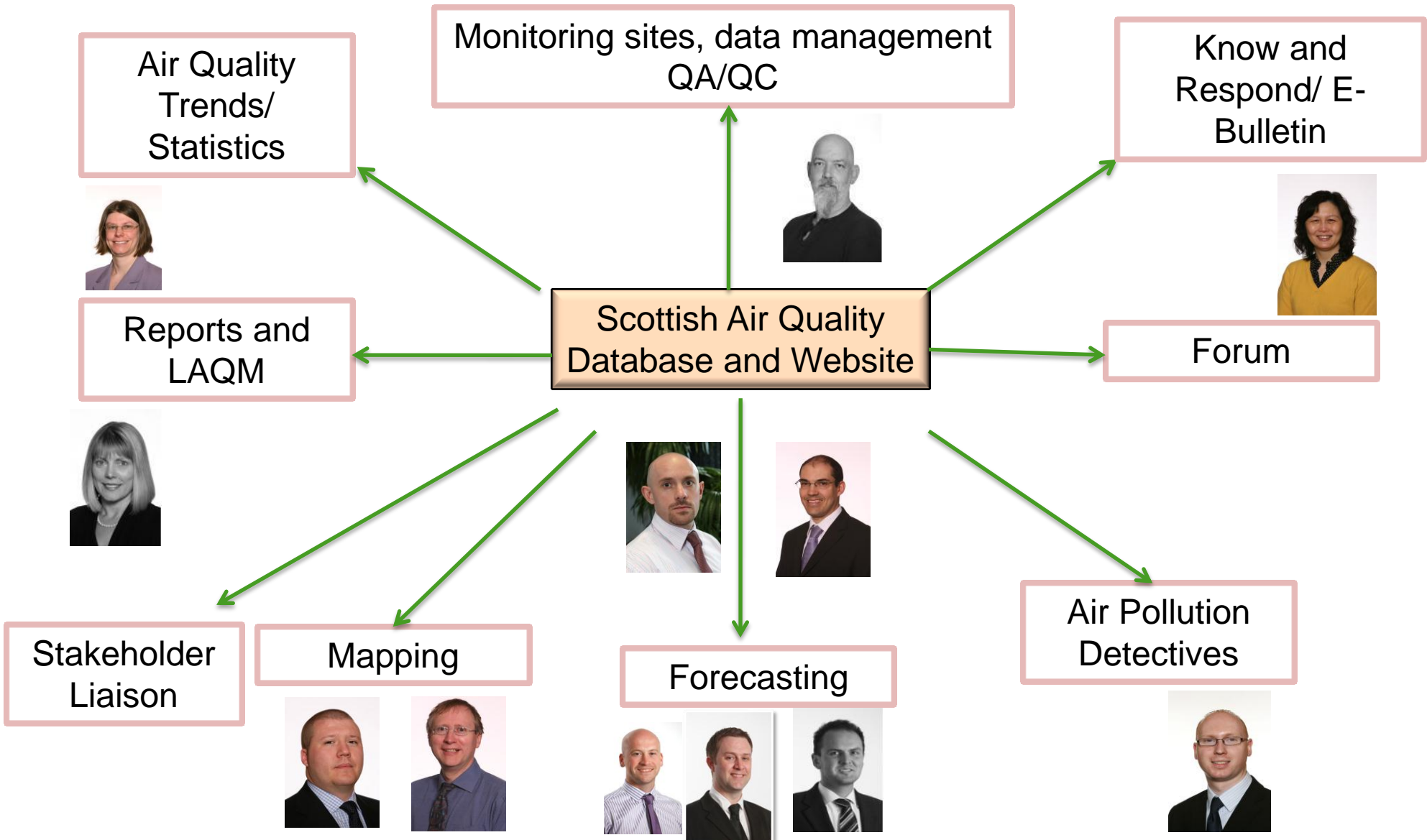


09:15	Registration and Coffee	
09:30	Welcome and Introduction	Andrew Taylor – Scottish Government
09:45	Annual SAQD Update	Dr Stuart Sneddon – Ricardo-AEA
10:15	PM <sub>2.5</sub> Overview	Dr Mat Heal – University of Edinburgh
10:45	Scottish Transport Emissions Partnership	Drew Hill -Transport Scotland
11:15	Tea/Coffee Break	
11:30	Low Emission Strategies	Dr Beth Conlan – Ricardo-AEA
12:00	Air Quality & Athletes Study	Prof Andrew Hursthouse – University of the West Scotland
12:30	AHER Emergency Response	Ben Jackson - SEPA
1300	Lunch	
14:00	The Bonnygate Air Quality Action Plan - Building a Template for Action	Kenny Bisset - Fife Council
14:30	Health Impacts of Air Quality	Dr Jackie Hyland – NHS Fife
15:00	Tea/Coffee Break	
15:15	SAQD New Developments 2013 - 2016	Contractor
15:45	Q&A	All
16:00	Closing Comments	Andrew Taylor- Scottish Government

- Overview of the Scottish Air Quality Database and Ricardo-AEA Project Team;
- Scottish Air Quality Database - monitoring;
- Recent areas of development on the Project;
- Scottish Air Quality Trends;

