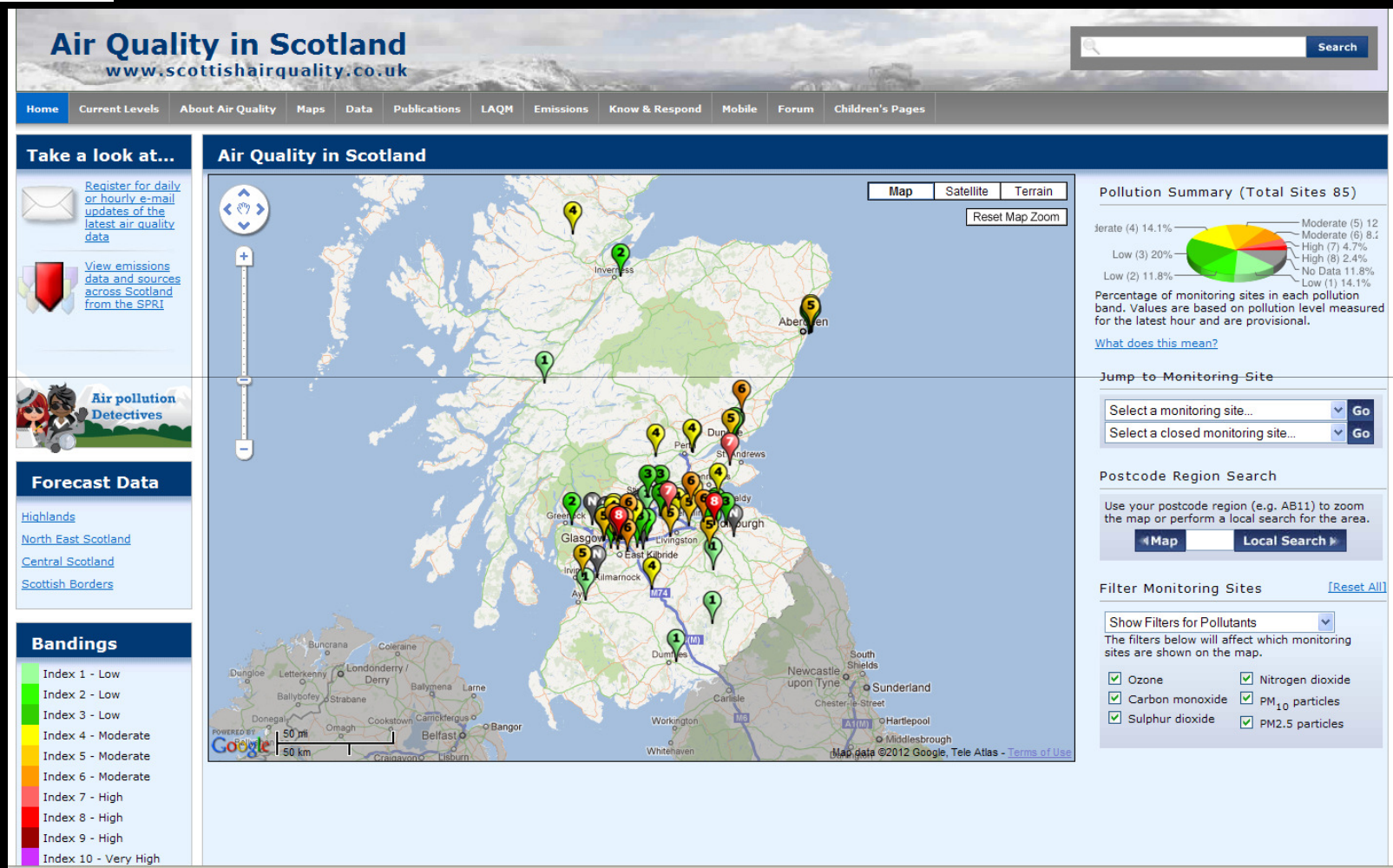


The Scottish Air Quality Database and Website



Dr Stuart Sneddon, AEA

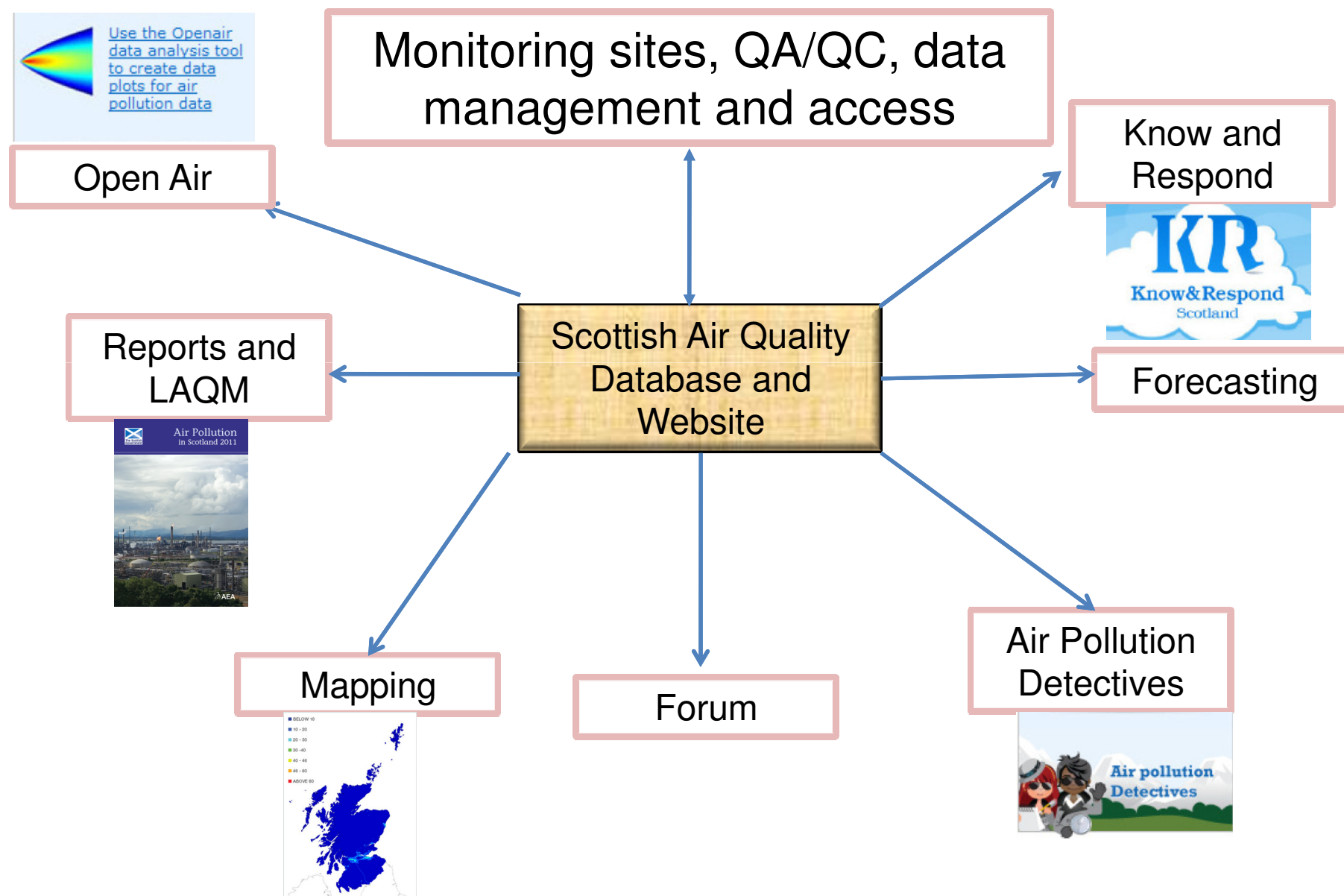
Agenda



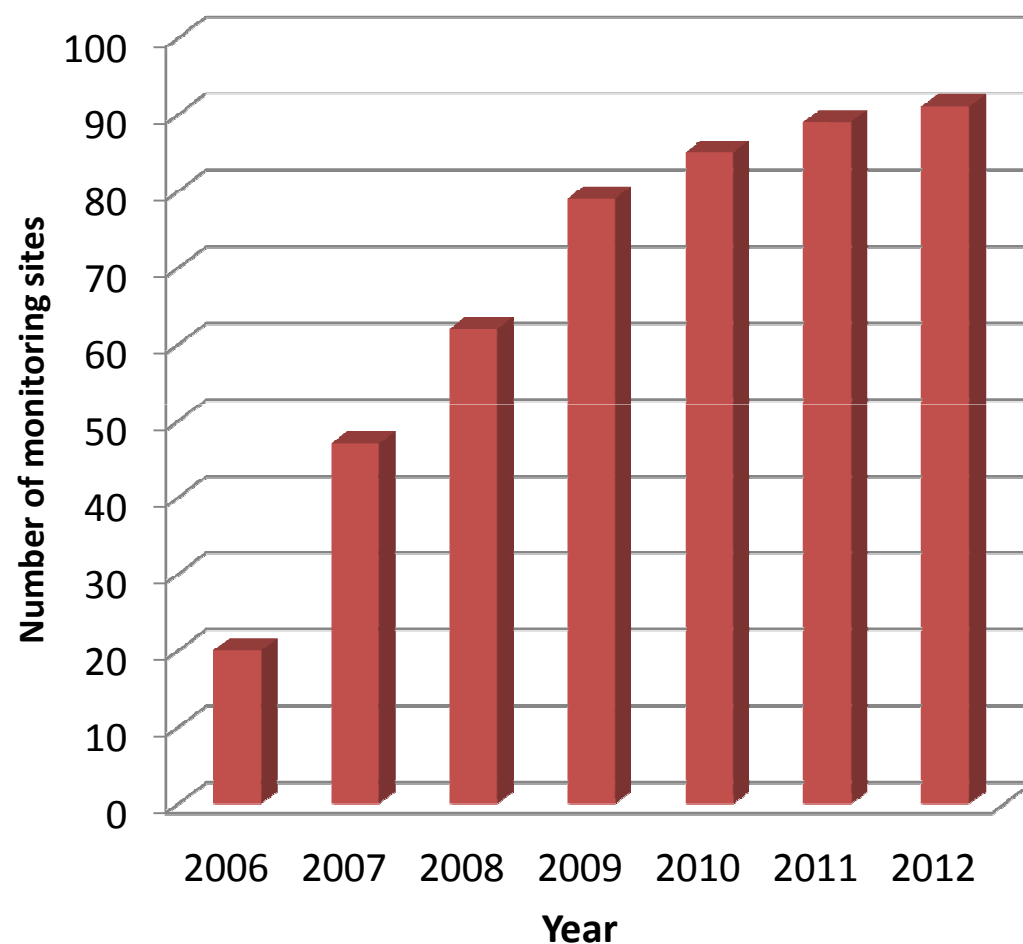
09:15	Registration and Coffee	
09:30	Welcome and Introduction	Andrew Taylor, SG
09:45	General Updates to the Database and Website – including brief QA / QC	Stuart Sneddon, AEA
10:20	Particulate Matter – Emerging Issues	Stephen Stratton/ David Hector, AEA
10:50	Carbotraf	Jim Mills Air Monitors
11:10	Tea/Coffee Break	
11:30	Open Air – enhanced functionality on SAQD	Scott Hamilton, AEA
12:05	LAQM Appraisal Team	Sofia Girnary Transport and Travel Research Ltd
12:35	Revocation of Harthill AQMA	Fiona Maguire, North Lanarkshire Council
12:55	Lunch	
13:45	Health Impacts of Air Quality	Dr Ken Anderson MD FRCP Consultant Physician University Hospital Crosshouse
14:20	Air Quality Forecasting and the Know and Respond Alert System	Paul Willis, AEA
14:55	Tea/Coffee Break	
15:10	Upgrading City Buses to Reduce NOx Emissions	Janet Brown and Kathye-Ann Henderson Edinburgh City Council and EMINOX
15:45	Questions and Answers	
16:00	Closing Comments	Andrew Taylor

