

ANNUAL REPORT 2013



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Cover photo: Subfossil chironomid (Diptera: Chironomidae) larvae head capsule of *Micropsectra insignilobus*-type common in cold, oxygen rich lakes. Subfossil chironomids in lake sediment cores are used in palaeoclimate reconstructions to quantitatively reconstruct summer temperatures. Head capsule sizes are typically c. 100 – 200 microns. The specimen in the picture is from Lake Vuoksjavratje in Vindelfjällen, Swedish Lapland. Photo: Annika Berntsson

1. Introduction

The Department of Physical Geography and Quaternary Geology is one of the larger departments at the university, with about 150 employees: 16 professors, 47 lecturers and researchers, 51 PhD students and 32 technical/administrative staff. Our personnel consist of an exciting mix of people coming from around the world, together creating a very dynamic and creative research and education environment.

Together with our neighbours, the Department of Geological Sciences, the Department of Applied Environmental Science and the Department of Human Geography, in the Geosciences building at the campus of Stockholm University, we constitute one of the most complete geocentres in Scandinavia. Within one building, we have all the facilities of a modern university: library, laboratories, and equipment to conduct advanced scientific studies and offer stimulating and awarded education to current and prospective students.

We conduct multi-disciplinary research in the fields of landscape ecology, geomorphology and paleoglaciology, glaciology, hydrology, paleoclimatology, Quaternary geology, remote sensing and GIS, and tropical geography. Our research can be grouped under the following research profiles: i) climate, environment and landscape development; ii) glacier and polar environments; iii) land and water resources and iv) landscape analysis and geomatics. Basic research is oriented towards furthering our understanding of short- and long-term processes and interactions that lead to landscape development and environmental and climate changes. The behaviour of past and present systems and interactions between systems are modelled for predictions of future trends. The department is equipped with a state-of-the-art GIS and remote sensing cluster, and microscopy, sediment and dendroclimatology laboratories.

We also take pride in providing a broad high-quality education at basic, Masters and postgraduate levels. The goal of the undergraduate and Masters education is to offer high quality learning, reflecting the research profiles of the department, and meeting the society's need for a sound theoretical competence. The department carries out undergraduate education in geography, earth sciences, integrated biology-earth science, and in environmental sciences. We offer a wide range of Masters education subjects, tailored to our research profiles, and taught in English. Every year slightly more than 1700 students attend our undergraduate and Master education programmes. Postgraduate education consists of four years and, given its high standard and international staff, it constitutes an important cornerstone of the department's profile.

Arjen Stroeven
Head of the Department

History

Geography was established at Stockholm University as a subject in its own right in 1912, but it was not until 1929 that the first professor, Hans W:son Ahlmann, was appointed. He held this position until 1950. Gunnar Hoppe was appointed professor in 1954, one year before the division between Physical Geography and Human Geography commenced. Professor Hoppe retired in 1980 and was succeeded by Gunnar Østrem, Wibjörn Karlén, and, in 2003, by Peter Kuhry. Hans W:son Ahlmann, particularly interested in Arctic research, led several expeditions to the Arctic and initiated the establishment of a glaciological research station in the Swedish mountains, the Tarfala Research Station. Valter Schytt was appointed professor of glaciology in 1970 and held the position until 1985. Per Holmlund succeeded him in 1999.

Gunnar Hoppe pioneered the incorporation and interpretation of aerial photographs in geomorphological research. His strong interest in remote sensing led to the creation of a professorship in remote sensing at the Department of Physical Geography in 1980, a position held by Leif Wastenson until 2001. Johan Kleman succeeded him. Leif Wastenson developed and expanded the field of remote sensing leading to the establishment of a professorship in ecological geography, held by Margareta Ihse between 1997 and 2008. In 2005, following a strategic decision to develop the Department's profile in hydrology, a new professorship in hydrology, hydrogeology and water resources was established. The position is held by Georgia Destouni.

As long as geology has been a subject at Stockholm University, Quaternary Geology has received considerable attention. Two early professors of geology, Gerard De Geer (1897-1924) and Lennart von Post (1929-1950) had international reputations in Quaternary geology, De Geer for his invention of the clay-varve dating method and von Post as the father of pollen analysis. In 1956 von Post's successor, Ivar Hessland, created an assistant professorship, the first holder of which was Carl-Gösta Wenner, who gave the department new direction towards applied geology. In 1962 Quaternary Geology became an independent subject and in 1963 a Department on its own. Jan Lundqvist succeeded Wenner in 1980 and became the first full professor of Quaternary Geology at Stockholm University. Lundqvist retired in 1993 and was succeeded by Bertil Ringberg, and, from 2002 to 2007, by Barbara Wohlfarth.

The Department of Physical Geography and the Department of Quaternary Research amalgamated to create the Department of Physical Geography and Quaternary Geology on January 1, 2001. Research interests of other professorships at the department are in tropical geography (Carl Christiansson), paleoclimatology (Karin Holmgren and Gunhild Rosqvist), glaciology (Margareta Hansson and Peter Jansson), paleoglaciology (Clas Hätteland and Arjen Stroeven), landscape ecology (Sara Cousins), and Quaternary geology (Frank Preusser and Stefan Wastegård). Together with the aforementioned professorships we successfully straddle both traditional and innovative directions in physical geography and Quaternary geology.

2. Current Research

Research groups in the fields of ecological geography, geomorphology and paleoglaciology, glaciology, hydrology, paleoclimatology, Quaternary geology, remote sensing and GIS, and tropical geography contribute to four research profiles described below. All research groups are involved in the Bert Bolin Centre for Climate Research program (2.5).

2.1. Glaciers and polar environments

Research themes and areas

Research focusses on glaciers, ice sheets and cold (permafrost) environments in a global perspective. Study areas include Antarctica and Greenland, alpine environments in Scandinavia (and elsewhere), and the tundra regions. In a temporal perspective we are working with three different time slots: the entire quaternary period (last 2 million years), the present (last 200 years) and the future. Research activities can be subdivided into:

- Climate related processes and impacts of Global Change.
- Glacial processes and ice physical properties
- Paleoglaciological inverse and numerical modelling of past and present ice sheets.
- Coupling between high latitude land ecosystems and the global climate system.

A significant number of projects are linked to Tarfala Research Station in the Kebnekaise massif where the department is running an extensive monitoring programme. Tarfala is used as a platform for both education and for national and international research programmes.



Tarfalajaure and the Kebnepakte glacier, Tarfala. Photo: Ewa Lind

Ongoing projects

1. Marginal ice dynamics / *Kirchner N*
2. Snow volume estimation from InSAR / *Brown I*
3. Multi-scale investigations of microwave snowpack observations (MIMSO) / *Brown I, Ingvander S, Jansson P*
4. Estimating volume changes of Patagonian glaciers using inventory data and scaling techniques / *De Angelis H*
5. Exploring the conditions for stability and modes of behaviour of glacier systems / *De Angelis H*
6. Modelling the transfer of supraglacial meltwater to the bed of glaciers through moulins and lake drainages / *Clason C*
7. Modelling the Late Weichselian Scandinavian Ice Sheet and its sensitivity to surface meltwater-enhanced basal sliding / *Clason C*
8. Investigating flow pathways and transit times for the dispersal of hydrocarbon pollution on Rabots glacier, Kebnekaise / *Clason C*
9. Mapping and analysis of glacial geomorphology from multibeam bathymetry on the bed of the Baltic Sea and the Gulf of Bothnia / *Clason C*
10. The impact of glacial erosion on northern shields (GEONORTHS) / *Ebert K, Kleman J*
11. The north Greenland Eemian ice drilling (NEEM) / *Hansson M*
12. The European Programme on Ice Coring in Antarctica (EPICA) / *Hansson M*
13. Erosion of Tibet investigated using cosmogenic nuclide analysis / *Heyman J*
14. Environmental history and climate change in relation to historical land use changes in East Africa / *Higgins L*
15. Climate, glaciers and permafrost in the Swedish mountains / *Holmlund P*
16. Subglacial thermal conditions through a glaciation phase / *Holmlund P*
17. The Japanese-Swedish Antarctic Expedition (JASE) / *Holmlund P, Hansson M, Ingvander S, Karlin T, Johansson M*
18. Terrestrial history of the Muonionalusta meteorites / *Hättestrand C*
19. The hydrology and dynamics of the Greenland ice sheet / *Jansson, P*
20. Glacier mass balance and tree rings as indicators of atmospheric circulation / *Jansson P*
21. Weichselian Ice dammed lakes - formation and climatic significance (WeIDFoCS) / *Kirchner N*
22. A Bayesian Hierarchical Modeling approach to investigate former ice shelf configurations in the Arctic Ocean region / *Kirchner N*
23. CARBO-north project / *Kuhry P*
24. PAGE21: Changing Permafrost in the Arctic and its Global Effects in the 21st Century / *Kuhry P, Hugelius G*
25. DEFROST: Impacts of a changing cryosphere - depicting ecosystem-climate feedbacks from permafrost, snow and ice / *Kuhry P, Hugelius G*
26. Landscape partitioning and lability mapping of soil organic matter in permafrost terrain / *Palmtag J*
27. On the age and origin of glacial overdeepening in the Alps / *Preusser F*
28. The fate of hydrocarbon pollution in Kebnekaise / *Rosqvist G, Jarsjö J*
29. Simulation of the Cordilleran Ice Sheet through a glacial cycle / *Seguinot J, Stroeve A.P, Kleman J, Zhang Q*
30. Paleoglaciology of the northern sector of the Cordilleran ice sheet / *Stroeve A.P, Margold M*
31. Paleoglaciology of the Shaluli upland on the SE Tibetan Plateau / *Fu P, Stroeve A.P, Hättestrand C, Heyman J*

32. Deglaciation of the Fennoscandian ice sheet / *Stroeven A.P, Kleman J, Hättestrand C, Goodfellow B, Rosqvist, G, Jansson K, Heyman J, Lundqvist J*
33. Glacial and climate history of Central Asia / *Blomdin R, Gribenski N, Harbor J, Stroeven A.P, Hättestrand C, Jansson K, Preusser F, Heyman J*

Staff affiliations

Margareta Hansson, Professor (see also 2.2)
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Julien Seguinot
Matthias Siewert

2.2. Climate, environment and landscape development

Research themes and areas

Our research is aimed at describing climate, environment and landscape changes in time and space, and understanding underlying processes and causes. Investigations address recent and rapid change as well as long term evolution over millions of years. We work over the whole world with ongoing projects in the Nordic countries, the rest of Europe, Africa, South-America, northern Russia, Canada, China, Antarctica and Greenland.

