



**Department of Physical Geography
and Quaternary Geology
Stockholm University**



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1. Introduction

The Department of Physical Geography and the Department of Quaternary Research joined forces to create the Department of Physical Geography and Quaternary Geology on January 1, 2001. The merger was motivated because of a clear common interest between some fields in Physical Geography and some in Quaternary Geology. Physical Geography is about the landscape of today, landforms, climate, and the vegetation cover, and its changes (past, present and future) by natural processes and human impact. Quaternary Geologists are concerned with climatic and environmental changes during the Quaternary period. The two fields clearly overlap one another. Analysis of spatial patterns is characterising the geographical approach, while Quaternary Geology utilises the Quaternary stratigraphic record. The questions that we address in teaching and research emphasise the need for interdisciplinary and multidisciplinary approaches. Basic research is oriented towards furthering our understanding of short- and long-term processes and interactions that lead to landscape development and environmental and climatic changes. Past and present systems behaviour and interactions are modelled for predictions of future likely trends. Education and research at the department have expanded over the past decades. We currently have a growing competence of staff and students, and exciting new research avenues are being explored.

In addition to the traditional research focus in geomorphology, glaciology, polar research, terrestrial Quaternary stratigraphy, glacial geology and paleoclimatic and palaeoenvironmental changes, the fields of remote sensing, geographic information systems and cartography, supported by the rapid development of computer techniques, have taken an advanced position in the research profile of the department. The fields of ecological geography, tropical geography are also relatively new research strongholds. The Department of Physical Geography and Quaternary Geology and the Department of Human Geography jointly conduct the interdisciplinary research in tropical geography. The fields of hydrology and water resources were firmly established last year by the move of a strong research group from the Royal Institute of Technology (KTH) to our department.

All geoscience institutions are located in the Geosciences building at the campus of Stockholm University in Frescati since the fall of 1996. We have all the facilities of a modern housing, laboratories, and equipment to conduct increasingly successful scientific studies and offer stimulating and advanced education to prospective students.

Arjen Stroeven
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Physical Geography

Barbara Wohlfarth
professor
Quaternary Geology

Karin Holmgren
docent
Head of the Department

History

Although geography at Stockholm University was established as a subject in its own right in 1912, 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 had a particular interest in Arctic research and glaciology. He led several expeditions to the Arctic and also initiated the establishment of a glaciological research station in the Swedish mountains, the Tarfala Research Station. Valter Schytt, appointed professor of glaciology between 1970 and 1985, continued the tradition of Arctic research by organising several expeditions to Svalbard and adjacent areas and to the Antarctic. Per Holmlund succeeded him in 1999.

Most of Gunnar Hoppe's scientific work concerned the deglaciation history of the Fennoscandian ice sheet. He pioneered the incorporation and interpretation of aerial photographs in geomorphological research, and he initiated and led a geomorphological survey mapping of the Swedish high mountains. 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.

As long as geology has been a subject at Stockholm University, Quaternary Geology has had a strong position. Two early professors of Geology, Gerard De Geer (1897 – 1924) and Lennart von Post (1929 – 1950) had an international reputation in Quaternary geology, De Geer mainly 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 a new direction towards applied geology. However, it was not until 1962 that Quaternary geology became an independent subject of examination and in 1963 a department of its own. At Wenner's retirement in 1980 Jan Lundqvist succeeded him to become the first full professor of Quaternary Geology at Stockholm University. Lundqvist retired in 1993 and was succeeded by Bertil Ringberg, and, in 2002, by Barbara Wohlfarth.

Research directions of the other professorships are in tropical geography (Carl Christiansson), hydrology (Georgia Destouni), ecological geography (Margareta Ihse), geomorphology (Karna Lidmar-Bergström), and paleoglaciology (Arjen Stroeven). Together with the aforementioned professorships at the Department, we successfully straddle both traditional and current directions in physical geography and Quaternary geology.

2. Current Research

2.1. Geomorphology

Glacial Geomorphology and Palaeoglaciology

The focus of our research is the landform record created by former ice sheets. We use regional and ice-sheet scale patterns to infer glaciological parameters, particularly basal thermal regime and flow pattern. Target areas are those that have been covered by former ice sheets in Fennoscandia and North America. Crosscutting relationships between landform systems and their correlation to stratigraphical data allow the establishment of a reconstruction of glacial evolution through time. The geographical distribution pattern and the detailed morphology of specific landforms yield important clues to the formation mechanisms, environment, and the time of formation. The recent application of cosmogenic nuclide techniques allows a further precision on the timing of specific glacial events to be determined. These studies also help constrain the long-term erosive impact of past ice sheets. Hence, key elements employed within our research strategy are the geographical approach, which is based on a comprehensive mapping in aerial and satellite photographs, the development and continuous improvement of inversion models for the reconstruction of palaeo-ice sheet behaviour from geomorphological data, and the application of cosmogenic nuclide techniques to study the long-term evolution of glacial landscapes and the total impact of glacial erosion on the current landscape.

The following important topics are addressed:

- Evolution of the Fennoscandian ice sheet through the last glacial cycle
- Landform record of the Quebec-Labrador sector of the Laurentide ice sheet
- The evolution of the Laurentide ice sheet during the last glacial cycle
- Landforms as indicators of ice sheet basal thermal patterns
- Glacial and long-term geomorphic evolution of the ice-overridden mountain ranges in Fennoscandia and Antarctica.

Long-term landform evolution around the North Atlantic

Research is focused on the relationship between landforms and Cainozoic uplift around the North Atlantic. It is performed in co-operation with geophysicists working with the thermal evolution of the bedrock and geologists working with the surrounding sedimentary basins. The work has hitherto mainly been performed within Fennoscandia. Much effort has been devoted to map re-exposed surface topography in the basement and to localize remnants of old weathering mantles (saprolites). The focus has lately widened to include the relation between stepped surfaces, valley incision and Cainozoic uplift within the Northern and Southern Scandes. The work has led to the identification of three domes within Fennoscandia of different heights viz. the Northern Scandes (2100 m), the Southern Scandes (2500 m) and the South Swedish Dome (400 m) and conclusions on their different uplift histories. A Neogene uplift of the Southern Scandes is also relevant to the relation between uplift, glaciation and valley development.

Another theme for the group, performed in co-operation with Göteborg and Karlstad Universities, is a study of the impact of deep weathering in relation to glacial erosion on the present relief on different palaeosurfaces. This is of importance for understanding the erosive capacity of glaciers over different types of substratum.

Present research focuses on the following subjects:

- Landforms and Cainozoic uplift around the North Atlantic
- The differentiation between glacial and fluvial erosion during the Neogene and Quaternary
- Glacial erosion in relation to inherited relief of different palaeosurfaces.



Bedrock outcrops, tors, on upland surfaces in the northern Swedish Mountains. These uplands normally have a distinctly non-glacial, relict, appearance, which has been corroborated by cosmogenic nuclide studies. The upper panel is a panorama from uplands between lakes Torneträsk and Rautas, and the lower panel from uplands south of lake Paitasjärvi. Photographs by A. Stroeven.

Reviewed articles

1. Bonow, J.M., Lidmar-Bergström, K. and Näslund, J.-O. 2003: Palaeosurfaces and major valleys in the area of Kjølén Mountains, southern Norway. Consequences of uplift and climatic change. *Norsk Geografisk Tidsskrift*, 7: 83-101.
2. Clarhäll, A. and Jansson, K.N. 2003: Time perspectives on glacial landscape formation - Glacial flow chronology at Lac aux Goélands, north-eastern Québec, Canada. *Journal of Quaternary Science*, 18: 441-452.
3. Jansson, K.N. 2003: Early Holocene glacial lakes and ice marginal retreat pattern in Labrador/Ungava, Canada. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 193: 473-501.
4. Jansson, K. and Lidmar-Bergström, K. 2003: Observations on weathering forms at the Caniapiscau Reservoir, North-Central Québec, Canada. *The Canadian Geographer*, 48: 1-10.
5. Jansson, K.N., Stroeven, A.P. and Kleman, J. 2003: Configuration and timing of Ungava Bay ice streams, Labrador-Ungava, Canada. *Boreas*, 32: 256-262.

Other publications

1. Lidmar-Bergström, K., Näslund, J.-O., Bonow, J.M. and Neubeck, T. 2002: Hur gammal är fjällkedjan och hur blev den till? *Ymer*, 122: 39-51.

Staff affiliations

Johan Kleman, Professor (see also 2.4)

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2.2. Glaciology

Tarfala Research Station

The glaciological studies carried out at Tarfala are focused on Storglaciären, and the most important programme is the mass balance study, which now has been running for 54 consecutive years. Additionally, the mass balance of 6 other glaciers and the glacier front positions of 20 glaciers are studied. The mass balance measurements include surveys on an annual basis. Direct climatic information is received from 6 weather stations run by the Department as a complement to the network of climate stations operated by the Swedish Meteorological and Hydrological Institute (SMHI). In order to understand the coupling between climate-induced mass changes and geometry changes in glacier extent and thickness, ice dynamic studies are performed. Ice velocity measurements are also used to increase the understanding of how glacier movement relates to changes in the hydrological regime. An extensive hydrological programme has been run both in the Tarfala valley and on the glaciers since the early sixties. At present the research efforts are focused on firn hydrology. Over the past decade radar application has been an important part of most glaciological programmes run by the group.

Antarctic research

The programmes outlined by the SCAR Global Change programme GLOCHANT, and the European Programme for ice coring in Antarctica (EPICA) govern the Antarctic projects. The GLOCHANT programmes concern present day climate development (ITASE), the mass balance of the continental ice sheet (ISMASS) and the Quaternary development of the ice sheet (ANTIME). Our efforts in these programmes are focused on firn coring, ice velocity measurements, and on radar soundings to map ice thickness and snow stratigraphy. During the winter 1997/98 we performed EPICA pre-site surveys within the SWEDARP initiative in Dronning Maud Land. Three 100-130 m long ice cores were sampled at two sites, one on the Polar Plateau and one near the coast.