- Overview of the project;
- Key data and Trends;
- Data provisions and usage;
- Some recent and future developments;

Scottish Air Quality Database and Website

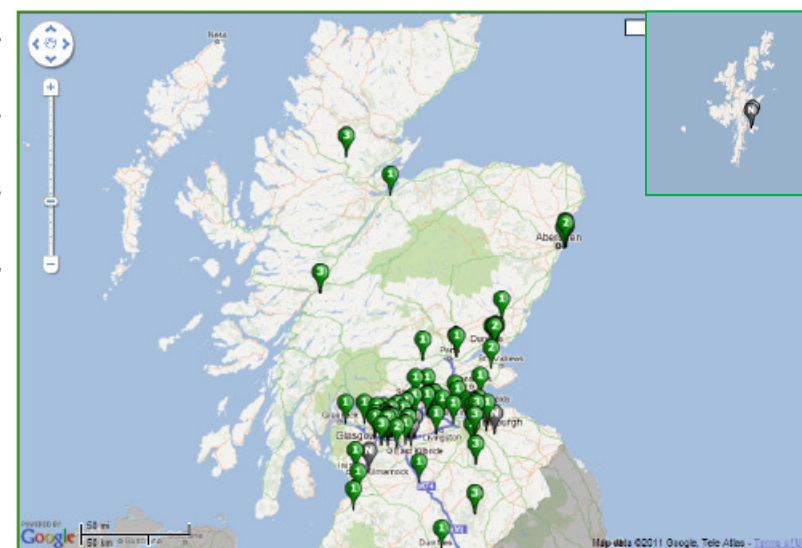


Monitoring sites included in the Scottish Air Quality Database



Current situation

- 91 Sites on Scottish Database
- 17 AURN
- Scottish Government - Project
- Local Authority – Air Quality Grant



Data Quality Assurance and Control

As outlined in LAQM.TG(09):

“Proper QA/QC practice is necessary to ensure data integrity and guarantee the data quality required for meeting the overall monitoring objectives. Fundamental data requirements are:”

- accuracy;
- precision;
- data capture;
- traceability to national/international metrology standards;
- long-term consistency.

QA - the control of operational factors affecting data quality. QC – identifying any problems not identified at the quality assurance stage.

- **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

Site audits – ensures traceability;

Collection and storage of all calibrations and service records etc;

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;