We make use of long instrumental records as well as natural archives such as lake sediments, peat deposits, ice cores, drip stones, tree rings, glacial sequences and archeological evidence to investigate changes in climate, environment and associated biological, chemical and physical processes. The comparison between multiple archives allows a better reconstruction of past changes at local, regional and global scales. We interpret landscape, landforms and sediment layers to understand landscape development. Regional reconstructions of landscape and ice sheet development are performed through a combination of spatial analyses based on aerial photos, satellite images, digital terrain models and field mapping with studies of sediments and their stratigraphy, and dating of landforms and sedimentary deposits. We also apply computer simulations to investigate how glaciers, ice sheets and global sea level are affected by climatic change.



Geography students at Mt Cook on a field course to New Zealand. Photo: Anton Kinlund

Ongoing projects

1. Reconstruction of environmental and climate changes in Vindelfjällen, northern Sweden, using lake sediments / *Berntsson A*
2. Speleothems in Warm Climates – Holocene records from the Caribbean and Mediterranean / *Boyd M*
3. Measuring earthquake periodicity and calculating chemical weathering rates with a portable XRF and cosmogenic isotopes/ *Fritzon R, Goodfellow B, Stroeve A.P, Skelton A*
4. Precipitation control on chemical weathering / *Goodfellow B*
5. Chemical and mechanical processes of granitoid weathering / *Goodfellow B*
6. Controls of tor formation, Cairngorm Mountains, Scotland / *Goodfellow B*
7. Multiproxy dendroclimatology in Greece / *Grudd H, Krusic P*
8. Tree-ring density and stable isotopes from Torneträsk, northern Sweden / *Grudd H*
9. Pollution investigations in trees / *Grudd H*
10. Finding the key to shipwreck preservation / *Grudd H*
11. Climate vs past human use in mountain forest ecotones, Sweden The Scottish Pine Project / *Gunnarson B*
12. The north Greenland Eemian ice drilling (NEEM) / *Hansson M, Wastegård S*
13. Holocene Climate Variability in southern Greece / *Holmgren K, Finné M, Sundqvist*
14. Holocene climate variability in southern Africa / *Holmgren K, Sundqvist H, Zhang Q*
15. Late Quaternary climate variability and vegetation dynamics in southern Greece / *Holmgren K, Boyd M, Finné M, Norström E, Sundqvist H*
16. European isotope-climate reconstruction for the last 2000 years based on lake sediments, speleothems and tree-rings / *Sundqvist, Holmgren K*
17. Formation and age of Veiki moraine, northern Sweden / *Hättestrand M, Hättestrand C*
18. CARBO-North: Quantifying the carbon budget in northern Russia: past, present and future / *Kuhry P, Holzkämper S, Hugelius G, Palmtag J*
19. A Bayesian Hierarchical Modeling approach to investigate former ice shelf configurations in the Arctic Ocean region / *Kirchner N*
20. Weichselian Ice dammed lakes-formation and climatic significance (WeIDFoCS) / *Kirchner N*
21. Cryo-CARB: Long Term Carbon Storage in Cryoturbated Arctic Soils / *Kuhry P, Hugelius G*
22. Key sites for relief identification on the South Swedish Dome / *Lidmar-Bergström K*
23. Stratigraphic Landscape Analysis and geomorphological paradigms: Scandinavia as an example of Phanerozoic uplift and subsidence / *Lidmar-Bergström K*
24. Plains, steps, and hilly relief in northern Sweden – review, interpretations, and implications / *Lidmar-Bergström K*
25. Tephrochronology of the north Atlantic region during the early Holocene / *Lind E, Wastegård S*
26. Climate data-model comparisons for the last millennium / *Moberg A, Grudd H*
27. A statistical framework for comparing paleoclimate data and climate model simulations / *Moberg A, Zhang Q*
28. Euro-Atlantic climate variability during the last millennium: atmospheric circulation and extreme events / *Moberg A*
29. Past climate variability and environmental change in southern Mozambique / *Norström E*
30. Climate dynamics and environmental change during the Eemian Interglacial (MIS 5e) in Fennoscandia inferred from a unique sediment sequence at Sokli (northern Finland) / *Pliik A, Helmens K*

31. Vegetation development and introduction of cultural landscape in Småland, southern Sweden / *Regnell M*
32. Prehistoric farming in Västra Götaland, south-western Sweden / *Regnell M*
33. Prehistoric plant use, agriculture and environment in southern Sweden / *Regnell M*
34. Holocene climate and glacier change in northern Sweden / *Rosqvist G*
35. Reconstructions of past changes in precipitation using geochemical signatures in lake sediments / *Rosqvist G*
36. Environmental changes in the eastern parts of Lake Mälaren, west of Stockholm, during the last 8000 years / *Risberg J*
37. Construction of palaeogeographical maps for eastern Svealand for the last 7000 years / *Risberg J*
38. Climate change in southern Mozambique during the last 4000 years / *Risberg J*
39. Climate change in northwestern Tanzania / *Risberg J*
40. Black carbon aspect of climate change / *Rosqvist G*
41. Modelling plant species dispersal in fragmented landscapes / *Cousins S, Schmucki R*
42. Early Holocene deglaciation and the Holocene thermal maximum at high latitudes as recorded by multi-proxy evidence / *Shala S, Helmens K*
43. DAPHNE-dated speleothem archives of the paleoenvironment / *Sundqvist H, Holmgren K*
44. Constraining the chronology of glacial advances on Svalbard–Kapp Ekholm revisited / *Preusser F*
45. Reconstructing the environmental history of Arabia / *Preusser F*
46. Towards a revised chronology of the glaciation history of northern Switzerland / *Preusser F*
47. Geoarchaeology of Amiternum, central Italy / *Preusser F*
48. Testing the potential of OSL to date glacial sediments from Estonia / *Preusser F*
49. Reconstructing sea-level change on Ruhnu Island, Baltic Sea / *Preusser F*
50. Geoarchaeology of Beidha, Jordan / *Preusser F*
51. Investigating potential geohazards along the coast of Oman / *Preusser F*
52. Sharpening the tools—improving tephrochronology around the Atlantic Sea / *Wastegård S*
53. SMART project (synchronising marine and ice-core records using tephrochronology) / *Wastegård S*
54. Potrok Aike Lake sediment archive drilling project / *Wastegård S*
55. Current expansion and past dynamics of small-holder irrigation farming in African drylands—measuring landscape, labour and climate interactions / *Westerberg L-O*
56. Factors affecting mangroves of the Rufiji Delta and impact on the livelihood of surrounding communities / *Westerberg L-O, Mwansasu S, Dahlberg A*
57. Environmental change in northern Tanzania during the last 1000 years / *Öberg H*
58. Atmospheric modelling using space-based observations of stable water isotopes / *Zhang Q*

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2.3. Landscape analysis and geomatics

Research themes and areas

Research and education in these fields comprises methods development in satellite image processing, air photo interpretation, positioning, geographical information systems, and the application of these methods to a wide variety of geoscientific, bioscientific, landscape ecological and environmental issues. Study areas are in Sweden, other Nordic countries, the British Isles, Russia, Canada, South America, Eastern Africa, Southeast Asia, Antarctica and Greenland.

Research in glacial and periglacial environments include glacial geomorphological mapping for reconstructions of paleoglaciological and long-term landscape evolution, the mapping of recent dynamics in permafrost landscapes, and glaciological remote sensing. Remote sensing and modelling techniques are developed to monitor changes in water quality and coastal ecosystems. The research of landscape ecological questions includes vegetation mapping for change detection in sensitive mountainous environments, analysis of landscape ecological structures, and mapping and monitoring of biodiversity and biological values in cultural landscapes. GIS is applied for monitoring and analysis of the cultural landscape and for environmental management and protection in urban/semiurban areas.

The Department has been instrumental in the development of the National Atlas project and its GIS components, as in applied projects of landscape and habitat inventory and monitoring in cooperation with the Swedish Environmental Protection agency in the Landscape Monitoring project of the agricultural landscapes, LiM, and the Natura 2000 program.

