ENVIRONMENTAL SCIENCE & CLIMATE CHANGE

DEMOKRITOS
NATIONAL CENTRE FOR SCIENTIFIC RESEARCH

WHO WE ARE

The Centre's strategic approach in the area of Environmental Technologies & Climate Change consists of world-class basic and applied R&D based on state-of-the-art computational, analytical and measurement expertise and infrastructures as well as design ofinnovative experimental techniques. Targeted research goals include:

- Studies of climate change through measurements and modelling of aerosol short-lived climate forcers, greenhouse gases and mitigation of their effects on a regional scale.
- Development of customized technology platforms for studying air quality and evaluate mitigation measures by providing detailed characterization of pollution sources, quantifying their contribution and their radiological and health impacts in different environments (urban, industrial, remote, etc), including indoors.
- Development of analytical protocols and risk assessment methodologies for aerosol species, heavy metals, dioxins and new POPs (Persistent Organic Pollutants) - Monitoring levels in the food chain, the atmosphere and human biological samples (blood and breast milk) in order to evaluate exposure, address public health issues related to POPs and assist policy making and regulation.

RESEARCH

Air Quality & Aerosols

Particulate matter chemical composition, Dioxins and PCBs in air and emissions, VOCs, source apportionment, atmospheric processes, optical properties, hygroscopicity and dynamics of particle size distribution

Climate Change

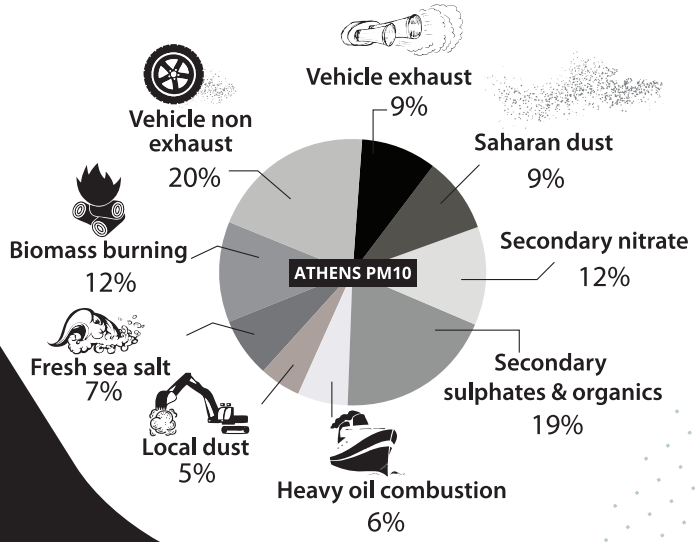
Short lived Climate forcers, Greenhouse gases, CTMs, Impacts on infrastructure and risk assessment

Radiological Hazard

Radioecology, global releases, data assimilation, radon, nuclear analytical techniques

Advanced Oxidation

Generation of reactive oxygen species by AOPs (Photocatalysis, γ-Radiation, Sonolysis) for air and water treatment, Photocatalytic building materials evaluation, Degradation of pollutants:
mechanistic aspects and transformation products, Standardization and management practices



Safety

Food, Materials, Air and Nanoparticle Micro contaminants, infrastructure & human reliability; quantitative risk assessment/management, Dioxins and emerging POPs

Health Effects

Inhalation toxicology, dose assessment for aerosol pollutants and health impact metrics for epidemiology, quantitative risk assessment/ management

Water Pollution

Dioxins, PCBs, Flame retardants and Emerging pollutants in water, Detection, occurrence and fate of cyanotoxins, Identification tools for new potential toxins, Regulations and accreditation of analytical Methods

EN 12341
ISO 1948:2010
ISO 12884:2000
EU 277/2012
EN 14902
ISO/IEC 17025
EU 1259/2011
EPA 1613

Protecting the Environmental & Public Health

Development – validation – application of instrumental methods of analysis for the determination of a wide range of environmental pollutants (ISO 17025)

Air Pollution PM2.5 /PM10 Gravimetric analysis (EN 12341), Dioxins and PCBs (ISO 1948:2010), VOCs PAHs (ISO 12884:2000), heavy and toxic metals (EN 14902), water soluble ions

Modelling Air Quality modelling for urban and industrial applications

Water Pollution Dioxins, PCBs (EPA 1613) and Emerging pollutants in surface and drinking water, Detection, occurrence and fate of cyanotoxins. Identification tools for new potential toxins, Regulations and accreditation of analytical methods

Radioactivity on food, air, water, materials and soil

Performance Evaluation of photocatalytic materials for air and water purification

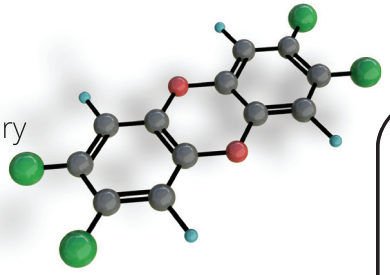
Dioxins and Perfluorinated compounds control in food and feed, according to European Regulations EU 1259/2011 and EU 277/2012

Helmos
Mountain Station
at 2314m
Find more data at
http://ebas.nilu.no

Infrastructures

Analytical Infrastructures

Radioactivity • Aerosol lab • Dioxins National Reference Laboratory • Air Pollution Chemistry lab • Mass Spectrometry unit • Organic micropolluntants analysis



Environmental Monitoring Stations

GAW/ACTRIS stations • Free Troposphere Helmos Atmospheric Aerosol & Climate Change Station • Athens Suburban Atmospheric Aerosol & Air Quality Station

Computational Infrastructure (Clusters – Nodes)

HPC cluster consisting of 98 CPUs theoretical performance of 66TFlops in single precision. Atmospheric pollutant dispersion and air chemistry, climate prediction, characterization of structure and transport properties of porous and composite media and biological membranes in atomistic scale

ISO 17025
Certified Analysis
of Cyanotoxins,
unique in Europe

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