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

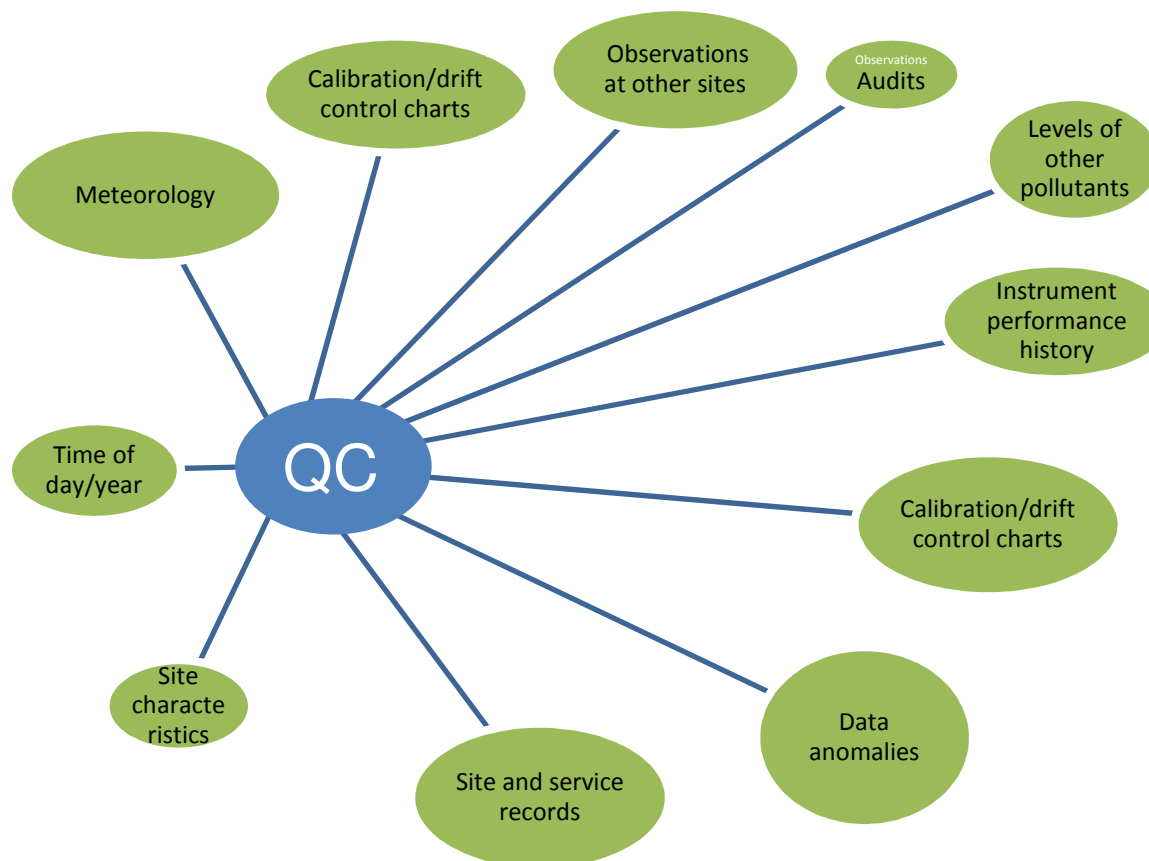
- Data are automatically scaled using the last manual or automatic calibration;
- Database software automatically highlights possible problems using custom-built algorithms;
- Daily checks carried out to check if data have been collected, check for scaling errors, analyser faults etc;
- Weekly FDMS checks;
- Poor data are removed;
- Local Authorities are contacted;

Quality Circle

- Project Manager
- Data Manager
- Field Manager
- Data Ratifiers

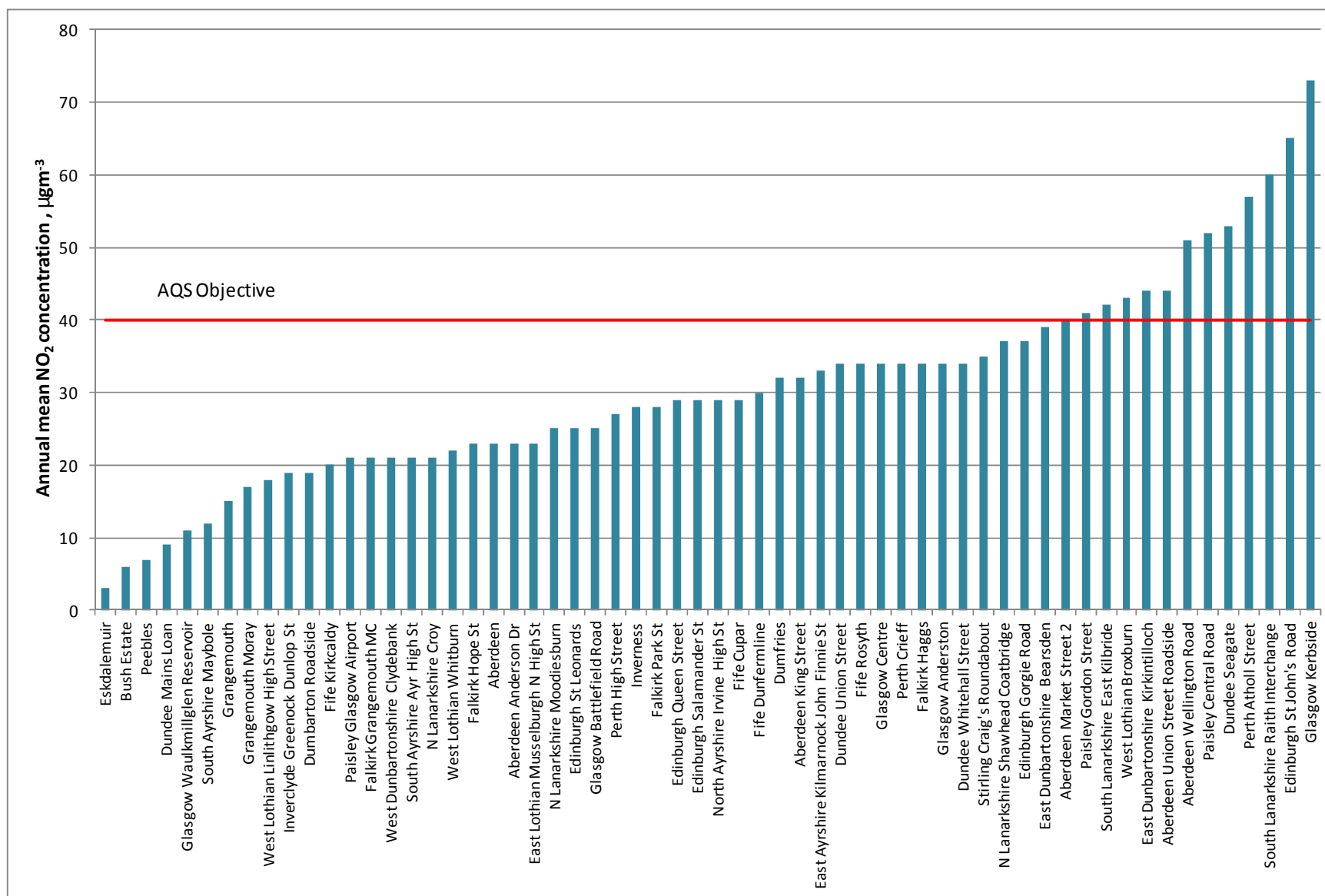
Aims of the Quality Circle

- Final decisions on data
- Identify quality issues
- Feedback via actions & recommendations