Ongoing projects

1. Measuring environmental change in Darfur, Sudan: implications for the conflict / *Brown I*
2. Land use change and effects of functional and spatial connectivity on historical and present biodiversity patterns / *Cousins S, Aggemyr E*
3. Historical land use influence on dispersal and diversity of grassland species in rural landscapes / *Cousins S, Auffret A*
4. Modelling plant species dispersal in fragmented landscapes / *Cousins S, Scmuki R.*
5. Changes in wetland distribution and consequences for biodiversity and ecosystem services / *Cousins S, Ermold M*
6. A multiscale, cross-disciplinary approach to the study of climate change on natural resources, ecosystem services and biodiversity (EKOKLIM) / *Cousins S, Ermold M, Lindborg R, Plue J, Tränk L*
7. Linking management and feedback across scales in social-ecological systems - examples from forest ecosystem / *Eriksson I*
8. Effect of agricultural land use on biodiversity and function in Swedish wetlands / *Ermold M*
9. Studies of actual and medieval vegetation in summer farming areas of Snorre Sturlasson, Iceland / *Ihse M*
10. Woody or treeless pastures? Linking subsidy systems, farmers decisions and management for understanding biodiversity patterns / *Jakobsson S, Lindborg R*
11. Influence of Environmental and Social factors on Wildlife Dispersal Areas in Malagarasi-Moyovosi Ramsar Site, Western Tanzania / *Kalumanga E, Cousins S*

12. Harnessing Biodiversity for Sustaining Agricultural Production and Ecosystem Services (SAPES) / *Lindborg R*
13. Ecosystem services in agricultural landscapes: the development of a framework for assessing synergies and dealing with trade-offs among multiple services / *Lindborg R*
14. Habitat restoration in fragmented landscapes: effects on biodiversity and ecosystem functions / *Lindborg R*
15. How do seed banks contribute to species persistence in fragmented landscapes/ *Plue J, Cousins S*
16. EMMA Environmental Mapping and Monitoring with Airborne laser and digital images / *Skånes H*
17. NorthScape (Nordic network for land use and land-cover monitoring). A Network project between Denmark, Norway, Sweden, Iceland and Finland / *Skånes H*

Staff affiliations

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2.4. Land and water resources

Research themes and areas

We investigate natural processes and anthropogenic effects in different land, soil and water environments and their changes in space and time.

The research relates also to other Earth and environmental sciences, and to environmental monitoring, management and regulation of land and water resources in different applications. We carry out research for different parts of the world on:

- Land, water and waterborne substance interactions, flow and transport dynamics and changes in space and time.
- Freshwater interactions with climate, coastal and marine waters, snow/ice and socio-economic systems.
- Land and water resources in different physical, biogeochemical, ecological and cultural environments.
- The interaction between climate extremes, air pollution, soil conditions and forest ecosystems.
- Climate feedbacks and effects on land-water systems within the cross-disciplinary Stockholm University Climate Research Environment (Bert Bolin Centre for Climate Research)

In this research, we use, develop and couple tools such as hydrological flow and solute-pollutant transport models, geographical information systems and remote sensing for both basic process quantifications and different applications.



Researchers and students at Rabots glacier in August 2013. Photo: Yeti

Ongoing projects

1. Pan-Arctic ice-water-biogeochemical system responses and social-ecological resilience effects in a warming climate / *Destouni G, Bring A, Lyon S*
2. Pan-Arctic hydrological and biogeochemical responses to climate change / *Destouni G, Mård Karlsson J, Lyon S, Dyurgerov M, Peterson G*
3. The subsurface water system role for land-to-atmosphere and land-to-sea vapor-water partitioning and solute mass flows / *Destouni G, Asokan S, Prieto C, Darracq A.*
4. Risk quantification for accidental pollutant spreading through subsurface water / *Destouni G, Persson K, Prieto C, Darracq A, Jarsjö J*
5. The role of permafrost, hydrological and ecosystem shifts for arctic hydro-climatic interactions and carbon fluxes / *Janze E*
6. Modelling multi-phase flow in porous and fractured media / *Jarsjö J, Frampton A, Dessirier B*
7. FutureLearn: Utveckling av ett simulerings- och visualiseringsverktyg för flöde- och transportprocesser inom hydrologisk utbildning / *Frampton A*
8. Flow and tracer transport in crystalline fractured media / *Frampton A*
9. The role of permafrost, hydrological and ecosystem shifts for arctic hydro-climatic interactions and carbon fluxes / *Jantze E*
10. Quantifying the potential of carbon dioxide storage, long-term retention and surface return flow minimization in Swedish bedrock / *Jarsjö J, Destouni G, Desouche C*
11. Mitigating agricultural pollution impacts on health and environment in the Aral Sea Basin / *Jarsjö J, Törnqvist R*
12. The invisible carbon – an early indication of ecosystem change / *Lyon S*
13. LiDAR 2.0: better utilization of current and next generation LiDAR data / *Lyon S*
14. Development of simulation and visualization tools for flow and transport processes in hydrological education / *Frampton A, Lyon S, Jarsjö J*
15. Water resources effects of land-water management in Tanzania, Africa / *Lyon S, Jarsjö J, Lindborg R, Dahlke H, Holmgren K*
16. Improved streamflow and flood monitoring using remotely sensed LiDAR data / *Lyon S, Nathansson M*
17. Cross-scale modeling of coupled hydrological-permafrost interactions and carbon transport in a changing climate / *Lyon S, Frampton A*
18. Quantifying a safe operating space for human use of coastal groundwater under multiple change pressures/ *Mazi A*
19. Seawater intrusion risks and controls for safe use of coastal groundwater under multiple change pressures - Analytical evaluation and exemplification for Mediterranean aquifers / *Mazi, A*
20. Intensively exploited Mediterranean aquifers: resilience to seawater intrusion and proximity to critical thresholds / *Mazi, A*
21. Classification and comparative study of Mediterranean coastal aquifers subject to climate changes with the use of the analytical single-potential, sharp-interface solution / *Mazi A*
22. Hydro-climatic trends and interactions in the Mediterranean region / *Mazi A, Destouni G*
23. Identifying key landscape features which contribute to the ecosystem service of waterborne nutrient and pollutant retention / *Quin A, Destouni G*
24. National Environmental Objectives in the Mountain Environment – management, future and conflict analysis / *Schlyter P, Stjernquist I*
25. The effect of biomass withdrawal on the nutrient balance in forest soils / *Schlyter P, Stjernquist I*
26. Hydrological modelling for climate-change impact assessment / *Seibert J, Teutschbein C*

27. Gruppmodelleringsbaserad analys av miljöanpassad upphandling av livsmedel och måltider: hinder, problem och möjligheter/ *Seibert J, Stjernquist I*
28. Determining and mapping spatial distributions and thawing rates of inland permafrost under climatic change in the Arctic and Sub-Arctic / *Sjöberg Y*
29. Mapping permafrost using ground penetrating radar for validation of hydrological modeling of permafrost distributions / *Sjöberg Y*
30. Modeling permafrost spatial distributions and thawing rates in arctic and sub-arctic Sweden using recession flow analysis / *Sjöberg Y*
31. Green Infrastructures for ecological sustainability and human well-being: a network of forest rural and urban landscapes as laboratories for integrative research / *Stjernquist I*

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2.5. The Bert Bolin Centre for Climate Research

The centre conducts a 10-year research and research environment-building program, funded by a Linné-grant from FORMAS and VR. The research program brings together the climate research expertise in four departments, and the program is coordinated by the Department of Physical Geography and Quaternary Geology. The research program focuses on five cross-disciplinary core themes; **climate variability, atmospheric and ocean circulation, geodata for circulation system modeling, biogeochemical cycles, and climate governing small-scale processes**. The financial framework is 10 Mkr (1.7 mill \$)/year over the 10-year period 2006-2016, with an additional 2 Mkr/year for the associated research school.

Important policy decisions for sustainable development are based on climate scenarios derived through numerical climate modeling. Such models are a synthesis of our current understanding of climate-influencing processes in the various components of the climate system. Our challenge and aim is to provide improved knowledge about climate-influencing processes, over a range of time-scales and subsystems. The Bert Bolin Centre for Climate Research program embraces natural climate processes and variability, as well as changes imposed by man's ever-increasing impact on the climate system through emission of greenhouse gases and aerosols, and changes in land-use, vegetation and hydrology. With the present strong public and political interest in climate research, interaction with media and policy makers is an important task for many of the researchers involved in the program. There is already a strong involvement by Bert Bolin Centre for Climate Research researchers in IPCC, and on the policy side in the climate commission of the Swedish government.

2.6. Navarino Environmental Observatory (NEO)

Navarino Environmental Observatory (NEO), a cooperation between Stockholm University, the Academy of Athens and TEMES S.A., the developer of Costa Navarino, is dedicated to research and education on the climate and the environment of the Mediterranean region. Located at Costa Navarino, NEO will develop into a dynamic hub where scientists from all over the world conduct frontline research, develop new tools and methods, as well as meet to exchange knowledge and ideas.

Covering a wide range of topics of both local and global relevance, the research activities of NEO are carried out by scientists from the Bert Bolin Centre for Climate Research at Stockholm University and the Atmospheric Environment Division of Biomedical Research at the Academy of Athens. Atmospheric composition and meteorological parameters are continuously monitored in order to track the origin of particulate and gaseous pollutants and detect climate change signals. Global and regional scale modeling is applied for climate projections and future pollution level simulations. Hydrological research, monitoring and evaluation are undertaken in order to understand past, present and future processes and to develop suitable water resource management strategies for the region. Tectonic, climate, environment and landscape studies are carried out on a long-term perspective, in order to understand the physical science basis of our earth, and on a short-term perspective, in order to understand the role of natural versus human induced climate/environmental changes. An important perspective is to analyze the role of physical factors in the context of tourism and urbanism. All monitoring activities are linked to international networks.

The establishment of NEO is a very important step toward strengthening Swedish-Greek cooperation in the area of climate and environmental research. The operation of NEO presents a real example of how the academic community and the private sector can work together to focus on issues of great importance to society and nature.



