health.

Who is Known & Respond for?

The Know & Respond air pollution alert service is provided anyone wishing to know about the quality of the air they breathe. It will be of particular benefit to people with medical conditions that may be affected by pollution, such as asthma, bronchitis and emphysema. It may also benefit people whose breathing gets worse when air pollution increases. This early warning service allows you to make informed decisions and take [action](#) if necessary to minimise the effects.

How to sign up

To register, you need to provide us with some information about yourself and your medical condition. You can choose how you would like to receive your alerts (via email, SMS or voicemail). You may also register on behalf of someone else or a group of people who are susceptible to the effects of air pollution. If you do this, you will also need to provide some information about the patient(s).

To sign up to the Known & Respond scheme click [here](#). Alternatively, please E-mail us at: info@scottishairquality.co.uk

Relevant links

- [Committee on the Medical Effects of Air Pollutants \(COMEAP\)](#)
- The [Breathe Easy](#) support group network provides support and information for people living with a lung condition, and for those who look after them.
- [Asthma UK](#) is the charity dedicated to improving the health and well-being of the 5.4 million people in the UK whose lives are affected by asthma.

Know and Respond Sign-up Page



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Logon

Known & Respond

Form to subscribe to the service

Please note that the service providers are not responsible for the health of the individuals subscribing to the service; subscribers should contact their GP or health service for specific advice on any issues of concern to their condition.

We will not pass on any personal information to a third party.

Username *
Password *
At least 5 characters

Firstname *
Surname *

Subscribe for: Self

Date of Birth
(dd/mm/yyyy)

E-mail: *
The account details will be sent to this address.

Mobile:

Start Date: *
12/11/2009
(dd/mm/yyyy), this subscription will take effect from this date

End Date:
(dd/mm/yyyy)

Submit

How Does it Work – AQ Forecasts



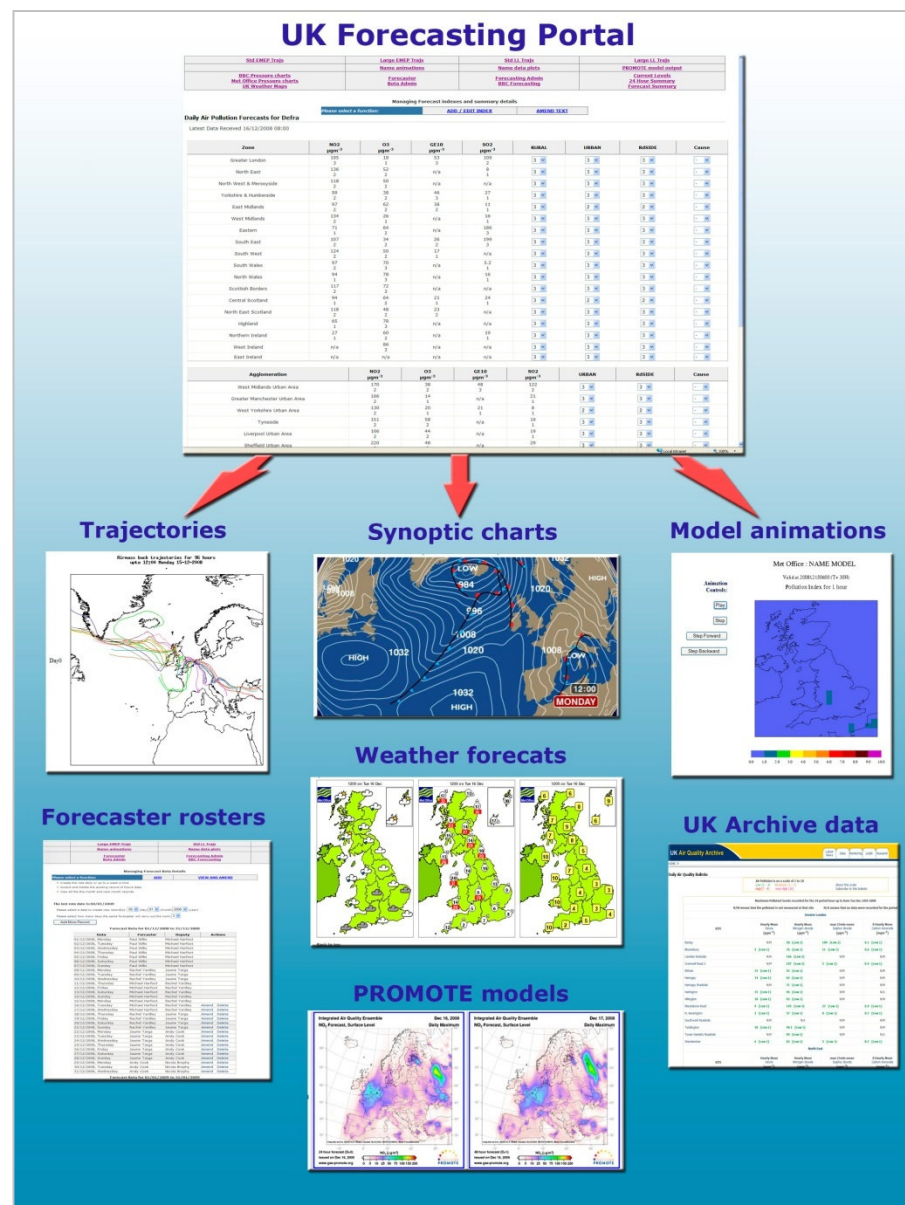
- Air Quality Forecasts are produced twice each day on behalf of the Scottish Government by a team of experts at AEA.
- Forecasts are based on a combination of computer models and expert judgement, analogous to weather forecasting.
- A forecast is issued for rural, urban background and roadside locations in each region of Scotland.
- The “overall” forecast for any region is based on the “worst-case” location and pollutant in that region.