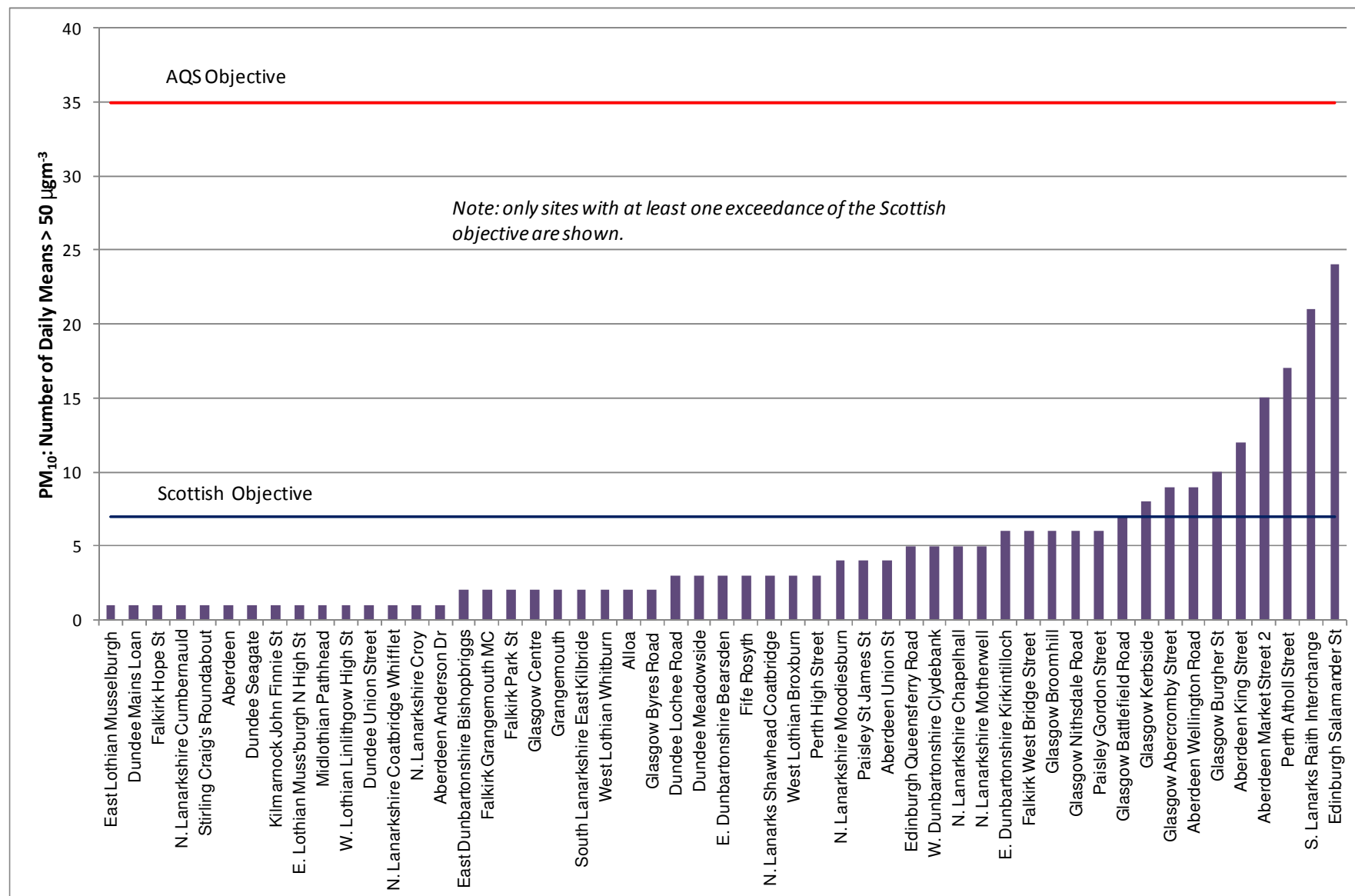


Key Results for 2011

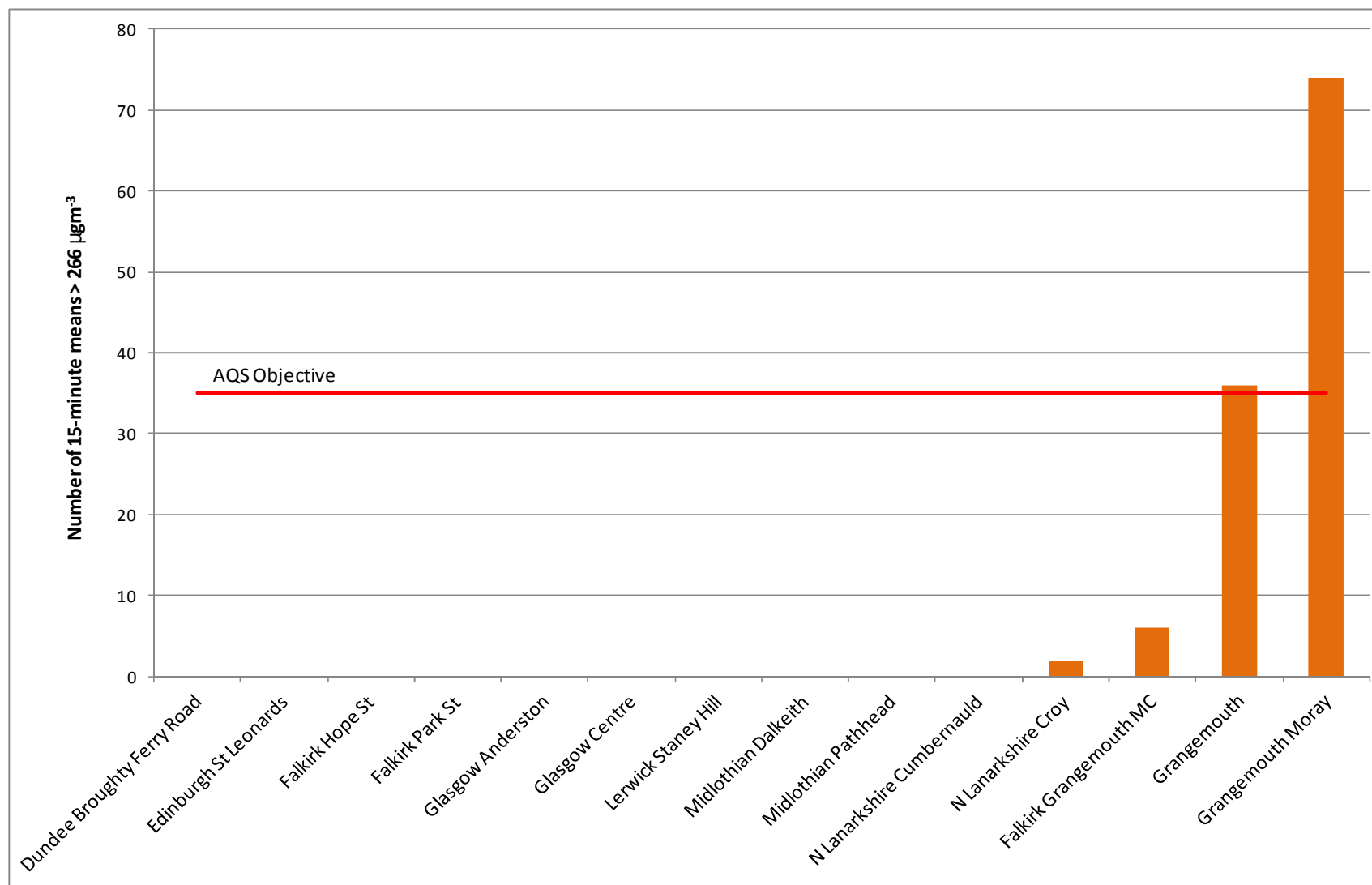
Annual Mean NO₂ concentrations