Navarino Environmental Observatory in Peloponnese, Greece. Photo: Giorgos Maneas.

3. Publications

Reviewed articles

1. **Ahlkrona, J., Kirchner, N.** and Lötstedt, P. 2013. Accuracy of the zeroth- and second-order shallow-ice approximation - numerical and theoretical results. *Geoscientific Model Development*, 6(6), 2135-2152.
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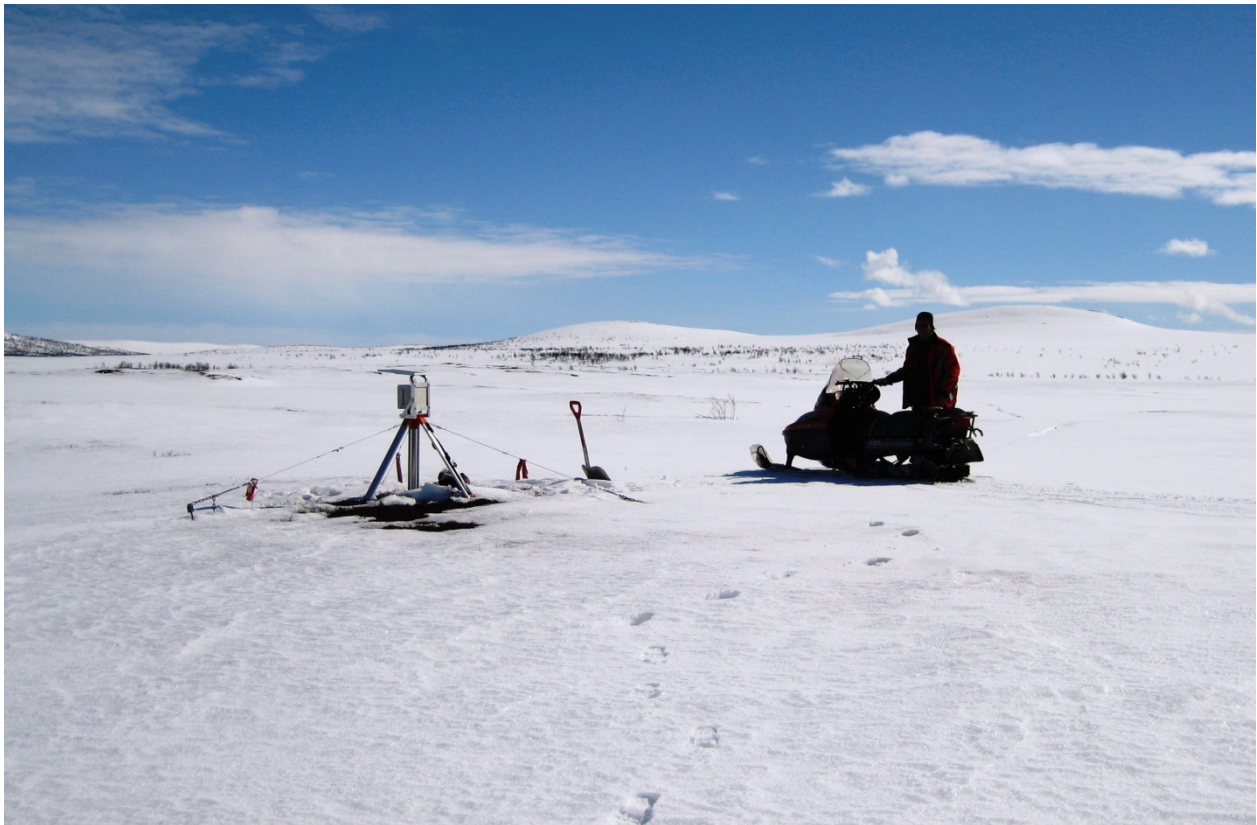
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Field work at the ground temperature monitoring site in Tavvavuoma, northern Sweden. Photo: Britta Sannel.

4. Publication series

Ongoing

Dissertations from the Department of Physical Geography and Quaternary Geology, 2006-
Reports from the Department of Physical Geography and Quaternary Geology, 2002-
Tarfala Research Station Annual Reports, electronic pdf-based series, 1998-

Past

Thesis in Quaternary Geology, 2002-2005
Thesis in Geography with emphasis on Physical Geography, 2001-2006
Quaternaria. Series A, 1995-2001
Quaternaria. Series B, 1995-2001
The Department of Physical Geography, Stockholm University Dissertation Series, 1994-2000
Research Report, Department of Physical Geography, 1968-2000
Meddelanden från Naturgeografiska institutionen, 1965-1994

5. Education

The goal of the undergraduate education at the Department of Physical Geography and Quaternary Geology is to offer a high quality education, reflecting the research profile of the Department, and meeting the society's need for theoretical and practical competence within the fields of education. The department offers education at undergraduate (bachelor's) level in geography, earth sciences, integrated biology-earth science, and in environmental studies. In addition, a wide spectrum of graduate (master's level) programmes and courses are given, reflecting the research profiles of the department. Every year almost 2000 students attend our undergraduate and graduate education.

At Stockholm University degrees are structured in accordance with the Bologna Model of higher education:

First cycle: Kandidatexamen (Bachelor's Degree) 3 years

Second cycle: Magisterexamen 1 year, Masterexamen (Master's Degree) 2 years;

Third cycle: Licentiatexamen 2 years, Doktorsexamen (Doctorate) 4 years.

Stockholm University uses the European Credit Transfer and Accumulation System, ECTS. One academic credit (Sw. *högskolepoäng* or hp; Eng. translation *Higher Education Credit* or HEC), corresponds to one ECTS credit or approximately 3 days of full time studies. One semester is composed of 30 credits, corresponding to approximately 20 study weeks, and a full study year is composed of 60 credits, corresponding to 40 study weeks.

5.1. Bachelor's level (First Cycle)

Three undergraduate (Bachelor's) programmes are given by the Department of Physical Geography and Quaternary Geology:

Bachelor's programme in Geography

Bachelor's programme in Earth Science

Bachelor's programme in Biology-Earth Science

Bachelor's programme in Geography

The *Geography programme* includes courses up to 180 credits, which correspond to three years of full-time studies:

1-30 credits: Geography I, 30 credits

31-60 credits: Geography II, 30 credits

61-90 credits: Geography III, 30 credits

91-165 credits: Elective and Optional courses

166-180 credits: Geography, Degree Project (Bachelor's Thesis), 15 credits

The Department of Physical Geography and Quaternary Geology and the Department of Human Geography at Stockholm University collaborate within the geography education, and much of the education is integrated physical and human geography. Every year 100-120 students start their Geography studies. They study geography either as a part of ordinary university studies or as a part of the theoretical education within the teachers' training programme at Stockholm University. Geography can be studied within a programme framework or as independent courses. Seen over a period of ten years, the influx of students has increased substantially. One reason for this increase is the elevated interest, and need for knowledge, in the field of geography in a world where globalization is steadily increasing.

Bachelor's Programme in Earth Science

The Bachelor's Programme in *Earth Science* (180 credits) is given in collaboration with the Department of Geological Sciences at Stockholm University. Courses can be taken within the programme framework or as stand-alone courses, both study paths leading to a Bachelor's Degree. Within the programme, the first year (60 credits) consists of mandatory courses where students learn the basics in earth science: Physical Geography and Quaternary Geology (30 credits) and Geology (30 credits), respectively. After the first year the students specialize within Physical Geography, Hydrology, Quaternary Geology, Geology, Marine Geoscience, or Geochemistry. The programme is completed with a 15 credits Degree Project (Bachelor's Thesis), which at the Department of Physical Geography and Quaternary Geology is either in Quaternary Geology, Physical Geography, or in Hydrology and Hydrogeology.

Bachelor's Programme in Biology-Earth Science

The Biology-Earth Science study programme encompasses 180 credits, and is carried out in collaboration with the Department of Biology Education at Stockholm University. The programme consists of 90 credits mandatory courses in earth sciences and environmental issues and 90 credits in biology. A 15 credits Degree Project (Bachelor's Thesis) ends the programme. A distinctive feature of the programme is the integration between Earth Science and Biology. The Earth Science parts focus particularly on Biogeography, Climatology, Geomorphology, Cartography, Soil Science, Aerial Photograph Interpretation and GIS, and Environmental Issues and Nature Conservation.

Environmental Studies

The Department of Physical Geography and Quaternary Geology offers a wide range of courses on Environmental Issues on Bachelor's level (first cycle). The courses are independent courses that are optional within the study paths of the bachelor programmes in Geography, Earth Science, Biology, and many other subjects.

5.2. Master's level (Second Cycle)

The Department of Physical Geography and Quaternary Geology offers advanced courses in Glaciology and Glacial Geomorphology, Climatology and Palaeoclimatology, Palaeoecology, Quaternary Geology, Hydrology and Hydrogeology, Geographic Information Systems, Cartography, Remote Sensing and Landscape Ecology. In addition the department offers courses in Political Ecology, Environmental Issues and Environment and Health Protection. The courses provide the prospective geoscientist and geographer with an overall breadth to be used in working with, for example, nature and environmental control, geoscientific examinations, planning, risk assessment and research.

The advanced courses are compiled in a number of Master's Programmes. These are all two years long and always include a research task in the form of a Degree Project. The programmes in general start with 1.5-2 semesters of mandatory courses with a certain topical emphasis. Thereafter the students take 1-1.5 semester of elective or optional courses and finish the programmes with a Degree Project of 1-2 semesters.