Glacier modelling

We have three different ice numerical modelling programmes running; the modelling of valley glaciers, past Scandinavian ice sheets, and the present ice sheet in East Antarctica. These programmes are run in collaboration with ETH in Zurich, University of Maine, Geological Survey of Sweden, and the EPICA-community.

Research headlines for the Glaciology group

- Glacier mass balance
- Ice velocity measurements
- Ice temperature
- Snow and ice cores
- Glacial hydrology
- Glacier and landscape
- Remote sensing of snow and ice



The Riukojietna ice cap in northern Sweden is located on the border between Sweden and Norway and is the only ice cap-type glacier in Sweden. This photograph was taken on June 30, 2003, and shows the extremely negative mass balance experienced by glaciers in northern Scandinavia during 2003. The negative balance was the effect of a combination of low winter accumulation followed by a warm summer. Photograph by P. Jansson.

Reviewed articles

1. Claquin, T., Roelandt, C., Kohfeld, K.E., Harrison, S.P., Tegen, I., Prentice, I.C., Balkanski, Y., Bergametti, G., Hansson, M., Mahowald, N., Rodhe, H. and Schulz, M. 2003: Radiative forcing of climate by ice-age atmospheric dust. *Climate Dynamics*, 20: 193-202.
2. Glasser, N.F., Hambrey, M.J., Etienne, J.L., Jansson, P. and Petterson, R. 2003: The origin and significance of debris-charged ridges on the surface of Storglaciären, northern Sweden. *Geografiska Annaler*, 85A: 127–147.
3. Grönlund, A., Nilsson, D., Koponen, I.K., Virkkula, A. and Hansson, M.E. 2002: Aerosol dry deposition measured with eddy-covariance technique at Wasa and Aboa, Dronning Maud Land. *Annals of Glaciology*, 35: 355-361.
4. Harris, C., Mühll, D.V., Isaksen, K., Haeberli, W., Sollid, J.L., King, L., Holmlund, P., Dramis, F., Guglielmin, M. and Palacios, D. 2003: Warming permafrost in European mountains. *Global and Planetary Change*, 39: 215-225.
5. Jansson, P., Hock, R. and Schneider, T. 2003: The concept of glacier storage – A review. *Journal of Hydrology*, 282: 116–129. doi: 10.1016/S0022-1694(03)00258-0.

6. Jonsell, U., Hock, R. and Holmgren, B. 2003: Spatial and Temporal variations in albedo on Storglaciären, Sweden. *Journal of Glaciology*, 49 (164): 59-68.
7. Klingbjer, P. and Moberg, A. 2003: A composite monthly temperature record from Tornedalen in northern Sweden 1802-2002. *International Journal of Climatology*, 23: 1465-1494.
8. Littot, G.C., Mulvaney, R., Röthlisberger, R., Udisti, R., Wolff, E.W., Castellano, E., De Angelis, M., Hansson, M.E., Sommer, S. and Steffensen, J.P. 2002: Comparison of analytical methods used for measuring major ions in the EPICA Dome C (Antarctica) ice core. *Annals of Glaciology*, 35: 299-305.
9. Näslund, J.-O., Rodhe, L., Fastook, J. and Holmlund, P. 2003: New ways of studying ice sheet flow directions and glacial erosion by ice sheet modelling - examples from Fennoscandia. *Quaternary Science Reviews*, 22: 245-258.
10. Pettersson, R., Jansson, P. and Holmlund, P. 2003: Cold surface layer thinning on Storglaciären, Sweden, observed by repeated ground penetrating radar surveys. *Journal of Geophysical Research*, 108 (F1): 6004. doi:10.1029/2003JF000024.
11. Röthlisberger, R., Hutterli, M., Wolff, E.W., Mulvaney, R., Fischer, H., Bigler, M., Goto-Azuma, K., Hansson, M.E., Ruth, U., Siggaard-Andersen, M.-L. and Steffensen, J.P. 2002: Nitrate in Greenland and Antarctic ice cores: a detailed description of post-depositional processes. *Annals of Glaciology*, 35: 209-216.
12. Röthlisberger, R., Mulvaney, R., Wolff, E.W., Hutterli, M., Bigler, M., De Angelis, M., Hansson, M.E., Steffensen, J.P. and Udisti, R. 2003: Limited dechlorination of sea-salt aerosols during the last glacial period: Evidence from the European Project for Ice Coring in Antarctica (EPICA) Dome C ice core. *Journal of Geophysical Research*, 108 (D16): 4526. doi:10.1029/2003JD003604.

Other publications

1. Hansson, M. 2003: Studier av djupiskärnor i Antarktis. In: Holmlund, P. and Jansson, P. (Eds.): *Glaciologi*. Stockholms universitet och vetenskapsrådet, 176 p.
2. Hansson, M. and Nyman, M. 2003: EPICA Dome C – Ice core drilling deep into the past. In: Rickberg, S. (Ed): *Polarforskningssektariatet Årsbok 2002*: 38-40.
3. Holmlund, P. 2003: Biografi över Valter Schytt. *Svenskt Biografiskt lexikon*, 31: 726-732.
4. Holmlund, P. 2003: Djupfryst – men levande. Hett om kalla fakta. Aktuell forskning om temperaturen, människan och naturen. In: Åberg, L. (Ed): *Vetenskapsrådets årsbok 2003*: 81-90.
5. Holmlund, P. and Jansson, P. (Eds.) 2003: *Glaciologi*. Stockholms universitet och vetenskapsrådet, 176 p. (ISBN 91-974541-0-9).
6. Klingbjer, P. 2003: Salajekna 1992. Scale 1:20 000. Department of Physical Geography and Quaternary Geology, Stockholm University (map).
7. Klingbjer, P. 2003: Sälkaglaciären 1980. Scale 1:20 000. Department of Physical Geography and Quaternary Geology, Stockholm University (map).
8. Näslund, J.-O. 2003: Ismodellering. In: Holmlund, P. and Jansson, P. (Eds.): *Glaciologi*. Stockholms universitet och vetenskapsrådet: 152-158.

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2.3. Climatology

The climate research group includes 5 staff members and seven postgraduate students and several undergraduate students engaged in term projects. Many projects involve collaborative research with scientists from other Swedish and foreign Universities. Our objectives are to document climate variability and derive quantitative information about past changes in climate using new high precision geochemical analysis on natural climate archives such as lake sediments, peat, trees and cave deposits.

Long instrumental records and temperature reconstructions

Previously unexplored temperature data obtained between 1802 and 1860 in northern Sweden has been combined with the temperature series from the synoptic station in Haparanda (from 1859 and onwards), to create a complete composite record for the period 1802 to 2002. A new timescale-dependent method for temperature reconstruction, utilising both high and low resolution temperature proxy data, over the past two millennia has been developed in collaboration with scientists at MISU and at the Hydrometeorological Research Centre of Russia.

Lacustrine sediments

We use high precision multi-proxy geochemical, physical and biostratigraphical analyses of lake sediments, to derived information about past changes in temperature and hydrological conditions. Centennial-millennial scale climate change during the last 2500 and 5000 years on Gotland and northern Lapland respectively, has been determined using oxygen, carbon and nitrogen isotopes in biogenic silica (diatoms), authigenic carbonate and organic material. Participation in the *Scottish Antarctic Scotia Expedition -2003* resulted in 40 m of lake sediments from South Georgia that will be jointly analyzed by scientists at INK and at different UK universities. The scientific aims of the expedition were to investigate environmental changes at South Georgia since the last glacial maximum. Sediment from the Empakaai Crater in northern Tanzania has been used to derive information about past changes in vegetation dynamics during the Pleistocene-Holocene transition.

Speleothems

Stable isotope, trace element and growth laminae analysis of well-dated speleothems permit reconstructions in temperature, precipitation and sometimes of vegetation. We carry out stalagmite based climate projects in Africa, Sweden and Romania. Data obtained from stalagmites from South Africa and Tanzania show regional climatic changes in the Late Pleistocene and Holocene.

Dendrochronology

In lower latitudes the potentials of dendrochronology are not yet fully explored. One PhD project investigates the potentials of carbon, oxygen and hydrogen isotope ratios in tropical tree cellulose, to provide records of changes in temperature, humidity and water sources in South Africa.

Peatlands and soils

The role of northern peatlands and soils in global terrestrial carbon cycle was introduced through the appointment of Peter Kurhy as professor in Physical Geography. Holocene peat accumulation in Canada and Russia is studied in relation to climate-, fire- and permafrost dynamics. Studies of Arctic and Arctic-Alpine ecosystems at the catchment level focus on such topics as environmental feedbacks to global warming and the consequences of global warming for sustainable development in the Arctic.



Palsas in the East European Tundra (Russia). Photograph by P. Kuhry.