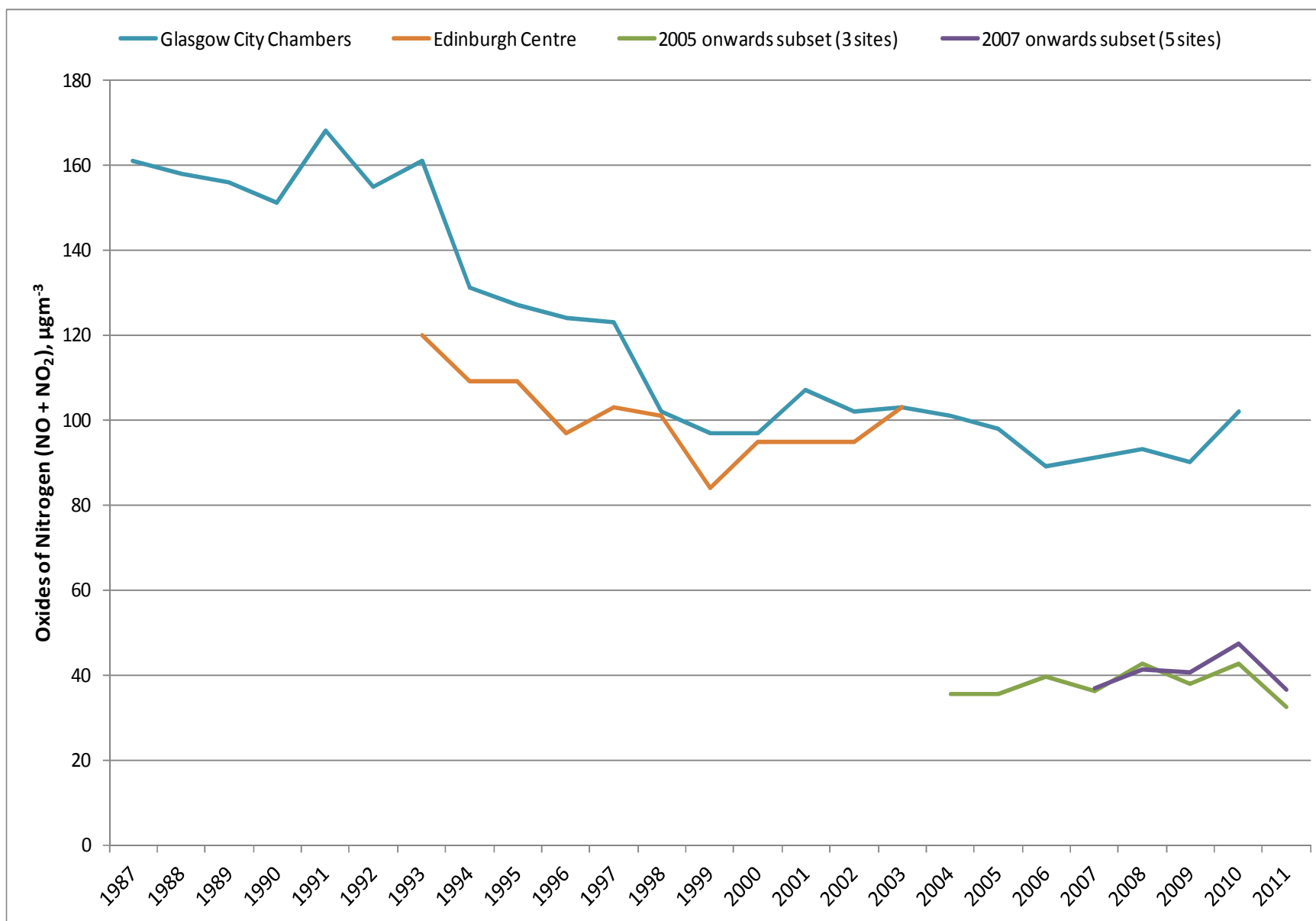
Exceedances of Daily Mean Objectives for PM₁₀



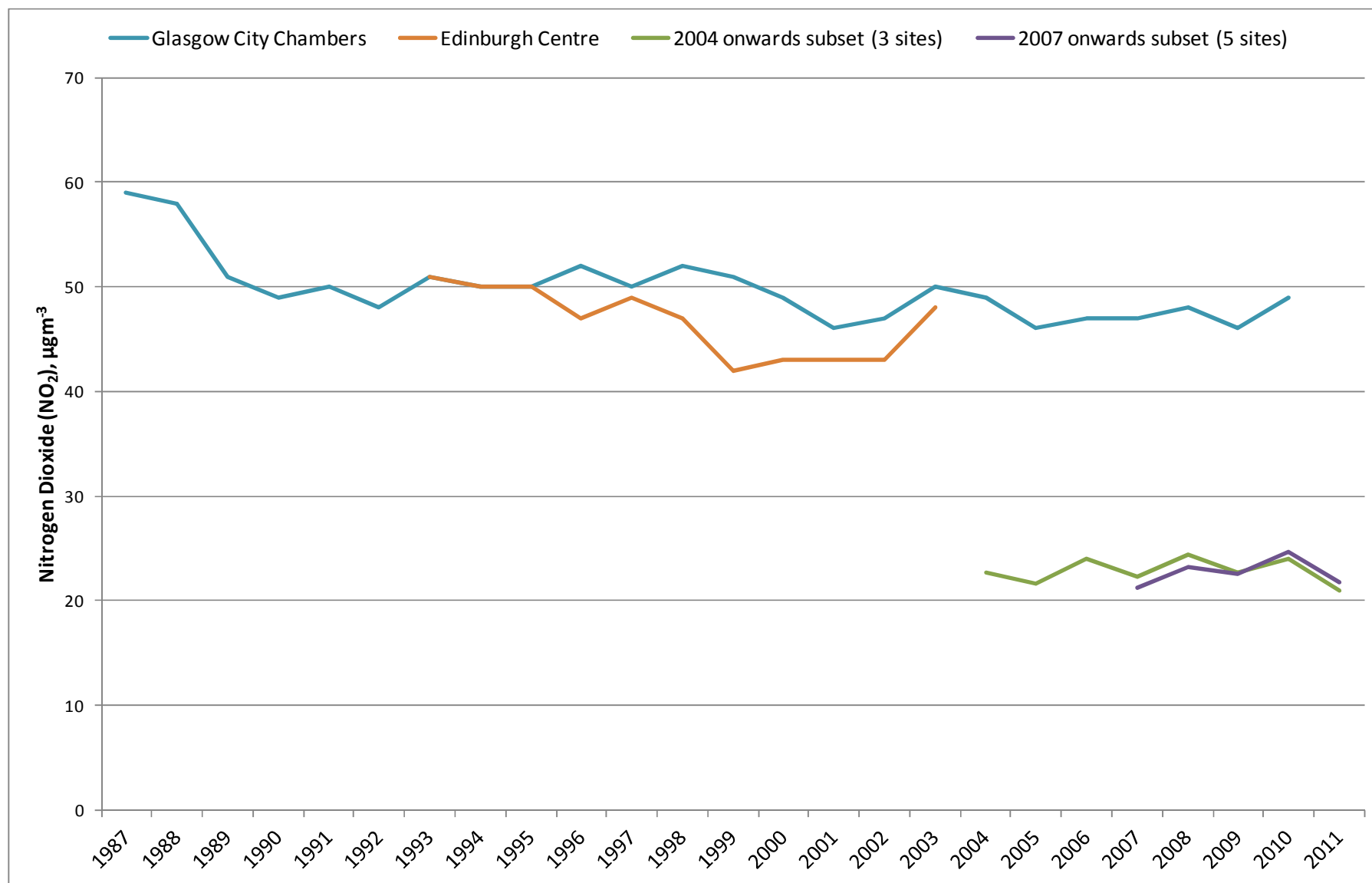
Exceedances of 15-min AQS objective for SO₂