Master's Programmes

- Biology-Earth Sciences
- Environment and Health Protection
- Environmental Management and Physical Planning
- Geography
- Glaciology and Polar Environments
- Hydrology, Hydrogeology and Water Resources
- Landscape Analysis with Remote Sensing, GIS and Cartography
- Physical Geography and Quaternary Geology
- Quaternary Science and Climate Development

Other courses

The course "Science Communication, 15 credits" is an advanced course, which offers a generally deepened understanding of the role that scientific research plays in society and the problems attached to it, and offers a practice in the style of scientific writing and in communicating science in media.

Summer courses at field stations

The summer course "Glaciers and High Mountain Environments 7.5 credits" is a glaciology field course held at the Tarfala Research Station, northern Sweden. The field-based part of the course introduces different methods of measurement and analysis and the study of glacial or periglacial landscapes and processes. Another summer course, "Ecohydrology - a Mediterranean Perspective 7.5 credits", is based on theory and field-based experimentation relevant for ecohydrology. The field-based part of the course is held at the Navarino Environmental Observatory (NEO) in Greece. The last summer course offered by the department is "Urban Farming – Planning, Environment and Health 7.5 credits".

5.3. Postgraduate (Third Cycle) education

The postgraduate education program at the Department of Physical Geography and Quaternary Geology, Stockholm University, includes courses, seminars, excursions and the writing and defence of a Licentiate and a Doctoral thesis. Students can choose to either graduate in “Physical Geography” or in “Quaternary Geology”. The success of our postgraduate programme is reflected in the amount and quality of Doctoral theses produced (see section 6 in this report for a list of recent theses). Below, we will tabulate currently enrolled students and their projects within each examination subject.

Geography, Physical Geography:

Elsa Aggemyr

Land use change and effects of connectivity on past and present plant patterns in the archipelago

Alistair Auffret

Historical land use effects on dispersal of grassland species in rural landscapes

Robin Blomdin

Paleoglaciology and paleoclimate history of Central Asia bordered by the Kunlun Shan, Tian Shan and Altai Mountains

Meighan Boyd

Speleothems in Warm Climates – Holocene records from the Caribbean and Mediterranean

Arvid Bring

Arctic Climate and Water Change: Information Relevance for Assessment and Adaptation

Lucas Dawson

Systems dynamics and scenario-based modelling for integrated management and adaptive governance of functional green infrastructure and natural resource analysis at multiple spatial scales

Benoit Dessirier

Multi-phase flow in porous and fractured media

Matti Ermold

Changes in wetland distribution and consequences for biodiversity and ecosystem services

Martin Finné

Holocene climate variability in southern Greece

Ruben Fritzon

Earthquake periodicity in southern Greece from geochemical and geochronological studies of fault surfaces

Ping Fu

Glacial Geomorphology of the Haizi Shan area, SE Tibetan Plateau

Natacha Gribenski

Comparison of dating methods for glacier chronology in the Central Asia mountains

Christian Helanow

Theory for water routing through ice sheets

Lindsey Higgins

Environmental history and climate change in relation to historical land use changes in East Africa

Charlotta Högberg

Atmospheric modelling using space-based observations of stable water isotopes

Simon Jakobsson

Woody or treeless pastures? Linking subsidy systems, farmers decisions and management for understanding biodiversity patterns

Elin Jantze

The role of permafrost, hydrological and ecosystem shifts for arctic hydro-climatic interactions and carbon fluxes

Fernando Jaramillo

Nutrient sources, retention-attenuation and transport in hydrological catchments under climate change

Elikana Kalumanga

Movement and distribution of wild mammals in Malagarasi-Muyovozi Ramsar site, North-West Tanzania

Daniel Ketzer

Potential of Agrovoltaic systems to reduce land use competition between food and energy production

Alexander Koutsouris

Land management effect on water resources in Tanzania, Africa

Paul Krusic

Dendroclimatic reconstruction: Eastern Mediterranean region

Norris Lam

Improving streamflow and flood monitoring using LiDAR

Jessica Lindgren

Small remnant habitats additive value for biodiversity and ecosystem services in intensively utilized landscapes

Elidio Massuunganhe

Modeling sustainability of the Mozambican coastal zone – Geomorphology and changes of the Mozambican coast

Aikaterini Mazi

Hydro-climatic trends and interactions in the Mediterranean region

René Mbanguka

Modelling water resources effects of land-water management in Tanzania, Africa

Andrew Mercer

Accuracy of methods used for monitoring regional glacier mass balance changes

Simon Mwansasu

Factors affecting mangroves of the Rufiji Delta and impact on the livelihood of surrounding communities

Johanna Mård Karlsson

Mapping Arctic social-ecological resilience to hydrological change

Michaela Nylund

Mass movements in the Kenyan highlands – Land use and vulnerability

Juri Palmtag

Landscape partitioning and lability mapping of soil organic matter in permafrost terrain

Romain Pannetier

Modelling permafrost dynamics, permafrost hydrology and related solute transport under climate change

Jan Pietron

Basin-scale hydrological spreading of pollutants and wetland opportunities for reducing them

Julien Seguinot

Simulation of the Cordilleran Ice Sheet through a glacial cycle

Matthias Siewert

High-resolution mapping of soil organic matter storage and remobilization potential in periglacial landscapes

Ylva Sjöberg

Determining and mapping spatial distributions and thawing rates of inland permafrost under climatic change in the Arctic and Sub-Arctic

Claudia Teutschbein

Hydrological modelling for climate change impact assessment

Rebecka Törnqvist

Basin-scale hydrological och pollutant load impacts of land use and climatic changes

Lucile Verrot

Soil moisture and linked hydrological flow and transport changes

Anna Wahlstrand

Mass movements in the Kenyan highlands – Tropical soils and vulnerability

Emelie Waldén

Effects of local and regional processes on biodiversity in restored semi-natural grasslands

Quaternary Geology:

Annika Berntsson

Reconstruction of environmental and climate changes in Vindelfjällen, northern Sweden, using lake sediments

Hans Johansson

Late Quaternary tephrochronology of the Azores

Torbjörn Karlin

Deep ice core analysis of processes in the climate system

Ewa Lind

Tephrochronology of the north Atlantic region during the early Holocene

Anna Pliikk

Climate dynamics and environmental change during the Eemian Interglacial (MIS 5e) in Scandinavia inferred from a unique sediment sequence at Sokli (northern Finland)

Mats Regnell

Prehistoric plant use, agriculture and environment in southern Sweden

Shyhrete Shala

Early Holocene deglacial environment and hypsithermal warming at high latitudes (N Fennoscandia) as recorded by multi-proxy evidence

Sandra Siteo

Reconstructing flooding events in the Limpopo River flood-plain area, Mozambique

List of examinations for 2013

Name	Date	Degree
Claudia Teutschbein	15 February	PhD, Physical Geography
Arvid Bring	11 March	PhD, Physical Geography
Shilpa Asokan	03 April	PhD, Physical Geography
Alistair Auffret	05 June	PhD, Physical Geography
Carl Lilja	10 June	PhLic, Quaternary Geology
Rebecka Törnqvist	18 October	PhD, Physical Geography

6. Dissertations

The Department of Physical Geography and Quaternary Geology, Stockholm University

Thesis in Geography with emphasis on Physical Geography (2001-2006)

- SARA A. O. COUSINS, 2001. Plant species diversity patterns in a Swedish rural landscape: Effects of the past and consequences for the future. Dissertation No. 17. Faculty opponent: Dr. Roy Haines-Young
- CECILIA RICHARDSON-NÄSLUND, 2001. Spatial distribution of snow in Antarctica and other glacier studies using ground-penetrating radar. Dissertation No. 18. Faculty opponent: Prof. Robert W. Jacobel
- THOMAS SCHNEIDER, 2001. Hydrological processes in firn on Storglaciären, Sweden. Dissertation No. 19. Faculty opponent: Prof. Andrew Fountain
- HANS W. LINDERHOLM, 2001. Temporal and spatial couplings between tree-ring variability and climate in Scandinavia. Dissertation No. 20. Faculty opponent: Dr. Astrid Ogilvie
- MARIANNE I. LAGERKLINT, 2001. Marine multi-proxy records of late Quaternary climate change from the Atlantic Ocean. Dissertation No. 21. Faculty opponent: Dr. Lloyd H. Burckle
- RICHARD Y. M. KANGALawe, 2001. Changing land-use patterns in the Irangi hills, central Tanzania. A study of soil degradation and adaptive farming strategies. Dissertation No. 22. Faculty opponent: Prof. William Adams
- ANDERS CLARHÄLL, 2002. Glacial Erosion Zonation - Perspectives on Topography, Landforms, Processes and Time. Dissertation No. 23. Faculty opponent: Dr. Chris Clark
- KRISTER N. JANSSON, 2002. Glacial geomorphology of north-central Labrador-Ungava, Canada. Dissertation No. 24. Faculty opponent: Dr. Andrée Bolduc
- BJÖRN E. GUNNARSON, 2002. Holocene climate and environmental fluctuations from subfossil pines in central Sweden. Dissertation No. 25. Faculty opponent: Prof. Mike G. L. Baillie
- KATARINA. LÖFVENHAFT, 2002. Spatial and temporal perspectives on biodiversity for physical planning – Examples from urban Stockholm, Sweden. Dissertation No. 26. Faculty opponent: Prof. Jan Bengtsson
- ANNA ALLARD, 2003: Vegetation changes in mountainous areas - A monitoring methodology based on aerial photographs, high-resolution satellite images, and field investigations. Dissertation No. 27. Faculty opponent: Doc. Timo Helle
- PER KLINGBJER, 2004: Glaciers and climate in northern Sweden during the 19th and 20th century. Dissertation No. 28. Faculty opponent: Dr. Georg Kaser
- OLA FREDIN, 2004. Mountain centred ice fields in northern Scandinavia Dissertation No. 29. Faculty opponent: Prof. Jon Landvik