Reviewed articles

1. Finch, A.A., Shaw, P.A., Holmgren, K. and Lee-Thorp, J. 2003: Corroborated rainfall records from aragonitic stalagmites. *Earth and Planetary Science Letters*, 215: 265-273.
2. Holmgren, K., Lee-Thorp, J.A., Cooper, G.J., Lundblad, K., Partridge, T.C., Scott, L., Sithaldeen, R., Talma, A.S. and Tyson, P.D. 2003: Persistent millennial-scale climatic variability over the past 25,000 years in southern Africa. *Quaternary Science Reviews*, 22: 2311-2326.
3. Linderholm, H.W. 2003: Twentieth-century Scots pine growth variations in the central Scandinavian Mountains related to climate change. *Arctic Antarctic and Alpine Research*, 34: 440-449.
4. Linderholm, H.W., Solberg, B.O. and Lindholm, M. 2003: Tree-ring records from central Fennoscandia: the relationship between tree growth and climate along a west-east transect. *Holocene*, 13: 887-895.
5. Rosqvist, G. and Schuber, P. 2003: Millennial-scale climate changes on South Georgia, Southern Ocean. *Quaternary Research*, 59: 470-475.
6. Rubensdotter, L. and Rosqvist, G. 2003: The effect of geomorphological setting on Holocene lake sediment variability, northern Swedish Lapland. *Journal of Quaternary Science*, 18: 757-767.
7. Scott, L., Holmgren, K., Talma, A.S., Woodborne, S. and Vogel, J. 2003: Age interpretation of the Wonderkrater spring sediments and vegetation change in the savanna biome, Limpopo Province, South Africa. *South Africa Journal of Science*, 99: 484-488.

Other publications

1. Holmgren, K., Baker, A. and McDermott, F. 2003: Speleothems. ESF-Holivar Workshop on Holocene dating, chronologies, and age modelling. [Extended abstract](#) (8 pages).

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2.4. Remote Sensing/ Geographical Information Systems

The research group undertakes basic and applied research in remote sensing and GIS using a variety of techniques and platforms covering diverse geographical regions. Our main research interests are:

- The use of remote sensing in mapping the glaciogenic landforms of former ice sheets
- The application of GIS and database technologies in palaeo-ice sheet reconstruction
- Geodesy, co-ordinate systems and global positioning
- Thermography and remote sensing of geological features
- Land degradation monitoring and vegetation change detection
- Classification methods for upland environments
- GIS and database integration in the digital version of the National Atlas of Sweden
- Knowledge-based digitisation of thematic maps
- Algal bloom and cyanobacteria monitoring in the Baltic Sea
- Optical modelling of water leaving radiance
- SAR backscatter analysis over snow and ice masses
- Interferometric observations of surface deformation and glacier velocity
- Airborne radiometry, aerial photography interpretation and photogrammetry

The group undertakes core research and also provides remote sensing support for other researchers. In particular we are involved in projects within ecological geography, glaciology, geomorphology and marine monitoring. International contacts are important to our work and we have established connections to researchers and institutions in Europe, Africa and North America. In the years to come we will focus on improved integration of remote sensing techniques in research applications in a variety of additional disciplines and the propagation of research and innovation into teaching. Our umbrella theme is the analysis, interpretation and representation of earth surface phenomena, climate, and environmental change at different temporal scales.

Reviewed articles

1. Baden, S., Gullström, M., Lundén, B., Pihl, L. and Rosenberg, R. 2003: Vanishing seagrass (*Zostera marina*, L.) in Swedish coastal waters. *Ambio*, 32: 374-377.
2. Hall, O. and Hay, G.J. 2003: A multiscale object-specific approach to digital change detection. *International Journal of Applied Earth Observation and Geoinformation*, 4 (4): 311-327.
3. Hall et al 2003: *Introduktion till Kartografi och Geografisk Information*. Studentlitteratur, Lund, 205 p. (ISBN 9144040504).
4. Kratzer, S., Buchan, S. and Bowers, D.G. 2003: Testing long term trends in turbidity in the Menai Strait, North Wales. *Estuarine, Coastal and Shelf Science*, 56: 221-226.
5. Kratzer, S., Håkansson, B. and Sahlin, C. 2003: Assessing Secchi and photic zone depth in the Baltic Sea from Space, *Ambio*, 32: 577-585.
6. Lundén, B. and Gullström, M. 2003: Satellite remote sensing for monitoring of vanishing seagrass in Swedish coastal waters. *Norwegian Journal of Geography*, 57: 121-124.
7. Nordberg, M.-L. and Evertson, J. 2003: Monitoring change in mountainous dry-heath vegetation at a regional scale using multitemporal Landsat TM data. *Ambio*, 32: 502-509.
8. Rönnbäck, B.-I., Nordberg, M.-L., Olsson, A. and Östman, A. 2003: Evaluation of environmental monitoring strategies. *Ambio*, 32: 495-501.
9. Tett, P., Gilpin, L., Svendsen, H., Erlandsson, C.P., Larsson, U., Kratzer, S., Fouilland, E., Janzen, C., Lee, J.-Y., Grenz, C., Newton, A., Ferreira, J.G., Fernandes, T. and Scory,

- S. 2003; Eutrophication and some European waters of restricted exchange. *Continental Shelf Research*, 23: 1635-1671.
10. Shaghude, Y.W., Wannäs, K. and Lundén, B. 2003: Assessment of shoreline changes in the western side of Zanzibar Channel using satellite remote sensing. *International Journal of Remote Sensing*, 24: 4953-4967.

Other publications

1. Hansson, E. and Arnberg, W. 2003: Satellitburen radar för översvämningskartering. *Kart & Bildteknik*, 2003:2: 20-24.
2. Nordberg, M.-L. och Evertson, J. 2003: *Tillämpning av satellitbaserad fjärranalys för regional övervakning av störningskänsliga fjällbedar*. Project report to Jämtland County Administration, Feb. 2003, 11 p.

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2.5. Ecological Geography

Current research

Research within ecological geography deals with the development and use of methods for analysing, visualising, and monitoring distribution and dynamics of vegetation/biotopes in space and time. Our primary focus is the Nordic region. The subject builds on transdisciplinary work mainly between the fields of physical geography, ecology, and human geography. Our goal is to improve knowledge of the ecological infrastructure in the landscape and its importance for biodiversity, ecosystem function, and sustainable nature resource management. We use applications within remote sensing and GIS on an array of sources ranging from aerial photographs and satellite imagery to historical maps and field data spanning the past 350 years.

The research focus during 2003 has been on the ecological content of the Swedish landscape, especially vegetation and biotopes in the mountains, the boreal forests, the hemiboreal forests of high natural value, suburban forests, and on the agricultural landscape.

- Establish criteria and indices for key biotopes in boreal forests by studies of spectral and textural features in CIR aerial photographs
- Develop methods for evaluating bird rich areas from habitat mapping
- Develop methods for inventory and monitoring of agricultural landscape, its structure and values for biodiversity, with special regard to grasslands
- Analyse the changes and dynamics of the mountain ecosystem during the last 20 years using CIR aerial photos and high resolution satellites, like Ikonos, and during historic time, 50 – 300 years ago, in part to develop change detection methods for monitoring
- Monitor the agricultural landscape with special focus of changes of importance for biodiversity – the LiM-project

The various studies have resulted in a comprehensive knowledge of the ecosystems and biotopes spatial distribution and temporal changes of importance for biodiversity. The results have been of importance for nature conservation and environmental monitoring in Sweden, and have been applied. The work implies collaboration with several authorities on local, regional and national levels. The study of key biotopes in forests has led to a handbook for interpretation with stereogram in CIR aerial photos (under publication together with the Swedish forest company Stora Enso). In the collaboration with Swedish Environmental Protection Agency in the LiM (Landscape monitoring) project the research group has been overall responsible for the CIR aerial change interpretation and GIS handling, and for interpretation of about half of the total twenty test areas all over Sweden.

In collaboration with Swedish Environmental Protection Agency and Tyresta National Park we have produced a vegetation map of the National Park, including development of classification system, data collection by CIR aerial photograph interpretation, evaluation of accuracy by field control and cartographic work.

In collaboration with the regional planning office we have mapped, and presented in digital form, the distribution of old forests of high recreation value in the larger Stockholm area, by CIR aerial photography.

During the year we have taken part in an international research school with lectures on cultural landscape and data collection of biological values, (Darwin, Australia).



Old forest has a potentially high biodiversity value, because it contains elements such as dead trees and fallen trunks. These components are often biotopes for fungi, lichen, mosses, and several wood-living insects. Such forests are of high interest, not only for biodiversity assessments, but also for recreation purposes. We have mapped these forests using colour infrared aerial photos in all the semi-urban areas of Stockholm, to underpin regional planning decisions on recreational planning in the green belts of Stockholm. Photograph by M. Ihse.

Reviewed articles

1. Bengtsson, J., Angelstam, P., Elmqvist, T., Emanuelsson, U., Folke, C., Ihse, M., Moberg, F. and Nyström, M. 2003. Reserves, resilience and dynamic landscapes. *Ambio*, 32: 389-396.

Other publications

1. Norderhaug, A. och Ihse, M. 2003: Kulturlandskapsutviklingen i Norden 1975-2000- ett försök på oppsummering. In: Austad, I., Hamre, L.N. and Ådland, E. (Eds.): *Gjengroing av Kulturmark*. Bergens Museum skrifter, 15: 7-12.
2. Runborg, S. and Ihse, M. Vegetationskarta över Tyresta. Karta och beskrivning. Nr 12 i Naturvårdsverkets serie om nationalparker.
3. Ihse, M. 2003: Det biologiska kulturarvet – landskapets minnen Om Vitterhetsakademiens egendom Stensjö by i Småland. Kungliga Vitterhets Historie och Antikvitetsakademiens Årsbok 2003: 93-110.
4. Nesheim, L., Norderhaug, A. and Ihse, M. (Eds.) 2003: *Beiting och kulturlandskap*. Plantefors rapportserie Grønn forskning, 6 (52/2002): 66 p.

