Stockholms universitet

Styrelsemöte
PROTOKOLL
2014-02-10

Bolincentret för klimatforskning

Tid och Plats:	Den 19 maj 2014, kl. 9-12, T40, Geovetenskapens hus, Stockholms universitet
Närvarande styrelseledamöter:	*Cynthia de Wit, ordförande* *Dan Henningson, KTH* *Erik Kjellström, Rossbycentret* *Martin Jakobsson, prefekt IGV* *Marianne Lilliesköld, Naturvårdsverket* *Michael McLachlan, prefekt ITM* *Johan Nilsson, sft prefekt MISU (till och med halva §8)*
Närvarande med yttranderätt:	*Alasdair Skelton, direktör för Bolincentret* *Leonard Barrie, vetenskaplig direktör för Bolincentret* *Karin Jonsell, vetenskaplig koordinator för Bolincentret* *Anders Karlhede, vicerektor och dekanus för Nat. fakulteten (§ 6)*
Frånvarande:	*Arjen Stroeven, prefekt INK* *NN, studentrepresentant*
Protokollförare:	*Karin Jonsell*

§ 1	**Mötets öppnande** Ordförande hälsade välkommen.
§ 2	**Protokollsjusterare** Dan Henningson utsågs till att justera dagens protokoll.
§ 3	**Fastställande av dagordning** Dagordningen fastställdes.
§ 4	**Webinars** Ett sätt att underlätta för forskningsutbytet är att sända Bolincentrets seminarium på webben, sk. webinars. ITM sänder och arkiverar sina veckoseminarier sedan flera år med hjälp av Adobe connect och har goda erfarenheter av detta. Styrelsen ansåg detta vara en god idé och ber direktoratet att undersöka hur det ska kunna implementeras vid Bolincentrets alla partners inkl. SMHI och KTH.
§ 5	**Bolincentrets utvärdering av SFO-stödet** Direktor Alasdair Skelton meddelade att självutvärderingen av de strategiska medlen för klimatmodellering (SFO) från regeringen har skickats in till Vetenskapsrådet, se appendix 1a. Han passade på att tacka alla som bidragit, framförallt Gunilla Svensson, Leonard Barrie och Erik Kjellström. Underlaget till den andra delen av utvärderingen som ska sändas in från Stockholms universitet centralt håller på att skrivas, se appendix 1b. Denna skickas in av SU i juni.

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§ 6	**Information om den framtida SFO-finansieringen** Styrelsens ordförande hade bjudit in fakultetens dekanus Anders Karlhede, se appendix 2. Anders Karlhede informerade styrelsen om universitetets tankegångar inför den andra fasen av regeringens strategiska satsning (SFO). Om SU får behålla SFO medlen de kommande 5 åren, får SFO-miljöerna garanterat 50 % av den ursprungliga summan och de övriga 50 % fördelas av värduniversiteten på det sätt de anser befogat. Anders förklarade att han i Områdesövergripande rådet och Universitetsstyrelsen kommer att yrka att alla SFO-medel ska tilldelas SFO-miljöerna och att medlen också i fortsättningen ska kanaliseras via Naturvetenskapliga fakulteten, men att användningsområdet skall breddas. För Bolincentret innebär det att medlen ska användas för klimatforskning generellt och inte bara till klimatmodellering. Medlen ska fördelas så att de bedöms göra bästa möjliga nytta inom forskningsområdena. Detta betyder att medlen inte på ett schablonmässigt sätt ska fördelas ut till de i miljöerna ingående institutionerna. Det är viktigt att inkludera externa partners. Beslutet om fördelningen tas i höst av Universitetsstyrelsen.
§ 7	**Den strategiska planen för Bolincentret** Bolincentrets direktorat och styrelse har jobbat med den strategiska planen under de föregående veckorna (appendix 3a) och de sista justeringarna gjordes vid sittande bord. Den fastställda strategiska planen (appendix 3b) justerades omedelbart. Styrelsen kommer att se över den strategiska planen under nästa år efter SFO-utvärderingens resultat har tillkännagivits. En diskussion om det eventuella behovet av en aktivitetsplan för Bolincentret bordlades till kommande styrelsemöte.
§ 10	**Information** a. Bolindagarna för skolor 400 skolbarn och en grupp lärare besökte Bolindagarna för skolor som hölls på Naturens hus i början av maj. Lågstadiebarnen fick åka ”Klimattåget” och känna på olika typer av klimat och mellanstadiebarnen fick göra ”Hands-on”-aktiviteter vid fyra olika stationer. Stationerna var: 1) Den nya globen 2) Hur vädersystem uppkommer pga. jordens rotation 3) Världens pussel 4) Försurningen av haven och dess effekter. Utvärderingarna var lysande från både barnen och lärarna! Fortbildningsdagen för lärare var också lyckad, men inte så välbesökt. Bolindagarna för skolor kommer att köras näst år igen, och då siktar vi på att engagera fler manliga forskare. b. Bert Bolin-föreläsningen Bert Bolin-föreläsningen med temat ”Global Carbon Cycle” kommer att hållas på eftermiddagen den 22 maj i Aula Magna. Dagen före kommer ett vetenskapligt forum att arrangeras tillsammans med EkoKlim. Planeringen fortskrider i samarbete med Fakulteten.

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	c. Grundkursen i klimatvetenskap Direktör Alasdair Skelton informerade om planeringen av den nya kursen. Förslag till kursplanerna har skickats till institutionerna. Institutionerna kommer att godkänna sina egna planer som sedan skickas till grundutbildnings-beredningen. d. Ekonomiadministratör Bolincentrets ekonomihantering kommer att skötas av Monica Rosenblom på IGV från och med nu. e. Vetenskapliga koordinatorn Karin Jonsell var sjukskriven 100 % 24 mars – 30 april och kommer att vara sjukskriven 50 % 1 maj – 30 juni.
§ 11	**Övriga frågor** Inga övriga frågor.
§ 12	**Nästa möte** Kommande möten under hösten 2014 kommer att beslutas via Doodle. Det sista mötet för hösten är redan inplanerat till fredagen den 21 november, kl. 13-16, dagen efter Bolindagarna. Till detta möte kommer ordföranden i det externa vetenskapliga rådet att ge feedback utifrån deras intryck och utvärdering av Bolindagarna.

Vid protokollet:

Karin Jonsell

Justeras:

Cynthia de Wit Dan Henningson

Stockholms universitet

Styrelsemöte
PROTOKOLL
2014-05-27

Bolincentret för klimatforskning

Tid och Plats: Den 19 maj 2014, kl. 9-12, T40, Geovetenskapens hus, Stockholms universitet

På följande sida/or finns

Appendix 1a

Evaluation of Strategic Research Areas

FRÅGA 1

Evaluation of Strategic Research Areas (Modelling initiative of the Bert Bolin Centre for Climate Change) Self-evaluation

The self-evaluation is part of the background information for the evaluators in their assessment of the increased support to strategic research areas and the included research environments. The self-evaluation is distributed to each one of the 43 research environments included in the government's investment in strategic research areas.

The focus of this self-evaluation is
Research Output
Strategic value for society and the business sector
Collaborations
Research and Education Integration

The following should be considered when you are carrying out the questionnaire:
The self-evaluation should be answered in consultation with co-applicant(s).
When answering the questions, the original grant application and the previously reported information provided in the annual follow-up studies should be considered.
There is limited space for your answers, use it to give as detailed and to-the-point information as possible.

Last response date for the survey is May 19, 2014

FRÅGA 2

OUT: Research output

FRÅGA 3

OUT 1a) Please fill out the proportions of different kinds of publications from the strategic research environment (numbers should correspond to the number of publications reported in the 2010-2013 follow-up studies)

	Number of outputs 2010	Number of outputs 2011	Number of outputs 2012	Number of outputs 2013
Books	0	0	1	3
Book Chapters	0	0	0	5
Journal Articles	1	34	94	227
Conference Publications	0	0	38	80
Other	0	4	3	30

FRÅGA 4

OUT 1b) Please comment on the publication profile and its development over time (Out 1a) (1600 characters)

The SRA funding has substantially increased the productivity of the Bolin Centre as documented in the above table of publications. During the first five years of the Bolin Centre, 2006-2011, an average of 100 peer-reviewed papers were published annually. In 2013, over 200 peer-reviewed papers were published, most of them are in leading disciplinary journals. Fifteen of the papers published in 2010-2013 were in Nature or Science. The very rapid growth of the SRA reported publications reflects the step-by-step recruitment of seven tenured climate modelers and the gradual integration of the climate modeling initiative in the already existing Linnaeus centre. Note that because the climate modeling SRA mostly conducts fundamental research, publication in disciplinary peer-reviewed journal is the most common dissemination of results. An internal bibliometric study comparing the 2010 and 2013 Bolin Centre publications reveal substantial increase in cross-departmental inter-disciplinary research.

Analysis of the 2013 publications reveals that 36 peer-reviewed journal papers were authored or co-authored by the SRA-recruited tenured climate modelers. The four research tracks of the SRA: 1) circulation, variability, and decadal predictability; 2) unresolved scales; 3) paleoclimate modeling; and 4) Arctic climate change now make up half of the 2013 reported journal publications: 24, 42, 22 and 24, respectively. Thus, our 2013 publications reflect scientific activities not only within the scope of the SRA but also within the entire Bolin Centre which encompasses many aspects of the climate system, not all of which are directly related to the climate modeling activities. Eleven licentiate and doctoral theses, defended during 2011 - 2013, have extensively used climate models on regional or global scales.

FRÅGA 5

OUT 2) What research results from the strategic research environment have had the most significant academic impact? Describe briefly the development and standing of the research compared to the research performed internationally. (1600 characters)

The SRA funds have considerably strengthened the Bolin Centre's ability in climate modeling. Significant academic achievements have focused on design and analysis of climate model experiments, improvement of descriptions of unresolved processes and confronting climate models with observations.

These results exemplify cross-disciplinary research along four tracks:

Circulation, variability, and decadal predictability: Global model experiments have revealed 1) aerosol-induced circulation changes on stationary wave patterns, 2) the control of Southern Hemisphere westerlies on the position of the Subtropical ocean front, 3) favorable atmospheric conditions for extreme European wind storms and 4) decadal prediction skill for Atlantic hurricanes.

Unresolved scales: We have 1) made new insights on natural aerosol emissions from oceans and forests, organic compounds and aerosol nucleation, 2) revealed biases in diurnal cycles and low-level clouds, 3) studied effects of surface drag on storm-track positions, and 4) found best representation of recent observed temperature trends with careful treatment of aerosol-cloud interactions.

Paleoclimate modeling: Model-paleo-data comparison has given 1) new insights about Asian monsoon variability, Eocene climate, ice sheet and ice shelf dynamics, and 2) rigorous evaluation of PMIP models of the last millennium.

Arctic climate change: We have 1) estimated present and future fluxes of methane and other carbon compounds from land and marine frozen reservoirs, 2) advanced understanding of Arctic temperature amplification, 3) revealed the role of moisture transport for Arctic climate and sea-ice extent, and 4) evaluated climate models using in-situ and satellite data concerning aerosols, clouds, ice-albedo, turbulent fluxes, hydrological processes, ocean and atmospheric circulations.

FRÅGA 6

STR: Strategic value for society and the business sector

Compare to question B6 in the follow-up focusing on the industrial and/or societal problems and needs that have been addressed in the research.

FRÅGA 7

STR 3) Elaborate on your strategic research environment's capacity and capability to transfer research results for utilisation in society or the business sector. (1600 characters)

The SRA funds have considerably enhanced the capacity of the Bolin Centre for communicating its scientific results to society and the business sector. To meet a growing societal need for authoritative and timely knowledge about climate and climate change, Bolin Centre scientists make research results accessible to society and the business sector with the aid of a science communicator at SU and channels provided by SMHI.

