

Biogeochemical cycles

## WHY: ARE BIOGEOCHEMICAL CYCLES IMPORTANT?

**BECAUSE: THEY ARE FUNDAMENTAL DRIVERS OF LOCAL, REGIONAL AND GLOBAL AIR POLLUTION, AND CLIMATE CHANGE**

**Human activities impact on all Earth's natural biogeochemical cycles, which in turn affect climate change, ecosystem services, biodiversity and human health.**

**A full understanding of biogeochemical cycles and natural feedback processes is essential to establish how they affect the biosphere, on which humankind depends. Determining how they might change through man's activities and identifying what mitigation and adaptation measures we have to put in place are challenges that we all face.**



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### DELIVERING IMPACT

CEH manages large-scale, field manipulation systems studying carbon and nitrogen fluxes and budgets, greenhouse gas emissions, changes in species composition and chemistry and interactions with biotic and abiotic stresses.

CEH coordinates the International Cooperative Programme on Effects of Air Pollution on Natural Vegetation and Crops, focusing on the impacts of ozone pollution and atmospheric deposition of heavy metals and nitrogen.

CEH manages one of two UK EMEP supersites monitoring air pollutants, contributing to a Europe-wide programme under the UN Economic Commission for Europe's Convention on Long-Range Transboundary Air Pollution.

CEH continues to co-develop the Joint UK Land Environment Simulator (JULES) that integrates biogeochemical cycles into coupled climate-land surface models.

CEH led Defra's Review of Transboundary Air Pollution (RoTAP) to inform future air quality policies.

### FUTURE CHALLENGES

To define the complex interactions between air pollution and climate change and their impacts on atmospheric chemistry, ecosystem services (e.g. carbon storage, biodiversity, food security, flood prevention) and feedbacks to the Earth's climate system.

To improve the representation of biogeochemical cycles within Earth system models.

To develop and assess mitigation measures for nitrogen and ozone pollution and their relationships with climate change.

