Global Challenge Network on Ozone – 1st Workshop

Royal Society of Edinburgh, 1st of May 2013

Summary report & actions

1. Workshop summary

The first workshop of the Global Challenge Network on Ozone was attended by 24 participants from 16 different organisations. After a short introduction to the workshop by the network coordinator (see ANNEX A for the full programme), the focus was on all participants presenting an overview of the ozone related research conducted within their organisations. Participants highlighted current research and ongoing work, as well as giving first indications of future priorities and challenges. After a lunch break, the three topic champions for observations, modelling and effects provide short overviews on wider ozone-related activities, including reflections on international activities e.g. in the frame of the United Nations Economic Commission for Europe (UNECE) under the Convention on Long-range Transboundary Air Pollution and ongoing EC FP7 and Defra & NERC funded research projects. There were already common themes and challenges emerging from the introductory round and the topical presentations, which will be highlighted in the workshop outcomes and actions. All presentations are made available on the network website.

Following the presentations, four breakout groups were formed to identify and elaborate on the main areas the network should focus on, taking into account the following guiding questions:

"What can the network do? Identifying gaps and steps forward ...

- *... towards integration and synthesis of research & evidence;*

- *... to bring together human and ecosystem health effects work;*

- *... to identify key research needs and future challenges."*

Each group reported back and the consolidated outcomes are summarised below. The workshop was concluded with an outlook on next steps, actions and a tentative work plan for the next few months, including the trawl for suitable dates for a second, consolidating workshop to be held in November. For this second workshop, York was identified as a suitable location and University of York and SEI-York agreed to look into hosting the event.

2. Key outcomes

The detailed feedback from the breakout groups can be found in ANNEX C, with the main steps identified as:

- extending the network by including more partners: a.s.a.p. *(Stefan lead)*

- website with group profiles & document repository, facilitating exchange

- engaging with other events and networks/activities for synergies

    o 2nd consolidating workshop: autumn 2013

    o smaller meetings on specific topics: spring 2014

- aiming at paper writing & developing joint research grant applications

    o Policy briefs: first set following 2nd workshop?

- Review papers/position papers: spring/summer 2014

3. Actions

3.1 Network infrastructure and composition

- Circulating 1st workshop notes & presentations to the network *(Stefan)*

- Circulating Doodle for 2nd workshop timing *(Stefan)*

- Developing draft overview notes on topics observations, modelling, effects *(topic champions with input from all)*

- Website development & group profiles *(CEH & all)*

- Increase the interaction with STFC staff (e.g. Damien Weidmann, Brian Kerridge - remote sensing group at RAL, Richard Siddins, Georgina Miles - earth observation) *(Stefan & Kevin)*

- Explore interactions involving STFC large data store (Victoria Bennet) and fast computers (e.g. JASMIN, CEMS) *(Stefan & Kevin)*

- Link to other GCN network activities and reports (e.g. env. radioactivity) *(Stefan)*

3.2 Networking activities

- Develop a scheme for funding applications from network participants for exchange visits, travel grants, STFC collaborations, joint field campaigns etc.

- Explore the possibility for summer/winter schools, which could be hosted by STFC (e.g. Abingdon)

- Develop a roadmap for horizon scanning, future scenarios (Stefan to contact Jeff McBride @ STFC), e.g. to explore a potential thematic workshop on future development of ozone concentrations

3.3 Specific activities

In addition to the above listed more immediate actions, the following longer term activities are proposed:

1. As one of the core interests under the "atmospheric measurements" heading, the development of advanced (fast, high resolution, ...) ozone sensors has been highlighted. A key requirement for this is to precisely define what the community needs are (How fast? How accurate? How cheap ? etc.) for sensor developers and researchers to converge on proof-of-concept studies and ultimately products that are useful and used. A proposed activity for the network is the development of a requirements profile for new ozone sensors, led by the "atmospheric measurements" topic champion (**Mhairi Coyle**) in consultation with the network participants in the course of the coming months.

2. A second core activity for the next 6 months will be to extend the network, including other groups in the UK and beyond. This will include the development of an 'activities' portfolio for the network (e.g. exchange/travel grants, support for joint field campaigns and training activities, such as summer/winter schools). *(Lead: Stefan Reis, with support from all network participants)*

Proposals for other areas to be developed (including lead contributors) are most welcome!