In 2013, Bolin Centre scientists participated in more than one hundred communication events of which many were broadcasted on national radio and TV. They also regularly present their research results to scientists, policy makers, students and the public.

In our communication strategy, we have chosen to target policy makers and the future generation of citizens. We contribute regularly to assessment reports such as the recent IPCC reports, which cite over 70 papers authored or co-authored by our scientists. For national policy support, we provide expert advice to the government and agencies mostly through SMHI. For the next generation we target schools. We provide continued professional development for school teachers and create hands-on activities for school children and youth. The Bolin Days for Schools and the Bert Bolin Climate Lecture are events, together with regular activities at Vetenskapens hus, where our research findings have been made accessible to over 400 school children and their teachers.

Our scientists have been provided with professional media training to build their communication skills. To further promote communication we have also arranged a climate change course for journalists, arranged a workshop before the IPCC negotiations in 2013, invited a science journalist to our annual meeting, and encourage communication skills with awards for the best presented poster.

FRÅGA 8

STR 4) Elaborate on the impact of your research to society. (1600 characters)

The reality of our changing climate and its effects, expressed explicitly in the recent IPCC Working group reports, ranks among the major challenges facing society, not only today but also in the future. Our research results guide society and specifically its policy makers as to the extent of ongoing and future climate change. In this respect, SRA funds have strengthened Bolin Centre engagement in the assessment of climate model performance and construction of regional climate scenarios on which to base societal responses.

Our climate modelers seek to provide a quantitative basis for guidance and advice on mitigating ongoing and future climate change, understanding its nature and statistical characteristics and predicting geographical shifts of climate zones. These research results reach society and its policy makers not only in the form of major international science assessments, such as IPCC, but also via our partnership with the SMHI which has long experience of conveying scientific findings to society and which represents Sweden in the World Meteorological Organization and the Global Framework for Climate Services. We are also closely affiliated with several research based organizations and agencies that raise societal and governmental awareness of the challenges facing climate scientists both nationally, through the Swedish Environmental Protection Agency and internationally, through the European Climate Research Alliance and programs and projects of the International Geosphere-Biosphere Program. Our scientists are also well connected with several NGOs, such as Greenpeace and WWF.

The future impact of our research on society is facilitated by our commitment to a long term partnership with SMHI, which has the task of establishing and maintaining a national knowledge centre for climate change adaptation.

FRÅGA 9

STR 5) Elaborate on the impact of your research to the business sector. (1600 characters)

Because our SRA concentrates on fundamental understanding of the climate system, no immediate connections to the business sector were identified in the original application. Nevertheless, our impact on the business sector is evident through assessment reports, contacts, solicited lectures and connections made together with SMHI.

Bolin Centre scientists are providing guidance regarding long-term climate development with impact on nuclear waste management in collaboration with the Swedish Nuclear Fuel and Waste Management Company (SKB). Several projects examining various angles of the risk assessments for future bed-rock storage are aided by research on ice-sheet development, hydrological processes, climate variability and rapid climate change. Paleo-climatological records in combination with models are used to explore impacts that can be expected on the long (>100 thousand years) time scales of radioactive decay.

Examples of direct collaboration with industry include a project with Aerodyne on instrument development for air-quality observations and projects with mapping companies and organizations such as GEBCO (General Bathymetric Chart of the Oceans) for the purpose of high resolution bathymetric mapping of key areas, such as the Arctic Ocean. Also, research on business related pollutant regulations is conducted in collaboration with the Swedish Environmental Protection Agency (EPA). This research relates to the Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants (CCAC) which was launched by the United Nations Environment Programme (UNEP) on February 16, 2012, that is supported by Canada, Denmark, the European Commission, Germany, Japan, the Netherlands, Norway, Sweden, and the United States.

FRÅGA 10

STR 6) Exemplify how industrial and societal needs have been identified and how it has influenced the choice of research problems addressed. (1600 characters)

Assessment of climate model performance and the need for regional climate scenarios of direct relevance to industry and society guided the recruitment of modelers and influence the Bolin Centre research agenda.

All of society including industry is affected by climate change. Preparing strategies on how to act in this changing environment is of high priority. The Bolin Centre modeling expansion provides a nationally improved scientific base for the ongoing identification of specific needs. Activities are in two main directions, model evaluation and scenario production.

The Bolin Centre conducts fundamental research to further our understanding of complex interactions in the natural climate system and consequences of changes in external forcing. At the same time, society needs firm ground for taking decisions. In our SRA, the most efficient means to bridge the gap is through continual dialogue between members of society and the scientific community. This is, for example, done through the Rossby Centre at SMHI.

This dialogue, which has been ongoing since the establishment of the Rossby Centre in 1997 reveals society's specific needs of climate data and interpretation. The Rossby Centre meets this need with regional climate scenarios along with support for impact studies and adaptation measures. Direct communication between Rossby Centre researchers and end users has so far led to identification of climate indices relevant for different user communities. Subsequently, such indices have been derived from regional climate scenarios for the benefit of the users. Concrete actions include evaluation of the regional climate model developed at SMHI and production of large ensembles of regional climate model scenarios for different regions including Europe, Africa and the Arctic.

FRÅGA 11

COL: Collaborations

Collaboration with co-applicant(s) universities/research institutes

FRÅGA 12

COL 7) What is the long term plan for the collaboration between host-university and co-applicant(s) regarding the strategic research environment? (1600 characters)

The Bolin Centre is an established organisation in Sweden and while the majority of the activities are at SU it is complemented and strengthened considerably by its partners SMHI and KTH. Our intention is to continue and further strengthen these collaborations.

The reformation of the governance of the Bolin Centre, with a Board that includes representatives for SMHI and KTH, provides long-term stability. The intention is to continue to share strategic funds as stated in the original application. The success and development of the collaboration is exemplified by the number of PhD students that are co-advised (currently five) and papers that are co-authored between scientists at SU, SMHI and KTH. Examples of published collaborative research include evaluation of present climate and future climate change in the Arctic and past climate conditions for the last glacial maximum.

The collaboration with KTH has mainly been on paleoclimate modeling, chemical properties of aerosols, atmospheric turbulence and modeling thereof. The future direction of this collaborative research will continue to be on small-scale processes such as turbulence, aerosols and clouds. The common research tools used to answer engineering flow problems and problems related to atmospheric science form a bridge between the Bolin Centre, SeRC and FLOW.

The strategic importance of the SMHI partner for societal relevance is clear and will continue to be a strong motivator for sustained long-term interaction. The very rewarding collaborative efforts on EC-Earth development and CMIP participation are foreseen to continue. The research connections between the Research Department at SMHI, where Rossby Centre is one unit, SU and KTH are strong but can grow stronger with benefits for all three partners. It is the ambition of the Bolin Centre to further strengthen these collaborations.

FRÅGA 13

COL 8) What has been the major challenges in the collaboration between host-university and co-applicant(s) regarding the strategic research environment? (1600 characters)

The collaboration between the co-applicants is based on common research interests, common usage of computational infrastructure and computer codes as well as co-advised PhD student projects. The major challenge has been to overcome the physical distances between the various research environments.

The physical distance between Norrköping (SMHI) and Stockholm (SU and KTH) is about 165 km. Hence, daily physical contacts between members from the Rossby Centre and Stockholm partners are impractical. However, frequent coordination of activities between the Climate Modeling Coordinator and the Rossby Centre and KTH group leaders has ensured information flow. This has concerned budget preparation, management and hiring, infrastructure and research projects. Coordinated monthly climate-modeling e-mails and frequent lunch meetings have ensured efficient communication.

PhD-students working at SMHI and KTH, engaged in the Bolin Centre, all have formal or informal co-advisors at SU and are attending graduate courses at SU. When possible, although complicated by the distance, arrangements are made so that students employed by SMHI are stationed longer or shorter time periods at SU, to be exposed to another academic environment.

The Bolin Centre Annual Meeting is a repeated event where all members get to present, listen to and discuss research results and ideas. These are well attended with social events embedded to stimulate further discussions. In addition, climate modeling workshops have been held both in Stockholm and at SMHI, as well as many other such gatherings, in core theme or research area settings, over the years attracting members across the environments.

Since 2013, decisions regarding the co-applicant partners have been formalized by their representation in the governing Board.

FRÅGA 14

Collaboration with other strategic research environments

FRÅGA 15

COL 9) To what extent have you collaborated with other research environments included in the strategic research areas? (500 characters)

The Bolin Centre collaborates with BEAM and Ekoklim (SU), MERGE (LU) and SeRC (KTH). With BEAM, our scientists collaborate on climate effects on the Baltic Sea. With EkoKlim, collaboration concerns the effects of climate change on biodiversity and ecosystems. The Rossby Centre is a partner in MERGE with focus on representation of the biosphere in climate models. Collaboration is also on aerosols and biogeochemistry. E-science aspects of climate modeling are considerably strengthened by SeRC. MERGE and SeRC are strategic partners in Nordic and international collaborations.

FRÅGA 16

Strategies and support regarding collaborations

FRÅGA 17

COL 10) Describe the purpose of different kinds of collaborations to reach the intentions of your strategic research? (Please make use of Table B3 in the annual follow-up studies) (1600 characters)

National and international long-lasting collaborations are central to climate modeling science and have been and will continue to be extremely important for the success of the Bolin Centre.

Climate models or Earth System Models (ESMs) are complex computer codes in which the general circulation models of the atmosphere and the ocean comprise the core units. Scientists within our strategic research environment are active contributors to the development of ESMs. Bolin Centre scientists are very active in the EC-Earth consortium, an ESM developed by European research institutions and universities. The atmospheric model is from the European Centre for Medium range Weather Forecasts (ECMWF) and the ocean model is developed at Grenoble University. Bolin Centre scientists collaborate with these development teams and the Rossby Centre is currently leading the development of the next version of EC-Earth to be used in the upcoming CMIP6.

Climate modeling relies on access to supercomputing infrastructure and expertise. For this purpose our strategic research environment collaborates with the Center for High-Performance Computing (PDC) at KTH and the National Supercomputer Centre (NSC) at Linköping University. Both belong to the Swedish National Infrastructure for Computing (SNIC). The collaboration is reinforced by the active participation of Bolin Centre scientists in SeRC. These collaborations have resulted in a dedicated application expert in climate modeling stationed at NSC but with weekly visits alternating to Rossby Centre and SU.

The activities within the Bolin Centre are broad and other ESMs are used in our research. Bolin Centre scientists collaborate with many other international partners such as the National Centre for Atmospheric Research (NCAR), USA, and the Max Planck Institutes for Biogeochemistry and Meteorology, Germany.

FRÅGA 18

COL 11) Describe the development, since the start of the funding, of your international collaborations with partners in and outside academia (including the EU Framework programme). (1600 characters)

International collaboration is essential for the Bolin Centre and its scientists and in our 2013 report we listed over 40 long-standing collaborations.

The complexity of ESMs calls for international collaboration since maintaining and development of such a computer program, that contains many hundred thousands of lines of code, requires substantial resources. The ambition of the Bolin Centre has never been to build and host such a model of our own, thus collaborators have since the outset been essential. Two model development nodes are among these: the National Centre for Atmospheric Research (NCAR, USA) and the EC-Earth Consortium.

As the EC-Earth consortium was formed, not long before the start of the SRA, this endeavor has grown along with the Bolin Centre modeling initiative. Bolin Centre scientists have developed international interactions with the ECMWF on atmospheric parameterizations, while the University of Grenoble has worked on the ocean model. The newly recruited senior climate modelers have with their previous experience brought along new international collaborations and involvement in other ESMs, but they all express sincere interest and commitment to contribute to the development of EC-Earth. This is evident in the publication list for 2013 where several papers authored by the newly recruited staff include EC-Earth. The collaboration with NCAR was already ongoing and will continue. Stronger or new collaborations with Max Planck Institutes in Germany have emerged.