# Scottish Air Quality Database and Website – Ricardo-AEA Team



# Ricardo-AEA Scottish Air Quality Database - QA/QC Team

**RICARDO-AEA**

- Diane Mooney



Brian Stacey



Sam  
Copsey



- Stephen Stratton



David Hector



- Susannah Telfer

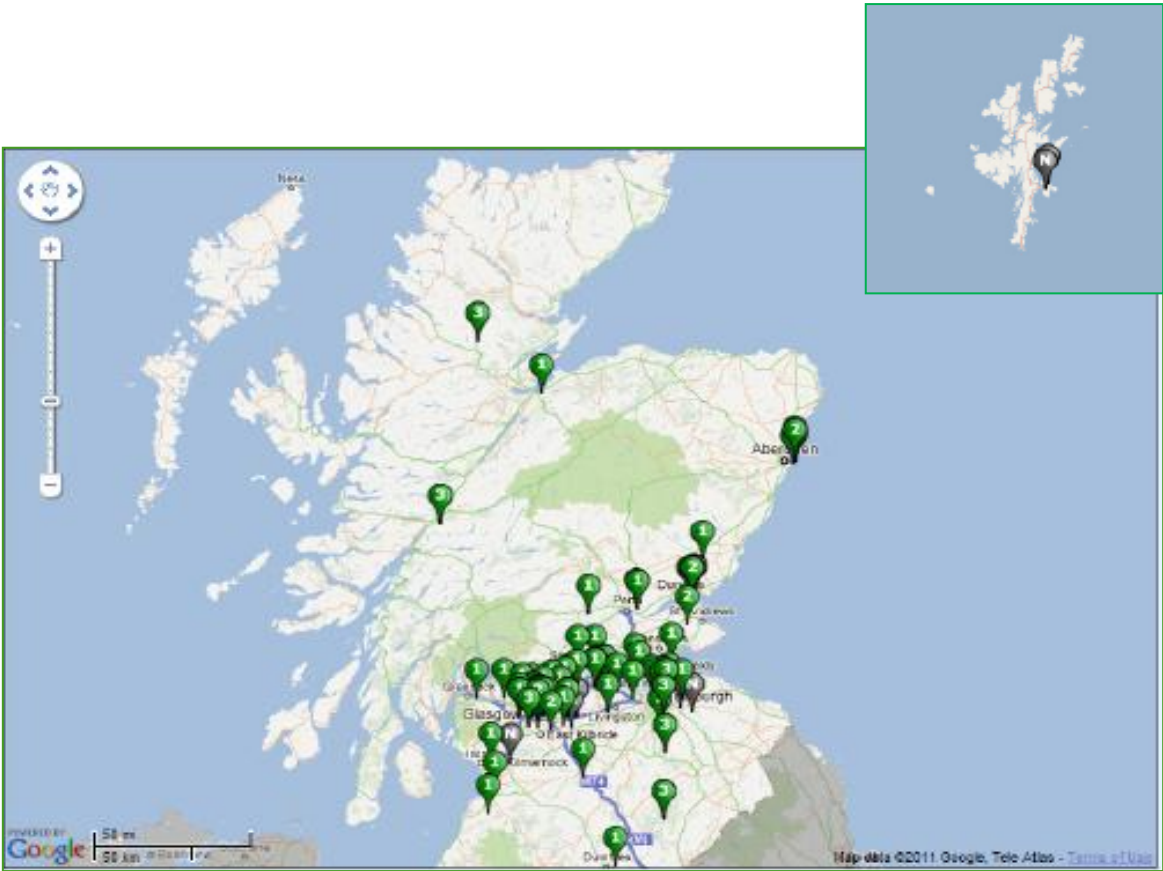


Stephen Gray



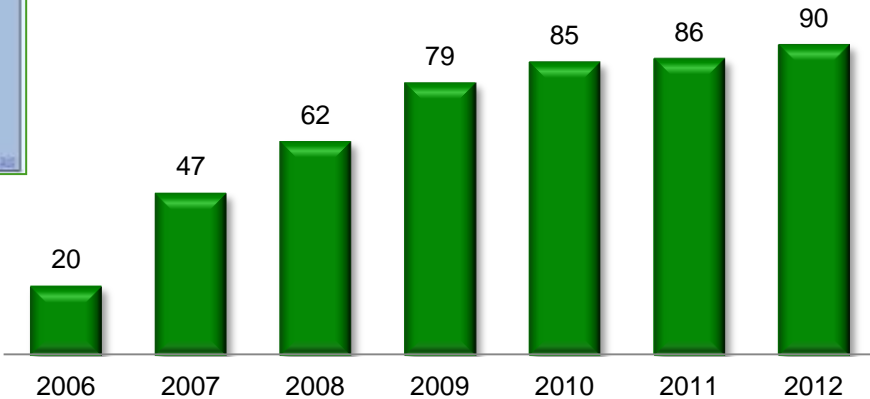


# Monitoring sites in the Scottish Air Quality Database



## Current situation

- 90 Sites on Scottish Website (up from 20 in 2006)
- 16 AURN
- 9 funded by Scottish Grant Scheme
- 68 site operated under this project
- 3 sites split between SAQD and AURN – Lerwick, Aberdeen Union St and Grangemouth Moray hence  $68+9+16=93$



# SAQD Monitoring Site Composition - 2012

Pollutant	SAQD	AURN
● Nitrogen Dioxide	62	13
● PM <sub>10</sub>	73	5
● PM <sub>2.5</sub>	0	5
● Sulphur Dioxide	9	2
● Carbon Monoxide	3	1
● Ozone	1	9
● Total	183	
● 6.4 million data points created each year.		



- **QA: Quality Assurance** – relates to the process of monitoring e.g.:
  - Instrument calibration
  - Operator training
  - Site audits and inter-calibrations
- **QC: Quality Control** – relates to checking outputs including:
  - Data ratification
  - Information management
  - Quality Circle review and feedback



# QA/QC of Scottish Air Quality Database sites

Daily collection and checking of data from each site;  
Scaling of data from last calibration results;  
Update to website;  
On-going data update as new information becomes available;

Site audits – ensures traceability;  
Collection and storage of all calibrations and service records etc;

