

Our research facilities

NERC-funded, world-leading facilities underpin and enhance the delivery of excellent environmental science and are available for the environmental science community to use. Our funding enables NERC researchers to undertake projects into issues currently facing the environment on a global scale. NERC facilities contribute to nearly every Sustainable Development Goal, and showcase how they are working towards NERC Responsible Business Statement and the UKRI Environmental Sustainability Strategy.



The NERC tree includes

- Atmospheric Measurement & Observation Facility (AMOF)
- NERC Arctic Research Station
- British Ocean Sediment Core Research Facility (BOSCORF)
- Culture Collection of Algae & Protozoa (CCAP)
- UK EISCAT Support Group
- Field Spectroscopy Facility (FSF)
- Geophysical Equipment Facility (GEF)
- Ion Microprobe Facility (IMF)
- National Environmental Isotope Facility (NEIF)
- NERC EO Data Acquisition and Analysis Service (NEODAAS)
- NERC Environmental Omics Facility (NEOF)

The UN Global Goals for Sustainable Development (SDGs)



Atmospheric Measurement & Observation Facility

amof.ac.uk

3 Good health and well-being
3.3 Fight communicable diseases
 AMOF has supported two projects looking at the potential of droplets to spread of Covid-19. One looked at the production of droplets from singing and playing wind instruments, whilst the second looked at the spread of droplets within the environment of an operating theatre.

3.9 Reduce illnesses and death from hazardous chemicals and pollution
 A number of AMOF supported publications have looked at air quality/pollution with several focussing on the Chinese city of Beijing. One paper looked specifically at changes in the UK's air quality during the first Covid-19 lockdown.

7 Affordable and clean energy
7.3 Double the improvement in energy efficiency
 One publication supported by AMOF evaluated a natural building ventilation system, which requires less energy to run than traditional mechanical heating and air ventilation systems.

11 Sustainable cities and communities
11.5 Reduce the adverse effects of natural disasters
 Convective events can be responsible for both damaging winds and large accumulations of rain. One study supported by AMOF looked at the ability of an operational forecast model to predict such events.

11.6 Reduce the environmental impact of cities
 As mentioned above, AMOF supported a number of publications looking at air quality associated with cities.

13 Climate action
13.3 Build knowledge and capacity to meet climate change
 Methane is a more potent greenhouse gas than carbon dioxide, albeit one with a shorter lifetime in the atmosphere. AMOF has supported a number of papers dealing with measurements of its abundance. Clouds are known to play an important role in global climate, although there is still considerable

uncertainty as to their net effect. AMOF has supported research that aims to improve cloud representation in climate and forecast models.

15 Life on land
15.5 Protect biodiversity and natural habitats
 Ecosystems rely on insects for a number of vital functions, including pollination. However, the traditional method of monitoring populations using traps is labour intensive and can only provide information about diversity trends rather than overall abundance. AMOF is helping to improve this situation, using its radar capability to support the Biodar project. This is developing new ways to identify and quantify insect populations, and aims to use UK's weather radar network to derive wider-scale information.

17 Partnerships for the goals
17.8 Strengthen the science, technology and innovation capacity for least developed countries
 The AMOF-supported DACCIWA and African Swift projects are focussed on

atmospheric/weather impacts in Africa. Both involve partners from universities and national meteorological services in African countries.

Cape Verde Atmospheric Observatory (CVAO)

NERC Arctic Research Station

arctic.ac.uk

4 Quality education
4.7 Education for sustainable development and global citizenship
 Through support of the Arctic Live annual project, NERC Arctic Research Station raises awareness in schools across the globe through the Live-Skype lessons, connecting to researchers addressing issues relating to climate change and providing free resources.

12 Responsible consumption and production
12.2 Sustainable management and use of natural resources
 NERC Arctic Research Station contributes to knowledge on the impacts of misuse of ocean resources and pollution including plastic pollution.

13 Climate action
13.2 Integrate climate change measures into policy and planning
 The NERC Arctic Station is located in the fastest-warming part of the Arctic. All the terrestrial and atmospheric changes in the region, as well as the marine

changes, have direct and indirect consequences on the state of the Arctic Ocean, and in particular the Fram Strait, Greenland Sea and Barents Sea. Research conducted at the Station helps to build the picture of what is happening, how fast and why.

13.3 Build knowledge and capacity to meet climate change
 Station research and education raises awareness of the impacts of climate change on Polar regions.

14 Life below water
14.1 Reduce marine pollution
 The station has housed projects that assess the impacts of marine plastics.

14.2 Protect and restore ecosystems
 Station research feeds into decisions that are taken to ensure that any development of the oceans, in particular the Arctic Ocean, is sustainable.