Approach



- 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 Scottish, UK & European monitoring data.
 - Weather forecasts.
 - Satellite imagery.
 - Expert judgement based on analyses of historical air pollution episodes.

http://uk-air.defra.gov.uk/forecast_admin/



WRF-CMAQ AQ Modelling System



Meteorology Data produced using WRF (Weather Research and Forecasting) Model

Using GFS initial and boundary conditions

Emissions data

EMEP - 50km
NAEI - 1km
Biogenic Potential Inventory
BPI - 50km

CMAQ (Community Multiscalar Air Quality) Model

A 'One Atmosphere' Chemical Transport Model including :

Advection, Diffusion, Chemical Transformation, Deposition, Aerosol formation, Emissions

Gas species

Ozone NO₂
SO₂ VOC

Particulate matter

PM₁₀ PM_{2.5}
Organic PM components
Inorganic PM components

Wet and Dry deposition

Nitrogen, Sulphur

WRF and CMAQ are operated as independent models

The UK & Scottish forecast is nested within a European forecast

- The Advanced Research version of WRF create European and UK hourly numerical weather forecasts, at 48km and 12km resolution and 48 vertical layers.
- A new forecast has been developed at 50km and 10km resolutions for EC Directive compliance across Europe, the UK and Scotland.
- CMAQ uses the same resolution, with a slightly smaller grid and 25 vertical layers, with 12 layer below 800M

In addition to the Meteorology, Emissions data are required

- Annual European and UK emissions are converted to hourly emissions
- Natural emissions are based on the temperature and radiation

CMAQ

- Version 4.7
- CB5 Chemistry with aerosol and aqueous extensions
- Boundary conditions are from the global STOCHEM global model

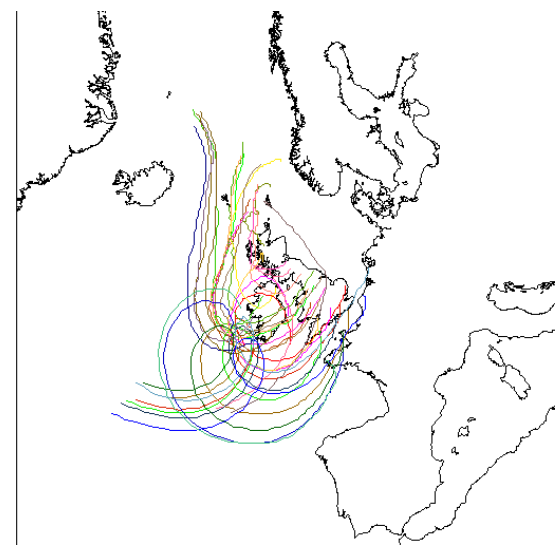
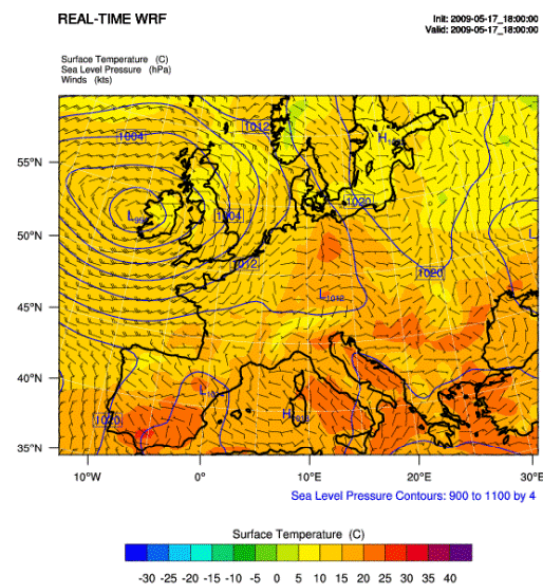
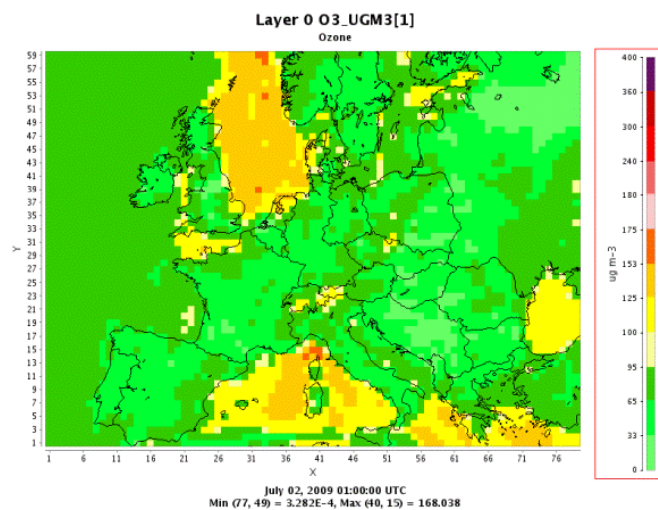
Model Outputs



