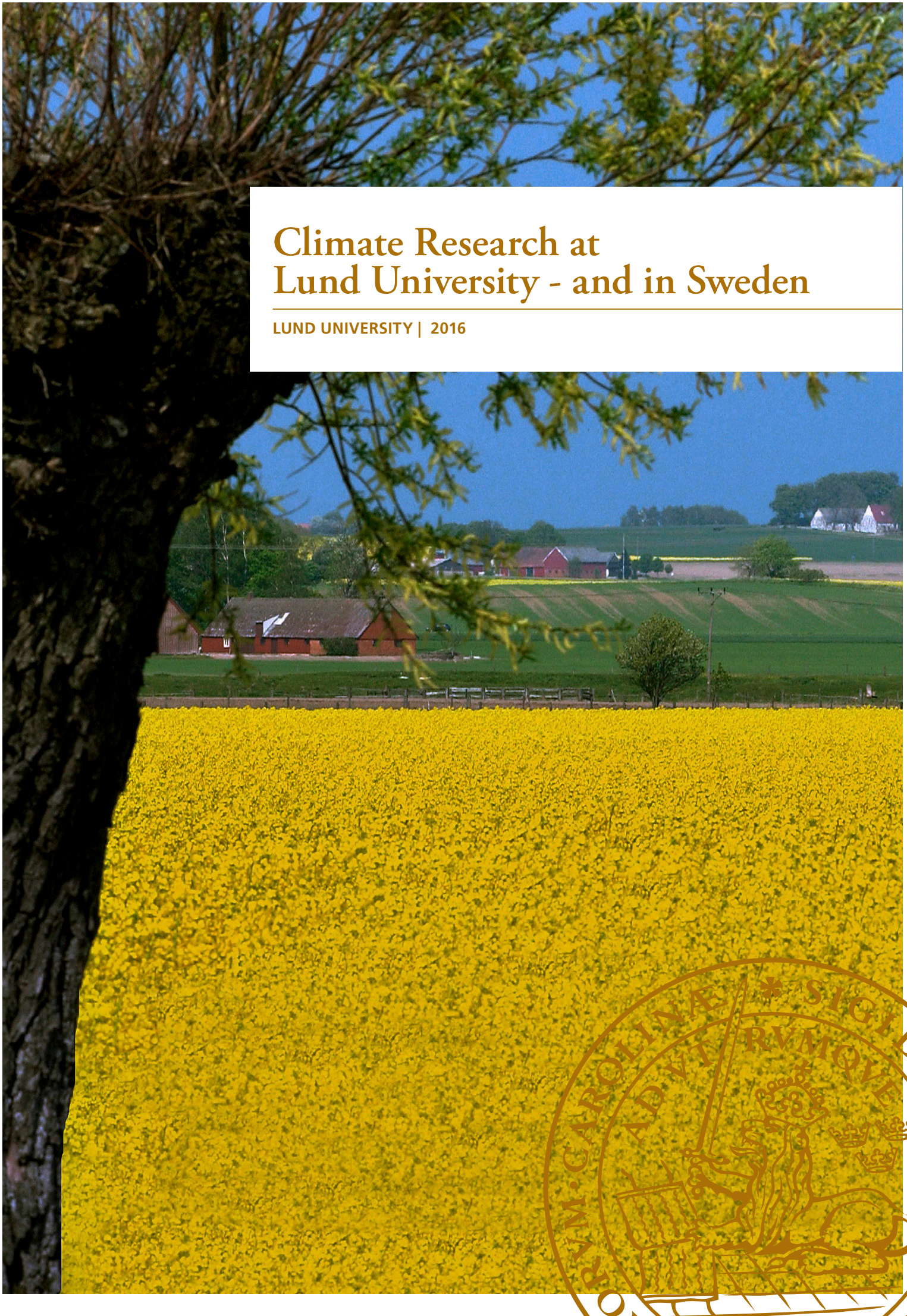
Climate Research at Lund University - and in Sweden

LUND UNIVERSITY | 2016



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Climate change is a real, challenging and urgent matter for the world, all countries, the public and the private sector as well as civil society. Climate change is intimately connected to other global challenges that need to be tackled in order to achieve sustainable development. Sound scientific understanding should shape how the world deals with these global challenges and form the basis for political decisions, as well as other decisions on international agreements, investments, regulation, incentives, support to technical, economic and social innovation, and so on. As the future unfolds and new decisions are taken, the landscape changes, however. Research needs to be able to respond to new emerging issues and surprises, and also anticipate new developments before they are with us.

Lund University engages within climate research

Lund University engages heavily with these issues. We pursue both basic and applied research on climate change. This engages most of our eight faculties and specific institutes and research centres. Our natural, social, engineering sciences and humanities' scholars contribute to the generation, communication and critical scrutiny of relevant knowledge and practice. We study the climate and the Earth system as a whole, contributing to defining problems and to possible solutions. We also study social systems and the processes with which we try to deal with climate change, from the United Nations to the everyday. Our researchers can be found in the field in Greenland, the Amazon, the Sahara and yet other locations, but also in climate negotiations, international assessments, urban metropolises, agricultural fields, palm oil and coffee plantations, and elsewhere.