5. Norderhaug, A., Nesheim, L. and Ihse, M. 2003. Beitets funksjon i et økologisk og økonomisk bærekraftig landbruk. In: Nesheim, L., Norderhaug, A. and Ihse, M. (Eds.): *Beiting og kulturlandskap*. Plantefors rapportserie Grønn forskning, 6 (52/2002): 63- 66.
6. Runborg, S. and Ihse, M. 2003: Kartering av äldre tätortsnära skog i Stockholmsregionen. Rapport till Stockholms landstings regionplane- och trafikkontor: 20 p.
7. Ihse, M och Kindström, M. 2003: Inventering av nyckelbiotoper i boreal skog.Handledning för tolkning i IRF-flygbilder med stereogram –stencilerad rapport 66 s med 22 stereogram.
8. Ihse, M. and Wastenson, L. 2003: Vegetation change- analysis of spectral, temporal and spatial characteristics of Swedish vegetation types and landscape elements and their changes (phase I) and vegetation and biotope monitoring (phase II). Final report 1997-2002 to MISTRA - Mimeographed.

Staff affiliations

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Bo Eknert, PhLic

Merit Kindström

2.6. Tropical Geography

The tropical geography research group forms part of the Environment and Development Studies Unit (EDSU), run jointly by the Departments of Physical Geography & Quaternary Geology and Human Geography at Stockholm University. Since 2001, this has continued as part of the PLATINA research environment. At present more than 25 senior researchers and PhD students associated to EDSU/PLATINA are engaged in projects in the tropics, particularly in Africa.

The PLATINA research environment aims at developing landscape history research in eastern and southern Africa, through strengthening collaboration between scholars at both departments. The core theme of this research environment is the diverse ways in which African lands have been used throughout history, including the interactions between human, environmental and climatic factors shaping the landscape. The theme is explored through a series of multidisciplinary workshops. The aim is to build a consolidated base for interdisciplinary landscape history research. The research environment is concerned with issues, such as increased scientific understanding regarding land use, soil and water conservation and climate change; capacity building; integration of social and natural sciences and North-South collaboration.



Investigation of a soil profile in a fossil beach ridge in Engaruka Basin, northern Tanzania. Research on environmental history in northern Tanzania during the last 1000 years is carried out in relation to archaeological studies of the fossil land use system at Engaruka. Photograph by L.-O. Westerberg.

Several studies deal with processes in the landscape in a long as well as a short perspective, exemplified by climate variations and changes in vegetation, soils and landforms. Furthermore, small scale agriculture in the study areas, in particular its structure, development and sustainability, is in focus of our research. Our studies also document how people adapt to the specific environmental conditions and how they are affected by environmental change. The various studies have resulted in a comprehensive knowledge of how natural resources are understood and utilised by local people, the causes behind deterioration of land and water resources and the effects seen in the landscape.

Tropical studies are executed in collaboration with researchers from universities in several countries. A number of the studies form part of collaboration between the Geography

Departments at Stockholm University and the universities in Dar es Salaam in Tanzania, Gaborone in Botswana, Durban and Cape Town in South Africa, the Desert Research Foundation of Namibia in Windhoek, Namibia and the Wondo Genet College of Forestry in Ethiopia. Three African students were registered for the PhD programme in 2003.

Reviewed articles

1. Eriksson, M., Reuterswärd, K. and Christiansson, C. 2003: Changes in the fluvial system of the Kondoa Irangi Hills, central Tanzania, since 1960. *Hydrological Processes*, 17: 3271-3285.

Other publications

1. Dahlberg, A., Öberg, H., Trygger, S., Holmgren, K. and Lane, P. 2003: Second PLATINA workshop 17-19 October 2002. Usa River, Arusha, Tanzania. *EDSU working paper series*, 46. Stockholm.
2. Klintenberg, P., Gustad, G., Kruger, A.S. and Seely, M.K. 2003: Monitoring desertification in Namibia: A tool for improved natural resource management. In: Allsopp, N., Palmer, A.R., Milton, S.J., Kirkman, K.P., Kerley, G.I.H., Hurt, C.R. and Brown, C.J. (Eds.): *VIIth International Rangelands Congress, Document Transformation Technologies, Durban, South Africa*: 717-719.
3. Kruger, A.S., Gaseb, N., Klintenberg, P., Seely, M.K. and Werner, W. 2003: Towards community-driven natural resource management in Namibia: The FIRM example. In: Allsopp, N., Palmer, A.R., Milton, S.J., Kirkman, K.P., Kerley, G.I.H., Hurt, C.R. and Brown, C.J. (Eds.): *VIIth International Rangelands Congress, Durban, South Africa*: 1757-1759.

Staff affiliations

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Lars-Ove Westerberg, PhD

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Anders Fahlén, PhLic

Gessesse Gebreegziabher

Patrik Klintenberg

Reuben Sebego

2.7. Quaternary Geology

Research within Quaternary Geology at Stockholm University is focused upon the study of biological, chemical and physical processes and changes during the younger part of the Quaternary time period. The overall aim is to gain an understanding of the temporal and spatial variability and underlying causes of past climatic and environmental changes. We employ predominantly continental stratigraphies, such as lake sediments, peat bogs, glacial sediments and archaeological deposits. A multi-disciplinary approach, combined with high-resolution correlations to other archives, facilitates detailed palaeoenvironmental and palaeoclimatic reconstructions on local and regional scales. The variety of individual research projects within Quaternary Geology can be summarized under the following main research topics:

- Stratigraphy and chronology of Swedish Weichselian and pre-Weichselian glacial, interstadial and interglacial sequences; vegetation and climate development during the Weichselian
- Palaeoenvironmental and palaeoclimatic reconstructions during the Late Glacial and/or Holocene based on lake and/or peat stratigraphies (ongoing studies in Sweden, Romania, Russia, Svalbard, Faeroe Islands, western Canada, Sri Lanka)
- Geoarchaeological investigations (ongoing studies in Sweden and Mozambique)
- High-resolution correlation of land-ice-marine records using tephrochronology
- Long-term glacial landscape changes using cosmogenic isotope techniques

The Swedish varve chronology or Swedish Time Scale has been the subject of intensive research for many years, and most of the older varve diagram measurements are now also available in a database. Over the past years, the group has developed strong expertise in tephrochronology, which is an ideal tool to synchronise diverse palaeoclimatic archives, such as marine sediments, lacustrine sediments, and ice cores.

Quaternary Geology has national research networks with universities and research groups at Lund, Uppsala, Göteborg and Umeå, and international collaboration with universities and research groups in Denmark, Norway, Svalbard, Iceland, Finland, Russia, Romania, Estonia, Lithuania, Latvia, UK, France, Holland, Switzerland, Canada, USA, Australia, Sri Lanka and Mozambique. Based on this extensive network, we frequently accommodate guest researchers and students from abroad. We also regard it as an important mission to further higher education and research in Eastern Europe, by offering students the possibility to participate in undergraduate and graduate courses and researchers to use our facilities. Currently we are engaged in a scientific student and staff exchange program with Simon Fraser University in Canada. Participation in several European research networks, such as INTIMATE (INTEgration of Ice core, MARine and TERrestrial deposits) and LAMSCAN (Detecting rapid environmental changes by studies of annually LAMinated lake sediments in northern SCANDinavia: Linkages to the North Atlantic Ocean circulation) are just a few examples.

Research funding has been obtained, among others, from the Swedish Research Council, the Swedish Institute, The Royal Swedish Academy of Sciences, The Swedish Foundation for International Cooperation in Research and Higher Education, the Nordic Council of Ministers, and the National Science Foundation in the USA.



Quarry at Klyftamon, in the Billingen drainage area. The Baltic Ice Lake catastrophically lowered when the ice sheet retreated beyond the northern tip of Billingen, thus scouring the landscape by fluvial (sub-marine) erosion. Pockets of sediments survived, however, such as in this quarry. Photograph by A. Stroeven.

Reviewed articles

1. Björkman, L., Feurdean, A. and Wohlfarth, B. 2003: Late glacial and Holocene forest dynamics at Steregoiu in the Gutaiului Mountains, Northwest Romania. *Review of Palaeobotany and Palynology*, 124: 79-111.
2. Davies, S., Wastegård, S. and Wohlfarth, B. 2003: Extending the limits of the Borrobol Tephra to Scandinavia and detection of new early Holocene tephras. *Quaternary Research*, 59: 345-352.
3. Gunnarson, B., Borgmark, A. and Wastegård, S. 2003: Holocene humidity fluctuations in Sweden inferred from dendrochronology and peat stratigraphy. *Boreas*, 32: 347-360.
4. Hannon, G.E., Bradshaw, R.H.W. and Wastegård, S. 2003: Rapid vegetation change during the early Holocene in the Faroe Islands detected in terrestrial and aquatic ecosystems. *Journal of Quaternary Science*, 18: 615-619.
5. Heimdahl, J. 2003: Den urbana naturen. Synen på urban stratigrafi i mötet mellan arkeologi och kvartärgeologi. *META*, 03 (3): 3-19.
6. Heimdahl, J., Karlsson, P. and Menander, H. 2003: Arkeologiskt och geologiskt samarbete i fält, erfarenheter från den arkeologiska undersökningen i kv Konstantinopel,