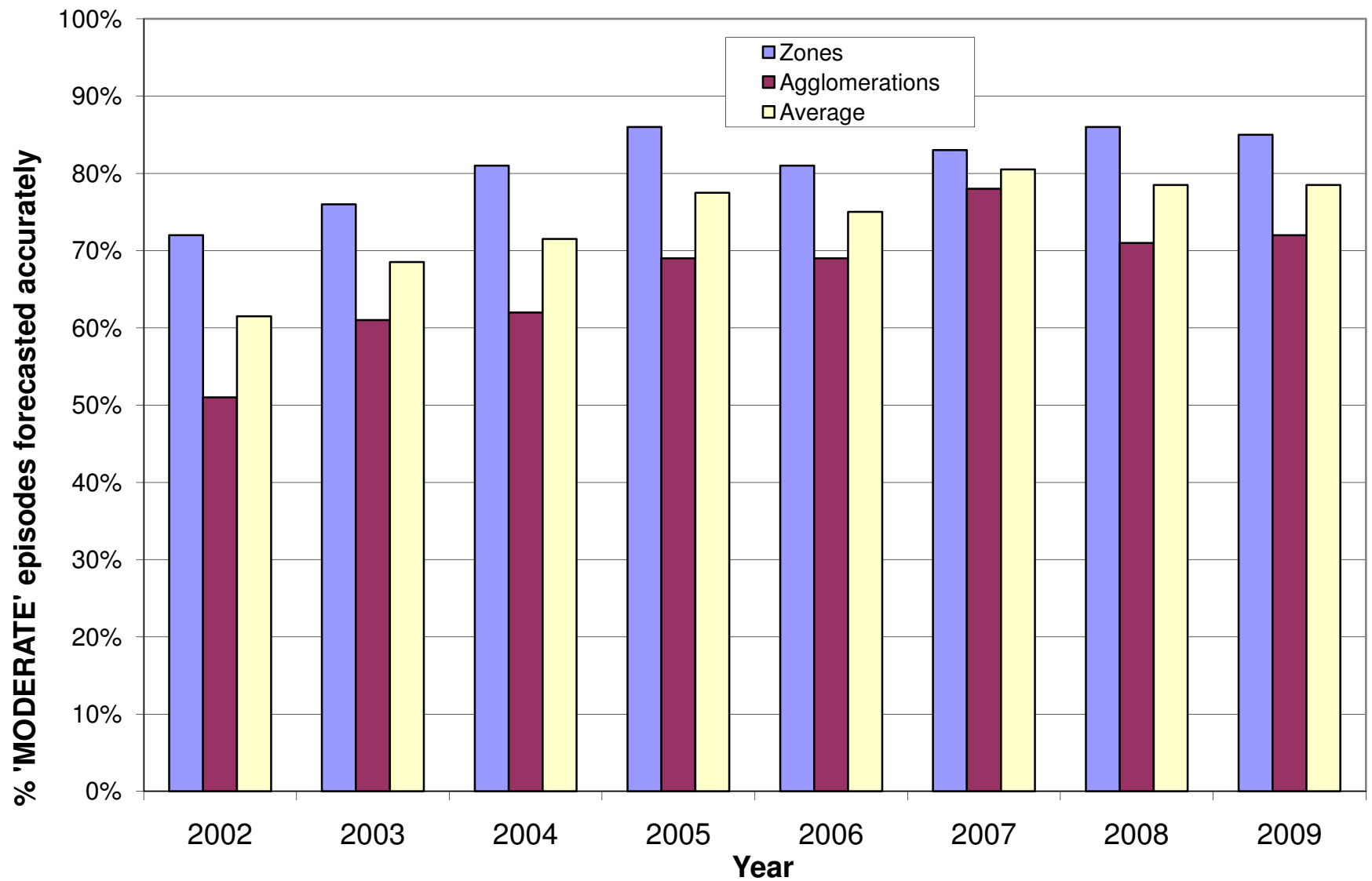
- Meteorology.

- Pollutants

- Forecast Airmass back-trajectories



Success Rates



- Alerts based on Daily AQ Forecasts will soon be available by SMS, email and Text to Speech services.
- Alerts are based on the well established UK AQ Forecasting service operated by AEA on behalf of SG
- Analysis shows the approach has around 80% success rate of forecasting “Moderate or Worse” air pollution incidents.
- Questions