Natural and social sciences research

In the natural sciences, Lund University research excellence is particularly strong in climate system/carbon cycle interactions spanning from the distant past to the present and into studies on possible futures, climate and Earth System modelling with a particular focus on biospheric processes, change and feedback under climate change. We also study how ecosystem services and biodiversity are affected by climate change and land use, and the details of how related aerosols – small airborne particles – affect the climate.

Our research on climate impacts is also about socioeconomic systems and processes and human behaviour. Lund University has a long tradition of interdisciplinary research on energy for sustainable development and resource efficient economies, research on land use as well as multifunctional forestry and agriculture.

Climate and Energy policy, technology and systems

The Engineering Faculty covers a wide range of climate and energy policy, low-carbon technology and system areas, including Biofuels, Wind and Geoenergy, Photovoltaics, Low energy buildings, LED-Lighting, Green chemistry, Combustion engines, and Smart grids. The research is often undertaken in broad inter- and multidisciplinary constellations with fundamental as well as applied research, including environmental assessments and policy analysis. Lund University also promotes innovation for climate solutions and works with industry and entrepreneurs, both new and established ones. The Climate Knowledge and Innovation Community (Climate-KIC) is one such platform, bringing together 280 universities, enterprises and public actors from across Europe.

Social science, and interdisciplinary approaches to bridging social and natural science, play a key role, as does transdisciplinary research connecting research and practice. Issues such as climate change politics, governance, behavioural economics, ethics, philosophy, psychology are rapidly gaining attention. In addition to relevant faculties, research on these area takes place in dedicated interdisciplinary centres designed to utilise opportunities for problem- and policy-oriented research that transcends disciplinary borders. The transformation to a low carbon society is a strong research area in Lund, and it brings together social science, engineering, economics and the humanities.

Climate research in Sweden

In Sweden, publicly-funded research is largely the Universities' remit. There are also research institutes and some governmental authorities that engage in research. In addition to Faculty funding, Sweden has two research councils, one of which focuses on basic, and the other applied science , an innovation agency, the Energy Agency, the Environmental Protection Agency, research foundations and yet other research funders. These bodies provide funding for climate research both in thematic calls, as well as in their general calls. European and other international funding sources are significant as well. The order-of-magnitude funding of climate research is around 250 MUSD. The largest share – well over half – goes to research to support climate mitigation (reducing emissions), and the rest to research on the climate system, climate models, and climate impacts, adaptation and vulnerability.

Sweden has a long tradition of climate research and researchers. For example, Svante Arrhenius made the first calculation on how the global mean temperature would respond to changes to the amount of carbon dioxide in the atmosphere – in 1896. Professor Bert Bolin pioneered carbon cycle and climate science, and was the first Chair of the Intergovernmental Panel on Climate Change (IPCC).

Today, Sweden has internationally well-recognised, and well-connected, climate research in a number of areas, including ecosystem and climate modelling, paleoclimate, cryosphere (snow and ice), carbon cycle and greenhouse gas balances, water resources, climate justice, climate change and sustainability, as well as climate policy, governance and economics. Sweden also engages with developing countries to develop capacity, research environments and research activities.

The future is likely to bring additional deepening of disciplinary research, and more interdisciplinary activities in response to known and future knowledge needs. Research is essential for the transition towards a low/zero/negative carbon society. It entails making use of synergies and co-benefits in solving coupled and complex problems, learning more about Earth System feedback and tipping points in the climate system, as well as on long-term limits to warming, sea level rise and ice melt.

Research can also help us learn more about how we perceive and act on climate change; including questions around the meaning of economic growth, alignment of solutions to climate change with other considerations, equity and the intrinsic values of ecosystems and their services.

RELEVANT RESEARCH ENVIRONMENTS, FACILITIES AND NETWORKS AT LUND UNIVERSITY:

BECC Strategic Research Area: Biodiversity and Ecosystem Services in a Changing Climate.
www.becc.lu.se

Centre for Environmental and Climate Research
www.cec.lu.se

Climate-KIC Europe's largest public-private innovation partnership which Lund University is a member of.
www.climate-kic.org

Earth System Governance social science research network in the area of governance and global environmental change
www.earthsystemgovernance.org

Environmental and Energy Systems studies
www.miljo.lth.se/english

Environmental Politics Research Group
www.svet.lu.se/en/research/research-groups/environmental-politics-research-group-eprg

ICOS greenhouse gas flux observation network and the related ICOS Carbon Portal:
www.icos-sweden.se

IIIEE International Institute for Industrial Environment Economics
www.iiiee.lu.se/

LUCCI Linnaeus Centre: Lund University Centre for studies of Carbon Cycle and Climate Interactions.
www.lucci.lu.se

LUCSUS Lund University Centre for Sustainability Studies
www.lucsus.lu.se

LUCID Lund University Centre of Excellence for Integration of Social and Natural Dimensions of Sustainability.
www.lucid.lu.se

MAX IV a world-leading synchrotron light facility with a broad range of techniques for studies of climate-related processes in air, soil and water as well as characterization of materials for new energy technologies.
www.maxlab.lu.se/maxiv

MERGE Strategic Research Area: Modelling the Regional and Global Earth System.
www.merge.lu.se

Sustainability Forum works as a bridge between society and academia concerning sustainability research at LU.
www.sustainability.lu.se/

Urban Arena gathers and communicates LU research and undergraduate education related to sustainable urban development.
www.urban.lu.se/

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