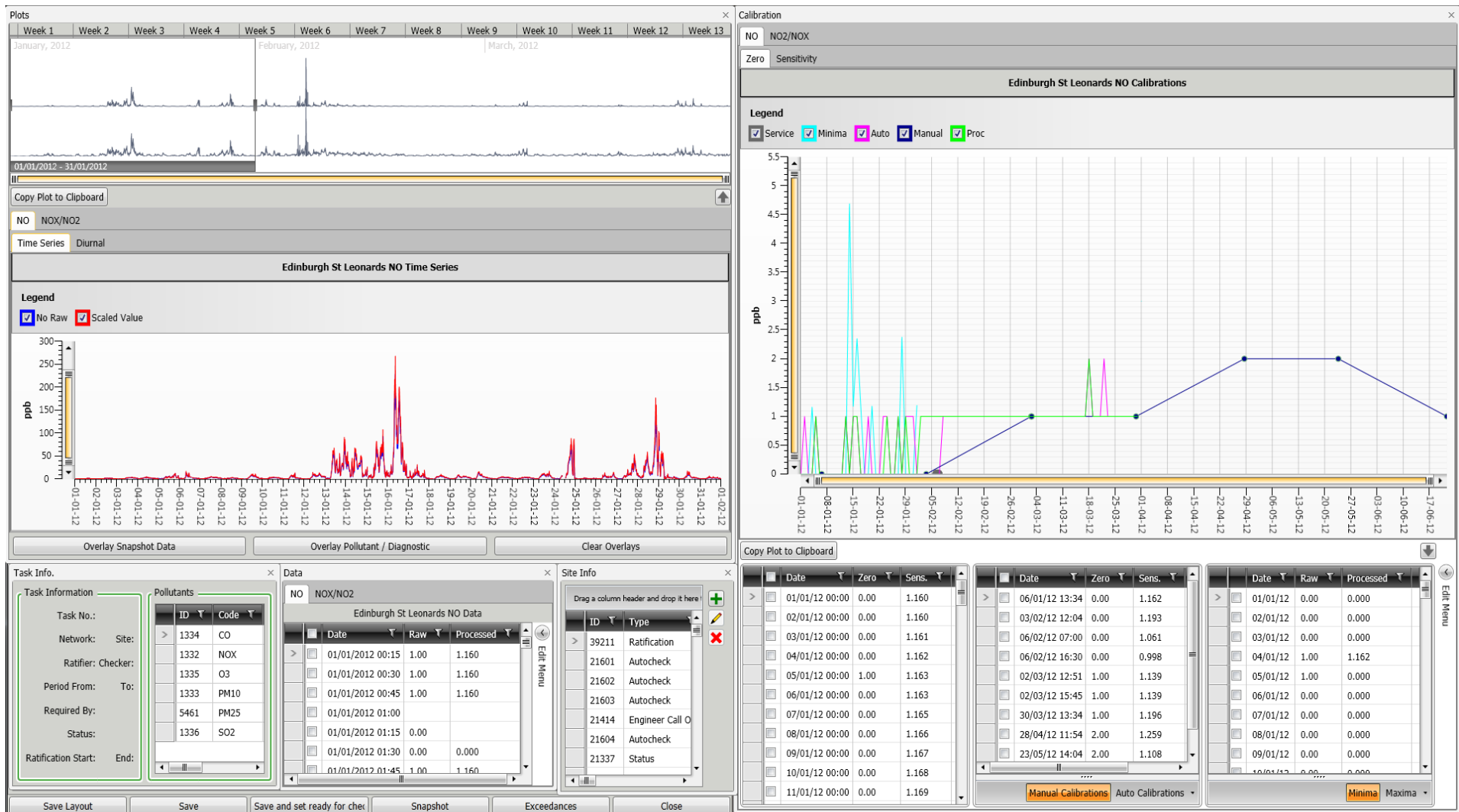
- 6-monthly data ratification;
- Quality Circle data review;
- Update of ratified data to the website;
- Assistance to local authorities where-ever possible;



- Ricardo-AEA visits each site every 6-months to undertake the inter-calibration and site audit
  - Check analysers
  - Check calibration gases
  - Site infrastructure
  - Local Site Operator



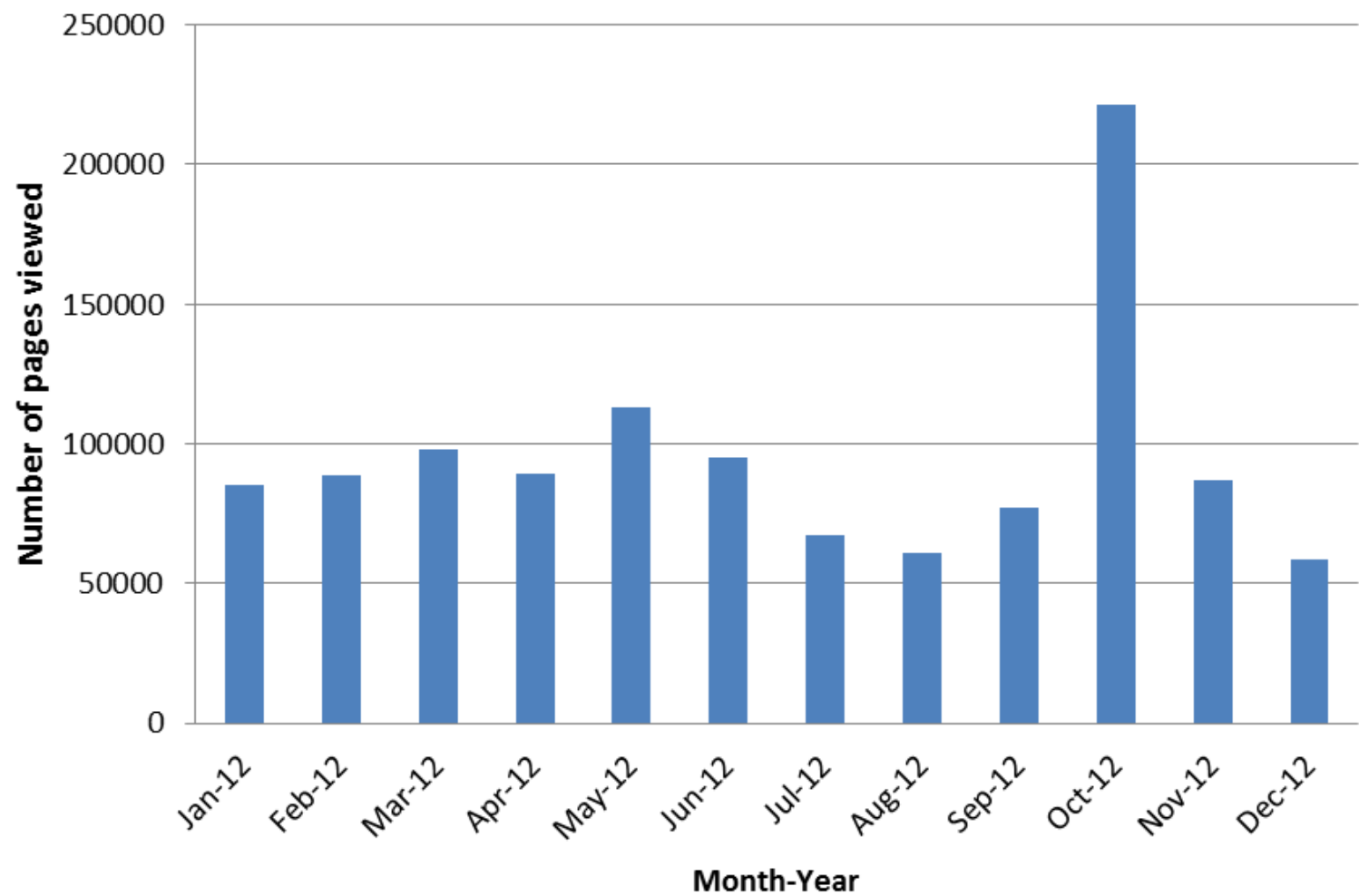
# QA/QC: Data Ratification



- Full public access via website, database and email air quality bulletins;
- Local Air Quality Management – local authorities and SEPA
- Annual brochure and project report;
- Students and members of the public asking for assistance;
- Cited as a data source in Key Scottish Environment Statistics;
- Daily Air Quality Index
- Know & Respond Service