Besides strong collaborations between individual scientists at the Bolin Centre and other universities or meteorological institutes, many collaborations are also found in EU projects, Nordic Center of Excellences, international organizations etc. As with Bolin Centre publications, these collaborations reflect activities both related to and extending beyond the SRA.

FRÅGA 19

Collaboration Case Study

We have chosen a case study format. This to create the possibility for you to focus on one successful (“best practice”) project that includes collaboration as an example of when it has served the purpose of conducting research of high international quality with relevance for society or the business sector.

You can describe your case in a separate document to be uploaded below.

FRÅGA 20

COL 12) Choose one of your research projects that include collaboration with one or several non-academic organizations or companies to illustrate how collaboration a) has improved the research quality and b) has improved the prerequisites for society and the business sector to utilise the research.

Please enter the name of the chosen project and the project period in the table. Also give a short description of the procject (500 characters).

	Name of project	Project period	Short descritption (500 characters)
	Advancing use of climate research in the Swedish society	The whole duration of the strategic collaboration	The only tool available for scientifically based scenarios of the possible evolution of the climate system is numerical climate models. Here the Bolin Centre and Rossby Centre, SMHI, collaborated within the EC-Earth consortium to perform climate model simulations for the 5th phase of the internationally Coordinated Global Climate Model Intercomparison Project (CMIP5). Science results derived from CMIP5 are used in the IPCC assessments. Our results concern evaluation of EC-Earth, centennial and decadal simulations as well as downscaling that are communicated to society.

FRÅGA 21

Please enter collaboration partners (maximum 2) and verfied contact information.

	Name of organisation	Name of contact person	Verfied contact information, including e-mail
Partner 1	Stockholm University	Gunilla Svensson	gunilla@misu.su.se
Partner 2	SMHI	Erik Kjellström	erik.kjellstrom@smhi.se

FRÅGA 22

When describing your case we would like you to consider the following aspects:

A description of how the collaboration has been organised (contracts; division of labour; meetings; financial or in-kind contributions etc.).

If and in what way the research collaboration has led to advances or alterations in higher education programs associated with the strategic research at the university

If and in what way the research collaboration has led to an improved international status of the strategic research environment.

The major challenges in this research project with regard to its collaborative aspects.

In total you have 6000 characters at disposal for your case study.

Please upload the case study as a pdf or word-file here:

Antal bifogade filer: 1. Filen/filerna kan ses i resultatöversikten (webb).

FRÅGA 23

INT: Research and Education integration

FRÅGA 24

INT 13) Exemplify how research within the strategic research environment is integrated with different levels of education (1600 characters)

The Bolin Centre has strengthened university education on all levels, primarily on the Master and PhD level but also through post-doctoral positions and education of primary and secondary school children and their teachers.

The Climate Research School is part of the Bolin Centre. It arranges courses and sponsors PhD student participation in international courses and conferences. During the last four years, three summer schools have been organized with international participation of both teachers and students in Abisko focusing on Arctic climate and at Navarino Environmental Observatory focusing on the Subtropical Frontier. A course in climate modeling was held in 2012 with lecturers and instructors from all Bolin Centre partners as well as from international collaborators, mainly NCAR. This included a substantial project work with the student's own climate modeling experiments. This course will be held every second year now that we have more in-house expertise. We also plan a course on Arctic predictability together with the WWRP Polar Prediction Project and the WCRP Polar Climate Prediction Initiative.

The Master level programs given by the Bolin Centre departments have mandatory or optional courses about climate. New aspects in these courses are taught by our SRA-funded climate modelers. In recent years, we have seen an increase in the number of Master student's thesis projects that include climate modeling experiments or analysis of already available climate model output. We are also developing a full semester Internet-based course on climate science. The purpose of this is to provide a basic understanding of climate science intended for e.g. school teachers and other members of society as continued professional development. For school children and teachers we arrange the Bolin Days for Schools and the Bert Bolin Climate Lecture.

FRÅGA 25

INT 14) Explore to what extent the educational programs associated with the strategic research environment provide the industry and society with qualified personnel and research based knowledge. (1600 characters)

The Bolin Centre provides research-based education for almost 100 PhD students and the host departments and partners educate many more Masters level students on climate and climate related issues. The graduates from these programs stay in academia or take up positions in industry and society and increase the knowledge base on climate issues in society.

For research students and Masters students, our Climate Research School offers regular courses conveying essential skills such as computer programming, statistics and communication, media training, travel support to conferences and summer schools where research-based knowledge is conveyed by our own scientists and by internationally renowned guest lecturers. The new expertise in climate modeling widens the knowledge base for our students. Our graduates become the qualified personnel needed by industry and society that are equipped in many ways to work on many aspects of a changing climate. Graduates from our programs are for example found at SMHI and other governmental agencies, SKB, consultancy for wind power, hydropower sector and the re-insurance sector.

In addition, we work towards provision of qualified personnel to industry and society by focusing on schools. We provide continued professional development (CPD) for school teachers and learning activities for school children. This is because for every school teacher participating in CPD, multiple classes of school children will share this knowledge. In this manner, a handful of scientists can make a meaningful contribution towards a society with the research-based knowledge that is needed not only to read but also to understand the IPCC reports on climate change. In this, we collaborate with Vetenskapens hus.

FRÅGA 26

INT 15) Explain to what extent you use international recruitment of students (including research training of PhD students and post-docs) to achieve the goals for the strategic research environment? (1600 characters)

Recruitment of all SRA-funded scientists, postdoctoral fellows and research students has been through international recruitment campaigns and from a sizeable pool of international applicants. This is Stockholm University policy and is a vital part of achieving the scientific goals of the strategic research environment which is part of an international effort to understand climate and the Earth system.

The seven SRA-funded lecturers/professor recruited as part of the modeling initiative of the Bolin Centre for Climate Research were recruited from England, Ireland, Germany, Finland, Sweden and China. Each of these lecturers extended our pool of applicants for PhD studentships and postdoctoral fellowships internationally. Over a third of the more than 100 PhD students and postdoctoral fellows who are members of the Bolin Centre and/or its Climate Research School were recruited from abroad. Many of these young scientists come from the homelands of our SRA-funded senior lecturers.

This internationalization brings new expertise to the strategic research environment and to Sweden. This is concretized by co-supervision of PhD students and postdoctoral fellows with scientists from abroad. The result is that the Bolin Centre has become a multinational research community in Sweden – a home for both scientific and cultural exchange – and has become an internationally well-known entity. This is a vital part of ensuring that our strategic research environment is internationally recognized.

FRÅGA 27

OTHER

FRÅGA 28

OTH16) What are the major changes made in the research program since 2009? Please describe and motivate (1600 characters)

SRA funding has made it possible for climate modeling to become an integrated part of the Bolin Centre. As result of the new abilities in climate modeling, we restructured the leadership, research communities and introduced coordination and support functions. The new research areas are co-led by SRA-funded climate modelers.

The Bolin Centre is now an environment where climate modeling expertise is fully integrated in the team of experts on climate observations and processes. The Bolin Centre has brought down disciplinary and departmental boundaries. The new team of senior scientists, postdoctoral fellows, research engineers and students in the preexisting Bolin Centre bridge the gap between climate modeling, process studies and observation. The partnership with KTH and SMHI has resulted in new dimensions to our research and provided a more direct link for our research findings to be used in society. This has further transformed the Bolin Centre and will help create stability for the future.

The transformation was concretized in 2013 by the establishment of the new structure of the Bolin Centre. A new board was formed and the directorate was expanded, while the preexisting core themes, with global and regional climate modeling as a separate theme, were restructured and revised into six new research areas, with the expressed purpose of integrating climate modeling across the broad spectrum of climate research at the Bolin Centre. Each of these new research areas is co-led by climate SRA-funded modeler/s and scientists working with climate observation and/or climate processes. These new research areas are: 1) Ocean-atmosphere dynamics and climate; 2) Clouds, aerosols, turbulence and climate; 3) Hydrosphere, cryosphere and climate; 4) Biogeochemical cycles and climate; 5) Historical to millennial; and 6) Orbital to tectonic climate variability.

FRÅGA 29

OTH 17) Describe your long-term strategy for the supply of competence to the research environment, both in terms of research capacity and leadership. How are succession, equality and diversity dimensions incorporated in this? (3200 characters)

The supply of competence to the research environment is guaranteed by its long term strategy and leadership structure. The long term strategy of the Bolin Centre aims to ensure a future as a nationally leading and internationally recognized research environment that is engaged in creating and communicating fundamental climate and Earth system science to scientists, educators, policy makers and society.

This is being and will be achieved through our strategic goals, which are to:

i. Enhance the creation of fundamental knowledge on past, present and future climate

ii. Encourage intra- and multidisciplinary climate science

iii. Bridge the gaps between climate measurement, climate processes research and climate modelling

iv. Promote and support research training and undergraduate education in climate science

v. Communicate its findings to scientists, educators, students, school children, policy makers and society

vi. Provide an environment for scientists to become scientific leaders

vii. Promote shared leadership

viii. Promote equal opportunities in climate science

ix. Link Swedish climate and Earth system science to related national and international research and education endeavors

The leadership structure of the Bolin Centre ensures succession, equality, diversity and longevity. It encompasses:

i. A Board which is comprised of the Head of each Department at SU that participate in the Bolin Centre, representatives of the partner organizations KTH and SMHI and one external member

ii. A Directorate that operatively leads the Bolin Centre, supports the Board and is guided by the Science Advisory Group and the External Science Advisory Group (see below)

iii. A Coordination Team for science, data and modelling

iv. Six research areas (RAs) engaged in fundamental climate research, each of which is led by 2 or 3 co-leaders

v. A Science Advisory Group (SAG) comprised of the RA co-leaders

vi. An External Science Advisory Group (ESAG) comprised of national and international experts on climate and Earth system science

vii. Climate Research School (CRS)

Succession is guaranteed by terms of reference for all leadership positions in the Bolin Centre; each is held for a period of three years. Equality and diversity are key principles in recruitment of leaders in the Bolin Centre. Currently, we can claim both gender balance and international diversity among our leaders. Longevity is guaranteed by the Board of the Bolin Centre which comprises the Head of each Department at SU that participate in the Bolin Centre, representatives of our partner organizations KTH and SMHI, a member from the Swedish Environmental Protection Agency and is chaired by the Dean of the Section of Earth and Environmental Sciences.

FRÅGA 30

OTH 18) Have you applied for, and/or received EU-funding within the scope of the research environment? Please list the number of applications and received grants respectively. (500 characters)

The SRA funding has had a direct and positive impact on our capability of attracting EU funding.

The Rossby Centre is highly successful in participating and receiving grants in the field of climate change research. Over the last four year they have participated in eight unfunded proposals and ten funded programs: participation in CLIP-C (590 k€), HELIX (800 k€), GLOBAQUA (200 k€), JPI Climate (10 k€), IS-ENES (65 k€), IS, ENES2 (600 k€), SPECS (530 k€), EUPORIAS (670 k€) and IMPACT2C (410 k€) and one as coordinators: EMBRACE (1,100 k€).

SU scientists participate in FP7 projects EUCLIPSE (123 k€) specially targeted to improve clouds in climate models and PAGE21 on changing permafrost in the Arctic.

One of our SRA-funded climate modelers, Ilona Riipinen, received an ERC starting grant in 2011: ATMOGAIN (1,498 k€). In the environment we have a COST network, a Marie Sklodowska-Curie Individual Fellowship, Marie Curie Training Networks. Currently several Bolin Centre scientist are involved in Horizon 2020 applications.

FRÅGA 31

OTH 19) Elaborate on how your research environment ensures that also future industrial and societal needs are identified and incorporated in the research (1600 characters)

Already identified future industry and societal needs are more detailed reliable high-resolution climate scenarios for climate change adaptation. The detailed information, however, comes with substantial uncertainties that arise from unknown processes and limitations of the models. This calls for more fundamental research and model improvement, activities that are at the heart of the Bolin Centre.