14.3 Reduce ocean acidification
 Station research has included work on understanding ocean acidification.

13 Climate action
13.2 Integrate climate change measures into policy and planning
 Through stakeholder and public engagement BOSCORF increases awareness of environmental issues.

14 Life below water
14.1 Reduce marine pollution
 BOSCORF provides samples, analysis and data to assist with investigating pollution and microplastic distribution within the deep sea.

17 Partnerships for the goals
17.6 Knowledge sharing and cooperation for access to science, technology and innovation
 BOSCORF collaborates with national and international institutes to produce high quality scientific outputs and increase understanding of the deep sea environment.

Splitting a core

Culture Collection of Algae and Protozoa (CCAP)

ccap.ac.uk

2 Zero hunger
2.4 Sustainable food production and resilient agricultural practices
 CCAP conducts research into needs as a primary source of diet and as an alternative to land plant crops. Equally, microalgae are used in aquaculture, and they represent an important alternative to land crops. CCAP is also a secure depository for commercially valuable algal strains and holds several strains used in current food research, currently being trialled for use as nutritious, sustainable and natural foods.

4 Quality education
4.7 Education for sustainable development and global citizenship
 CCAP promotes awareness and protection of the environment through research, open-source research publications, university teaching, courses and training of masters and PhD students.

6 Clean Water and Sanitation
6.1 Adequate and equitable sanitation and hygiene
 CCAP encourages and supports improvements

in water quality and quantity. Algae have many qualities which make them suitable for wastewater treatment, including their capacity to uptake nutrients responsible for eutrophic events, heavy metals, and emergent contaminants including microplastics and pharmaceuticals.

13 Climate action
13.3 Awareness raising on climate change
 CCAP participates in research projects that raise awareness of climate change and help mitigate the impact. These projects use algae as a resource with a limited environmental footprint capable to produce food, pharmaceuticals, bioplastics and biofuels; from snow algae isolated from Polar regions.

14 Life below water
14.3 Reduce ocean acidification
 CCAP's strains are the key to investigate the effects of ocean acidification and to better understand the effect of these organisms in the environment helping with the conservation of biodiversity and sustainability of the aquatic environment.

14.7 Increase the economic benefits

from sustainable use of marine resources
 CCAP supports the development of seaweed farming best practices in developing countries through the GCRF Global Seaweed Star programme, providing training on seaweed cultivation and seaweed diseases.

14.4 Increase scientific knowledge, research and technology for ocean health
 CCAP is the most diverse biological resource centre for living strains of microalgae, macroalgae, cyanobacteria, protozoa and algal pathogens. Microalgae are the main primary producers in aquatic environments, some species are very important as they form blooms that influence global climate through calcium carbonate sequestration. Some microalgae species form Harmful Algal Blooms (HABs), capable of killing fish and causing human disease after consumption. Some symbiotic species play a pivotal role in the biology of reef-building corals.

17 Partnerships for the goals
17.16 Enhance global partnerships for sustainable development
 CCAP was a partner in the project 'Building

Scientific and Technical Capacities in Phytoecology in Colombia' providing training in seaweed and microalgae, from taxonomy to cultivation aiding in the establishment of a new Master course in phyecology, strengthening the knowledge of applied phyecology in Colombia.

Culture collections

Ion Microprobe Facility

ed.ac.uk/people/chemistry/about/facilities/ionmicroprobe

3 Good health and well-being
3.9 Reduce illnesses and deaths from hazardous chemicals and pollution
 IMF research includes work on the impacts of volcanic ash on respiration

6 Clean water and sanitation
6.3 Improve water quality by reducing pollution
 Groundwater nitrogen contamination is driving a crisis in human health and wider environment. IMF are measuring nitrogen in groundwater to help understand the legacy nitrate in natural environments.

7 Affordable and Clean Energy
7.1 affordable, reliable, modern energy sources
 Critical raw materials for batteries include lithium. IMF are actively involved in the LIFE (Lithium for Future Technology) research consortium measuring lithium isotopes to understand lithium cycling in the natural environment. Rare earth elements are also key to the energy transition and we are measuring REE partitioning behaviours in a range of experimental and natural products.

11 Sustainable cities and communities
11.5 Reduce the adverse effects of natural disasters
 IMF has carried out work to assess the impacts of natural disasters.

13 Climate action
13.1 Strengthen resilience and adaptive capacity to climate-related hazards
 Ocean acidification is a massive threat to life on planet Earth. Through high resolution analysis of a range of key elemental ratios as well as oxygen and boron isotopes in corals and foraminifera IMF aim to improve understanding of ocean chemistry in the past, present and future. Conodont analyses have helped reconstruct past ocean temperatures.

14 Life below water
14.2 sustainably manage and protect marine and coastal ecosystems
 Work on salmon migration, tuna and whelks to deliver sustainable fish stocks.