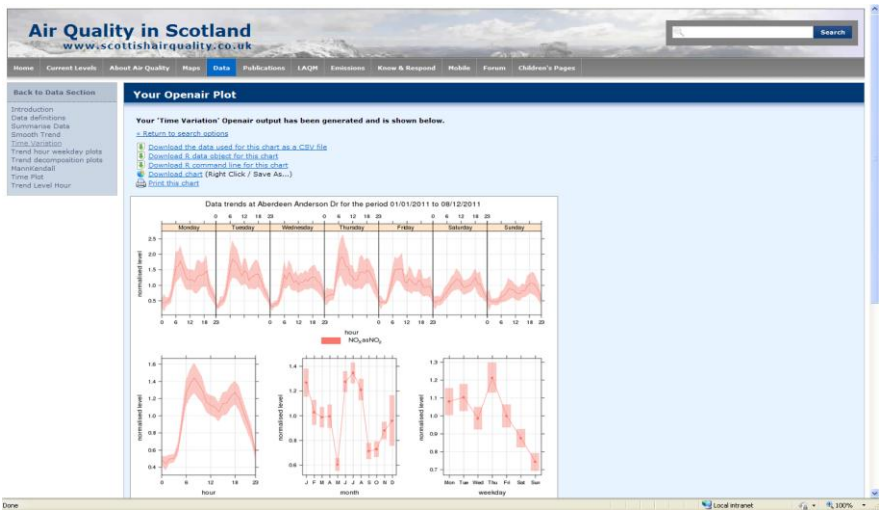
Number of pages each month during 2012





# Additional components of project:

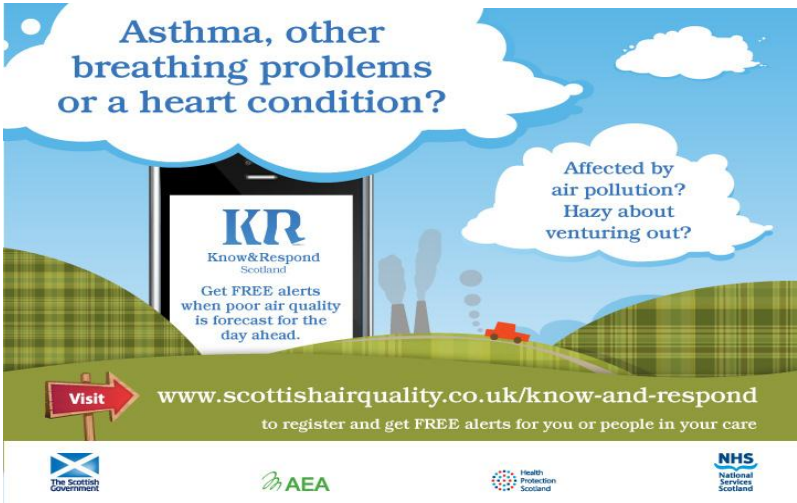
Openair



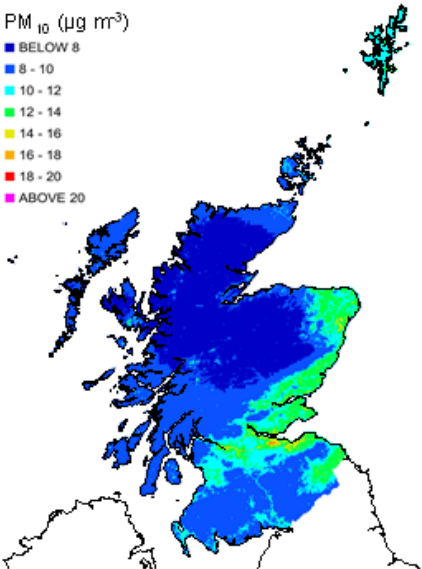
Air Pollution Detectives



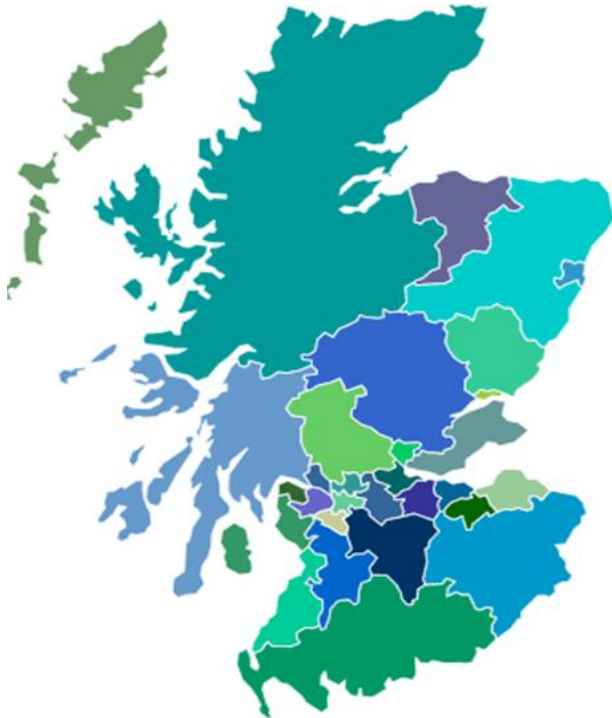
## Know & Respon **Recent developments**



Background Maps







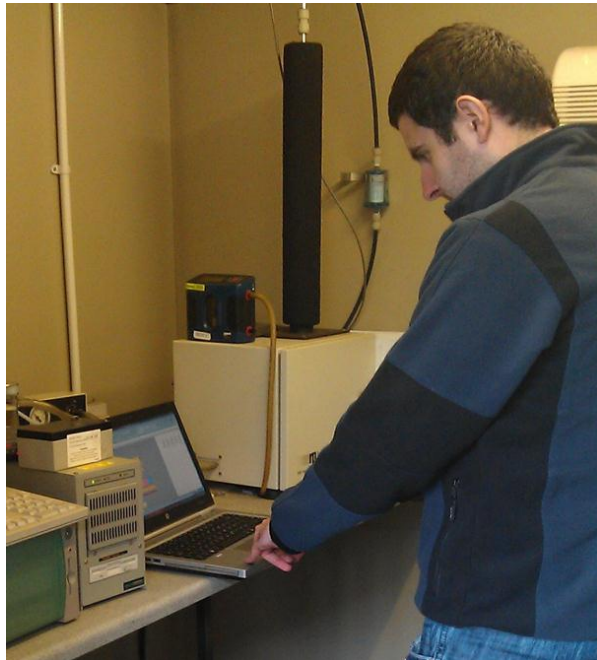
## 3 Structured Areas of Training:

- In-house training event for each Council:
  - Presentation
  - On-site Training
- Tutorial Video's
- Scottish Network LSO Manual

# Enhanced LSO Training

## In-house Training Event Presentation

- General outline of network
- Highlight the roles of LSO, ESU and QA/QC
- LSO Duties incl. Calibration and Maintenance of Sites



**RICARDO-AEA**



## On-site Training

- One on one tailored training for the LSOs specific site needs
- Ability to assist with any specific site issues the LSOs have
- Ricardo-AEA will be able to resolve common/ individual errors picked up during the QA/QC process e.g. poor quality calibrations, errors in calibration data entry and site maintenance issues

# Tutorial Video's

**RICARDO-AEA**

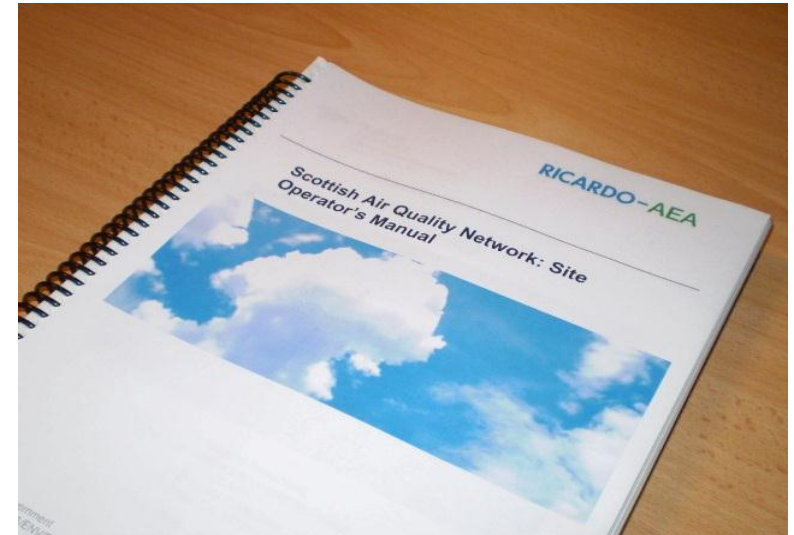
Videos will soon be available online on the SAQD website, which will allow LSO's and LA's to have the benefit of being able to revise and train using this material as and when required.

- The initial 5 training videos cover:
  - TEOM Calibration
  - TEOM FDMS Calibration
  - PM inlet head Cleaning Procedure
  - BAM Calibration
  - Gaseous Analyser Calibrations



# Scottish Network LSO Manual

- An Operational Manual will be supplied to each site operator
- The manual will be supplied in an electronic format, which will be:
  - Emailed to each site operator
  - Available on the Air Quality Scotland website



The Tutorial Video's will be embedded within the relevant sections of the manual.

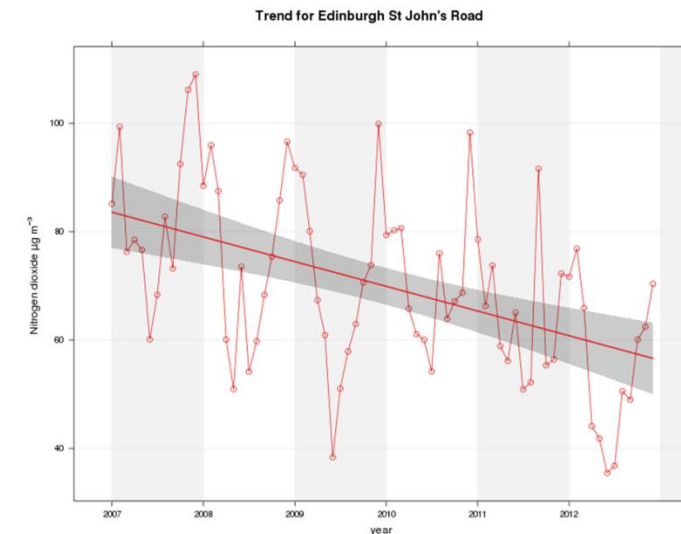
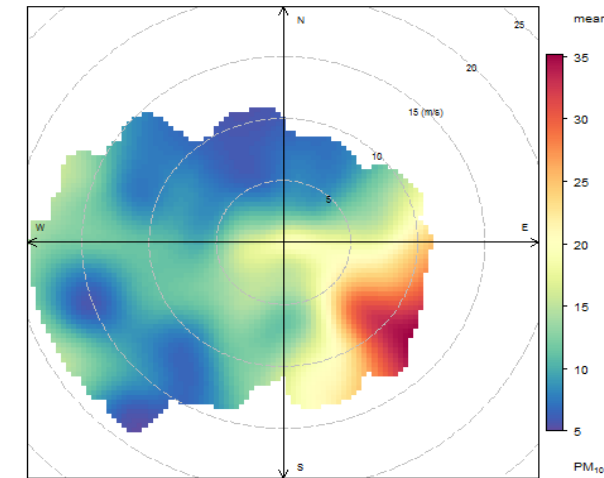
## **Enhanced training aims to:**

- Increase data quality and data capture
- Improve LSO understanding and confidence in their duties
- Enhance the quality of LSO interactions with sites e.g. Callouts and Calibrations
- Enable LSOs to improve their knowledge by being able to ask specific questions during the training

# Enhancement of 'openair' on Air Quality Scotland

**RICARDO-AEA**

- Open Source data analysis tools in R were developed by Dr David Carslaw and his team at the University of Leeds (and now KCL).
- During 2011 Ricardo-AEA developed a way of linking the tools directly to National AQ databases, with Air Quality Scotland being the first made publicly available in this way.
- Toolset of openair on SAQD was originally restricted by lack of met data.
- But daily forecast Weather Research and Forecasting (WRF) maps are now freely available.