Construction of more detailed climate scenarios with high-resolution information is ongoing work at the Rossby Centre and will continue to be a focus area in future. Currently, there is ongoing development of the next-generation non-hydrostatic high-resolution regional climate model and on production of new and improved high-resolution reanalysis data sets to be used for evaluation and development of climate models as well as for research on climate variability. This is done in collaboration with other institutes in Europe.

We are aware that industrial and societal needs change in an evolving climate. Together with our partners, we have a firm footing in both pure and applied climate science that is of societal relevance. We also have access to advice from an External Science Advisory Board comprised of national and international experts with considerable knowledge of the evolving needs of industry and society in a changing climate.

Central to the long term strategy of the Bolin Centre is that it will continue to provide high quality research and education that meets the needs of future industry and society, specifically at the interface of climate modeling and observation of past, present and future climate.

FRÅGA 32

OTH 20) What has the specific funding from the strategic research grant meant to your research environment? (1000 characters)

The SRA funds have made it possible for climate modeling to become a sizable, supported and integrated part of the Bolin Centre.

The SRA funding has made it possible for Stockholm University to recruit and support seven lecturers/professors in climate modeling, hosted by four different departments but working together as a gender balanced group complementing the already existing modeling competence at SU and its partners. This group of new generation scientists will carry the Bolin Centre into the future. Long-term computing support has been ensured by recruitment of scientific computing experts. This firmly roots climate modeling activities in the four departments at SU. Furthermore, SRA-funds have been used to boost research education by recruitment of postdoctoral fellows and PhD students. The initiative has created a niche for the Bolin Centre at the interface between climate modeling, climate observation and studies of climate processes relevant to past, present and future climate. It ensures that the Bolin Centre is internationally recognized and in doing so, ensures longevity of the research environment.

FRÅGA 33

Thanks for your answers! Go to next page to send in your report!

Stockholms universitet

Styrelsemöte
PROTOKOLL
2014-05-27

Bolincentret för klimatforskning

Tid och Plats: Den 19 maj 2014, kl. 9-12, T40, Geovetenskapens hus, Stockholms universitet

På följande sida/or finns

Appendix 1b

UM 3) What is the nature of support (for example recruitment strategies, management training, collaborations, infrastructures) from the host-university when it comes to the development and management of the strategic research environment in regard of

a) Maintaining or reaching research quality of the highest international standard and to reach an international leading position within their field of research.

Through a carefully managed effort since 2006, the Bolin Centre for Climate Research has evolved and is maturing into a stable internationally recognized organization with support from all involved. It started with a Stockholm University faculty of science funded climate research school in 2005. Shortly afterwards in 2006, a Linnaeus grant made it possible to begin the strategic process of changing the traditional disciplinary climate research to the modern departmental cross-cutting collaborative research with partners at KTH and SMHI that is now a trademark of the Bolin Centre.

The ability to use models to integrate observations and processes to improve the understanding of the complex nonlinear multi-scale climate system strengthens ongoing past climate and climate processes research and opens new avenues for study. Already at the start of the Linnaeus funding, the importance to the Bolin Centre of making use of numerical models was recognized by the engagement of three tenured positions and one scientific programmer. Numerical modeling puts large demands on infrastructure in terms of high-performance computing, storage and analysis capabilities. In this regard, the Bolin Centre has made good use of resources from the Knut and Alice Wallenberg foundation.

In 2010, when the strategic research funds were granted, the situation was ripe for the enhancement establishment of a climate modeling group to perform research of high international standard using and developing coupled Global Climate and Earth System Models (GCMs and ESMs). To achieve this, tenured faculty were recruited in seven specific research directions that encompass the domains of an Earth System Model. The positions, in numerical modeling of the climate system, were announced internationally emphasizing the collaborative nature of the expected work. The Faculty of Science established a special Teachers Appointment Committee for these positions, to ensure a high-quality hiring process. Each position had two international external expert reviewers with the Director and the Climate Modeling Coordinator also present at the interviews to ensure the strategic goals of the Centre were discussed with all candidates. The seven recruited lecturers/professors (five are females), are of many different nationalities. Only two are from Sweden, but all have substantial research experience in the USA and Europe. Each of them has been allocated funds for PhD positions or postdocs and startup grants. To further strengthen the long-term stability of the modelling activities, scientific computing personnel (on permanent contracts) and data-base managers were hired and distributed over the participating departments. All recruitments involved international advertizing and are in accordance with university policy. All Bolin Centre university employees are formally employed at a department and recognized as Bolin Centre researchers as well. In the hiring process, the candidate's pedagogic merits were also thoroughly evaluated even though their work description for the first five years is mainly research.

After a reorganization and addition of new Directors in early 2013, the Bolin Centre today is a growing organization. It consist of a team of more than 200 scientists from four departments at Stockholm University, Department of Mechanics at KTH and the Rossby Centre at the Swedish Meteorological and Hydrological Institute. The leadership of the Centre has developed and has a maturing program implemented by a Directorate with support functions for six Research Areas, communication, a climate research school, database and climate modeling coordination. Oversight on behalf of the Faculty of Science is provided by a Board appointed by the Vice Chancellor of SU. Science advice and guidance from Bolin Centre Research Area leaders and an External Science Advisory Group are taken into account in the implementation by the Directorate.

The building of the personal connections and coordination of the activities within the Bolin Centre is organized into six Research Areas. Each of these is co-led by 2-3 scientists and has involves all researchers active or interested in the topic including the newly recruited senior climate modelers. All members of the Bolin Centre have a research home in one or more of these Research Areas, but are also firmly rooted in their host departments. This enhances access to departmental infrastructure, for example, scientific instrumentation, field stations and administrative support and their contribution to the base university functions such as undergraduate education, supervision and administrative tasks.

Management training is offered to all persons with leadership positions at SU. This is part of a wider SU policy on providing its staff with continued professional development opportunities.

b) Linking the strategic research areas with the needs of societal organisation and the business sector?

The most important to link our science to the needs of societal organisations and business sector in Sweden is through our partner at SMHI. SMHI has a long experience of communicating results from climate research to the wider society. Since the establishment of the Rossby Centre, this has included not only climate scenario results and their interpretation, but also support to a wide range of climate impact researchers and to the wider society. Since 2011, SMHI is the appointed Swedish Centre of Knowledge for Climate Adaptation as part of its governmental directives. With the Rossby Centre as an integrated partner in the Bolin Centre, access to SMHIs facilities for science communication is available and forms a natural bridge for spreading information and knowledge about the climate system and climate research activities at the university to the wider society including both the general public and decision makers at different levels.

On the international level, the Intergovernmental Panel on Climate Change (IPCC) assessment reports, especially Working Group 1 (WG1), are of uttermost importance for the international discussions among policy makers. Bolin Centre scientists have increased the presence in many ways in the latest report from WG1, negotiated and approved in Stockholm in September 2013. Bolin Centre scientist were involved as contributing authors, expert reviewers and science advisors in the Swedish delegation of negotiations. The most significant contribution is through the research conducted in the Centre. More than 70 citations were made in the 2013 WG1 report to peer-reviewed scientific papers authored or co-authored by Bolin Centre scientists. Bolin Centre scientists also contribute to the work lead by the World Meteorological Organization, including the international UN Global Framework for Climate Services involving many UN agencies and other organizations. The adaptation to changing climate involves optimal use of knowledge for specific user group needs that constitutes a climate service.

The Bolin Center is an established source of information about climate and climate change and communicate climate science on many levels. This was especially visible in connection to the IPCC event in September 2013, Bolin Centre scientists were involved in numerous public events (radio programs, newspaper and TV interviews, chat) as well as targeted educational events for journalists, school-teachers and professionals from the broader society.

Although the majority of the research within the Centre is on basic research, there are joint projects with industry. For example, very long-term climate simulations are performed to study risks on the time-scales of nuclear waste together with the Swedish Nuclear Fuel and Waste Management Company (SKB). Scientist trained within the Centre are also recruited to expert positions in the wind energy and insurance sectors. To a smaller extent, Bolin Centre scientists are engaged with mitigation efforts, such as optimization of carbon sequestration.

c) Cultivating collaborations with other universities and non-academic organisations?

The collaborations between SU, KTH and Rossby Centre has grown substantially as a direct consequence of the strategic funding and is quite visible in the publication list as co-authored scientific papers. Efficient collaboration teams are formed, usually but not always, with PhD-student projects with advisors from two of the partners. The collaboration on infrastructure needs, computing, storage, data analysis and code development/maintenance is also strong and involves the successful collaboration within SeRC (SRA in e-science) as well. These collaborations were prerequisite for the Swedish effort in EC-Earth production runs for the CMIP5 project and ultimately the influence on the IPCC/AR5. As the collaboration between the partners in the Bolin Centre deepens and common strategic goals in science performed with climate models are formed, a stronger united view towards national and European funders of science, HPC resources and science policy networks such as the European Climate Research Alliance (ECRA) can be more efficiently expressed.

d) Strengthening the link between the research and education?

A cornerstone of university policy is that its education at all levels is firmly grounded in its research. This is manifested in that all senior staff is involved in undergraduate and graduate teaching in developing courses, lecturing and supervising projects and thesis work. Bolin Centre scientist are a natural part of the departments and are involved courses at all levels. The Research School provides an extra curriculum of climate-related courses to PhD students at SU, including hands-on courses in climate modeling but also in media training, proposal writing and career planning. The Bolin Centre is also engaged in science teaching to schools and in providing continued professional development for science teachers and science journalists.
(Maximum 2 pages for UM3a-d)

UM 4) SWOT analysis.

Please explore the Strenghts, Weaknesses, Opportunities and Threats to the Strategic Research Area hosted by your university, in regards of

a) Maintaining or reaching research quality of the highest international standard and to reach an international leading position within their field of research.

	Positive	**Negative**
Internal factors	**S(trenghs)** • Over 200 scientists at SU, KTH and SMHI are members of the Bolin Centre for Climate Research. • The Bolin Centre is at the interface between climate and Earth system observations (climate variables and processes) as well as climate process research and modeling. • Scientists at the Bolin Centre are experts in addressing the basis of our changing climate on timescales ranging from decades to millions of years. • Scientists from a wide range of disciplines (atmospheric science, ocean science, environmental science and geosciences) are members of the Bolin Centre. • The Bolin Centre has a highly successful science-centered structure that is firmly grounded in its hosts organizations (SU, KTH and SMHI).	**W(eaknesses)** • The Bolin Centre hosts scientists from a wide range of disciplinary backgrounds and for this reason, scientific communication between its members can be challenging. • The Bolin Centre hosts scientists with very different approaches to climate science (from modeling to observation) who are working on vastly different timescales. Establishing a platform of communication that accomodates such diversity is not straightforward.
External factors	**O(pportunities)** • The research focus of Bolin Centre scientists – our changing climate – is among the most important inter- and multidisciplinary questions challenging scientists today. This is recognized by the scientific community, policy-makers and funding organizations. For instance we are a participating member of the European Climate Research Alliance (ECRA). • The Bolin Centre is a recognized part of its host organizations (SU, KTH and SMHI), bringing added value in terms of research and education. • The Bolin Centre has substantial external research funds (SFO, Linnaeus, other external grants).	**T(hreats)** • The research focus of the Bolin Centre is a single (albeit critical) question – our changing climate Changing societal priorities and/or complacency with the subject can result in a shift away from this unresolved question. This could, for example, result in reduced funding. We therefore emphasize that we deal with fundamental knowldge of the Earth System as well as climate. • The main sources of Bolin Centre funding are SFO and Linnaeus. The latter ends in 2016. The future of SFO funding remains to be decided and will critically decide the fate of continued Earth System research.

b) Linking the strategic research areas with the needs of societal organisation and the business sector?