15 Life on Land
15.1 Sustainable use of ecosystems
 By analysing a range of natural samples including taphra and horse teeth IMF are investigating the impact of fluorine and

Ion Microprobe Facility

analyses also help understand atmospheric pollution following eruptions as well as modelling of volcanic and magmatic processes.

UK EISCAT Support Group

escat.ac.uk

9 Industry, innovation and infrastructure
9.1 Develop sustainable, resilient and inclusive infrastructures
 EISCAT research supports the resilience of infrastructure to space weather through the measurement of ionospheric electric currents and the improved understanding of short-term and long-term influences on satellite drag.

13 Climate action
13.1 Strengthen resilience and adaptive capacity to climate-related disasters
 EISCAT studies the effects of long-term change and potential climate effects on space weather.

EISCAT 30, Skibotn, Norway

4 Quality education
4.7 Education for sustainable development and global citizenship
 By supporting the latest research and outreach, GEF contributes to promoting and disseminating knowledge.

7 Affordable and clean energy
7.A Promote access to research, technology and investments in clean energy
 GEF supports projects related to geothermal energy research in Iceland and at the East African Rift.

9 Industry, innovation and infrastructure
9.1 Develop sustainable, resilient and inclusive infrastructures
 The science that GEF supports contributes to development of infrastructures for science based monitoring of changing environments. GEF works with industry suppliers supporting the development of innovative low power low cost, lower

impact equipment for environmental monitoring necessary to support societies increasingly reliant on technologies.

11 Sustainable cities and communities
11.5 Reduce the adverse effects of natural disasters
 The support the Facility provides leads to a better understanding of seismic and volcanic hazards which can be incorporated into design of resilient buildings and policies for mitigation and response to natural disasters.

GEF equipment surveying Breiðamerkurkjall, Iceland

Field Spectroscopy Facility (FSF)

fsf.nerc.ac.uk

2 Zero hunger
2.4 Sustainable food production and resilient agricultural practices
 FSF directly supports a number of projects aiming to improve crop health, yield monitoring and forecasting. Leveraging earth observation data for this purpose can help to improve efficiency and reduce waste within the agricultural sector.

3. Good health and well-being
3.9 Reduce illnesses and deaths from hazardous chemicals and pollution
 FSF's full-column atmospheric monitoring system will monitor air quality and GHGs within cities. As part of the DARE-UK project, it is currently monitoring London. High spatial and temporal resolution to this monitoring will help identify key causes of pollution or carbon emission, and this data may be used to influence policy changes to reduce harm to people and the environment.

9. Industry, innovation and infrastructure
9.5 Enhance research and upgrade industrial technologies

FSF connects manufacturers of EO equipment with the academic community, improving the design and performance of sensors commonly used within remote sensing. FSF also works with the user community to find novel methods for deploying sensors and sensor networks.

13. Climate Action
13.2 Integrate climate change measures into policy and planning
 FSF research raises awareness of the impacts of climate change, for example work supporting ecological monitoring regarding climate change in Antarctica, with projects looking at penguins, seals and snow algae have been reached billions of people worldwide in the press.

13.3 Build knowledge and capacity to meet climate change
 FSF's instrumentations allows key insights into the changing environment and underpins the data required to act. A large proportion of the projects supported by FSF use instruments to characterise ecosystems so that they may be directly monitored from satellite imagery to detect how climatic changes are affecting the

earth's vegetation and resources. FSF instrumentation has also been used to investigate wildfires, monitor glacial recession and measure desertification. FSF directly contributes to the scientific effort to monitor impact of climate change on earth. FSF's SAS network allows greenhouse gas monitoring over large areas and at very high temporal resolution to be achieved, adding to the understanding of how cities fit into the UK's carbon budget.

14 Life below water
14.4 Increase scientific knowledge, research and technology for ocean health
 FSF's instrumentation allows key insights into marine ecosystems, with spectral observations supporting upscaling of ecological research on topics including biodiversity, ecophysiology, plant stress and community structure.

15 Life on land
15.1 Conserve and restore terrestrial and freshwater ecosystems
 FSF's instrumental contributions to research on terrestrial ecosystems. As with 14 a

(above), this includes spectral observations supporting upscaling of ecological research on biodiversity, ecophysiology, plant stress and community structure. Additionally FSF's terrestrial research includes soil composition, forest monitoring and land use change biomass mapping.

Vanuatu

National Environmental Isotope Facility

isotopesuk.org

2 Zero hunger
2.2 Double the productivity and incomes of small-scale food producers
 The CoSoIL-UK free, publicly available tool was developed through NEIF, and allows users to calculate soil production rates and the sustainability of different soils (visit <https://github.com/angeles/cososil>).

2.4 Sustainable food production and resilient agricultural practices
 NEIF capability underpins studies of soil organic matter and its role in the primary elemental (C, N, P) cycles necessary for agricultural production.