4. AOB/Next meeting

The 2nd workshop of the network is tentatively planned in **late October/early November 2013** and colleagues from SEI and the University of York have kindly offered to host this workshop in York. Details on timing and dates to follow after completing the following DOODLE poll by mid June 2013: http://www.doodle.com/67nvxsninr4kv76b

ANNEX A: Programme

Start time	Activity	Lead
10:00	*Arrival & Coffee*	*--*
10:30	**Welcome and opening the workshop, plan for the day**	**Stefan Reis**
10:40	**Introductions/roundtable – all network partners** *~7 mins for each institution - please elaborate as well what priorities or main issues with regard to ozone you see for your group/institution in the next 3-5 years*	**Scott Jones**
12:30	**Where are we with tropospheric ozone ...**	
	... observations (sites, sensors, ...)	Neil Cape
	... modelling (space, time, scales, ...	Massimo Vieno
	... effects (health, crops, ecosystems, ...)	Gina Mills & Harry Harmens
	Short presentations & key questions - *5 min presentation and 5 min discussion each*	
13:00	*Lunch*	
13:45	**What can the network do? Identifying gaps and steps forward ...** ... towards integration and synthesis of research & evidence ... to bring together human and ecosystem health effects work ... to identify key research needs and future challenges *We intend to have 4 parallel group discussions for about an hour, followed by 15 min of two groups each sharing and discussing the outcomes; next, a plenary presentation of the outcomes from the consolidated groups will allow us to discuss and identify the key issues for the network and for the ozone research community. The detailed setup will be introduced on the day.*	**Scott Jones**
15:30	*Coffee*	
16:00	**Developing a work plan for the network (events, output, networking)**	**Stefan Reis**
16:20	**Wrap-up, next meeting and AOB**	**Stefan Reis**
16:30	*Workshop close*	

ANNEX B: List of Participants

	First Name	Surname	Organisation	Email
1	Judith	Agnew	STFC RAL	judith.agnew@stfc.ac.uk
2	Nick	Allen	NPL	nick.allen@npl.co.uk
3	William	Bloss	University of Birmingham	w.j.bloss@bham.ac.uk
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5	Neil	Cape	CEH	jnc@ceh.ac.uk
6	Lynette	Clapp	Defra	lynette.clapp@defra.gsi.gov.uk
7	Colin	Craggs	Air Monitors Limited	colin@airmonitors.co.uk
8	Julian	Dines	STFC / UKATC	julian.dines@stfc.ac.uk
9	Ruth	Doherty	University of Edinburgh	ruth.doherty@ed.ac.uk
10	Lisa	Emberson	SEI University of York	l.emberson@york.ac.uk
11	Zoe	Fleming	University of Leicester	zf5@le.ac.uk
12	David	Fowler	CEH	dfo@ceh.ac.uk
13	Colin	Gillespie	SEPA	colin.gillespie@sepa.org.uk
14	Harry	Harmens	CEH Bangor	hh@ceh.ac.uk
15	Mathew	Heal	University of Edinburgh	m.heal@ed.ac.uk
16	Fintan	Hurley	IOM	fintan.hurley@iom-world.org
17	*Scott*	*Jones*	*Mind-the-gap* *	*Scott@mind-the-gap.net*
18	Gina	Mills	CEH	gmi@ceh.ac.uk
19	Sarah	Moller	NCAS & Defra	sarah.moller@york.ac.uk
20	Ruth	Purvis	University of York / NCAS	ruth.purvis@york.ac.uk
21	Stefan	Reis	CEH	srei@ceh.ac.uk
22	Massimo	Vieno	CEH	mvi@ceh.ac.uk
23	Heather	Walton	King's College London	heather.walton@kcl.ac.uk
24	Oliver	Wild	Lancaster University	o.wild@lancaster.ac.uk

* facilitator

ANNEX C: Breakout group feedback

Notes from Discussion Group 1 *(Rapporteur: Gina Mills)*

Challenges

Scaling-up issues

- temporal (e.g. seasonal)

- spatial

Maps

- how "real" is the detail in e.g. 1 km maps?

Monitoring

- sensitivity vs. resolution (e.g. 1 Hz vs 10 kHz)

- portable, cheap monitors - will total oxidants do? (but health/vegetation exposure needs accuracy)

Links to be developed

- Citizen science - e.g. visible plant injury photographs sent in via ICP Vegetation web-page and iphone App (to be developed by spring 2014)

- simple tools, e.g. "dongle" in computer/laptop to sense ozone exposure

- electrochemical sensors (but: interference with other gases, temperature, rel Humidity), size issues

- human health monitoring

- develop collaborations abroad (e.g. China)

- Explore if ship/aircraft ozone measurements can be developed, e.g. collaboration with CARIBIC (http://www.caribic-atmospheric.com/)

- Develop long-term funding strategies for ozone research

Notes from Discussion Group 2 *(Rapporteur: Lisa Emberson)*

What do we want the network to do? Facilitate knowledge exchange…but need to find a common focus

…could this be surface exchange, since this integrates across the different communities present??