- Norrköping. In: Bodilsen, A., Hjermind, J. and Iversen, M. (Eds.) *Stratigrafiens mangfoldigheter. 4. Nordiske Stratigrafimøde 2001*. Viborg Middelalderseminar, 2: 7-17.
7. Lundqvist, J. 2003: Deglaciation pattern in subaquatic - supra-aquatic transitional environment illustrated by the Klarälven valley system, Värmland, western Sweden. *Geografiska Annaler*, 85A: 73 – 89.
 8. Onac, B.P. and Veres, D.S. 2003: Deposition of secondary phosphates in a karst environment: Evidence from Magurici Cave (Romania). *European Journal of Mineralogy*, 15: 741-745.
 9. Onac, B.P., Veres, D.S., Kearns, J., Chirienco, M., Minut, A. and Breban, R. 2003: Secondary sulfates found in an old adit from Rosia Montana, Romania. *Studia Universitatis Babeş-Bolyai, Geologia*, XLVIII (1): 29-44.
 10. Rasmussen, T.L., Thomsen, E., Kuijpers, A. and Wastegård, S. 2003: Late warming and early cooling of the sea surface in the Nordic Seas during MIS 5e (Eemian interglacial). *Quaternary Science Reviews*, 22: 809-821.
 11. Rasmussen, T.L., Wastegård, S., Kuijpers, A., van Weering, T.C.E. and Heinemeier, J. 2003: Stratigraphy and distribution of tephra layers in marine sediment cores from the Faeroe Islands, North Atlantic. *Marine Geology*, 199: 263-277.
 12. Ringberg, B. 2003: Readvance and retreat of the Late Weichselian Low Baltic ice stream in southernmost Sweden - a review. *GFF*, 125: 169-176.
 13. Ringberg, B., Björck, J. and Hang, T. 2003: Correlation of stadial and interstadial events in the south Swedish glacial varves with the GRIP oxygen isotope record. *Boreas*, 32: 427-435.
 14. Satkunas, J., Grigiene, A., Velichkevich, F., Robertsson, A.-M. and Sandgren, P. 2003: Upper Pleistocene stratigraphy at the Medininkai site, eastern Lithuania: A continuous record of the Eemian-Weichselian sequence. *Boreas*, 32: 627-641.
 15. Wastegård, S., Hall, V.A., Hannon, G.E., van den Bogaard, Ch., Pilcher, J.R., Sigurgeirsson, M.A. and Hermanns-Auðardóttir, M. 2003: Rhyolitic tephra horizons in North-western Europe and Iceland from the 700-800s AD; a potential alternative for dating first human impact. *The Holocene*, 13: 277-283.

Other publications

1. Björck, S., Sparrenbom, C.J., Alexanderson, H., Ljung, K. and Sparrenbom, N. 2003: Relative sea level changes in the southern Greenland sector after the last glacial maximum. *Polarforskningssekretariatet Årsbok*, 2002: 70-74.
2. Stroeven, P., Stroeven, A.P. and Hu, J. 2003: Particle orientation in “natural” concrete samples from Antarctica analysed by automated and manual procedures. In: Kasperkiewicz, J. and Brandt, A.M.: *Institute of Fundamental Technological Research, Polish Academy of Sciences, Warsaw, Conference Proceedings (AMAS Conference Proceedings)*, 3: 55-63.
3. Björck, Å. and Wohlfarth, B. 2003: Rumänien sett ur två perspektiv – en ung resenärs betraktelser och en forskares nyfikenhet. *Ymer*, 123: 49-61.

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Gun Pettersson, PhLic
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Daniel Veres, MSc

2.8. Hydrology and water resources

The research group in hydrology and water resources was established in 2003, by the introduction of a new guest professorship in hydrology. The group now includes three senior research staff members and four PhD students, and works in close collaboration with the engineering hydrology and [hydrogeochemistry research group](#) at the Royal Institute of Technology (KTH), including additional three associated PhD students.

A main research aim is to combine hydrological and biogeochemical process investigations and modelling with analysis of human and engineered system impacts on natural waters and identification of environmentally and socio-economically sustainable scenarios for water management. Current main research areas include:

Main research areas

- GIS-based hydrologic modelling;
- Groundwater-seawater interactions;
- Glacier hydrology (see also 2.2)
- Reactive solute transport and coupled physical-biogeochemical processes in different hydrological systems, including coupled subsurface and surface water in entire catchments;
- The role and handling of hydrological pollutant transport, and associated prediction uncertainty, in environmental risk analysis, economic optimisation of pollutant abatement measures, and integrated water resource management.

Application problem examples

- Environmental impact of mining waste and mined ground; Coastal nutrient and pollutant transport from catchments; Potential surface hydrological impact of nuclear waste repositories; Modelling glacier runoff and its response to future climate change; Integrated water resource management policy.

Study site examples

- *Swedish*: Norrström basin, Dalälven basin, Forsmark catchment, Tarfala research station.
- *International*: Aral Sea region, Neman River basin, Daugava River basin, Neckartalaue industrial area in Stuttgart.

Reviewed articles

1. Destouni, G., Hannerz, F., Cvetkovic, V., Frostell, B. and Hultman, B. 2003: Ett flödeschema för integrerad vattenförvaltning och operativt genomförande av ramdirektivet för vatten (with English abstract). *Vatten*, 59: 247-258.
2. Destouni G. and Prieto, C. 2003: On the possibility for generic modeling of submarine groundwater discharge. *Biogeochemistry*, 66: 171-186.
3. Hock, R. 2003: Temperature index melt modelling in mountain regions. *Journal of Hydrology*, 282: 104-115. doi:10.1016/S0022-1694(03)00257-9.
4. Jarsjö, J., Ptak, T., Bayer-Raich, M. and Holder, T. 2003: Uncertainties in contaminant plume characterisations based on concentration measurements in pumping wells: The Stuttgart-Neckartalaue site. In: Kovar, K. and Hrkal, Z. (Eds.): *Calibration and Reliability in Groundwater Modelling: A Few Steps Closer to Reality*. International Association of Hydrological Sciences (IAHS) Publication, 277: 351-358.
5. Bayer-Raich, M., Jarsjö, J., Holder, T. and Ptak, T. 2003: Numerical estimations of contaminant mass flow based on concentration measurements in pumping wells. In:

Kovar, K. and Hrkal, Z. (Eds.): *Calibration and Reliability in Groundwater Modelling: A Few Steps Closer to Reality*. International Association of Hydrological Sciences (IAHS) Publication, 277: 10-16.

Other publications

1. Berglund, S., Malmström, M.E., Jarsjö, J. and Destouni, G. 2003: Effects of spatially variable flow on the attenuation of acid mine drainage in groundwater. *Sudbury 2003 Mining and the Environment*, May 25-28 2003, Sudbury, Canada. Paper #94 (CD-ROM).

Staff affiliations

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Mattias de Woul, MSc (see also 2.2)

Associated PhD students at KTH

Carmen Prieto, MSc

Georg Lindgren, MSc

Christian Baresel, MSc

3. Education

3.1 Undergraduate Programme

The most important goal of the undergraduate programme at the Department of Physical Geography & Quaternary Geology is to offer a high quality education, reflecting the research profile of the Department, and to meet society's need for sound theoretical competence. The education also encompasses advanced courses in physical geography and Quaternary geology. The undergraduate education is characterised by a comprehensive view, its breadth, and a scientific approach. The Department carries out undergraduate education in Geography, Earth Sciences, Biology-Earth Sciences, and in Environmental Sciences. Every year around 1500 students attend our undergraduate education programme.

Geography education is planned in accordance with the structure of the *Geography programme* and it includes courses ranging from 20 credits to 100 credits (one credit is roughly the equivalent of one week of full-time study):

Geography 20 credits	basic course in geography
Geography 21-40 credits	intermediate course in geography
Geography 41-60 credits	advanced course in geography
Geography 61-80 credits	specialised course in geography
Geography 81-100 credits	specialised course in geography

The departments of Physical Geography & Quaternary Geology and Human Geography collaborate within the geography education. Every year 400-600 students attend the Geography programme. They study geography either as stand-alone courses outside the Geography programme or as a part of their theoretical education within the teachers' training programme at the Stockholm Institute of Education. Seen over a period of ten years, the influx of students has increased. One reason for this increase is probably the elevated interest in, and need for knowledge, in the field of geography. Another reason is the return of geography as an independent subject at senior high-school level.

Courses in the Earth Science programme are carried out in collaboration with the Department of Geology and Geochemistry. The courses can be taken within the Earth Science programme or as stand-alone courses outside the programme. The Earth Science programme encompasses 160 credits but final degrees are either 120 or 160 credits. Within the Earth Science programme, the first 80 credits consist of compulsory courses where students learn the basics of Earth evolution, geology, geomorphology, soils, hydrology, meteorology, climatology, remote sensing and Geographical Information Systems (GIS). For the remaining 40 or 80 credits of the programme, the students can specialise within the earth science spectrum. The Department offers advanced courses in historical geomorphology, glaciology and glacial geomorphology, climatology, palaeoclimatology, palaeoecology, Scandinavian Quaternary geology, risk assessment in geosciences, hydrology, GIS for earth scientists, cartography and map production, remote sensing, geographic analysis and visualisation in GIS, ecological geography, and natural resources, environment, and land use in the tropics. The programme provides the prospective geoscientist with an overall breadth to be used in working with, for example, nature and environmental control, geoscientific examinations, planning, and research.

The Biology-Earth Science programme encompasses 160 credits but final degrees are either 120 or 160 credits. The programme is carried out in collaboration with the Department of Biology. The programme starts with a basic education of 110 credits consisting of 40 credits of earth sciences, 60 credits of biology and 10 credits of environmental conservation. The distinctive feature of the programme is the integration between earth science and biology. Earth sciences include geology, Quaternary geology, climatology, geomorphology, cartography, aerial photograph interpretation and GIS, hydrology, and environmental and nature control. After the basic education the student has the option to do a 10 credits degree projekt towards a 120 credits degree. If the students wish to opt for a 160 credits degree, they can either take the Environment and Health Protection course of 40 credits or other advanced courses.

The Master programme in Environment and Health Protection accepts students with 120 credits in Biology, Chemistry, Earth Sciences or Biology-Earth Sciences. The programme consists of four sections of 10 credits each, Environment Studies and Health Protection, Environment Technology, Law and Planning, and a degree project in Environment and Health Protection.

”The Science communication course” of 20 credits is a specialised 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.