6 Clean water and sanitation
6.1 Safe and affordable drinking water
 NEIF infrastructure and expertise underpins projects examining the freshwater systems which human communities depend for survival. This includes monitoring water quality to mitigate impacts on vulnerable communities.

7 Affordable and clean energy
7.A Promote access to research, technology and investments in clean energy
<https://github.com/angeles/cososil>

NEIF leads internationally in isotope geochemistry for this purpose, for example innovative ways for abandoned mines to make a major contribution to the Green Energy Transition (Publication Banks et al., Int. J. Coal. Geol. 2020). NEIF has helped develop the CryoGas instrument (a mass spectrometer for tracing greenhouse gases) to help in monitoring injected CO₂ highlight leakages and interactions with the subsurface, and testing the reliability of the CO₂ aquifer.

9 Industry, innovation and infrastructure
9.2 Promote inclusive and sustainable industrialization
 NEIF works with industry to deliver new, innovative solutions. NEIF supports multiple CASE postgraduate students each year. Industrial partners (e.g. Coliden, ScotGold, Rio Tinto, Assmang) have been involved in these projects to establish sustainability in exploration and processing systems, improving efficiency and 'greening' industrial practices.

13 Climate action
13.3 Build knowledge and capacity to meet climate change

NEIF provides the empirical data that enables academics to understand the climate system, model future climate scenarios, pinpoint the most pressing threats to the wellbeing of this system, and identify the solutions with the best chance of success for the future. Enhancing public understanding of the science behind climate change is embedded in NEIF public engagement, particularly in seminars and talks on NEIF science and scientists.

14 Life below water
14.5 Conserve coastal and marine areas
 NEIF performs isotope analyses of flora and fauna in these delicate ecosystems to inform vital conservation and management activities. For example, NEIF has assessed threatened ray populations in the Bahamas region, through science that is central to conservation efforts.

15 Life on land
15.5 Protect biodiversity and natural habitats
 NEIF have developed a new isotopic tool to protect the Serengeti ecosystem. This tool can be used for preservation of these iconic systems, conducting the first ever work to

demonstrate migratory behaviour of the common bent-wing bat (*M. schreibersii*) throughout its range.

15.7 Eliminate poaching and trafficking of protected species
 NEIF have pioneered isotopic tools to support the world's most trafficked mammal, accounting for as much as 20% of all illegal wildlife trade. NEIF are leading a series of projects firstly through the NERC IAPETUS DTP to develop isotopic toolkits to understand provenance of these animals in an effort to reduce trafficking (cf. ivory trade).

Analytical equipment for measuring isotopes

NERC EO Data Acquisition and Analysis Service

nerc.eo.ac.uk

2 Zero hunger
2.4 Sustainable food production and resilient agricultural practices
 NEODAAS supports research into a sustainable aquaculture and natural fisheries.

6 Clean water and sanitation
6.6 Protect and restore water-related ecosystems
 NEODAAS provides capability to supply remote sensing data on inland waters.

6. Expand water and sanitation support to developing countries
 NEODAAS-supported research includes work on cholera risks.

13 Climate action
13.3 Build knowledge and capacity to meet climate change
 NEODAAS supports a variety of research which provides knowledge and addresses capacity to address climate change.

14 Life below water
14.2 Protect and restore ecosystems
 NEODAAS Capacity supports marine research cruises and other ocean science.

15 Life on land
15.2 End deforestation and restore degraded forests
 NEODAAS has supported the use of terrestrial aircraft overflights to monitor and research forests.

Delivering training on Artificial Intelligence

2 Zero hunger
2.4 Sustainable food production and resilient agricultural practices
 NEOF supports projects promoting food security through understanding the response of plants to climate change and improved productivity. NEOF uses omics to understand and manage the impact of agriculture on soils and invertebrates including pollinators.

6 Clean water and sanitation
6.3 Improve water quality, wastewater treatment and safe reuse
 NEOF's omics research methods have been used to assess water quality in rivers and drinking water distribution systems, and to monitor the microbiology of the wastewater.

11 Sustainable cities and communities
11.6 Reduce the environmental impacts of cities
 NEOF's research on urban green spaces contributes to mitigating effects of urbanisation on air quality.

14 Life below water
14.2 Protect and restore ecosystems
 NEOF's genomic tools and resources are used to understand multiple aspects of biodiversity and ecosystem function in marine ecosystems.

15 Life on land
15.9 Integrate ecosystem and biodiversity in governmental planning
 NEOF uses new technologies to quantify biodiversity and interactions among species, and support environmental solutions to halt biodiversity loss and make sustainable use of ecosystems within local communities.

Measuring bumblebee density

NERC Environmental Omics Facility (NEOF)

neof.nerc.ac.uk