Deposition velocity inter-comparison (for atmosphere-ecosystem interface)….and to use improved ozone concentrations estimates with *personal exposure monitoring* for human health assessments

- How to find the ozone data to test models…..perform research, e.g.

    o BADC http://badc.nerc.ac.uk/

    o UK Air (Defra website) http://uk-air.defra.gov.uk/

    o Airbase (EU community, JRC ISPRA) http://www.eea.europa.eu/data-and-maps/data/airbase-the-european-air-quality-database-7

- ….how to find the data you are looking for within these sites? Could the network provide guidance on this?

- Database of model algorithms and parameterisations…..land-cover (Gary Hayman report + Met Office UKCA Fiona O'Connor)

- Trends of O3 concentrations at specific-sites…how to use global models to inform and help understanding in O3 trends at a particular site (which they struggle with) and the global trends (which they do well)…how to bridge the gap, couple lidar/radiometer (O3 height profiling) with regional scale modelling/measurement networks….connecting to the two

- Educational/training/capacity building….translating between scientific disciplines…scientific speed dating e.g. for PhD students but also 'in-depth' science…important to understand the context within which our specific scientific understanding sits…..could help identify future research needs and challenges…

- COST programme. Establish a 'COST O3' initiative to bring 'scientists together with policy makers'. Funded by EU. Connect stakeholders to write papers and proposals targeted more towards policy solutions to pollution (and other related policy issues…integrated assessments).

- International reach? 'Future Earth' and other global connections….again identify projects, partners and 'link people'

Notes from Discussion Group 3 *(Rapporteur: Neil Cape)*

Synthesis and integration

Practical steps include active use of the web site by participants to provide detailed information on their research activities and aspirations, with links to key projects, reports and papers.

Need to work out what *can* be (reasonably) controlled, at UK, EU and global scales, and on what time scales, so that the effects of controls are viewed holistically. For example, local controls on NOx emissions may have localised health impacts in one direction, but different impacts on a regional scale; simulation modelling is needed.

Several issues were seen as common to both human health and vegetation effects:

- Definition of 'background' ozone – what is 'background' for a city is not what is regarded as 'background' for a remote site;
- A gap in the participants of the network was identified - biochemical expertise to identify markers of exposure to ozone;
- Measurement and modelling on relevant spatial scales, e.g. personal monitoring for human health, site-based monitoring for vegetation;
- Acute exposure effects have driven effects-based research to date (ozone episodes, peak concentrations), but long-term exposure to 'background' concentrations is now seen as important for both humans and vegetation. For population-based health, such effects may be demonstrable soon; for vegetation there is already evidence of slow and subtle changes in species composition without any effect on gross biomass production. On the positive side, it may be easier to model long-term changes in 'background' ozone relevant to chronic effects than it is to model the intensity and duration of acute episodes;
- There are common issues over thresholds for effects, and appropriate metrics to use to assess exposure – correlations with other pollutants or environmental stresses almost certainly modify simple exposure-effect relationships;

Challenges

The main challenge for research funding is the attitude of policy makers to ozone. In what priority order is ozone considered - climate change (greenhouse gas), human health, or ecosystem services? The perception is that human health concerns are driven first by PM, then NO_2, and only then ozone. If long-term effects of ozone on (human) populations are significant, the role of ozone will need to be moved up the agenda. It was noted that HTAP (UNECE Task Force on Hemispheric Transport of Air Pollution) is considering impacts on human health, i.e. how transboundary pollution, including ozone, may lead to human health impacts in receptor regions – this is similar to the approach taken for Critical Loads for acidity and nitrogen, but on a bigger scale.

Notes from Discussion Group 4 *(Rapporteur: Colin Craggs)*

Quality of Data

- Monitoring

    o Quantity

    o Quality

- o Monitoring of other Pollutants which impact Ozone concentrations

- o Cross correlation of Monitors

- o Data Format, Monitoring compatible with Modelling?

What/Who's Missing?

- Satellite measurements

- LIDAR Data

- BADC (British Atmospheric Data Centre)

    - o Historic Data

- Calibration of Ozone Pre-cursor measurement

Data Dissemination

- Is data produced by numerous organisations used to its full potential

    - o Liaison with other organisations to compare project with (say) background data

    - o How can Networks help us?

What's Needed.....?

- Fast Ozone Monitors?

    - o Better than 1Hz for Fluxes (10 to 20Hz preferable)

- Low Cost Sensors

    - o High Volume to prove Modelling

- More use of bio-monitoring methods for assessing effects of Ozone on Plants etc.

- Policy makers and Scientists to communicate more........

The Future.....

- Ozone peaks decreasing, but baseline readings increasing........

- Interactions between Air Pollution and Climate Change.....