The Department of Physical Geography & Quaternary Geology offers an *Environmental Science programme* of 50 credits. The following courses of 10 credits each are included: 1. Environmental Conservation, basic course, encompasses different aspects of the environment such as air-, land-, and water management, environmental control, and environmental legislation. 2. International conservation, with a global emphasis on environmental conservation issues. This course provides an excursion of one week to a European country. 3. Environmental Conservation, intermediate course, with an emphasis on Sweden. 4. Energy and environment, intermediate course. 5. Environmental Conservation Project, advanced course, requires that students provide environmental knowledge to a large project covering the whole course. The objective is to define an environmental impact assessment (MKB) for a current environmental project on the basis of each student's work.

Advanced and intermediate summer courses:

”The Tarfala course” of 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.

”The Abisko course” of 5 credits emphasises the Scandinavian mountains in respect of bedrock geology, as well as Quaternary geology, geomorphic processes and geologic and geomorphologic evolution.

3.2. Postgraduate Programme

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 “Geography with emphasis on Physical Geography” or in “Quaternary Geology”. Postgraduate students are expected to participate in an annual “symposium” within the Department where they present their progress (research and education) and plans for the coming year(s). The success of our postgraduate programme is reflected in the amount and quality of Doctoral theses produced (see section 4 in this report for a list of recent theses). Below, we will tabulate currently enrolled students and their projects within each examination subject.

Geography with emphasis on Physical Geography:

Anna Allard

Monitoring vegetation changes in Swedish mountains by remote sensing methods

Maria Bergström

The use of natural resources in a Swedish parish- comparison between historical periods from Neolithicum to recent time

Johan Bonow

Palaeosurfaces and palaeovalleys on North Atlantic glaciated passive margins -reference forms for conclusions on uplift and erosion

Hernán De Angelis

Paleo-ice stream dynamics and evolution in the northwestern Laurentide Ice Sheet

Mattias de Woul

Modelling of glacier mass balance - Sensitivity and response to predicted future climate changes

Karin Ebert

Cenozoic landscape development in northern Fennoscandia. Geomorphologic interpretation within a GIS-framework

Bo Eknert

Changing biotopes in the agricultural landscape and the effects of the bird fauna

Anders Fahlén

Resource management in mountainous ecosystems in Southeast Asia

Ola Fredin

Mountain centred ice sheets in Fennoscandia

Gessesse Gebreegziabher

Environmental Change during the Last Century: the Case of Awassa Watershed, Southern Ethiopia

Håkan Grudd

Tree rings and Holocene climate changes in northern Sweden

Fredrik Hannerz

Dynamic GIS based modelling of catchment solute transport, an information perspective approach

Maria Johansson

Snow mapping in mountainous areas by the use of remote sensing microwave techniques

Ulf Jonsell

Sulphate in the climate system over glacial cycles

Christina Jonsson

Stable isotopes in lake sediments from Lapland

Merit Kindström

Biodiversity and landscape ecological planning in the boreal forest in Sweden

Per Klingbjer

Glacier and climate in northern Sweden during the last 200 years

Patrick Klintonberg

Analysing environmental change in arid and semi-arid Namibia using environmental indicators

Marcus Liljeberg

Remote sensing in industrial affected coastal water

Katarina Lundblad

Geochemical studies of stalagmites and coral skeletons in Tanzania

Elin Norström

Reconstruction of past climate variability in South Africa through studies of trees and pollen

Rickard Pettersson

Temperature distribution in polythermal glaciers and its implications on glacier system

Lena Rubensdotter

The effect of different geomorphological processes on lake sedimentation, and their implications for Holocene palaeoclimatic reconstructions

Maria Ryner

Climate and environmental change in northern Tanzania

Reuben Sebego

An investigation on the causes of the spatial distribution of the mopane tree in eastern Botswana

Hanna Sundqvist

Environmental factors affecting speleothem growth, recorded from Swedish speleothems

Quaternary Geology:

Anders Borgmark

Climate variations in Sweden during the Holocene, variations in peat decomposition as a climatic archive

Amélie Darracq

Coupled modelling of reactive solute transport and geochemical reactions in subsurface and surface water systems

Angelica Feurdean

Palaeoenvironment and palaeoclimate in northwestern Romania during the past 15,000 years

Jens Heimdal

Plant macrofossils and lithostratigraphy as tools in tracing the urban archaeological, alluvial environment in two Swedish towns

Martina Hättestrand

Vegetation and climate in N Sweden during Weichselian Interstadials, as compared with early Holocene and recent pollen floras

Gull Olli

Biogenic silica and phosphorous accumulation in sediments as indicators of eutrophication in a bay of Lake Mälaren

Gun Pettersson

Fe-rich soils in southern Sweden, their formation and application for iron production during the Viking Age and Medieval time

Rathnasirit T. Premathilake

Late Quaternary climate change and human impact on the Horton Plains, central Sri Lanka

Yoshihiro Shibuo

GIS-based hydrological modelling -coupling groundwater-surface water

Daniel Veres

Terrestrial response to Dansgaard-Oeschger cycles and Heinrich events during OIS 2 and 3

List of examinations for 2003

Name	Date	Degree
Anna Allard	6 Jun 2003	PhD, Physical Geography
R.T. Premathilake	4 Jun 2003	PhD, Quaternary Geology
Jens Heimdahl	23 Jan 2003	PhLic, Quaternary Geology
Hanna Sundqvist	17 Sep 2003	PhLic, Physical Geography

4. Dissertations

The Department of Physical Geography, Stockholm University,
Dissertation Series (2000)

- MALIN M. STENBERG, 2000. Spatial variability and temporal changes in snow chemistry, Dronning Maud Land, Antarctica. Dissertation No. 15. Fakultetsopponent: Prof. Jon-Ove Hagen
- OLA AHLQVIST, 2000. Context sensitive transformation of geographic information. Dissertation No. 16. Fakultetsopponent: Prof. Peter Fisher

The Department of Physical Geography and Quaternary Geology, Stockholm University
Thesis in Geography with emphasis on Physical Geography (2001-2002)

- 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. Fakultetsopponent: 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. Fakultetsopponent: Prof. Robert W. Jacobel
- THOMAS SCHNEIDER, 2001. Hydrological processes in firn on Storglaciären, Sweden. Dissertation No. 19. Fakultetsopponent: Prof. Andrew Fountain
- HANS W. LINDERHOLM, 2001. Temporal and spatial couplings between tree-ring variability and climate in Scandinavia. Dissertation No. 20. Fakultetsopponent: Dr. Astrid Ogilvie
- MARIANNE I. LAGERKLINT, 2001. Marine multi-proxy records of late Quaternary climate change from the Atlantic Ocean. Dissertation No. 21. Fakultetsopponent: Dr. Lloyd H. Burckle
- RICHARD Y. M. KANGALAWA, 2001. Changing land-use patterns in the Irangi hills, central Tanzania. A study of soil degradation and adaptive farming strategies. Dissertation No. 22. Fakultetsopponent: Prof. William Adams
- ANDERS CLARHÄLL, 2002. Glacial Erosion Zonation - Perspectives on Topography, Landforms, Processes and Time. Dissertation No. 23. Fakultetsopponent: Dr. Chris Clark
- KRISTER N. JANSSON, 2002. Glacial geomorphology of north-central Labrador-Ungava, Canada. Dissertation No. 24. Fakultetsopponent: Dr. Andrée Bolduc
- BJÖRN E. GUNNARSON, 2002. Holocene climate and environmental fluctuations from subfossil pines in central Sweden. Dissertation No. 25. Fakultetsopponent: 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. Fakultetsopponent: 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. Fakultetsopponent: Doc. Timo Helle

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.

TITT 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)

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.

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.

5. Conferences and Seminars

January

Skånes: *BioHab workshop I in Madrid, Spain and Lisbon, Portugal*

February

Bonow: *Neogene uplift, erosion and redeposition in West Greenland, GEUS Köpenhamn, Project meeting*

Hock: *MAGICS/LASC workshop, Sakopane, Poland*

March

Bonow,
Lidmar-Bergström &
Stroeven: *Landform evolution along the northern passive continental margin- the relative importance of tectonics and climate, Stockholm University, Sweden*

Brunnberg: *Third International Limnogeology Congress, Tucson, Arizona, U.S.A.*

Ihse: *Vegetationskartering över Tyresta Nationalpark- Tyresta National Park 's seminarium 17 March, Tyresta, Sweden*

Ihse: *Linnésymposium, Royal Academy of Science, 24 March, Stockholm*

Ihse &
Johansson: *Biohab European Workshop- habitat review and definition, Roskilde (Tune), Danmark*

P. Jansson: *World Water Forum 3, Kyoto, Japan*

April

Destouni,
Hansson,
Stroeven &
Wohlfarth: *EGS/EUG/AGU conference, Nice, France*

Fredin: *33rd Annual Arctic Workshop, Tromsø, Norway*

Holmgren &
Wastegård: *Holocene dating methods, chronology and age modelling, HOLIVAR workshop, Zeist, the Netherlands*

Holmlund: *Arctic Science Summit Week, Kiruna, Sweden*

Ihse: *Vindkraft i landskapet i medvind och motvind, Royal Academy of Forestry and Agriculture, Stockholm, Sweden*

Jarsjö: *The Aral Sea Basin Conference, Bukhara, Uzbekistan*

May

Christiansson: *Geography Undergraduate Education Planning and Policy Conference. Stockholm*

Destouni &
Jarsjö: *International Liège Colloquium on Ocean Dynamics, "Dying and Dead Seas", Liège, Belgium*

Eknert,
Ihse,
Schlyter &
Skånes:
Näslund: *LALE Sweden annual meeting, Hallands Väderö/Hovs Hallar, Sweden*
Working Group on Coastline and Neotectonics, Göteborg, Sweden