	Positive	**Negative**
Internal factors	**S(trenghs)** • Many scientists at the Bolin Centre have a strong awareness of the needs of societal organisation and the business sector of trustworthy guidance with regards our changing climate. Outreach is a strategic goal of the Centre. • Many scientists at the Bolin Centre have direct links with societal organisation (e.g. schools, media, policy-makers) and businesses (e.g. nuclear waste management, carbon sequestration, medium term weather forecasting). We are aided greatly in this through our partner the SMHI	**W(eaknesses)** • Many scientists at the Bolin Centre are more comfortable conveying their scientific finding to their peers than to societal organisation (e.g. via the media) and to stakeholders in the business sector. • Many scientists at the Bolin Centre feel a sense of frustration at being unable to successfully convey the seriousness of ongoing and future climate change issue to policy makers.
External factors	**O(pportunities)** • The IPCC science assessment reports channel researchers' knowledge of climate into a consensus report effectively reaching the public and policy makers worldwide. Over 70 papers authored or co-authored by scientists at the Bolin Centre are cited in the Working Group I: Physical Basis of this report. • Responsible organisations seek qualified guidance with regards the effect of their business on our changing climate and its effect on their business.	**T(hreats)** • Changing priorities and/or complacency driven by a belief that the climate problem is solved and no longer requires fundamental Earth System research can diminish interest and/or taking of responsibility for our changing climate, both among policy makers, societal organisation and the business sector. • Government endorsing research funding policy that rewards only mission oriented research and failing to nurture a broad base of research that is often not immediately related to commerical products

c) Cultivating collaborations with other universities and non-academic organisations?

	Positive	**Negative**
Internal factors	**S(trenghs)** • The Bolin Centre has established parternships with other universities (KTH) and non-academic organisations (SMHI) as a direct result of its strategic research environment funding. • The Bolin Centre has numerous other collaborations with other universities and non-academic organisations that are led by its scientists. • The Bolin Centre participates in numerous organisations that bring climate scientists together worldwide. These include the European Climate Research Alliance (ECRA), the European and American Geopyhsical Unions And ICSU based initiatives such as IGBP and now Future Earth • Collaborations with KTH and SMHI are synergetic in that each partner makes a unique and essential contribution to the Bolin Centre.	**W(eaknesses)** • Our non-academic partner (SMHI) is located sufficiently far from Stockholm (SU and KTH) so as to make day-to-day collaboration less feasible. • There is not the same opportunity for casual meetings (from which many research ideas originate) between scientists at SU and scientists at its partners.
External factors	**O(pportunities)** • Society and stakeholders in academic and business sectors need multidisciplinary answers to questions about our changing climate. These answers can only be provided by a team of scientists with the theoretical, applied, computational and societally-aware competence that for the Bolin Centre, can only be fully attained as part of a collaborative effort between SU, KTH and SMHI.	**T(hreats)** • The largest threat to our newly cultivated collaborations with KTH and SMHI is an externally-forced change to the funding situation that would render sharing of funds no longer advantageous and/or feasible.

d) Strengthening the link between the research and education?

	Positive	Negative
Internal factors	**S(trenghs)** • One of the trademarks of Stockholm University is that its education is firmly grounded in its research. • The Bolin Centre has a research school focusing on climate-related topics. This research school is funded as part of a Linnaeus grant for the purpose of delivering courses to PhD students. • The Bolin Centre membership includes a huge number of highly qualified teachers. • The host departments of the Bolin Centre have a long tradition of excellence in teaching at all levels from elementary schools to research training.	**W(eaknesses)** • The full-time equivalent (HÅP) – full-time student (HÅS) system can be detrimental to research-driven education. This is because it rewards quantity of education (number of students) moreso than quality of education.
External factors	**O(pportunities)** • The reseach focus of the Bolin Centre – our changing climate is a topic which fascinates both school pupils and university students. • Despite the obvious importance of our climate to society, supply of educaton in climate science fails to meet societal demand for this education.	**T(hreats)** • Changing policies can force universities to compromise the quality of teaching in favour of the quantity of teaching for economic reasons. This can undermine research-driven teaching. • Poor numerical and science skills among school leavers challenges our ability to teach climate science at a level that is meaningful to future society. • While schools welcome offers of continued professional development and/or learning activities for their pupils, low school budgets mean that these efforts need to be conducted on a voluntary basis.

(Maximum 4 pages)

UM 5) What is your plan for the long-term partnership and collaboration with the co-applicant organisation(s) for the strategic research area? Please include considerations regarding the distribution of funding between the universities. (2 pages)

The Bolin Centre for Climate Research has established partnerships with the Royal Institute of Technology (KTH) and the Swedish Meteorological and Hydrological Institute (SMHI). These partnerships began as co-applicants for strategic research environment financing. Both partnerships have become critical to our research and education. For this reason the Bolin Centre Board has recommended that distribution of funds between SU, KTH and SMHI should remain at the present proportions, i.e. SU – 80%, KTH – 10% and SMHI – 10%.

Here, we need input, mainly from Gunilla, Erik and Dan.

Total maximum of 2 pages for UM5

Stockholms universitet

Styrelsemöte
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2014-05-27

Bolincentret för klimatforskning

Tid och Plats: Den 19 maj 2014, kl. 9-12, T40, Geovetenskapens hus, Stockholms universitet

På följande sida/or finns

Appendix 2

From: **Cynthia de Wit** Cynthia.deWit@itm.su.se
Subject: Bolin Centre board meeting 19 May, 9-12
Date: 12 maj 2014 08:51
To: Alasdair Skelton alasdair.skelton@geo.su.se, Arjen Stroeven (arjen.stroeven@natgeo.su.se) arjen.stroeven@natgeo.su.se, Cynthia de Wit Cynthia.deWit@itm.su.se, Dan Henning (henning@mech.kth.se) henning@mech.kth.se, Erik Kjellström (erik.kjellstrom@smhi.se) erik.kjellstrom@smhi.se, Karin Jonsell (karin.jonsell@su.se) karin.jonsell@su.se, Leonard (Len) Barrie leonard.barrie@geo.su.se, Marianne Lillieskold (Marianne.Lillieskold@naturvardsverket.se) Marianne.Lillieskold@naturvardsverket.se, Martin Jakobsson (martin.jakobsson@geo.su.se) martin.jakobsson@geo.su.se, Michael McLachlan Michael.McLachlan@itm.su.se, Michael Tjernström michaelt@misu.su.se
Cc: Gunilla Svensson gunilla@misu.su.se, Anders Karlhede ak@fysik.su.se

Dear board,

Please find attached the agenda, the latest draft of the strategic plan (Appendix 1) and the draft answers to the Management part of the evaluation (Appendix 3). The self-evaluation answers will be submitted to VR on May 16 and this document will be sent to the board at that time (Appendix 2).

In light of the discussion that has been taking place about the last section of the strategic plan, I have had a discussion with the dean of the Faculty of Science, Anders Karlhede to clarify the future of SFO funding of the Bolin Centre depending on the outcome of the evaluation. He sent a copy of the following decision made by the University Board:

I Universitetsstyrelsens budgetbeslut 2009-11-16 står det;

”Vidare erhåller universitetet inför 2010 sammanlagt 19 000 tkr för strategiska forskningsområden. Dessa är öronmärkta för vissa forskningsmiljöer och ska fördelas till Naturvetenskapliga fakultetsnämnden. Medlen är avsedda för följande områden:

- Effekter på naturresurser, ekosystemtjänster och biologisk mångfald (8 000 tkr)
- Havsmiljöforskning (4 900 tkr)
- Klimatmodeller (6 100 tkr)

Medlen ska tillfalla de berörda forskningsmiljöerna till 100 procent under de första fem åren, samt till minst 50 procent de efterföljande fem åren.”

So if the outcome of the evaluation of SFO funding is positive and funding is returned to Stockholm University, 50% of this has been promised to be returned to the research platform – i.e. to the Bolin Centre modelling initiative via the Faculty of Science for the next 5-year period. These funds do not belong to the departments, they belong to SU and the Faculty can redistribute these funds within the research platform if they so choose. Where the other 50% of funds goes is under the discretion of the Stockholm University Board. The current understanding is that, if we retain the funding, this 50% will probably come back to the Faculty of Science to be used for climate research in a broader context, and again it is the Faculty that will decide how this is distributed. Please keep this in mind as you read the last part of the strategic plan.

Anders Karlhede will take part in the Board meeting and explain this in more detail.

See you on May 19!

Cheers,
Cindy de Wit

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Stockholms universitet

Styrelsemöte
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2014-05-27

Bolincentret för klimatforskning

Tid och Plats: Den 19 maj 2014, kl. 9-12, T40, Geovetenskapens hus, Stockholms universitet

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Appendix 3a

Strategic Plan of the Bolin Centre for Climate Research

for science in a changing climate

Prelude

This strategic plan is a living document with the purpose of guiding the actions of the Bolin Centre for Climate Research and will be used to underpin the annual plan of activity. It is to be reviewed annually.

Introduction

Founded in 2006, the **Bolin Centre for Climate Research** is a multi-disciplinary consortium of researchers at Stockholm University that conducts fundamental research on the climate and Earth system. This research strengthens the knowledge-base for climate mitigation and adaptation policies nationally and internationally. The Centre involves researchers mainly from the Faculty of Science, Stockholm University as well as from the Swedish Meteorological and Hydrological Institute (SMHI) and the Royal Technical University (KTH). It also forges connections to other Swedish research institutions and to international research organizations.

The **Bolin Centre** is a synergetic collaboration between four Stockholm University Departments[1], SMHI and KTH. It is **nationally leading** and **internationally recognized** for excellence in research on natural climate evolution and variability, as well as on changes imposed by the increasing human impact on the Earth system. Through research, graduate education and outreach, it aims to build the next generation of expertise and knowledge on past, present and future climates and climate-influencing processes, over a range of time scales, spatial scales and subsystems while addressing related societal issues. This strategic plan is a statement of goals and principles which will guide the future long term development of the organization of the Bolin Centre by the Board and the Directorate.

Vision

[1] Department of Geological Sciences (IGV) http://www.geo.su.se/; Department of Physical Geography and Quaternary Geology (INK) http://www.ink.su.se/; Department of Applied Environmental Science (ITM) http://www.itm.su.se/; Department of Meteorology (MISU) http://www.misu.su.se/.

Our vision is for the Bolin Centre to be the nationally leading and internationally recognized centre for climate research and the primary contact point for scientists, media and the public on issues relating to the climate, past present and future. **Mission**

The mission of the **Bolin Centre** is to create and communicate fundamental climate and Earth system science as part of an evolving global effort to understand and adapt to the Earth's changing climate.

The ideas which guide our actions

The Bolin Centre exists for the production and communication of climate and Earth system science. At its core are over two hundred, free-thinking scientists spread across multiple disciplines. They are united by a common desire to understand climate and Earth system science and by the conviction that new directions in science result from the meeting of research excellence across natural science disciplines. The Bolin Centre provides opportunities for researchers and managers to interact. It helps to ensure that the partners' efforts are viewed externally as part of one centre of research excellence for climate. This excellence is nurtured through encouragement of new ideas, partnerships and research directions. Our operational philosophy is one of mutual respect and trust.

