

## Project Experience

### Coordination of the LRTAP Convention's ICP Vegetation

**Funded by:** Defra, UNECE

**Date:** 2014 - 2017 • **Contract value:** £450k

The ICP Vegetation is an International Cooperative Programme on the effects of air pollution on crops, trees and natural vegetation. Reporting to the UN's Convention on Long-range Transboundary Air Pollution, the ICP Vegetation collates field evidence of the damaging effects of air pollution and develops and applies risk assessment methodology for application in more than 50 contributing countries.



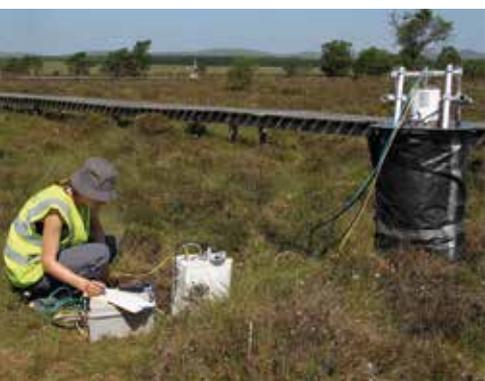
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### Support for National Air Pollution Control Strategies 2012-2015

**Funded by:** Defra

**Date:** 2013 - 2017 • **Contract value:** £2.1m

This project provides support for the development of air quality policies in the UK. It includes further development and application of modelling tools linking emissions, spatial patterns, dispersion, impacts, and costs of control options, and explores the impacts of a range of policy developments and cost-effective strategies to improve future air quality.



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## Contact

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### UKEAP

**Funded by:** Defra

**Date:** 2012 - 2016 • **Contract value:** £3.7m

CEH and Ricardo Energy & Environment operate the UK Eutrophying and Acidifying Atmospheric Pollutant contract for Defra. CEH manages the National Ammonia Monitoring Network, the Acid Gas and Aerosol Network and the Auchencorth Moss EMEP Supersite. CEH provides science support and interpretation for the measurements made in the national and international context.

### eLTER

**Funded by:** EC Horizon2020

**Date:** 2015 - 2019 • **Contract value:** €5,000k

The purpose of the project is to advance a European network of 162 Long-Term Ecosystem Research sites across 22 countries. A number of CEH sites are involved: Whim Bog, Auchencorth Moss, Cairngorm, Moor House and Wytham. Particularly Whim Bog allows experiments on nitrogen deposition on ecosystems whereas Auchencorth Moss is an experimental atmospheric observatory with research on carbon, greenhouse gases, aerosol composition and reactive gases. Data is provided from these sites and researchers are invited through the programme to have access.



## Understanding and mitigating air pollution – monitoring, measurements, modelling and effects



### Challenges

Air quality has an impact on many aspects of our lives affecting our health, the productivity of our crops and quality of our environment. The interactions of the air with the land is an important driver of climate which has implications for businesses and policymakers. These interactions are complicated, so it is necessary to monitor, measure and model the air around us to give the best understanding to enable the development of cost effective mitigation strategies by businesses and governments.

### Summary

CEH's unique data holdings, long-term monitoring networks, experimental facilities and models underpin its international leadership in air quality interactions. Its research supports UK, European, and global policies and businesses to mitigate the environmental and health impacts of pollution, land use and climate change. The CEH air pollution team work at a variety of scales from individual plant species through to international transboundary issues. Their partners range from individual organizations looking for optimal understanding and evidence based solutions to problems through to national governments looking to set up air quality monitoring and measurement systems.

### Services

- Modelling pollutant processes and transport
- Measuring air pollutants and air quality
- Understanding effects of air pollution
- Air pollution experimental facilities



## SERVICES

### Modelling pollutant processes and transport

CEH pollution models are state-of-the-art tools incorporating knowledge and evidence from long-term atmospheric and ecosystem measurements and detailed process and effects studies. They facilitate decision making for the control and mitigation measures needed to protect human health and the environment from the detrimental effects of air pollutants. These include modelling pollutant processes and transport, quantifying concentrations and deposition, and environmental fate of pollutants. The models operate at different scales - global, regional, or local depending on the issue in question. CEH models also examine the impacts of air pollution on health, food security and ecosystems as well as completing Integrated Assessment for scenario testing.



### Measuring air pollutants and air quality

Low and high temporal resolution atmospheric gas and particle composition measurement capabilities can be integrated with background scientific support and model validation.

Field measurements can be undertaken in all environments from Antarctica to urban centres. CEH operates samplers and instrumentation in measurement campaigns or long-term partnership to deliver measurements across a range of pollutants from inorganic and organic gases, particulate matter composition, wet deposition, greenhouse gases, heavy metals (including mercury) and trace reactive nitrogen ( $\text{NO}_x$ ) to understand the atmosphere's chemical climate. Scientists work in partnership with customers to make atmospheric measurements with a focus on rigorous state of the art solutions.



## Understanding effects of air pollution

CEH has over 40 years experience of developing an understanding of air pollution effects. It operates UK monitoring networks of atmospheric composition and has developed state-of-the art pollutant exposure facilities to test the effects of realistic air pollution concentrations on food security and ecosystems in current and future climates. In so doing, CEH has established a team of internationally acclaimed experts who have advised all types of organisations, including International Conventions, the European Union, National governments and conservation agencies on air pollution effects. CEH scientists also work at the local scale, advising farmers and land managers on potential impacts and how these can be avoided. Through this scientific understanding and its application to real life situations, CEH can work with any organisation to understand potential air pollution effects and help develop efficient solutions to assist in mitigating them.



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## Air pollution experimental facilities

CEH has state-of-the-art experimental facilities to investigate the impacts of air pollution on vegetation. These facilities have the capability and flexibility to deliver a wide range of pollutant concentrations, allowing testing of impacts and processes on many vegetation types and ecosystems including trees, grasslands, wetlands and crops. Different pollutant and climate change components can be combined to allow predictions of pollution impacts and interactions in a changing climate. The experimental systems are used to quantify impacts and feedbacks between elevated ozone, nitrogen deposition, climate change and above and below ground ecology.



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