JOHAN M. BONOW, 2004. Paleosurfaces and paleovalleys on North Atlantic previously glaciated passive margins-reference forms for conclusions on uplift and erosion. Dissertation No. 30. Faculty opponent: Dr. Adrian Hall

RICKARD PETTERSSON, 2004. Dynamics of the cold surface layer of polythermal Storglaciären, Sweden. Dissertation No. 31. Faculty opponent: Prof. Helgi Björnsson

KATARINA LUNDBLAD, 2006. Studies on Tropical Palaeo-variation in Climate and Cosmic Ray Influx. Geochemical Data from Stalagmites Collected in Tanzania and Northern South Africa. Dissertation No. 32. Faculty opponent: Prof. Augusto Mangini

LENA RUBENSDOTTER, 2006. Alpine lake sediment archives and catchment geomorphology; causal relationships and implications for paleoenvironmental reconstructions. Dissertation No. 33. Faculty opponent: Prof. Catherine Souch

The Department of Physical Geography and Quaternary Geology, Stockholm University

Thesis in Quaternary Geology, published in Quaternaria, ser A. (2001)

KRISTIAN SCHONING, 2001. Marine conditions in middle Sweden during the late Weichselian and early Holocene as inferred from foraminifera, Ostracoda and stable isotopes. Dissertation No. 8.

LAIMDOTA KALNINA, 2001. Middle and Late Pleistocene environmental changes recorded in the Latvian part of the Baltic Sea basin. Dissertation No. 9.

ANNA HEDENSTRÖM, 2001. Early Holocene shore displacement in eastern Svealand, Sweden, based on diatom stratigraphy, radiocarbon chronology and geochemical parameters. Dissertation No. 10.

TIIT HANG, 2001. Proglacial sedimentary environment, varve chronology and late Weichselian development of the Lake Peipsi, eastern Estonia. Dissertation No. 11.

The Department of Physical Geography and Quaternary Geology, Stockholm University

Thesis in Quaternary Geology (2002-2005)

GREGGER LINDEBERG, 2002. The Swedish varved clays revisited: Spectral- and image analysis of different types of varve series from the Baltic Basin. Dissertation No. 1. Faculty opponent: Prof. Björn Malmgren

RATHNASIRI PREMATHILAKE, 2003: Late Quaternary palaeoecological event stratigraphy in the Horton Plains, central Sri Lanka - with contributions to the recent pollen flora. Dissertation No. 2. Faculty opponent: Prof. Francoise Gasse

ANGELICA FEURDEAN, 2004: Palaeoenvironment in north-western Romania during the last 15,000 years. Dissertation No. 3. Faculty opponent: Prof. Katherine J. Willis

ANDERS BORGMARK, 2005: The colour of climate: changes in peat decomposition as a proxy for climate change. Dissertation No. 4. Faculty opponent: Dr. Bas van Geel

JENS HEIMDAHL, 2005: Urbanised nature in the past – site formation and environmental development in two Swedish towns, AD 1200-1800. Dissertation No. 5. Faculty opponent: Dr. Jane Sidall

Dissertations from the Department of Physical Geography and Quaternary Geology (2006-)

HÅKAN GRUDD, 2006: Tree rings as sensitive proxies of past climate change. Dissertation No. 1. Faculty opponent: Prof. Brian Luckman

ULF JONSELL, 2006: Sulfur in polar ice and snow. Interpretations of past atmosphere and climate through glacial archives. Dissertation No. 2. Faculty opponent: Dr. Mark Curran.

HANNA S. SUNDQVIST, 2007: Speleothems as environmental recorders – A study of Holocene speleothems and their growth environments in Sweden. Dissertation No. 3. Faculty opponent: Prof. Frank McDermott.

PATRIK KLINTENBERG, 2007: More water, less grass? An assessment of resource degradation and stakeholders' perceptions of environmental change in Ombuga grassland, northern Namibia. Dissertation No. 4. Faculty opponent: Prof. Stein Bie.

MARIA RYNER, 2007: Past environmental and climate changes in northern Tanzania. Vegetation and lake level variability in Empakaai Crater. Dissertation No. 5. Faculty opponent: Prof. Henry Lamb.

DANIEL S. VERES, 2007: Terrestrial response to Dansgaard-Oeschger cycles and Heinrich events: the lacustrine record of Les Echets, south-eastern France. Dissertation No. 6. Faculty opponent: Prof. John J. Lowe.

YOSHIHIRO SHIBUO, 2007: Modelling water and solute flows at land-sea and land-atmosphere interfaces under data limitations. Dissertation No. 7. Faculty opponent: Dr. Clifford Voss.

GESSESSE DESSIE, 2007: Forest Decline in South Central Ethiopia: Extent, history and process. Dissertation No. 8. Faculty opponent: Prof. Mats Widgren.

HERNÁN DE ANGELIS, 2007: Palaeo-ice streams in the north-eastern Laurentide Ice Sheet. Dissertation No. 9. Faculty opponent: Dr. Colm Ó Cofaigh.

AMÉLIE DARRACQ, 2007: Long-term development, modeling and management of nutrient loading to inland and coastal waters. Dissertation No. 10. Faculty opponent: Prof. Andrea Rinaldo.

ELIN NORSTRÖM, 2008: Late Quaternary climate and environmental change in the summer rainfall region of South Africa - A study using trees and wetland peat cores as natural archives. Dissertation No. 11. Faculty opponent: Prof. Michael Meadows.

- FREDRIK HANNERZ, 2008: Making water information relevant on local to global scale - the role of Information Systems for Intergrated Water Management. Dissertation No. 12. Faculty opponent: Prof. Dennis Lettenmaier.
- MATTIAS DE WOUL, 2008: Response of glaciers to climate change – Mass balance sensitivity, sea level rise and runoff. Dissertation No. 13. Faculty opponent: Dr. Roger Braithwaite.
- BRADLEY W GOODFELLOW, 2008: Relict non-glacial surfaces and autochthonous blockfields in the northern Swedish mountains. Dissertation No. 14. Faculty opponent: Dr. Adrian Hall.
- MARTINA HÄTTESTRAND, 2008: Vegetation and climate during Weichselian ice free intervals in northern Sweden – interpretations from fossil and modern pollen records. Dissertation No. 15. Faculty opponent: Prof. Donatella Magri.
- LINDA AMPEL, 2008: Dansgaard-Oeschger cycles and Heinrich events in western Europe – A diatom perspective. Dissertation No. 16. Faculty opponent: Prof. Sherilyn Fritz.
- GULL OLLI, 2008: Waterborne sediment and pollutant transport into lakes and accumulation in lake sediments. Dissertation No. 17. Faculty opponent: Prof. Ingmar Renberg.
- CHRISTINA E. JONSSON, 2009: Holocene climate and atmospheric circulation changes in northern Fennoscandia – interpretations from lacustrine oxygen isotope records. Dissertation No. 18. Faculty opponent: Dr. Philip Barker.
- KARIN EBERT, 2009: Cenozoic landscape evolution in northern Sweden. Geomorphological interpretation within a GIS-framework. Dissertation No. 19. Faculty opponent: Prof. Paul Bishop.
- SOFIA ANDERSSON, 2010: Late Holocene humidity variability in central Sweden. Dissertation No. 20. Faculty opponent: Prof. Frank Chambers.
- JAKOB HEYMAN, 2010: Palaeoglaciology of the northeastern Tibetan Plateau. Dissertation No. 21. Faculty opponent: Prof. Frank Lehmkuhl.
- TIMOTHY JOHNSEN, 2010: Late Quaternary ice sheet history and dynamics in central and southern Scandinavia. Dissertation No. 22. Faculty opponent: Prof. James T. Teller.
- BRITTA SANNEL, 2010: Temporal and spatial dynamics in subarctic peat plateaus and thermokarst lakes. Dissertation No. 23. Faculty opponent: Prof. Serge Payette.
- THOMAS GRABS, 2010: Water quality modelling on landscape analysis: importance of riparian hydrology. Dissertation No. 24. Faculty opponent: Dr. Irena Creed.
- ERIKSSON SOFIA, 2011: Cross-scale perspectives on heterogeneity in Swedish boreal forests. Dissertation No. 25. Faculty opponent: Prof. Risto Kalliola.
- HUGELIUS GUSTAF, 2011: Quantity and quality of soil organic matter in permafrost terrain. Dissertation No. 26. Faculty opponent: Prof. Philip Wookey.