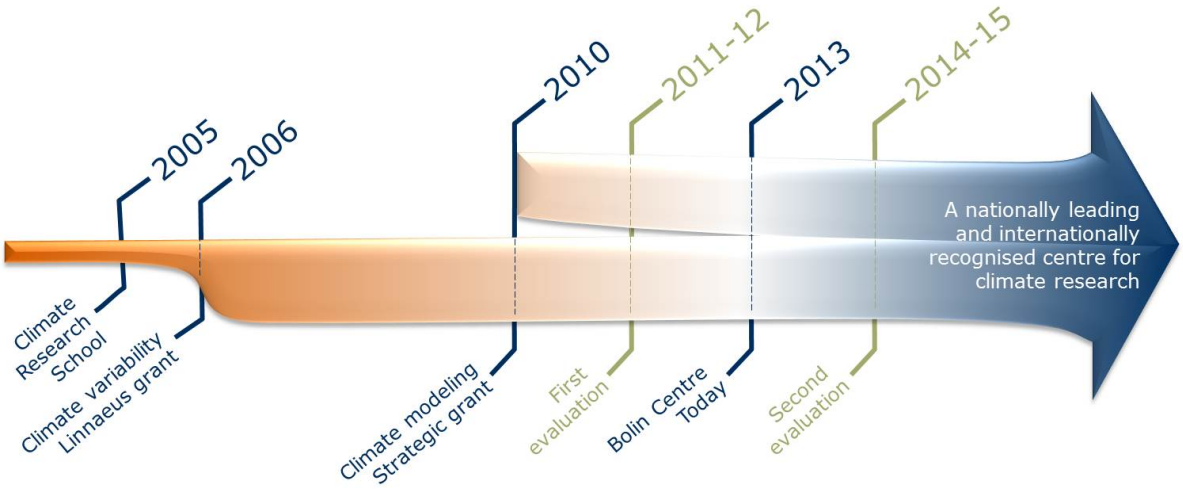

Figure 1: Timeline of the Bolin Centre – our first ten years

Timeline

The Bolin Centre was founded in 2006 stemming from a Climate Research School which was established by the four Bolin Centre Departments and the Faculty of Science of Stockholm University. The Bolin Centre is funded by a 10-year Linnaeus grant awarded in 2006 focusing on building research capacity in climate variability, and a strategic research grant (SFO) awarded in 2010 focusing on strengthening and expanding research on climate modelling. Thereby, Stockholm University's climate science agenda was consolidated. These funds together currently exceed 30 MSEK annually. The Bolin Centre was evaluated in 2011-12 and will be evaluated again in 2014. The outcome of the first evaluation was highly successful. It brought to the attention of sponsors the production of over 500 peer-reviewed publications, 16 in Nature and Science, and demonstrated that the Bolin Centre is Sweden's largest centre of research excellence focusing on fundamental climate science (Figure 1).With the recruitment of six SFO-funded climate modellers now completed, the Bolin Centre is at the start of a vital phase of scientific integration that will bring climate modelling and climate observation closer together. For this vital phase to be realised it is essential that the Bolin Centre retains the full strategic funding after 2014.

Strategic goals

To fulfil our mission, we outline the following strategic goals for the Bolin Centre. The goals listed in this plan are for the purpose of guiding our actions so as to ensure a future for the Bolin Centre as a **nationally leading** and **internationally recognised** centre engaged in creating and communicating fundamental climate and Earth system science to scientists, educators, policy makers and society.

The **Bolin Centre** will:

i. Enhance the creation of **fundamental knowledge** on past, present and future climate

ii. Encourage intra- and multidisciplinary climate science

iii. **Bridge the gaps** between climate measurement, climate processes research and climate modelling

iv. Promote and support **research training** and **undergraduate education** in climate science

v. **Communicate** its findings to scientists, educators, students, school children, policy makers and society

vi. Provide an environment for scientists to become **scientific leaders**

vii. Promote **shared leadership**

viii. Promote **equal opportunities** in climate science

ix. **Link** Swedish climate and Earth system science to related national and international research and education endeavours[2]

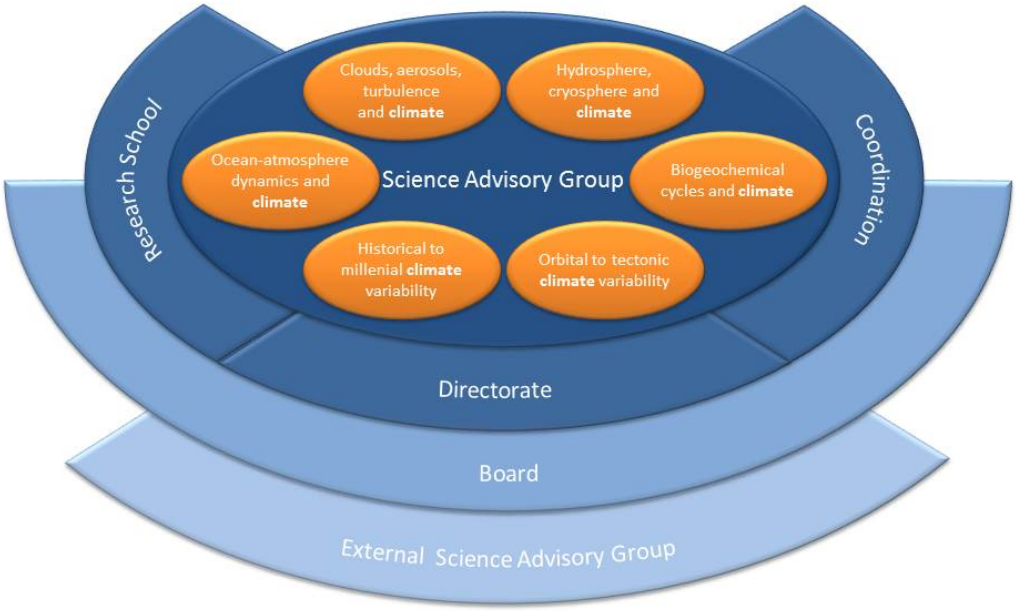

Figure 2: Structure of the Bolin Centre

Structure

The Bolin Centre is structured (Figure 2) as follows:

- A **Board** which is comprised of the Head of each Department at SU that participate in the Bolin Centre, representatives of the partner organizations KTH and SMHI and one external member
- A **Directorate** that operatively leads the Bolin Centre, supports the Board and is guided by the Science Advisory Group and the External Science Advisory Group (see below)
- A **Coordination Team** for science, data and modelling
- Six **research areas** (RAs) engaged in fundamental climate research, each of which is led by 2 or 3 co-leaders

[2] Currently we are formally linked to ICOS through LUCCI led by LUND, to the IPCC process, we are recognized as a participating member in the European Climate Research Alliance (ERCA), and we are part of the EC-Earth consortium for development of the EC-Earth global Erath system model. Other important strategic partners are the corresponding climate research partners in the Nordic countries, such as the Bjerknes Centre, SEI, Ekoklim and BEAM.

- A **Science Advisory Group** (SAG) comprised of the RA co-leaders
- An **External Science Advisory Group** (ESAG) comprised of national and international experts on climate and Earth system science
- A **Climate Research School** (CRS)

Ensuring the future of the Bolin Centre

The structure of the Bolin Centre is optimised to create and communicate fundamental climate and Earth system science. Its governance is designed to fulfil its mission (see above) while maintaining the Bolin Centre as Sweden's strongest centre for inter- and multidisciplinary climate research. The mandate and modus operandi of the entities of the Bolin Centre are defined in appendices 1-3. These are (1) the Bylaws of the Bolin Centre for Climate Research (by decision of the Vice-chancellor of Stockholm University on 2007-11-22 with one revision on 2012-12-20), (2) the Bolin Centre Structure (by decision of the Board of the Bolin Centre on 2012-12-15) and (3) the mandate, membership and modus operandi of the External Science Advisory Board (by decision of the Board of the Bolin Centre on 2014-02-03).

Ensuring the future of the Bolin Centre for Climate Research secures Stockholm University as a focal point for climate and Earth system science in Sweden and internationally. This requires a combination of internal and external funding to create excellent climate research, to maintain a structure that supports and promotes science and science education, and that ensures collaboration across disciplines and between Stockholm University and its partners. The Board, the Departments, SMHI and KTH are strongly committed to the continuation of the Bolin Centre and will continue to use the strategic (SFO) funds in the second 5-year period (to 2019) to finance the Centre in order to ensure its future. Central to our strategy is to fund the following core functions which have evolved with support of the Linnaeus grant ending 2016 and which are crucial to meeting the strategic goals of the Bolin Centre:

a. **activities** that promote a **strong research agenda** and **excellent climate science**
b. a permanent **Directorate**
c. **coordination** of research training, modelling infrastructure and an open access database
d.
e. **activities that communicate and educate** about climate and Earth system science

In the post Linnaeus grant period of 2016 and beyond, financial support is needed for these core functions of the Bolin Centre and the Board sees the current level of funding for these functions as a reasonable target.

The Board agrees that a funding formula is thus needed to ensure that this target is met in post 2016 operations of the Bolin Centre. In this regard, it is anticipated that the Faculty of Science will negotiate a funding formula in consultation with the Board, Departments/partners committed to the Bolin Centre that optimises the Centre's research and core functions, and the Directorate.

Appendix 1

Bylaws of the Bolin Centre for Climate Research

(*by decision of the Rector of Stockholm University on 2007-11-22 with one revision on 2012-12-20*)

Appendix 2

Bolin Centre Structure

(*by decision of the Board of the Bolin Centre on 2012-12-15*)

Appendix 3

Mandate, Membership and Modus Operandi of the External Science Advisory Board

(*by decision of the Board of the Bolin Centre on 2014-02-03*)

Stockholms universitet

Styrelsemöte
PROTOKOLL
2014-05-27

Bolincentret för klimatforskning

Tid och Plats: Den 19 maj 2014, kl. 9-12, T40, Geovetenskapens hus, Stockholms universitet

På följande sida/or finns

Appendix 3b

Strategic Plan of the Bolin Centre for Climate Research

for science in a changing climate

Prelude

This strategic plan is a living document with the purpose of guiding the actions of the Bolin Centre for Climate Research and will be used to underpin the annual plan of activity.

Introduction

Founded in 2006, the **Bolin Centre for Climate Research** is a multi-disciplinary consortium of researchers at Stockholm University that conducts fundamental research on the climate and Earth system. This research strengthens the knowledge-base for climate mitigation and adaptation policies nationally and internationally. The Centre involves researchers mainly from the Faculty of Science, Stockholm University as well as from the Swedish Meteorological and Hydrological Institute (SMHI) and the Royal Technical University (KTH). It also forges connections to other Swedish research institutions and to international research organizations.

The **Bolin Centre** is a synergetic collaboration between four Stockholm University Departments[1], SMHI and KTH. It is **nationally leading** and **internationally recognized** for excellence in research on natural climate evolution and variability, as well as on changes imposed by the increasing human impact on the Earth system. Through research, graduate education and outreach, it aims to build the next generation of expertise and knowledge on past, present and future climates and climate-influencing processes, over a range of time scales, spatial scales and subsystems while addressing related societal issues. This strategic plan is a statement of goals and principles which will guide the future long term development of the organization of the Bolin Centre by the Board and the Directorate.

Vision

[1] Department of Geological Sciences (IGV) http://www.geo.su.se/; Department of Physical Geography and Quaternary Geology (INK) http://www.ink.su.se/; Department of Applied Environmental Science (ITM) http://www.itm.su.se/; Department of Meteorology (MISU) http://www.misu.su.se/.

Our vision is the Bolin Centre as the nationally leading and internationally recognized centre for climate research and a primary Swedish contact point for scientists, media and the public on issues relating to the past, present and future climate.

Mission

The mission of the **Bolin Centre** is to create and communicate fundamental knowledge about climate and the Earth system as part of an evolving global effort to understand and adapt to the Earth's changing climate.