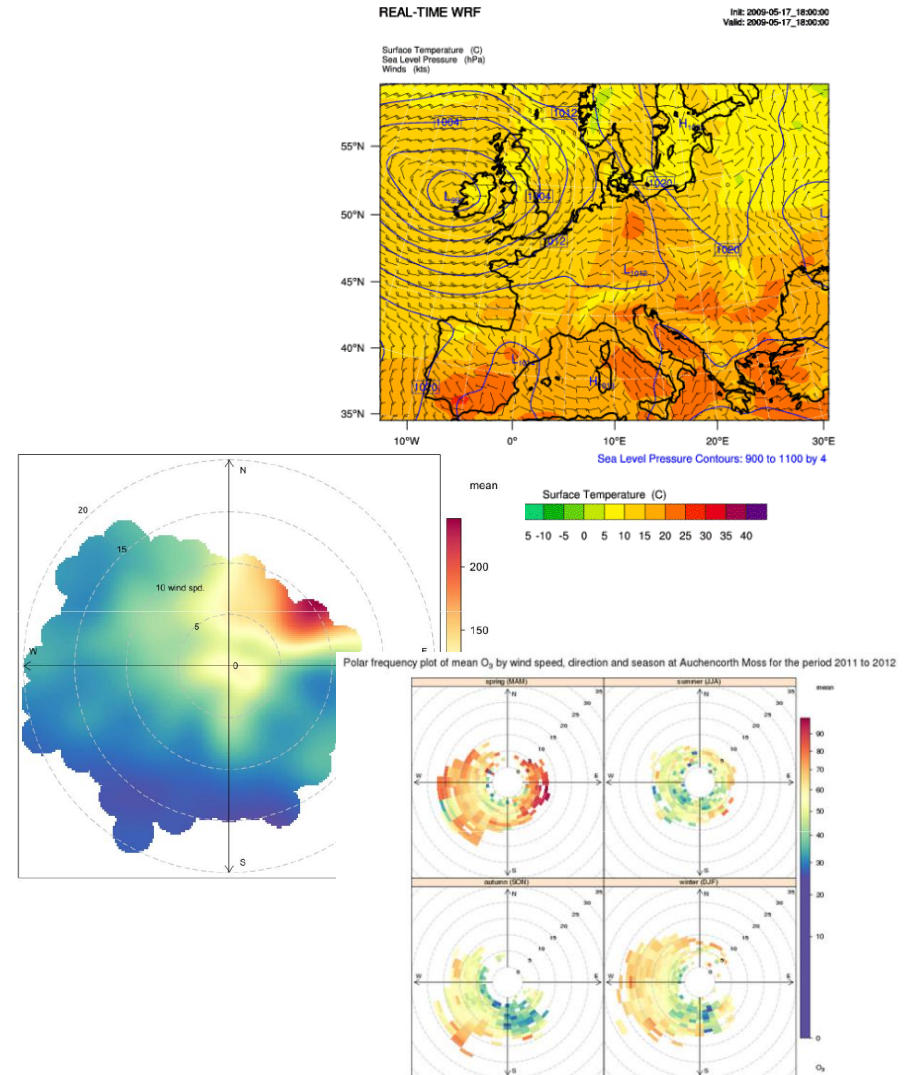




# Enhancement of 'openair' on Air Quality Scotland

RICARDO-AEA

- Weather Research and Forecasting (WRF) hourly modelled meteorological data for all monitoring stations included in the Scottish Air Quality Database.
- Further development of the user interface to allow interactive access to the new database features and tools.
- Enables the analyze the likely sources of pollutants under different conditions.
- The interface now allows the analysis of current and historic measurements and presents the result as report quality graphics, CSV files for spreadsheets and R-data objects.