- INGVANDER SUSANNE, 2011: Snow particle size investigations using digital image analysis - implications for ground observations and remote sensing of snow. Dissertation No. 27. Faculty opponent: Prof. Matti Leppäranta.
- PERSSON KLAS, 2011: Quantifying pollutant spreading and the risk of water pollution in hydrological catchments - A solute travel time-based scenario approach. Dissertation No. 28. Faculty opponent: Prof. Aldo Fiori.
- ÖBERG HELENA, 2012: Diatoms in Lake Duluti - Tracking Environmental Variability in Northern Tanzania during the Past 1000 Years. Dissertation No. 29. Faculty opponent: Prof. Dr. Robert Marchant.
- MARGOLD MARTIN, 2012: Retreat pattern and dynamics of glaciers and ice sheets: reconstructions based on metlwater features. Dissertation No. 30. Faculty opponent: Dr. Reader Chris Stokes.
- JOHANSSON MALIN, 2012: Remote sensing of supra-glacial lakes on the west Greenland Ice Sheet. Dissertation No. 31. Faculty opponent: Dr. Andreas Ahlstrøm.
- KAISLAHTI TILLMAN PÄIVI, 2012: Holocene climate and environmental change in high latitudes as recorded by stable isotopes in peat deposits. Dissertation No. 32. Faculty opponent: Prof. Thomas W.D. Edwards.
- GRANIT, JAKOB, 2012: The Collective Action Dilemma in Managing Transboundary Freshwaters - An Analysis of an Outcome-Driven Framework. Dissertation No. 33. Faculty opponent: Prof. Carl Christiansson.
- TEUTSCHBEIN CLAUDIA, 2013: Hydrological Modeling for Climate Change Impact Assessment: Transferring Large-Scale Information from Global Climate Models to the Catchment Scale. Dissertation No. 34. Faculty opponent: Prof. Chris Kilsby.
- BRING ARVID, 2013: Arctic Climate and Water Change: Information Relevance for Assessment and Adaptation. Dissertation No. 35. Faculty opponent: Dr. Richard Lammers.
- ASOKAN SHILPA, 2013: Hydro-climatic changes in irrigated world regions. Dissertation No. 36. Faculty opponent: Prof. Howard Wheeler.
- AUFFRET ALISTAIR, 2013: Seed mobility and connectivity in changing rural landscapes. Dissertation No. 37. Faculty opponent: Prof. Robin Pakeman.
- TÖRNQVIST REBECKA, 2013: Basin-scale change in water availability and water quality under intensified irrigated agriculture. Dissertation No. 38. Faculty opponent: Dr. Marcel van der Perk.

7. International exchange

INK has the perfect preconditions for international exchange. Our department is popular among incoming students from our partner universities (and other universities). This has always been the case but English Master Courses have increased INKs popularity. Some students get back to us after their Erasmus-stay as visiting students to write their thesis here. We can observe an increased interest among our own students to study in other countries.

7.1. Lecturer exchange

7.2. Student exchange

Erasmus exchange (coordinator: K. Ebert)

Bryssel/Belgien
Freiburg/Tyskland
Innsbruck/Österrike
Bern/Schweiz
Leuven/Belgien
Ostrava/Tjeckien
Grenoble/Frankrike
Coventry/UK
Murcia/Spanien
Aachen/Tyskland
Gent/Belgien
Turku/Finland
Novia/Finland
Patras/Grekland



Lunch on the Varanger Peninsula, close to the northernmost point of mainland Europe, sept 2013, excursion of the Masters course “Polar and Alpine environments”. Photo: Karin Ebert.

8. Conferences and seminars

February

Helmens, Rosqvist
Shala, Stroeven: *PAGES 4th Open Science Meeting, Goa, India*

March

Kirchner: *Gordon Research Conference, Polar Marine Science, Ventura, CA, USA*

Sundqvist: *Meeting of the Euro-Med2k Working Group, Reading, UK*

Quin: *Hydrologidagarna, SLU, Umeå, Sweden*

April

Bring: *Arctic Science Summit Week, Krakow, Poland*

Goodfellow
Heyman, Holzkämper,
Mazi, Törnqvist: *EGU, General Assembly, Vienna, Austria*

Lind, Wastegård
Heyman, Hättestrand: *BIOCOLD workshop, Tovetorp, Sweden*

Lind, Wastegård: *INTIMATE workshop, Blair Atholl, Scotland, UK*

Preusser: *DOVE workshop, Como, Italy*

Zhang: *Fjärranalysdagarna, Stockholm, Sweden*

EC-Earth meeting, Lisbon, Portugal

July

Boyd: *Summer School on Speleothem Science, Heidelberg, Germany*

August

Auffret, Lindborg
Cousins: *Intecol International Congress of Ecology, London, UK*

Ebert: *International Conference on Geomorphology, Paris, France*

Preusser: *Luminescence and ESR dating conference, St. Andrews, UK*

Sundqvist, Zhang: *Isotopes of Carbon, Water, and Geotracers in Paleoclimate Research, Bern, Switzerland*

October

Goodfellow: *NSF Workshop on Probing the Depths of the Critical Zone, Denver USA*

Preusser: *INTIMATE workshop, Obergurgl, Austria*

German Luminescence and ESR dating conference, Freiberg, Germany

Skånes: *SKMF MätKart13, Norrköping, Sweden*

Changing European Landscapes - Landscape ecology, local to global, IALE Europe. Manchester, UK

November

Clason: *International Glaciological Society Nordic Branch at Lammi Biological Station, Finland*

Higgins, Plikk: *Nordic Diatomists' Meeting, Norr Malma field station Norrtälje, Sweden*

Hind, Moberg: *Integrated analyses of reconstructions and multi-model simulations for the past two millennia, Madrid, Spain*

Mazi, Quin: *National Geosphere Laboratory Annual Science Meeting, Oskarshamn*

Inspiration vatten, Marholmen, Norrtälje

Skånes: *EMMA slutkonferens, Stockholm*

December

Bring, Goodfellow, Harbor
Hind, Lyon, Rosqvist,
Stroeven: *AGU Fall Meeting, San Francisco, USA*

Goodfellow, Harbor
Stroeven: *Gilbert Club Meeting, Berkeley USA*

9. Conference/Seminar convers, Editorships, PhD opponents

- Boyd: *Organizing Committee member: Summer School on Speleothem Science. Germany, July*
- Bring: *Visiting lecturer in water conflict management, UNESCO-IHE Institute for Water Education, Delft, the Netherlands*
- Bring,
Mård Karlsson: *Convener of session "Changes in the Arctic Freshwater System" at the AGU Fall Meeting, USA, December*
- Bring,
- Destouni: *Organizer of the National Geosphere Laboratory (NGL) Annual Science Meeting in Oskarshamn, Sweden, November*
- Harbor: *Associate Editor for the Anthropocene*
- Co-led a joint Stockholm University – Purdue University education collaboration that involved SU and PU students learning together in field trips in Sweden and Norway*
- Kirchner: *Guest lecturer at University Centre in Svalbard ,UNIS, within course "Marine Cryosphere and its Cenozoic History"*
- Lidmar-Bergström: *Stormöte på Ivögården angående reservatsbildningen på Ivö klack i regi av Länsstyrelsen Skåne, Miljöavdelningen, Naturskyddsenheten, April*
- Lind: *Guest lecturer in tephrochronology at the University Centre in Svalbard, UNIS, May*
- Lyon: *Doctoral examiner at the Faculty of Agriculture and Environment, University of Sydney, Australia, September*
- Visiting lecturer at the University of Dar es Salaam in Institute for Resource Assessment, May*
- Host for international students from University of Ahvaz and Utrecht University*
- Preusser: *Editor Quaternary Geochronology*
PhD examiner (Ash Parton), Oxford Brookes University, UK
- Skånes: *NordPlus, Turku, Finland*
- Co-organiser of Environmental mapping and monitoring with airborne laser and digital images conference in Stockholm, Sweden, November*

Wastegård: *Workshop convener, BIOCOLL, Tovetorp, Sweden, April*

Zhang: *Organiser of three mini workshop within RA5 in Bolin Centre
Kick-off in March, Stockholm
Model-data comparison workshop, May, Stockholm
Paleo-simulation set-up with EC-Earth, November, Stockholm*



Stockholm University – Purdue students together in field in Sweden and Norway.
Photo: Jon Harbor.

10. Financial support

GRANT ORGANIZATIONS

EU	<i>European Union</i>
FORMAS	<i>The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (Forskningsrådet för miljö, areella näringar och samhällsbyggande)</i>
RS	<i>Swedish National Space Board (Rymdstyrelsen)</i>
SIDA	<i>Swedish International Development Cooperation Agency (Styrelsen för internationellt utvecklingssamarbete)</i>
SKB	<i>Swedish Nuclear Fuel and Waste Management (Svensk kärnbränslehantering AB)</i>
SSM	<i>Swedish Radiation Safety Authority</i>
SU	<i>Stockholm University</i>
TRI	<i>Top-level Research Initiative</i>
VR	<i>The Swedish Research Council (Vetenskapsrådet)</i>

RESEARCH GRANT RECEIVER	FUNDING AUTHORITY	PROJECT	AMOUNT
Berg	SIDA	Mainstreaming an ecosystem based approach to climate change into biodiversity conservation planning in Vietnam.	593 000
Berg	SIDA	Sustainable management of ecosystem services for long term aquaculture production in the Mekong Delta, Vietnam	2 250 000
Brown	RS	Multi-scale investigations of microwave snowpack observations (MIMSO)	1 395 000
Cousins	FORMAS	Biodiversity and ecosystem services of small forest fragments in European landscapes	200 000
De la Torre Castro	VR	Genus, fattigdom och marina resurser i en kontext av klimatförändringar	1 000 000
Destouni	SU	Klimatmodeller	696 000
Destouni	VR	Källor, retention-självrening och transport av närsalter i avrinningsområden under klimatförändring	1 300 000
Destouni	SU	BEAM (Baltic Ecosystem Adaptive Management)	655 000
Destouni	Oskarshamns kommun	Nova FoU - KLIV (Climate-land-water changes and integrated water resource management)	500 000
Frampton	SKB	Flöde och transport i sprickigt kristallint berg	152 250

