The Department of Earth and Environmental Sciences aims at innovative scientific research on the functioning of geo- and ecosystems at different spatial and temporal scales, including the interaction between socio-economic aspects and bio-, litho-, hydro- and atmosphere. The department provides attractive and high-quality academic training at BSc, MSc and PhD level in the fields of bio-engineering, geology, geography and tourism. In addition, the department aspires to make a significant contribution to the scientific understanding of societal issues such as environmental pollution, food production, climate change, nature and landscape management, soil and water management, exploitation of underground resources, rural and urban development, international development collaboration and tourism.

Research profile

Research focuses on the fundamental understanding of the processes and interactions in the earth system, the interaction between society and its environment, the sustainable management of natural resources and the spatial dimension of human societies. Besides fundamental research, there are strong programmes on applied topics such as environmental pollution, the provision of raw materials and the exploitation of the subsoil, soil conservation, town planning and bio-economic aspects.

Keywords

Agricultural and food economics • global food supply chains • food security • biodiversity • bioenergy • biogeology • building materials mineralogy • Cenozoic stratigraphy • desertification • clay geology • ecotoxicology • environmental change and biogeochemical cycles • environmental geochemistry • forestry • geoarchaeology • geodynamics • geofluids • geomatics and remote sensing • GIS • green roofs • heavy metals • hydrogeology • integrated land use analysis • magmatic petrology • nature conservation • ore geology • population geography • regional climate modelling • remote sensing • soil and water management • soil chemistry • soil degradation • soil erosion • soil fertility • soil water transport processes • structural geology • sustainable management of natural resources • tourism and recreation • urban geography • urban green

Divisions

Division of Geography

The Division of Geography focuses on a broad range of topics: geomorphic processes, soil degradation and soil conservation; society and environment; terrestrial ecosystems and environmental change; regional climate studies; learning and teaching processes within geography; socio-economic geography of settlements; economic geography, regional development and spatial policy; tourism and leisure; prehistoric archaeology.
Division of Geology
The Division of Geology concentrates on the study of Planet Earth, i.e. the ‘solid’ Earth in particular aiming to figure out the significance of processes in the geosphere with respect to the functioning of Earth’s systems from global to local scale. Researchers look into ‘deep time’, but always in the perspective of the challenges the society faces today and in the future. Besides the fundamental research questions, this research is often driven by societal and economic aspects of geology (e.g. non-renewable natural resources, geohazards, water, climate change and waste management).

Division of Soil and Water Management
The Division of Soil and Water Management focuses on nutrient and contaminant cycling in soils and water with applications to soil fertility management, land use planning, irrigation advice and risk assessment. The expertise encompasses environmental microbiology and biodegradation of pesticides, risk assessments of heavy metals in the environment, soil mapping and analysis of land-use, modelling transport processes of water and solutes (nutrients-contaminants) in soils, expert systems for efficient crop water use, long-term trends in tropical soil fertility and speciation of metals and phosphorous species in soil and water.

Division of Forest, Nature and Landscape
The Division of Forest, Nature and Landscape focuses on forest, nature, urban green and its sustainable management. This includes topics such as evaluating environmental impacts on ecosystems (including agro-ecosystems), their components and optimizing its sustainability using a variety of data analysis and decision supporting tools.

Division of Bioeconomics
The Division of Bioeconomics focuses on the social and economic components of sustainability. A first research focus is on global and local supply chains of food and other bio-based products, specifically on supply chain innovations and their impact towards creating more sustainable food systems. A second research focus is on the sustainable use of land and other natural resources for the production of food, feed, fiber, fuel and fun, with specific focus on the interaction between social, economic and environmental aspects in the exploitation of land and other natural resources.

Unique infrastructure
The research infrastructure of the Department of Earth and Environmental Sciences includes two plant growth chambers as well as equipment for the simulation of wind and water processes. The department has an extensive research infrastructure for mineralogical, chemical and microbial analysis including XRD for mineral identification, X-ray pole figure goniometer, AMS analysis, DTA-TGA for mineralogical studies, ICPMS, AES and SEM for chemical and mineral analysis, laser diffraction size analysis, X-ray settling analysis and advanced microscopes for cathodoluminescence, fluorescence and fluid inclusion analysis. Of course, the necessary computer infrastructure for GIS and remote sensing applications is also available.

Collaboration and users
The department has intensive links with a large number of other universities and research institutions both in Europe and elsewhere. It has a long tradition in collaboration with developing countries.

The department contributes significantly to LSUE – The Leuven Sustainable Earth Research Centre – which brings together scientists from different disciplines with a common interest in sustainable development.

Various recent ad hoc collaborative projects between archeologists and natural scientists at KU Leuven gave rise to the Centre for Archaeological Sciences.

Spin-offs
Spatial Applications Division Leuven (SADL)

Figures

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