June

- Destouni: *Gordon Research Conference on Permeable Sediments, Bates College, Lewiston, U.S.A.*
- Holmgren: *Naturvetenskap och arkeologi. Krapperupsymposium, Krapperup stiftelsen, Arlöv, Sweden*
- M. Hätttestrand & Robertsson: *Nordic Arctic Research Program (NARP), Iceland*
- K. Jansson: *CANQUA - CGRC 2003, Halifax, Canada*
- Lidmar-Bergström: *Landforms and uplift in South Norway. Interdisciplinary excursion. Arranged by Karna Lidmar-Bergström, Stockholm, Elen Roaldset, Oslo and Jan Sulebak, Bergen. 22 participants (7 PhD students and 15 senior researchers) from Geology, Geophysics and Physical Geography in Sweden, Norway and Denmark.*
- Wastegård: *NORDLINK workshop, Tórshavn, Faroe Islands*

July

- Davies, C. Hätttestrand, Kleman, Lundqvist, Rosqvist & Wastegård: *XVIth INQUA Congress Reno, U.S.A.*
- Ihse & Skånes: *LALE Summer School in Darwin, Australia*
- Ihse, Löfvenhaft & Skånes: *LALE World congress in Darwin, Australia*
- Klintenberg: *7th International Rangelands Congress, Durban, South Africa*
- Löfvenhaft: *International Workshop on Urban Ecology, Melbourne, Australia*
- Löfvenhaft: *Australian Research Centre for Urban Ecology seminar, Melbourne, Australia*

August

- Darracq & Hannerz: *7th International Specialised Conference on Diffuse Pollution and Basin Management, Dublin, Ireland*
- Holmlund: *International Symposium on Antarctic Glaciology, Milan, Italy*
- Kratzer: *Baltic Sea Science Congress, Helsinki, Finland*
- Nordberg: *IGU-COMLAND CONFERENCE, Reykjavik, Iceland*
- Rosqvist: *9th International paleolimnology symposium, Espoo, Finland*

September

- Bonow & Lidmar-Bergström: *Nordic Society for Clay Research, Nässjö, Sweden, Annual meeting*
- Christiansson: *NCCR Site Meeting, Swiss National Science Foundation. Bishkek, Kyrgyzstan*
- Christiansson: *SNSF Review Panel Evaluation and Monitoring Meeting. Samarkand, Uzbekistan*
- Holmgren: *IGBP national meeting, Uppsala, Sweden*
- Holmgren & Öberg: *World System History and Global Environmental Change. International Conference, Lund, Sweden*
- Holmlund: *Climate change and its impacts on terrestrial ecosystems and landscapes of the Arctic: insights, challenges and ways forward, KVA, Abisko, Sweden*

Ihse: *Ecosystem services in European agriculture in theory and practice - Royal Academy of Forestry and Agriculture Bertebos international conference, Falkenberg*
Ihse: *Sustainable agricultural landscape, Royal Academy of Sciences, Stockholm, Sweden*
Ihse &
Johansson: *BioHab workshop III and ECOLAND meeting, Vienna, Austria*

October

Bonow: *Neogen landbävning i Vestgrönland - tolkning baseret på analyse af geomorfologi og fissionsspor, Madpakke-seminarieserien vid Geocentret, Köpenhamn*
Christiansson: *Centrum för biologisk mångfald, Naturvårdskonferens. Jönköping*
Christiansson: *Conference on Development Cooperation with Namibia. Sida, Stockholm*
Davies,
Klingbjer &
Rosqvist: *MUSCAD workshop, "Climate variations in Sweden during the past 2000 years", Uppsala University, Sweden*
Hansson: *EPICA Workshop, San Feliu de Guixclos, Spain*
Hansson &
Jonsell: *"Polar Regions and Quaternary Climate" EURESCO conference, San Feliu de Guixclos, Spain*
Hansson &
Jonsell: *NGRIP Workshop and Conference, Copenhagen, Denmark*
Heimdahl: *5:e Nordiska stratigrafimötet, Lund, Sweden*
Hock &
Holmlund: *Climate, Water and Energy, Minister council of the Nordic Countries, Reykjavik, Iceland*
M. Hättstrand: *POLLANDCAL workshop, Bergen, Norway*

November

M. Hättstrand &
Robertsson: *Nordic Arctic Research Program (NARP) workshop, Sandhamn, Sweden*
Johansson: *BioHab workshop IV in Wageningen, the Netherlands*
Stroeven: *GSA Annual, Seattle, U.S.A.*

December

Klintenberg: *Land Degradation Assessment in Drylands (LADA) Regional workshop on land degradation assessment, Dakar, Senegal*

6. Financial Support

GRANT ORGANISATIONS	
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>
LHS	<i>The Stockholm Institute of Education (Läraryhögskolan)</i>
NFR	<i>Swedish Natural Science Research Council (Naturvetenskapliga forskningsrådet)</i>
NV	<i>Swedish Environmental Protection Agency (Naturvårdsverket)</i>
MISTRA	<i>Foundation for Strategic Environmental Research (Stiftelsen för miljöstrategisk forskning)</i>
NMD (NMR)	<i>The Nordic working group for Environmental Monitoring and Data (The Nordic Council of Ministers)</i>
RAÄ	<i>Cultural Heritage Management (Riksantikvarieämbetet)</i>
RS	<i>Swedish National Space Board (Rymdstyrelsen)</i>
SIDA	<i>Swedish International Development Cooperation Agency (Styrelsen för internationellt utvecklingsamarbete)</i>
SKB	<i>Swedish Nuclear Fuel and Waste Management (svensk kärnbränslehantering AB)</i>
SLL	<i>Stockholm County Council (Stockholms Landstings Miljövårdsfond)</i>
STINT	<i>The Swedish Foundation for International Cooperation in Research and Higher Education (Stiftelsen för internationalisering av högre utbildning och forskning)</i>
UDSM	<i>University of Dar es Salaam</i>
VR	<i>The Swedish Research Council (Vetenskapsrådet)</i>

RESEARCH GRANT RECEIVER	FUNDING AUTHORITY	PROJECT	AMOUNT FOR 2003
Arnberg	Metria	RESE - Agreement pertains to publication of a special issue of the Royal Swedish Academy of Sciences environmental journal <i>Ambio</i> on the subject of: Remote Sensing for the Environment.	400 000
Brown	RS	Deltagande i "23rd EARSeL Symposium", Gent, Belgien, 2003-06-02--07. VI INQUA Congress, Reno, Nevada, USA.	14 200
Brown	C-Core, CA	"Northern View" Project - Global Monitoring for Environment and Security program.	230 000
Christiansson	UDSM	Man-Land Interrelations in Semi-Arid Tanzania.	112 625
Destouni	FORMAS	Modelling solute transport in catchments - integrating soil ground and surface water.	494 000
Destouni	FORMAS	Modellering av reaktiv transport i naturliga, heterogena grund-, mark- och ytvatten: La SAR-PHREEQC-metoden. (Garanterat t.o.m. 2004).	624 000
Destouni	VR	Modelling submarine groundwater discharge.	330 849
Hansson	NFR	Ice core studies within EPICA of glacial-interglacial variations in climate and atmospheric composition. (Extension of Junior research position).	496 816
Hansson	EU	EVK2-CT-2000-00077 - EPICA III.	45 000

RESEARCH GRANT RECEIVER	FUNDING AUTHORITY	PROJECT	AMOUNT FOR 2003
Hansson	VR	Djupiskärneanalyser av klimatvariationer över istidscykler. (Garanterat t.o.m. 2004).	325 000
Hock	VR	Framtida klimatförändringars påverkan på glaciärers avsmältning och avrinning. (Garanterat t.o.m. 2005).	605 800
Hock	VR	Framtida klimatförändringars påverkan på glaciärers avsmältning och avrinning. Projektbidrag.	130 000
Holmgren	VR	Klimatets variationer i tid och rum. (Garanterat t.o.m. 2004).	650 000
Holmgren	SIDA	Reconstruction of past climate variability in Southern Africa through analyses of trees and pollen. (Garanterat t.o.m. 2004).	450 000
Holmlund	VR	Klimatets växlingar och dess påverkan på glaciärer och permafrost i norra Sverige. (Garanterat t.o.m. 2004).	202 800
Håkansson	RS	Calibration/Validation activities of ENVISAT/MERIS sea products.	557 700
Hättestrand	VR	Forskarass-tj inom omr "Den tidiga glaciationshistorien i norra Fennoskandien" för tiden 2000-01-01--2003-12-31. (Garanterat för 2001-2003)	614 800
Hättestrand	VR	Senkvartär nedisningshistoria i norra Fennoskandia och Kolahalvön. (Garanterat t.o.m. 2004).	156 000
Ihse/ Ban	RS	ENVISAT-AO-PROJEKT: Synergi of ENVISAT ASAR & MERIS Data for landscape classification.	175 500
Ihse	SLL	BMS0302 - Flygbildskartering av äldre, tätortsnära natur.	177 000
Ihse	SLL	Tillägg t BMS0302 - Flygbildskartering av äldre, tätortsnära natur.	200 000
Ihse	NV	Tryckning av vegetationskarta Tyresta Nationalpark.	75 000
Ihse	NV	Slutkontroller och rättningar av digitaliserade referensområden i samarbete med LMV/Metria.	245 600
Jansson, P.	VR	Variationer i kalla ytskiktets tjocklek och dess effekt på polytermala glaciärers dynamik. (Garanterat t.o.m. 2004). (Garanterat för 2000-2001)	325 000
Jansson, P.	SKB	Framtagning av paleogeohydrologisk databas som skall användas vid analyser av subglacial hydraulik enligt offert av 2003-10-22.	185 000
Jarsjö	MISTRA	Mistra-projektet MIMI.	265 000
Jarsjö	SKB	Using PCRaster for GIS-based modelling of surface water hydrology in the Forsmark area.	280 000