RESEARCH GRANT RECEIVER	FUNDING AUTHORITY	PROJECT	AMOUNT
Frampton	SU/Future Learn	Utveckling av ett simulerings- och visualiseringsverktyg för flöde- och transportprocesser inom hydrologisk utbildning.	200 000
Holmgren	SIDA	Agreement regarding fund entrusted to the Swedish Institution as part of the Agreement on Research Cooperation between Sweden and The University of Dar es Salaam (UDSM) - Integrated Natural resource Mangement	367 500
Holmgren	TEMES/SU	"TEMES - Cooperation and partnership for climate and Environmental Research in the Mediterranean area trough Navarino Environmental Observatory (NEO) Research Program	2 700 000
Holmgren	SIDA	Environment and Natural Resource Management	475 500
Holmgren	Lund Uni./VR	Storskalig klimatdynamik i Europa under de senaste 2000 åren baserat på isotopanalys av sjösediment, grott-avlagringar och trädårsringar	108 000
Holmlund	VR	Klimat och miljödata från Arktis 1880-1980	800 000
Holmlund	SSM	Temperaturförhållanden i en inlandsis - Vattenflöde och erosionsförmåga	1 093 000
Jansson P	SKB	Water routing through ice sheets based on Greenland field data and its application to the Fennoscandian Ice Sheet	361 400
Kleman	VR	Norra hemisfärens paleotopografi under den glaciala sista cykelns uppbyggnads-faser 115-21 kyr BP, och dess inverkan på atmosfärens circulation	372 000
Kuhry	TRI	Impacts of a changing cryosphere-depicting ecosystem-climate feedbacks from permafrost, snow and ice	414 227
Kuhry	VR	Glacial Epoch Permafrost Carbon	1 527 000
Kuhry	EU-FP7	Changing Permafrost in the Arctic and its Global Effects in the 21st Century	900 000

RESEARCH GRANT RECEIVER	FUNDING AUTHORITY	PROJECT	AMOUNT
Lindborg	FORMAS	Träd på naturbetesmarker - effekter av ersättningssystem och skötsel på mångfald och artsammansättning	690 000
Lindborg	FORMAS	SAPES (Multifunctional Agriculture: Harnessing Biodiversity for Sustaining Agricultural Production and Ecosystem Services)	300 000
Lyon	VR	LiDAR data: ett innovativt verktyg för övervakning av flödet i vattendrag	750 000
Lyon	SIDA	Water resources effects of land-water management in Tanzania, Africa	800 000
Stjernquist	FORMAS	Gröna infrastrukturer	701 147
Stroeven	VR	Klimat- och nedisningshistorik i Centralasien och Tibet	800 000
Zhang	RS	Atmospheric medelling using space-Based observations of stable water isotopes	961 000
Totalt			23 062 024

11. Staff (autumn 2013)

Department Chairman/Head: Professor Arjen Stroeven
Vice Chairman: Dr Ingrid Stjernquist

PROFESSORS

Cousins, Sara	Professor of Physical Geography
Destouni, Georgia	Professor of Hydrology, Hydrogeology and Water Resources
Hansson, Margareta	Professor of Environmental Science with emphasis on Physical Geography / Quaternary Geology
Harbour, Jonathan	visiting Professor
Holmgren, Karin	Professor of Physical Geography
Holmlund, Per	Professor of Glaciology
Hättestrand, Clas	Professor of Physical Geography
Jansson, Peter	Professor of Physical Geography
Kleman, Johan	Professor of Remote Sensing
Kuhry, Peter	Professor of Physical Geography
Kuylenskierna, Johan	visiting Professor of Water Resources
Preusser, Frank	Professor of Quaternary Geology with emphasis on Environmental Reconstruction
Rosqvist, Gunhild	Professor of Geography, especially Physical Geography
Stroeven, Arjen	Professor of Physical Geography
Sverdrup, Harald	visiting Professor
Wastegård, Stefan	Professor of Quaternary Geology

ACADEMIC STAFF

Associate Professors (PhD, Docenter)

Berg, Håkan	senior lecturer
Brown, Ian	senior lecturer
Dahlberg, Annika	senior lecturer
De la Torre Castro, Marciela	senior lecturer
Gunnarson, Björn	director of studies, researcher
Helmens Femke, Karin	researcher
Holzkämper, Steffen	senior lecturer
Jansson, Krister	senior lecturer
Jarsjö, Jerker	senior lecturer
Lindborg, Regina	senior lecturer
Lyon, Steve	senior lecturer
Moberg, Anders	senior lecturer
Risberg, Jan	senior lecturer
Seibert, Jan	senior lecturer

PhD

Borgström, Ingmar	senior lecturer
Ballarotta, Maxime	postdoctor
Clason, Caroline	postdoctor
De Angelis, Hernán	research associate
Frampton, Andrew	associate senior lecturer

Goodfellow, Bradley	postdoctor
Grudd, Håkan	research engineer
Hind, Alistair	postdoctor
Hugelius, Carl-Gustaf	researcher
Hättestrand, Martina	researcher
Heyman, Jakob	postdoctor
Ingvander, Susanne	postdoctor
Juston, John	researcher
Kirchner, Nina	senior lecturer
Norström, Elin	researcher
Plue, Jan	postdoctor
Prieto, Carmen	research engineer
Quin, Andrew	postdoctor
Rogberg, Peter	researcher
Sannel, Britta	senior lecturer
Schlyter, Peter	senior lecturer
Skånes, Helle	senior lecturer
Stjernquist, Ingrid	senior lecturer
Sundqvist, Hanna	researcher
Vercauteren, Nikki	postdoctor
Westerberg, Lars-Ove	senior lecturer, director of undergraduate studies
Winterdahl, Mattias	postdoctor
Zhang, Qiong	senior lecturer
Öberg, Helena	postdoctor

PhLic, MSc, BSc

Eknert, Bo	PhLic, lecturer
Fridfeldt, Anders	BSc, lecturer, director of undergraduate studies
Karlsson, Sven	PhLic, researcher
Nordström, Anders	PhLic, senior lecturer
Regnell, Mats	PhLic, researcher

Postgraduate students (PhLic, MSc, BSc)

Aggemyr, Elsa
 Auffret, Alistair
 Berntsson, Annika
 Blomdin, Robin
 Boyd, Meighan
 Bring, Arvid
 Dawson, Lucas
 Dessirier, Benoit
 Ermold, Matti
 Finné, Martin
 Fritzon, Ruben
 Fu, Ping
 Gribenski, Natacha
 Helanow, Christian
 Higgins, Lindsey
 Högberg, Charlotta

Jakobsson, Simon
 Jantze, Elin
 Jaramillo, Fernando
 Johansson, Emma
 Johansson, Hans
 Kalumanga, Elikana
 Ketzer, Daniel
 Koutsouris, Alexander
 Krusic, Paul
 Lam, Norris
 Lind, Ewa
 Lindgren Jessica
 Massuanganhe, Elidio
 Mazi, Ekaterina
 Mbanguka, René
 Mercer, Andrew
 Mwansasu, Simon
 Mård Karlsson, Johanna
 Nylund, Michaela
 Palmtag, Juri
 Pannetier, Roman
 Pietron, Jan
 Plikk, Anna
 Seguinot, Julien
 Siewert, Matthias
 Shala, Shyhrete
 Siteo, Sandra
 Sjöberg, Ylva
 Than Nguyen, Tam
 Deutschbein, Claudia
 Törnqvist, Rebecka
 Verrot, Lucile
 Waldén, Emelie
 Wahlstrand, Anna
 Weiss, Niels

Teaching assistants

Andersson, Marcus, BSc
 Ekstedt, Karin, MSc
 Hamré, Moa, BSc
 Gilljam, Carl, MSc
 Wennbom, Marika, MSc

ADMINISTRATIVE STAFF

Blåndman, Susanna	BSc, BA, human resources administrator
Damberg, Maria	MSc, study advisor
Ebert, Karin	PhD, education coordinator
Hansson, Erik	MSc, educational administrator

Henriksson, Carina	University certified administrator, senior administrative officer
Holmlund, Moa	MSc educational administrator
Hörnby, Kerstin	MSc, educational administrator
Isdal, Maija-Liisa	BSc, financial administrative officer
Karlin, Torbjörn	station manager Tarfala research station
Maneas, Giorgos	PhD, station manager Navarino Environmental Observatory
Person, Karin	BSc, educational administrator
Reuterswärd, Karin	PhLic, educational administrator, study advisor
Richert, Linus	administrator
Schaffer, Christina	MSc, educational administrator
Stenberg de Serves, Malin	PhD, information officer
Sturesson, Elisabeth	MSc, educational administrator
Trygger Bergman, Sofie	MSc, educational administrator
Åkerblom, Lena	higher administrative officer

TECHNICAL STAFF

Alm, Göran	PhLic, systems engineer
Berglöf, Rasmus	system engineer
Brotén, Bengt	technician
Cabrera, Yanduy	caretaker
Jacobson, Rolf	web editor
Katrantsiotis, Christos	research assistant
Li, Qiang	PhD, scientific programmer
McGlynn, Laura	research assistant
Muliyil Asokan, Shilpa	PhD, research assistant
Oyabu, Ikumi	research assistant
Skantz, Johan	caretaker
Spångberg, Martin	systems engineer
Wolff, Jennifer	research assistant
Österlin, Carl	research assistant

PROFESSORS EMERITI

Christiansson, Carl	
Ihse, Margareta	
Lidmar-Bergström, Karna	
Lundén, Bengt	
Lundqvist, Jan	
Karlén, Wibjörn	
Miller, Urve	
Ringberg, Bertil	
Wastenson, Leif	
Østrem, Gunnar	DSc