The ideas which guide our actions

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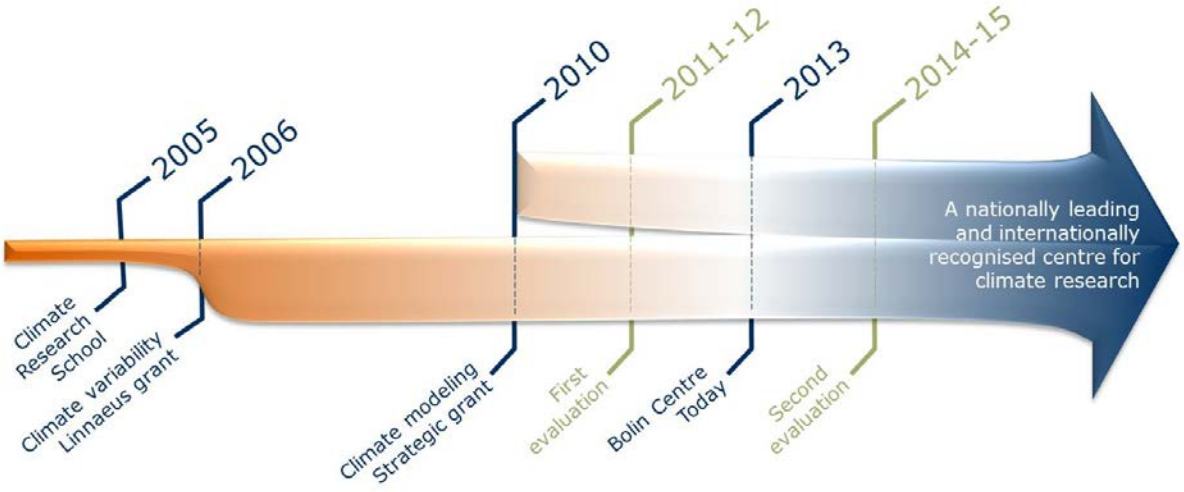

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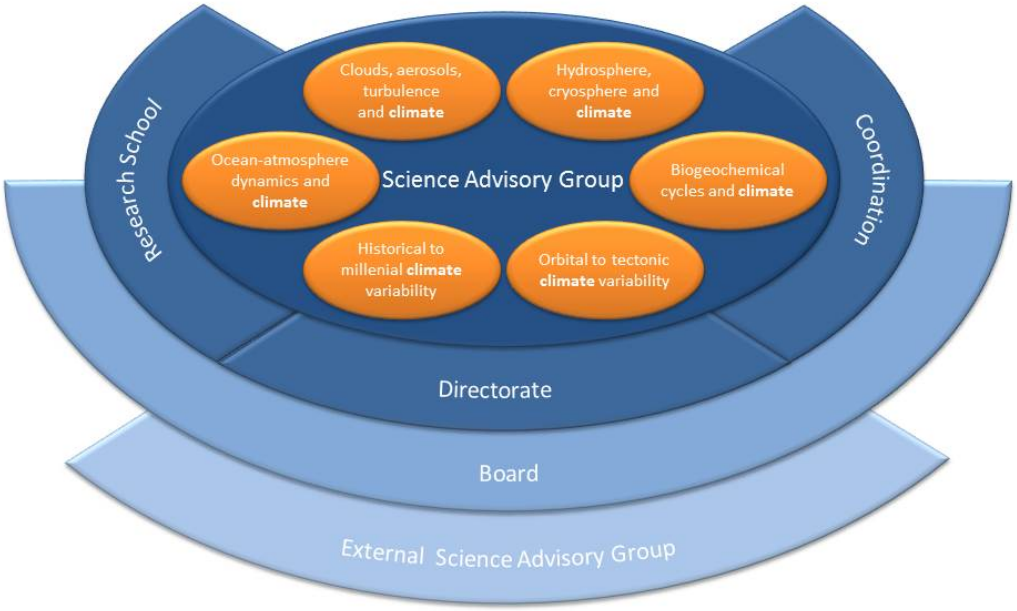

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Appendix 1

Stockholms universitet

UTDRAG UR PROTOKOLL
fört vid föredragning för rektor 2012-12-20

Ärende	Åtgärd
50. Förslag från Områdesnämnden för naturvetenskap om revidering av stadgar för Bert Bolincentret för klimatforskning (BBCC). *Föredragande: Ulrika Bjare, Ledningskansliet.*	Rektor beslutar fastställa stadgar enligt bilaga R-15-121220. Det antecknas att stadgarna ersätter tidigare beslut fattade av rektor (R 071122, R 110310).

Dessa beslut är fattade av rektor, professor Kåre Bremer, i närvaro av prorektor, professor Lena Gerholm och förvaltningschefen, universitetsdirektör Ann-Caroline Nordström. Studeranderepresentanter har informerats och haft tillfälle att yttra sig. Övrig närvarande har varit Anna Riddarström, Ledningskansliet (protokollförare).

Ur protokollet

Ulrika Bjare

STOCKHOLMS UNIVERSITET

Stadgar för Bolincentret för klimatforskning

Bolin Centre for Climate Research

fastställda av Rektor 2007-11-22, reviderade 2012-12-20

Bakgrund

Vetenskapsråden VR och FORMAS har tilldelat Stockholms universitet bidrag för projektet "Climate evolution, variability and sensitivity" under en 10-årsperiod med start den 1 juli 2006. Detta bidrag är ett så kallat Linnéstöd. Projektet organiserades i form av ett centrum, Bolincentret för klimatforskning, i samverken mellan forskare vid Institutionen för geologiska vetenskaper (IGV), Institutionen för naturgeografi och kvartärgeologi (INK), Meterologiska institutionen (MISU) och Institutionen för tillämpad miljövetenskap (ITM).

Med start den 1 januari 2010 tilldelades Stockholms universitet en så kallad Strategisk satsning för klimatmodellering. Till och med 31 december 2014 får de fyra institutionerna ingående i Bolincentret medel från denna satsning för att stärka klimatmodelleringen inom Bolincentrets verksamhet. Under förutsättning att de strategiska forskningsmedlen kvarstår inom universitetet efter 2014 ska under kommande femårsperiod minst 50 procent av medlen tillfalla forskningsmiljön.

Ändamål

Verksamhetens huvudsyfte är att öka kunskaperna om Jordens naturliga klimatsystem, klimatets variationer, klimatpåverkande processer, klimatförändringens effekter, människans påverkan på klimatsystemet samt klimatmodellering. I Bolincentret ingår också en forskarskola.

Huvudman/organisation

Bolincentet är ett självständigt centrum inom Institutionen för geologiska vetenskaper bestående av forskare från MISU, ITM, INK och IGV, samt från KTH och Rossbycentret. Bolincentrets ledning består av en styrelse, en direktör, en ställföreträdande direktör, ett internt vetenskapligt råd och ett externt vetenskapligt råd med följande funktioner:

Styrelse: Bolincentret leds av en styrelse bestående av en ordförande, prefekterna vid MISU, ITM, INK och IGV med deras respektive ställförträdare som suppleanter, en representant vardera från Rossbycentret, KTH och en extern representant, samt en studentrepresentant med suppleant. Bolincentrets direktör och ställföreträdande direktör deltar i styrelsens möten med yttranderätt, men utan rösträtt. Studentrepresentant med suppleant utses i enlighet med Studentkårsförordningen (2009:769). Övriga ledamöter utses av rektor efter förslag av dekanus, som har att samråda med respektive organisation inför förslaget.

Direktörer: Bolincentret leds operativt av en direktör och en ställföreträdande direktör, en av dessa kan utses till vetenskaplig direktör. Direktörerna tar operativa beslut och ska rapportera till styrelsen och ta råd från de externa och interna vetenskapliga råden i beaktande. Direktörerna är också ansvariga för Bolincentrets forskarskola. Direktör och ställföreträdande direktör utses av rektor efter förslag av dekanus.

Internt vetenskapligt råd: Bolincentret ska ha ett internt vetenskapligt råd, vars huvuduppgift är att ge råd i frågor rörande forskningen inom centrumet, inkluderande råd om anställningar. Ordförande för rådet är direktören och ställföreträdande ordförande är den ställföreträdande direktören; dessa båda är röstande medlemmar av rådet. I rådet ingår dessutom två ledare för varje forskningsområde; varav en har rösträtt i rådet. Forskningsområdena, ledarna och vem som har rösträtt beslutas, respektive utses, av direktören.

Externt vetenskapligt råd: Bolincentrets styrelse ska utse ett externt vetenskapligt råd bestående av ledande nationella och internationella forskare inom klimatområdet. Rådets sammansättning föreslås till styrelsen av Bolincentrets direktörer. Rådets huvuduppgifter är: (i) att upplysa Bolincentret om dess styrkor, svagheter och möjligheter för utveckling samt (ii) att öka Bolincentrets kontakter till internationella nätverk och forskargrupper inom klimatforskningsområdet.

Alla mandatperioder är tre år. Såväl ordförande som ledamöter och direktör, stf direktör, kan omförordnas.

Resurshantering

Rektor har beslutat att medel erhållna för Linnéstöd ska disponeras av den institution där Bolincentret har sin organisatoriska hemvist. Centrumetsvärdinstitution, IGV, fördelar efter beslut från Bolincentrets styrelse medel till forskare verksamma inom centrumet vilka tillhör de i centrumet ingående fyra institutionerna, samt KTH och Rossbycentret. De tre institutionerna ITM, INK och MISU har redovisningsansvar gentemot IGV, vilken i sin tur har redovisningsansvar gentemot bidragsgivande forskningsråd i enlighet med avtalet samt i övrigt enligt Stockholms universitets regelverk för ekonomihantering.

Rektor har beslutat att medel erhållna av Stockholms universitet i form av en Strategisk satsning till och med 31 december ska 2014 fördelas efter beslut från Bolincentrets styrelse till de fyra i centrumet ingående institutionerna. De tre institutionerna ITM, INK och MISU har även här redovisningsansvar gentemot centrumets värdinstitution, vilken i sin tur har redovisningsansvar gentemot bidragsgivande forskningsråd i enlighet med avtalet samt i övrigt enligt Stockholms universitets regelverk för ekonomihantering.

Anställning/motsvarande

Anställning av forskare och annan personal samt antagning av doktorander sker vid de deltagande institutionerna.

Ändring av föreskrifter

Dessa föreskrifter kan ändras på förslag av centrumets styrelse eller Områdesnämnden för naturvetenskap. Ändringar beslutas av rektor efter hörande av Områdesnämnden för naturvetenskap alternativt centrumets styrelse (beroende på vilken enhet som initierat förändringen).

Appendix 2

Structure of the Bolin Centre for Climate Research at Stockholm University, Sweden

A PROPOSAL

Alasdair Skelton and Leonard Barrie

Background/Rationale

The Bolin Centre for Climate Research (henceforth the Bolin Centre) was created in 2006 in response to a growing recognition by society of the need for multi-disciplinary research and education in Sweden related to changing climate and its impacts. The aim of the centre was to effectively harness national scientific expertise in a growing international effort to understand, mitigate and adapt to climate change. Between 2006 and 2012, the activities and structure of the Bolin Centre with its directorate at Stockholm University have been shaped by three major initiatives. The first, which preceded the Bolin Centre, was the creation of a Climate Research School at Stockholm University (SU). This was initially partly funded by the Faculty of Science and since 2006, has been co-funded by the Swedish Research Council. The second was the creation of a research environment focussing on Climate Evolution, Variability and Sensitivity. This has been funded by a ten year Swedish Research Council - FORMAS "Linnaeus Grant" since 2006 (Annex 1). The third was a long term Strategic Grant "Modelling Initiative of the Bert Bolin Centre for Climate Research" (Annex 2). Although the Centre has large contributions from SU, it critically relies upon partnerships of other universities and institutions in Sweden and abroad.