RESEARCH GRANT RECEIVER	FUNDING AUTHORITY	PROJECT	AMOUNT FOR 2003
Karlén	NFR	Holocene changes in the climate.	46 644
Karlsson	RAÄ	Pollenanalytiskt arbete (030601--040630).	215 787
Karlsson	RAÄ	Pollenanalytiskt arbete/prospektering - Fågelsta.	40 608
Kleman	VR	Paleo-isströmmars rums-tidsfördelning och sediment-transportdynamik - isströmmar med oceankontakt i den Laurentiska inlandsisen. (Garanterat t.o.m. 2005).	351 520
Kratzer	RS	Deltagande i workshop "Remote Sensing and bio-optical modelling of the Baltic sea" i Helsingfors 2003-08-28--29.	6 000
Lidmar-Bergström/ Näslund/ Olmo	NFR	Palaeorelief, saprolites and uplift/denudation of cratons.	184 408
Lundqvist	VR	Deltagande i XVI INQUA Congress, Reno, Nevada, USA, 2003-07-22--31.	24 700
Löfvenhaft	FORMAS	Verktyg för att bedöma påverkan på biotopresiliens i fysisk planering. Ex från Stockholm, Sverige. Bidrag till internat, workshop och IALE världskongress.	25 000
Nordberg	RS	Deltagande i "COMLAND meeting in Iceland. Land degradation and mitigation-problems-solutions-conflict", 2003-08-16--19, Reykjavik, Island.	13 700
Näslund/ P. Jansson	SKB	Inlandsisars bottenförhållanden och hydrologi. (Garanterat 2004-2006).	1 400 000
Risberg	Granholms Stiftelse	Nordic diatomist meeting.	6 500
Risberg	RAÄ	Strandförskjutningsstudier.	419 900
Risberg	SKB	Förstudie av marina sedimentprover.	27 540
Risberg	SKB	Visuell dokumentation av två sedimentkärnor fr Simpevarpsområdet m m.	50 000
Schlyter	Skånes Luftvårds- förbund	Statistisk och spetiell analys av luftföroreningarnas inverkan på skogen i Skåne.	119 200
Skånes	FORMAS	Landskapets "minne" som nyckel till förståelsen av människans inverkan på biotoper och potentiell biodiversitet. Utveckling av integrerad fjärranalysmetodik. (Garanterat t.o.m. 2004).	488 728
Skånes	FORMAS	Markanvändningshistoriska profiler - verktyg att hantera människans påverkan på biotopresiliens. Bidrag till IALE världskongress 2003 och vetenskaplig artikel.	45 000
Skånes	NMD (NMR)	Workshop kring harmonisering av nordisk habitatklassificering i EU perspektiv - Workshop on harmonisation of Nordic habitat classifications in an EU perspective.	100 000
Stroeven	VR	En simulering av den Skandinaviska inlandsisen under en nedisningscykel med hjälp av kosmogena radionuklider och en numerisk inlandsismodell.	390 000
Wastegård	NFR	Tephrochronology and climate variation around the north Atlantic during the Late Weichselian and the Holocene.	123 662

RESEARCH GRANT RECEIVER	FUNDING AUTHORITY	PROJECT	AMOUNT FOR 2003
Wastenson	EU	OAERRE - Oceanographic Applications to Eutrophication in Regions of Restricted Exchange.	441 092
Wohlfarth	VR	Datering o paleoklimatisk analys av kortvariga klimatförändringar under de sista 2000 åren.	286 000
Wohlfarth	STINT	Samarbete m John Clague, Earth Sciences, Simon Fraser Univ, Canada.	333 333
<i>Delsumma</i>			<i>13 507 012</i>
Skånes/ <i>Ihse</i>	EU	BIOHAB (Biodiversity and Habitats).	175 000
Natgeo/ <i>Lundén</i>	SIDA	United Nations Remote Sensing Course 2003.	3 288 877
GU	LHS		<i>569 000</i>
GU	Gotland		<i>224 068</i>
Westman/ <i>Särkinen</i>	Lärandets galleria	Utveckling av geografisk IT med inriktning mot distansutbildn i GIS o GIS-tillämpningar inom marksanering.	75 000
Total		Approved research grants 2003	17 838 957

7. Staff (31 December 2003)

Department Chairperson/Head: Professor Johan Kleman
Vice Chairperson: Associate professor Karin Holmgren

PROFESSORS

Christiansson, Carl	professor of Physical Geography, particularly Tropical Soil Conservation
Destouni, Georgia	guest professor, professor of Hydrology
Holmlund, Per	professor of Glaciology
Ihse, Margareta	professor of Ecological Geography
Karlén, Wibjörn	professor of Physical Geography, director of postgraduate studies (until Jun 31)
Kleman, Johan	professor of Remote Sensing
Kuhry, Peter	professor of Physical Geography
Lidmar-Bergström, Karna	professor of Physical Geography
Stroeven, Arjen Peter	professor of Physical Geography, director of postgraduate studies (since Jul 1)
Wohlfarth, Barbara	professor of Quaternary Geology

ACADEMIC STAFF

Associate Professors (PhD, Docenter)

Arnberg, Wolter	senior lecturer
Hansson, Margareta	senior lecturer
Hock, Regine	research associate
Holmgren, Karin	senior lecturer
Hättestrand, Clas	senior lecturer, also research associate
Jansson, Peter	senior lecturer
Lundén, Bengt	senior lecturer, also professor at Oslo University
Näslund, Jens-Ove	senior lecturer
Risberg, Jan	senior lecturer
Robertsson, Ann-Marie	senior lecturer
Rosqvist, Gunhild	senior lecturer
Wastegård, Stefan	research associate

PhD

Alexanderson, Helena	research associate
Borgström, Ingmar	senior lecturer, director of undergraduate studies
Brown, Ian	research associate
Brunnberg, Lars-Erik	senior lecturer
Jarsjö, Jerker	researcher
Kratzer, Susanne	researcher
Kristiansson, Jan	senior lecturer
Nordberg, Maj-Liz	senior lecturer
Richardson-Näslund, Cecilia	research associate
Schlyter, Peter	senior lecturer
Schneider, Thomas	senior lecturer

Schuler, Thomas	researcher
Skånes, Helle	research associate
Ulfstedt, Ann-Cathrine	senior lecturer
Westerberg, Lars-Ove	senior lecturer

PhLic, MSc, BSc

Bråvander, Lars-Gunnar	MSc, senior lecturer
Delteus, Åke	BSc, lecturer
Eknert, Bo	BSc, lecturer
Fridfeldt, Anders	BSc, lecturer
Nordström, Anders	PhLic, senior lecturer
Perhans, Karl-Erik	BSc, lecturer
Sannel, Britta	BSc, lecturer
Yrgård, Anders	PhLic, lecturer

Postgraduate students (PhLic, MSc, BSc)

Bergström, Maria
 Bonow, Johan
 Borgmark, Anders
 Darracq, Amélie
 De Angelis, Hernán
 de Woul, Mattias
 Ebert, Karin
 Feurdean, Angelica
 Fredin, Ola
 Gebreegziabher, Gessesse
 Hannerz, Fredrik
 Heimdal, Jens
 Hättestrand, Martina
 Jonsell, Ulf
 Jonsson, Christina
 Kindström, Merit
 Klingbjer, Per
 Klintenberg, Patrik
 Liljeberg, Markus
 Lundblad, Katarina
 Norström, Elin
 Pettersson, Gun
 Pettersson, Rickard
 Rubensdotter, Lena
 Ryner, Maria
 Shibuo, Yoshihiro
 Sundqvist, Hanna
 Veres, Daniel

Teaching assistants

Hansson, Erik	MSc
Lundin, Paula	BSc
Sahlin, Eva	MSc

Öberg, Helena

MSc

ADMINISTRATIVE STAFF

Berggren, Berit	senior administrative officer
Envall, Berit	financial executive
Geltner, Petra	BSc, personnel executive
Hammar, Camilla	MSc, personnel executive
Henkow, Månika	higher administrative officer
Henriksson, Carina	university-certified administrator, senior administrative officer
Hultblad, Gertrud	university-certified administrator, senior administrative officer
Jatéus, Elisabeth	higher administrative officer
Lenngren, Maria	MSc, study advisor
Persdotter, Eva	higher administrative officer
Schuber, Pernilla	MSc, study advisor
Sturesson, Elisabeth	higher administrative officer
Wahlgren-Brännström, Lis	PhLic, head of administration and technical service
Åkerblom, Lena	higher administrative officer

TECHNICAL STAFF

Alm, Göran	PhLic, systems engineer
Beskow, Andreas	MSc, systems technician
Brotén, Bengt	technician
Cabrera, Yanduy	caretaker
Evertson, Joakim	MSc, research assistant
Granell, Håkan	supervisor of office services
Hohl, Veronica	BSc, research assistant
Hörnby, Kerstin	research technician
Jacobson, Rolf	IT-manager
Jansson, Torunn	BSc, research assistant
Johansson, Eva-Marie	MSc, research engineer
Johansson, Viktoria	research assistant
Karlsson, Ann	laboratory assistant
Karlsson, Sven	PhLic, research assistant
Kleman, David	research assistant
Mahmoud, Nagham	research assistant
Matton, Anna	cook (Tarfala research station)
Nyman, Mart	research assistant
Omar, Athman	research assistant
Romero, Ivan	research engineer
Runborg, Siv	BSc, research assistant
Svanered, Ola	BSc, systems engineer
Walter, Ola T.	supervisor of security
Wegner, Anna	research assistant
Willis, Karin	BSc, research assistant
Winarve, Karin	cook (Tarfala research station)

PROFESSORS EMERITI

Hoppe, Gunnar	DSc
Lundqvist, Jan	
Miller, Urve	
Ringberg, Bertil	
Wastenson, Leif	
Østrem, Gunnar	DSc

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