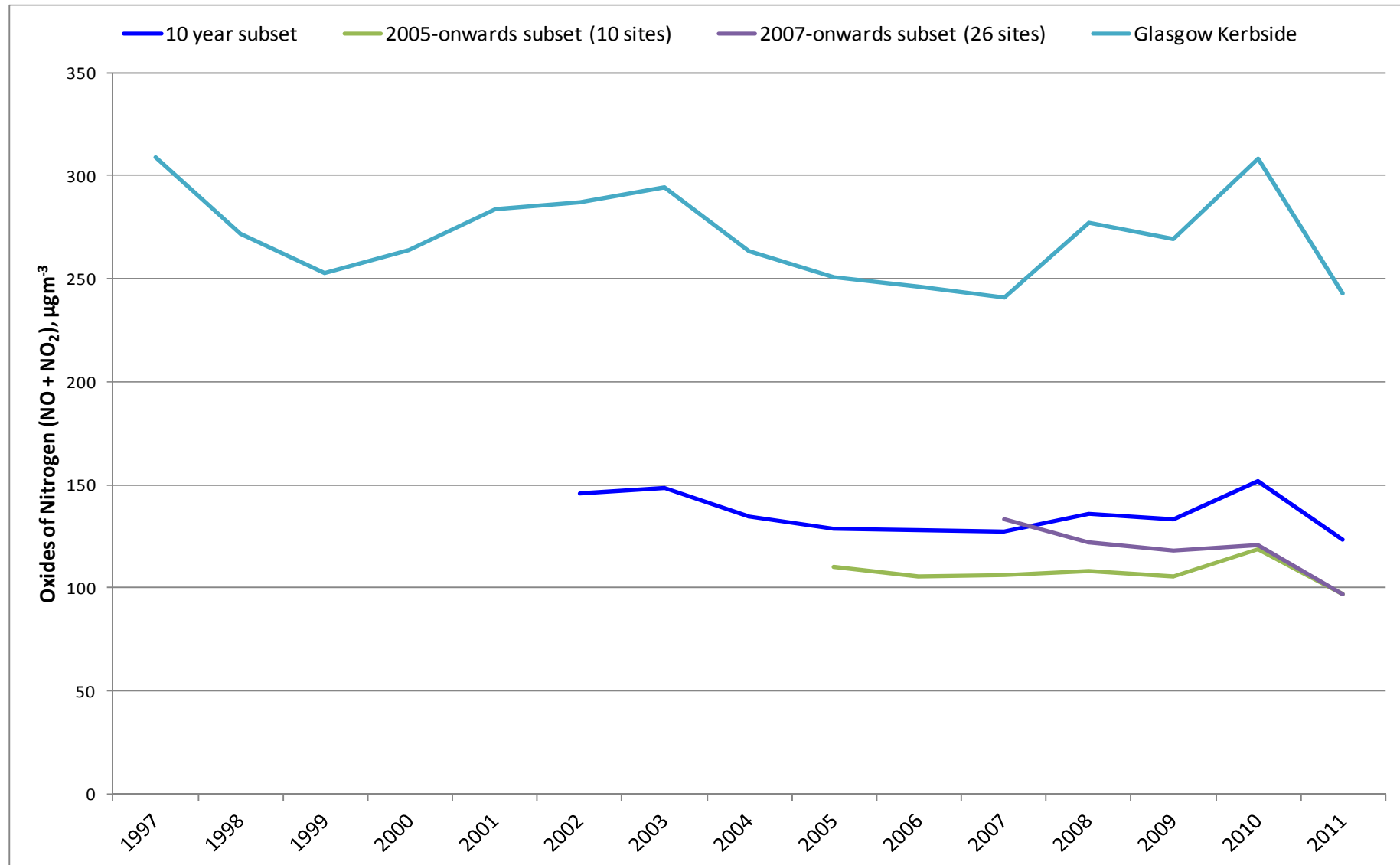
Time Series Graph: Annual Mean NO_x at Urban Background Sites, 1987-2011



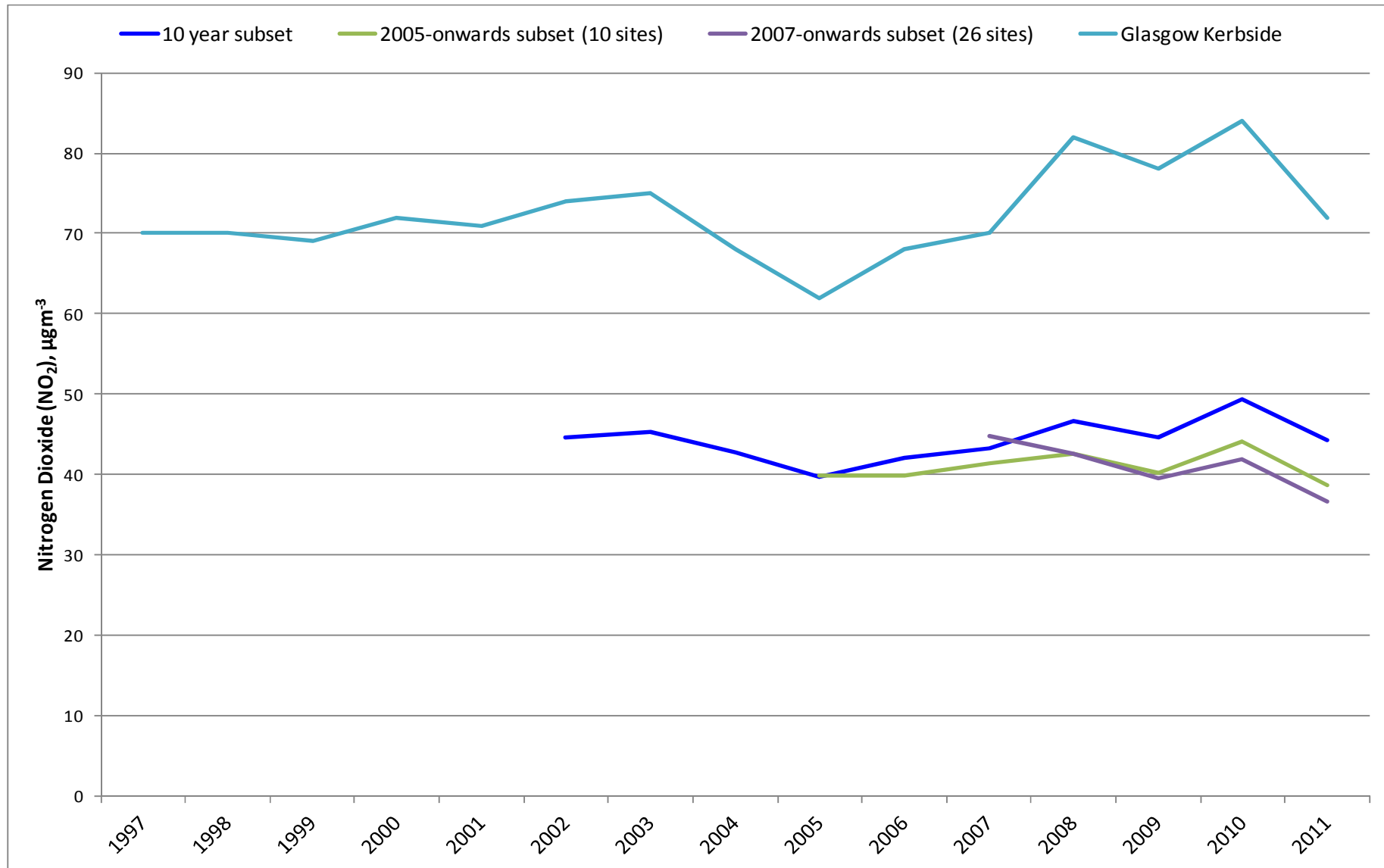
Time Series Graph: Annual Mean NO₂ at Urban Background Sites, 1987-2011