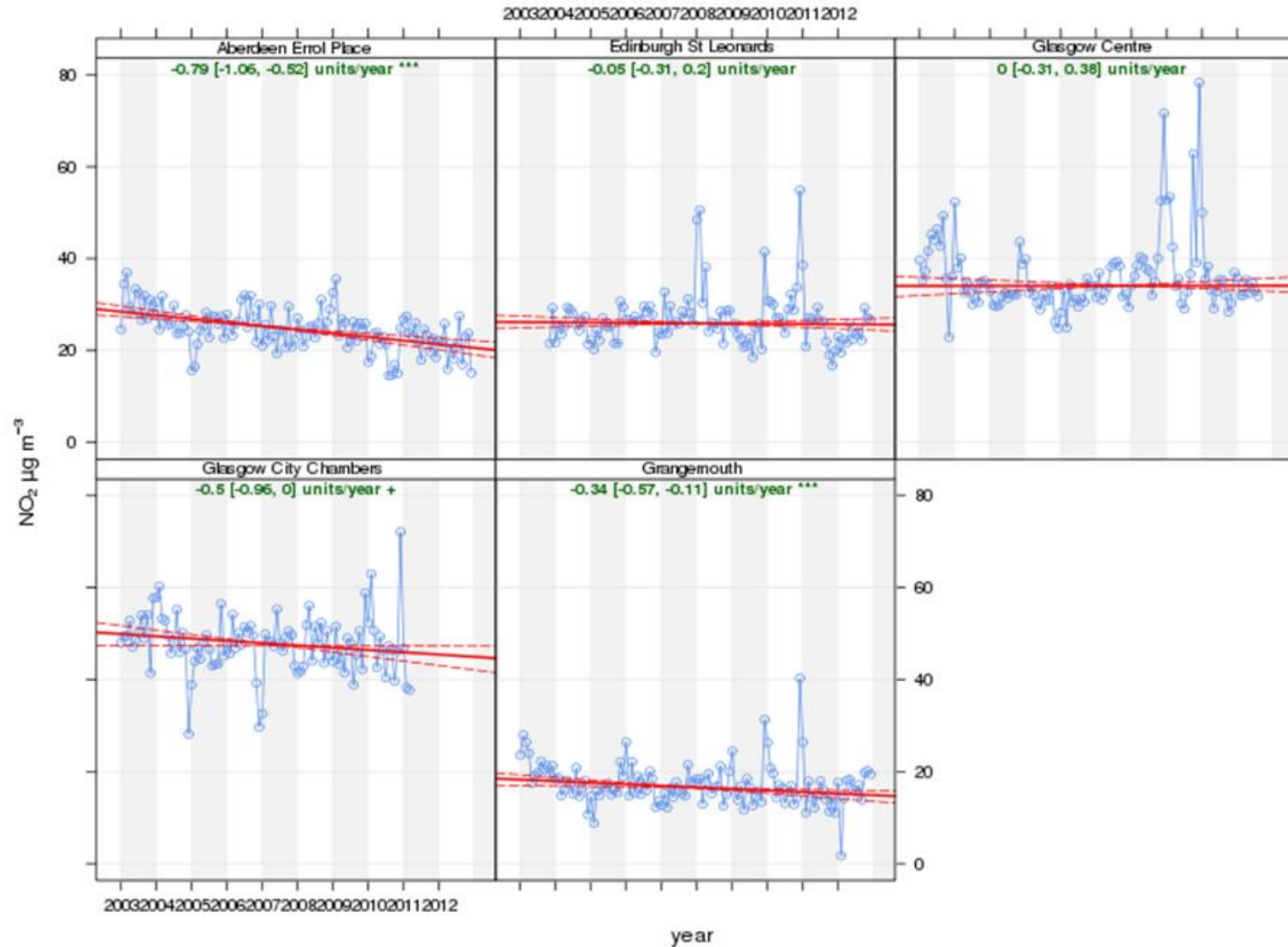




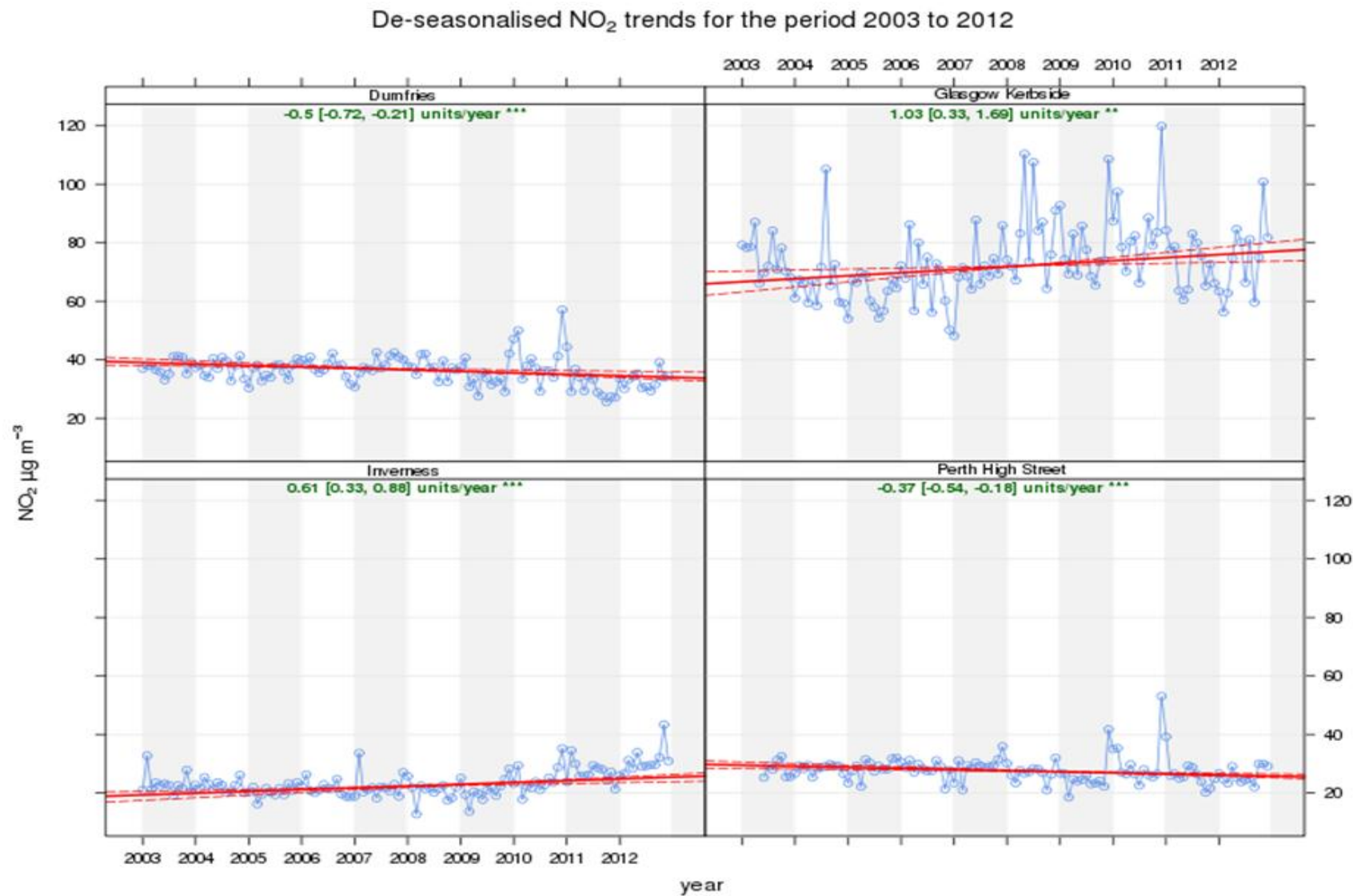
## **Air Quality Trends for Scotland**

# Trends in NO<sub>2</sub> Concentration at Five Long-running Urban Non-Roadside Sites, 2003-2012

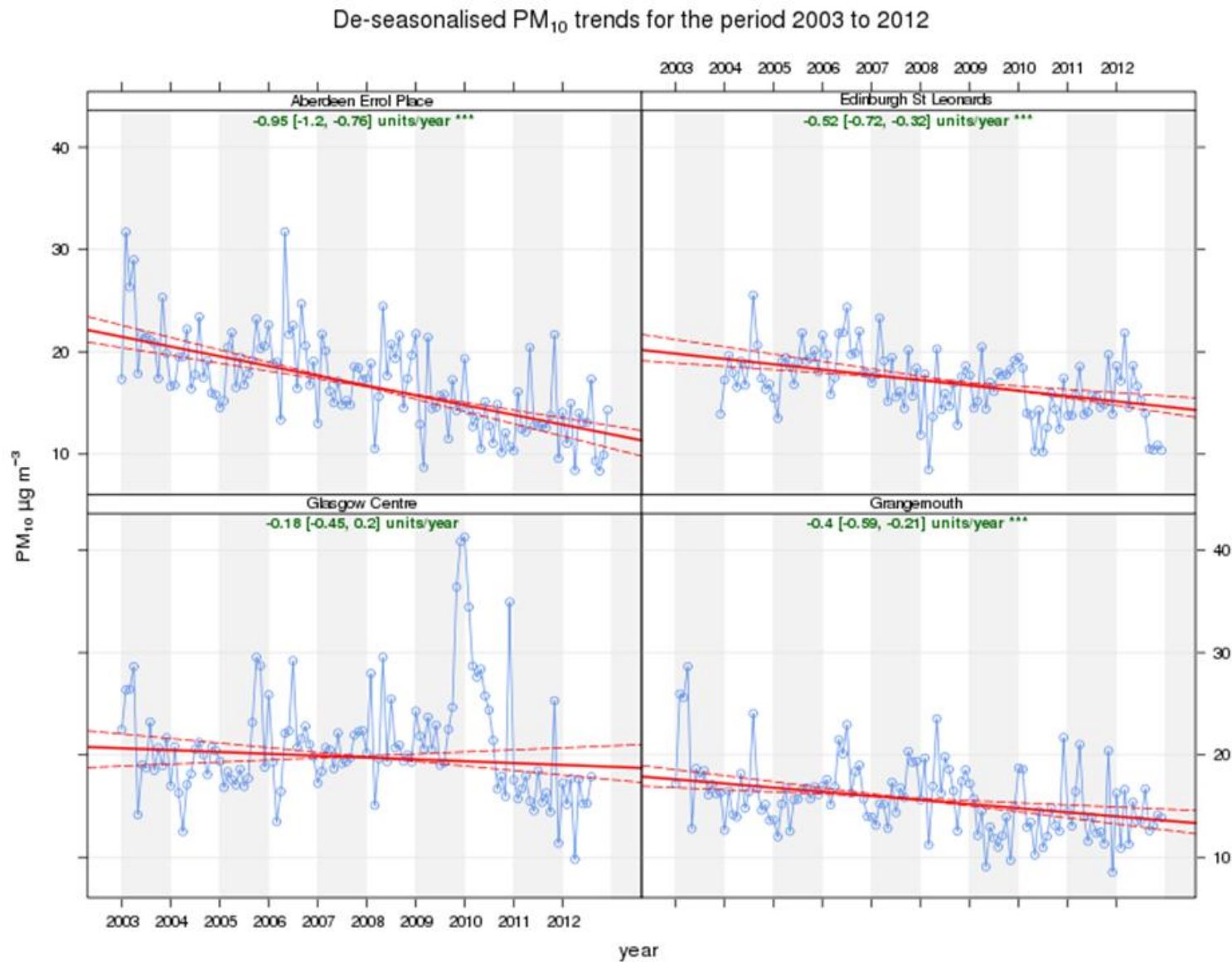
De-seasonalised NO<sub>2</sub> trends for the period 2003 to 2012



# Trends in NO<sub>2</sub> Concentration at Traffic Urban sites in Scotland: 2003 – 2012

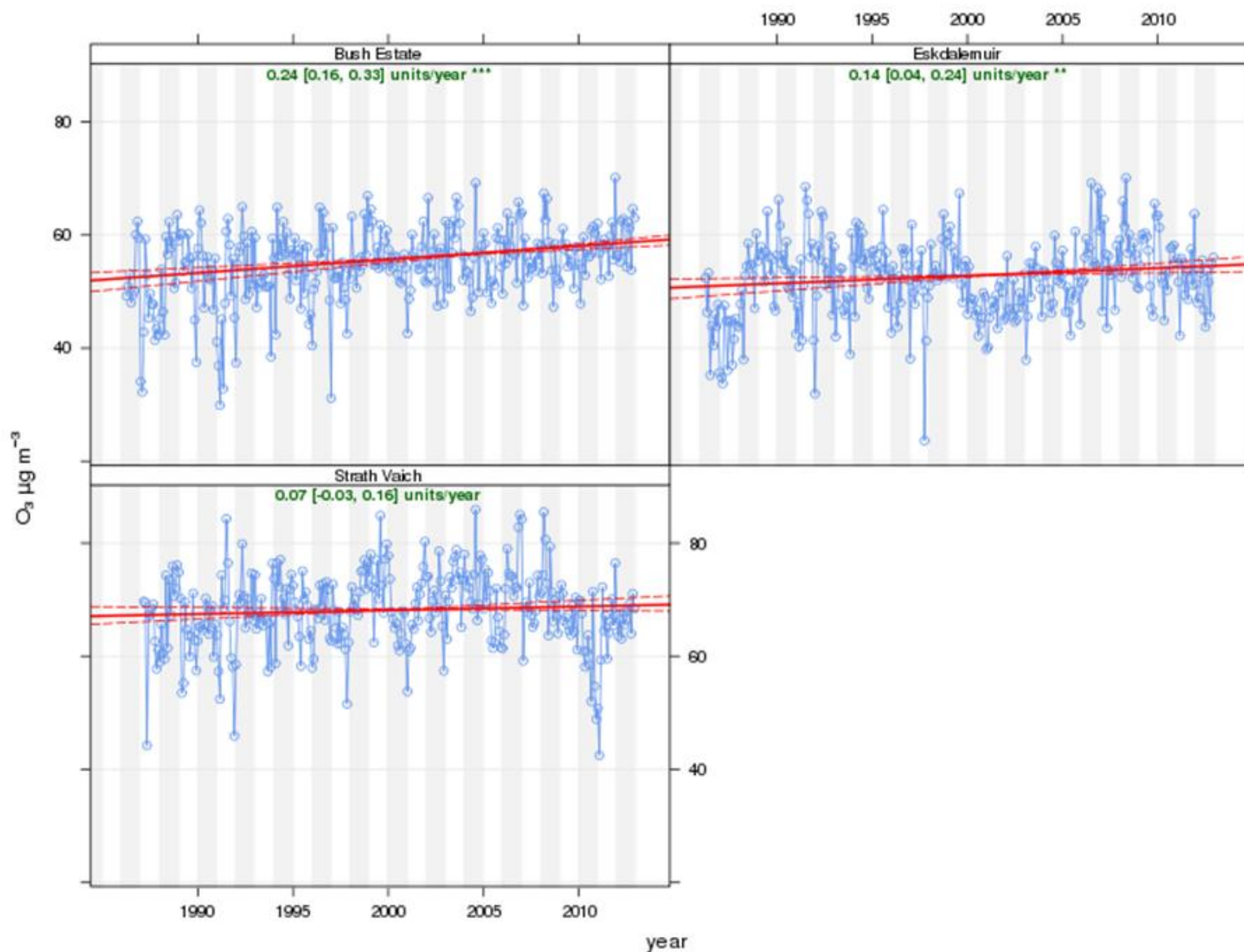


# Trends in PM<sub>10</sub> Concentration at Long-Running Scottish Urban Background Sites, 2003 – 2012



# Annual Mean O<sub>3</sub> Concentrations at Long-Running Scottish Rural Sites, 1986 – 2012

De-seasonalised O<sub>3</sub> trends for the period 1986 to 2012



Thank you for Listening

**Stuart Sneddon**

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KA14 3DD

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**E:** [Stuart.sneddon@ricardo-aea.com](mailto:Stuart.sneddon@ricardo-aea.com)  
**W:** [www.ricardo-aea.com](http://www.ricardo-aea.com)