Time Series Graph: Annual Mean NO_x at Kerbside and Roadside Sites, 1997-2011



Time Series Graph: Annual Mean NO₂ at Kerbside and Roadside Sites, 1997-2011



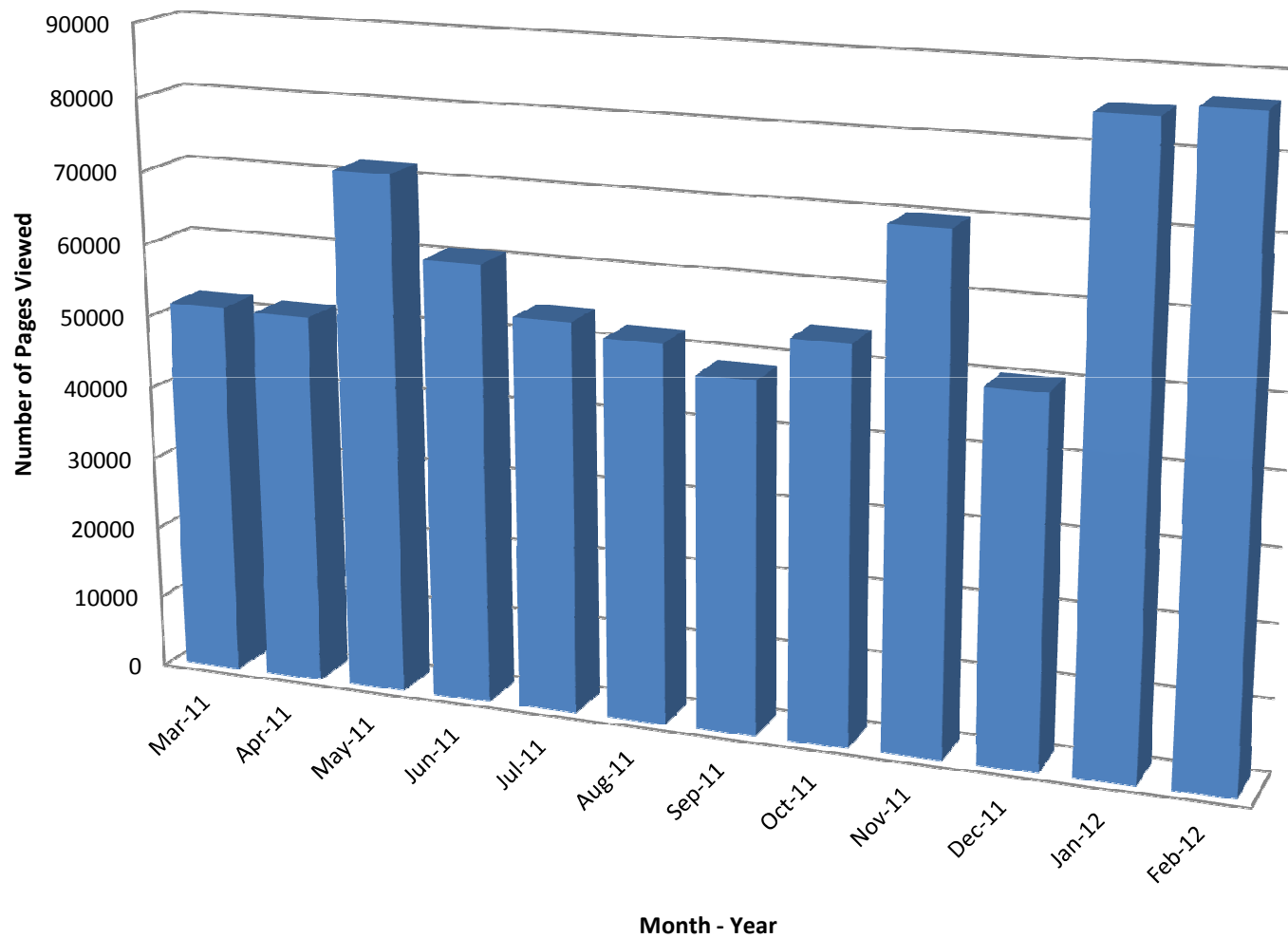
Provision and Usage of Data



- Full public access via website, database and email air quality bulletins;
- Local Air Quality Management – local authorities, SEPA, consultants;
- Provision of air quality information to SEWeb – web mapping;
- Distribution of annual brochure and project report;
- Students and academic researchers;
- Data source in Scottish Environment Statistics;
- Daily Air Quality Indicator
- Know and Respond Service

Boundaries Between Index Points for Each Pollutant						
Band	Index	Ozone	Nitrogen Dioxide	Sulphur Dioxide	PM2.5 Particles	PM10 Particles
		Running 8 hourly mean	hourly mean	15 minute mean	24 hour running mean	24 hour running mean
		µgm ⁻³	µgm ⁻³	µgm ⁻³	µgm ⁻³	µgm ⁻³ (Grav. Equiv.)
Low						
	1	0-33	0-66	0-88	0-11	0-16
	2	34-65	67-133	89-176	12-23	17-33
	3	66-99	134-199	177-265	24-34	34-49
Moderate						
	4	100-120	200-267	266-354	35-41	50-58
	5	121-140	268-334	335-442	42-46	59-66
	6	141-159	335-399	443-531	47-52	67-74
High						
	7	160-187	400-467	532-708	53-58	75-83
	8	188-213	468-534	709-886	59-64	84-91
	9	214-239	535-599	887-1063	65-69	92-99
Very High						
	10	240 or more	600 or more	1064 or more	70 or more	100 or more

Website Hits



Daily Air Quality Index – Thresholds of Bands



Boundaries Between Index Points for Each Pollutant

Band	Index	Ozone	Nitrogen Dioxide	Sulphur Dioxide	PM2.5 Particles	PM10 Particles
		Running 8 hourly mean	hourly mean	15 minute mean	24 hour running mean	24 hour running mean
		µgm ⁻³	µgm ⁻³	µgm ⁻³	µgm ⁻³	µgm ⁻³ (Grav. Equiv.)
Low						
	1	0-33	0-66	0-88	0-11	0-16
	2	34-65	67-133	89-176	12-23	17-33
	3	66-99	134-199	177-265	24-34	34-49
Moderate						
	4	100-120	200-267	266-354	35-41	50-58
	5	121-140	268-334	335-442	42-46	59-66
	6	141-159	335-399	443-531	47-52	67-74
High						
	7	160-187	400-467	532-708	53-58	75-83
	8	188-213	468-534	709-886	59-64	84-91
	9	214-239	535-599	887-1063	65-69	92-99
Very High						
	10	240 or more	600 or more	1064 or more	70 or more	100 or more



Asthma, other breathing problems or a heart condition?

KR
Know&Respond
Scotland

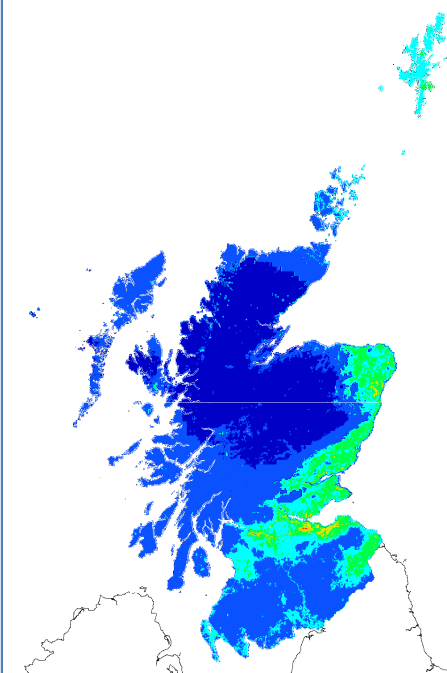
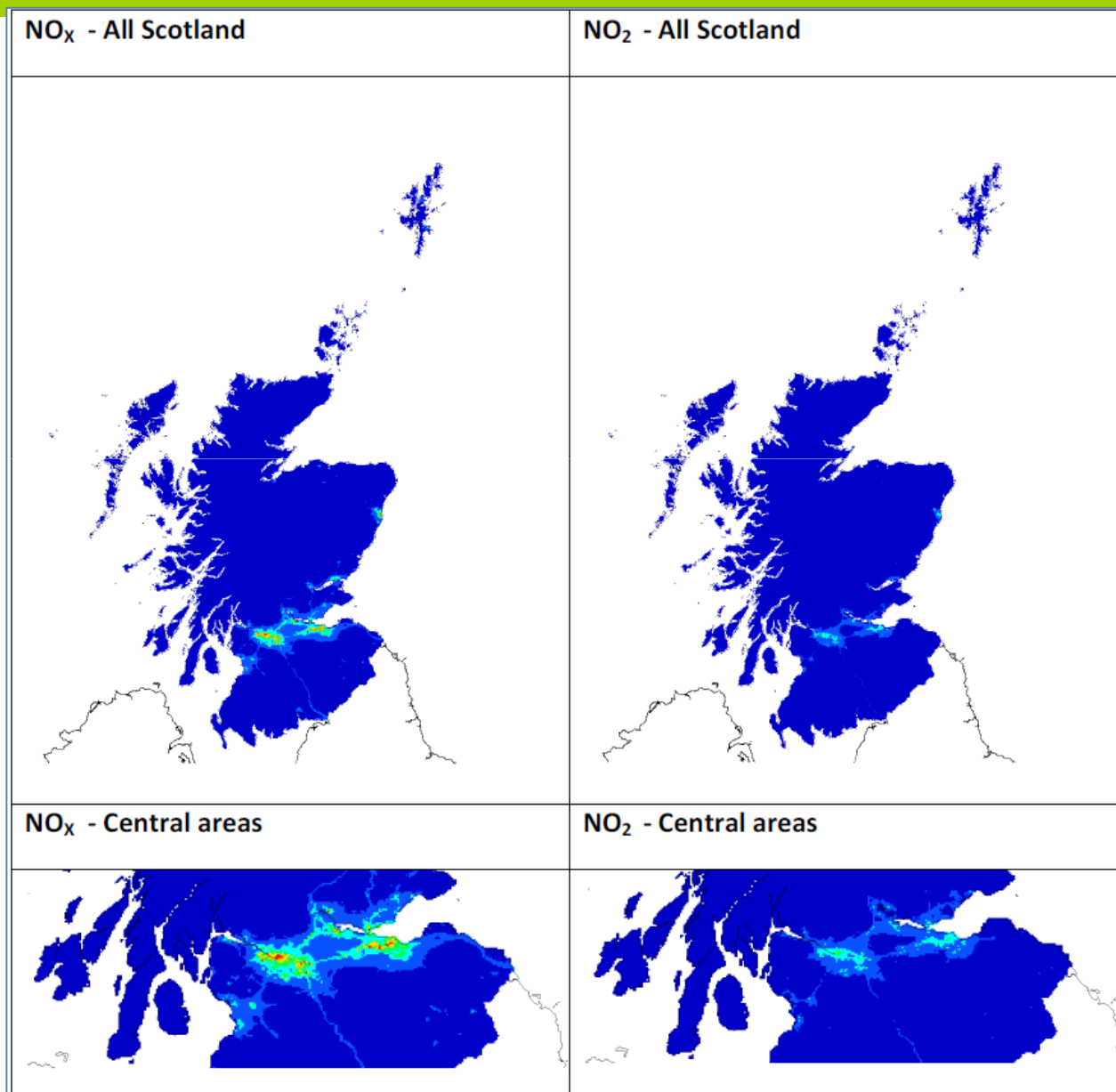
Get FREE alerts when poor air quality is forecast for the day ahead.

Affected by air pollution?
Hazy about venturing out?

Visit www.scottishairquality.co.uk/know-and-respond
to register and get FREE alerts for you or people in your care

The advertisement features a stylized landscape with green hills and a blue sky. A large white cloud contains the main headline. Below it, a smartphone screen displays the 'KR' logo and service details. To the right, another cloud contains a question about air pollution. At the bottom, a red arrow points to the website URL, and a small red tractor is visible on a path. The background includes stylized smokestacks and a plaid pattern on the hills.

Maps of Air Quality



PM₁₀

Air Quality in Scotland

www.scottishairquality.co.uk

Tuesday, March 29, 2011
[Low Graphics Mode](#)

Home Current Levels About Air Quality Maps **Data** Publications LAQM Emissions Mobile Web Forum

Search

Back to Data Section

- Introduction
- Data definitions
- Summarise Data
- Smooth Trend
- Time Variation
- Trend hour weekday plots
- Trend decomposition plots
- MannKendall
- Time Plot
- Trend Level Hour

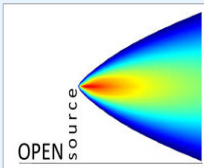
Introduction to Openair

Openair provides free, open-source innovative [data analysis tools in R](#); a free and open-source programming language designed for the analysis of data. The tools, documentation and other resources are available through the [openair website](#). The powerful graphing capabilities of openair have been applied here to allow complex and innovative analysis of current and archived air pollutant to be readily undertaken.

Many of the tools benefit from a high volume of data. However the value of the tools is in being able to apply an additional ('conditioning') variable such as splitting plots out by different time periods (hour of the day, day of the week, month etc). In these cases, the volume of data available for each category may become significantly lower than plotting the entire data series up. It can also significantly increase the processing burden for the analysis and therefore the time required for the website to produce the plots. So if you've chosen a long time series, several sites or to plot them by hour of the day, please be patient.

Currently this website provides a subset of the complete functionality of Openair, focussing on those tools that do not require met data in order to run. However the [openair website](#) contains a full description of all functions as well as downloads and guidance to help users apply the tools to their own data.

In addition to using these online tools to analyse and review automatic data from the Scottish air quality network, the user can also download the data as an R object, suitable for importing straight into R for further analysis. In this way, the user can select and preview the data desired using the online tools prior to downloading it for further analysis in the R environment.



Links About this Website Members Login

This site is hosted and maintained by [AEA](#)



Air Quality in Scotland

www.scottishairquality.co.uk

Home Current Levels About Air Quality Maps **Data** Publications LAQM Emissions Know & Respond Mobile Forum Children's Pages

Search

Back to Data Section

- Introduction
- Data definitions
- Summarise Data
- Smooth Trend
- Time Variation
- Trend hour weekday plots
- Trend decomposition plots
- MannKendall
- Time Plot
- Trend Level Hour

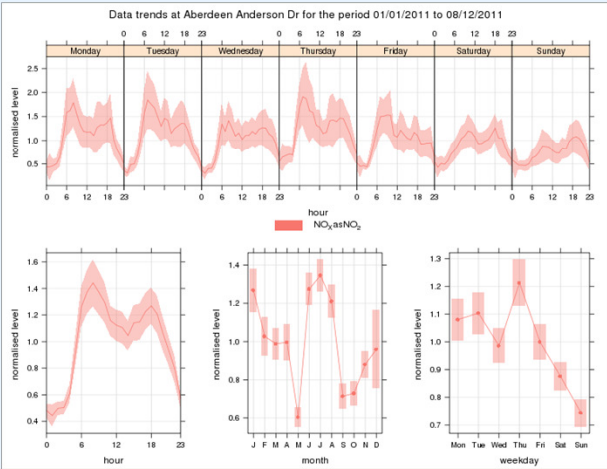
Your Openair Plot

Your 'Time Variation' Openair output has been generated and is shown below.

[Return to search options](#)

- [Download the data used for this chart as a CSV file](#)
- [Download R data object for this chart](#)
- [Download R command line for this chart](#)
- [Download chart \(Right Click / Save As...\)](#)
- [Print this chart](#)

Data trends at Aberdeen Anderson Dr for the period 01/01/2011 to 08/12/2011



hour
NO₂ as NO₂

hour month weekday

Recent Publicity of the Scottish Air Quality Database



- BBC Scotland Coverage;
- ENDS Report;
- Air Quality Bulletin;
- Defra's Review of Air Quality Communications Report
- Know and Respond Publicity Materials



Highlights of the planned developments of the SAQD during 2012



- Continued development of the network;
- Enhancement of Open Air functionality on SAQD;
- LSO training;
- Enhancement of LAQM pages to include LAQM R&A documents, guidance and examples of good practice;
- INSPIRE

Thank you for Listening