The external funding of the Bolin Centre is given in detail in Annex 3. In brief the funding is as follows:

- Linnaeus grant (climate research school): 2 MSEK annually, July 1, 2006 – June 30, 2016
- Linnaeus grant (climate evolution, variability and sensitivity): 10 MSEK annually, July 1, 2006 – June 30, 2016
- Strategic grant (Modelling Initiative of the Bert Bolin Centre for Climate Research) 18.3 MSEK annually (after an initial "ramp up period", January 1, 2010 onwards (until at least December 31, 2014). In 2015, funds will remain at SU. However, 50% of these funds may be reallocated by the Rector. In 2016 and thereafter, funding will depend on an evaluation which is likely to be conducted in 2015

In 2011 after five years of operation, The Bolin Centre and the Climate Research School were evaluated. This evaluation involved a combination of self-assessment and site visits. The panel considered the Bolin Centre to have very successfully established a single community for climate scientists from the Departments of Meteorology (MISU), Applied Environmental Science (ITM), Physical Geography and Quaternary Geology (INK) and Geological Sciences (IGV) at Stockholm University. They commended the added value of Stockholm University's strong commitment to the Bolin Centre and the spin-off "strategic climate modelling initiative". They raised concerns about maintaining current impetus and coherent direction after the retirement of the director (Johan Kleman). They acknowledged steps taken to strengthen internal collaboration and recommended further efforts in this direction, by taking advantage of co-supervisor arrangements for Ph.D. students. They also recommended more emphasis on increasing the visibility of the Bolin Centre internally, nationally and internationally. The issue of visibility was also raised in their evaluation of the Climate Research School which was otherwise commended for establishing courses dedicated to Ph.D. students working in climate science and for linking students from the four departments.

After a very successful start, evaluations and self assessments have highlighted the need for a more formalized structure for the Centre. Upon the request of the Faculty of Science, this proposal outlines a structure that aims to:

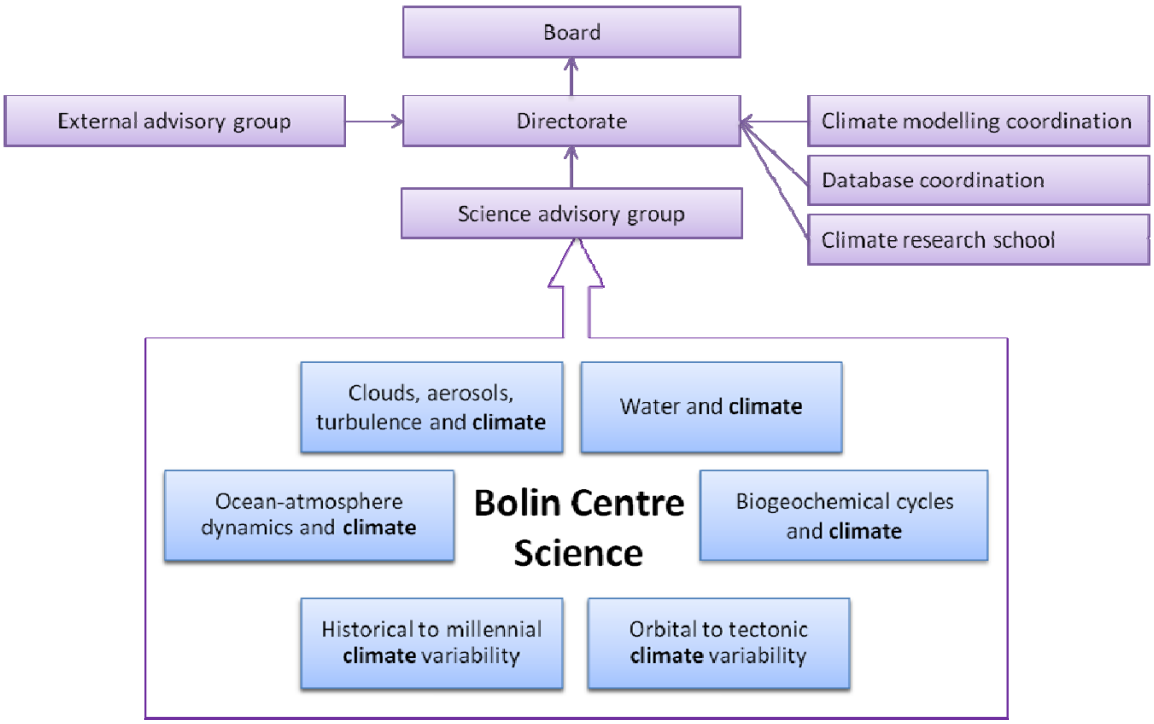
1. encompass the “Climate evolution, variability and sensitivity” program, the “Modelling initiative of the Bolin Centre for Climate Research” and the “Climate Research School” as well as other climate research activities at SU (past or present) into one centre
2. converge the “scientific tracks” and “research domains” of the “modelling initiative” application (Annex 2) with original “unifying questions” of the Bolin Centre (Annex 1)
3. capitalize on the efforts made by the core theme leaders in building the Bolin Centre
4. involve newly recruited researchers in leadership of the Bolin Centre
5. increase the visibility of the Bolin Centre
6. enhance the cross-departmental graduate research training program in Climate Science
7. engage the Bolin Centre in outreach and in promoting undergraduate education

The following key principles will be observed: complete economic transparency, economic fairness, simple decision-making process and promotion of dialog and visibility inwards and outwards.

Proposed structure for the Bolin Centre

It is proposed that the the Bolin Centre is structured and operated as explained in Figure 1 and the text below.

Figure 1: Proposed structure for the Bolin Centre:



Bolin Centre Board: The Board is comprised of the Department Heads of MISU, ITM, INK and IGV (with their respective Deputy Heads as reserve members), the Director (ex-officio member), the Research Director (ex-officio member), representatives of major partners (Rossby Centre, KTH, Naturvårdsverket), a student member and a reserve student member, and chaired by the Dean of Science (or the Dean of Earth and Environmental Science by delegation). It will make decisions related to the governance of the Centre as well as on issues/recommendations of the Directorate, the Science Advisory Group and others.

Directorate: The Bolin Centre Directorate is comprised of the Director, the Research Director and administrative support for organizing meetings, reports, communication and dissemination, education, outreach and the upcoming evaluation (one permanent position at 100%). The Directorate will make operative decisions and promote research of the Centre while reporting to the Board and taking into account advice from an External Advisory Group of experts and an internal Science Advisory Group. The Directorate is also responsible for the Climate Research School (CRS).

External Advisory Group: the Bolin Centre will have an External Advisory Group comprised of leading scientists drawn from national and international communities to be proposed by the Research Director and Director for approval by the Board. The role is twofold: (i) to advise the Bolin Centre on

its strengths, weaknesses and opportunities and (ii) to connect the Bolin Centre internationally to organized networks of climate and future Earth research.

Scientific Advisory Group: the Bolin Centre will have a Scientific Advisory Group which will be chaired by the Director (Alasdair Skelton, voting member) and co-chaired by the Research Director (Leonard Barrie, voting member). The role of the Scientific Advisory group is to steer and implement research in the Bolin Centre. The group is comprised of the two scientific co-leaders for each of the following research areas (one of which should be designated as a voting member at each meeting):

1. **Oceans-atmosphere dynamics and climate:** This research area brings ocean scientists, atmospheric scientists and other climate scientists together to study circulation, variability and predictability of the coupled ocean-atmosphere system. Proposed leaders: Johan Nilsson and Rodrigo Caballero (phasing in Agatha de Boer* within 3 years)
2. **Clouds, aerosols, turbulence and climate:** This research area brings atmospheric scientists, biogeochemists and other climate scientists together to study clouds, aerosols, turbulence and boundary layer processes, with an emphasis on model parameterisation at unresolved scales. Proposed leaders: Ilona Riipinen* and Gunilla Svensson (phasing in Annika Ekman within 3 years)
3. **Water and climate:** This research area brings hydrologists, geologists, geographers and atmospheric scientists together to work towards a quantitative and mechanistic understanding of climate-coupled water-mediated processes on timescales ranging from years to millions of years. Proposed leaders: Georgia Destouni and Uwe Ring*
4. **Biogeochemical cycles and climate:** This research area brings biogeochemists and other climate scientists together to study climate-coupled biogeochemical cycles, such as carbon, nitrogen, mercury and sulphur. Proposed leaders: Örjan Gustafsson and Volker Brüchert* (phasing in Christian Beer* within 3 years)
5. **Historical to millennial climate variability:** This research area brings geographers, geologists and other climate scientists together to study climate variability since the last glacial maximum. Proposed leaders: Malin Kylander* and Qiong Zhang*
6. **Orbital to tectonic climate variability:** This research area brings geologists, geographers and other climate scientists together to study climate variability from Earth's formation until and including the most recent Ice Age. Proposed leaders: Nina Kirchner* and Helen Coxall*

* These proposed research area co-leaders have not been formally asked. It is proposed that the Directorate is tasked with finding replacement research area co-leaders if any of these persons do not accept.

Climate modelling coordination: the Bolin Centre will have a Climate Modelling Coordinator (proposed: Gunilla Svensson). This person will coordinate climate modelling at the Bolin Centre. The Climate Modelling Coordinator will advise the Directorate on issues relating to climate modelling.

Database coordination: The Bolin Centre database was initiated and coordinated through the former Core Theme 5. The new Bolin Centre structure also needs database coordination. Staffing of this task is an issue for immediate action following approval of this proposal (see below).

Climate Research School: the Bolin Centre will have a Climate Research School (CRS). The CRS will be responsible for coordinating research education at the Bolin Centre. The CRS will be coordinated by

the Directorate, supported by a Director of Studies (Björn Gunnarsson). Funds are specifically allocated for research education activities (see below).

Communication: The "visibility" of the Bolin Centre was highlighted as an area for future consideration in its evaluation. The Bolin Centre will therefore have a permanent Administrator/ Communicator (100%: to be openly advertised). Funds will be specifically allocated for administration and communication activities (see below).

Research areas: The above-listed research areas replace the core themes. Each research area is co-led by two scientists. Each co-leader pair will be allocated funds the amount of which will be decided by the Board after discussion with the Directorate. These funds are for the purpose of supporting research activities. Each co-leader pair is tasked with coordinating regular meetings for researchers within their area. Each area should be viewed in its broadest possible sense to realise the Bolin Centre's goal of *inclusivity*. Overlap between research areas is encouraged. For examples, researchers are encouraged to belong to more than one research area. Each co-leader pair is tasked with identifying common interest question/s for researchers within their area. These questions are not for the purpose of excluding research focussing on other questions, nor as a motivation for division of funds. The purpose of these questions is to assist the Research Director in future funding applications.

Cross-cutting themes: The totality of research of the Bolin Centre will be captured not only through activities related to the Research Areas (Fig.1) but also through collection of research efforts necessitated by cross-cutting scientific and/or societal questions related to climate (e.g. Arctic climate, climate model development). The Directorate will organize appropriate activities in this respect based on input from all advisory and coordination bodies.

Members of the Bolin Centre: Any scientist can become a member of one or more of the Bolin Centre's research areas, provided that 1) he/she is conducting active research (i.e. publishing) on climate-related science and 2) he/she either belongs to or collaborates with a person belonging to one of the participating Departments at SU or its partners.

Mandate periods for Bolin Centre leaders: the mandate periods for all Bolin Centre leaders will be 3 years. New members will be proposed by the Directorate after consultation with the Science Advisory Group. New members of the Directorate will be selected by the Board after consultation with the Science Advisory Group. Members can be re-selected after three years, but can sit a maximum of two consecutive mandate periods.

Decision making: The Board after discussion with the Directorate decides on issues relating to governance and financing. The Directorate, after discussion with the Science Advisory Group, decides on scientific and other operational activities.

Strategic grant funds: With the exception of a contribution of 0.5 MSEK annually towards recruitment of an administrator/communicator and 0.9 MSEK for climate modelling coordination, all strategic grant funds have been allocated to MISU, ITM, INK and IGV. After covering all existing commitments, the respective Department Head/s will, in consultation with the Directorate and the Coordinator for Climate modelling, prepare proposals for the use of any remaining funds. These proposals will be submitted to the Board for consideration. The Bolin Centre Board will give their

recommendations to the respective Department Head/s, who have ultimate decision-making rights over these funds.

Linnaeus grant funds: It is proposed that after covering all existing financial commitments (5.8 MSEK annually), remaining Linnaeus grant funds (6.2 MSEK annually) are allocated as follows:

Director: 0.4 MSEK
Research director: 0.4 MSEK
Remaining cost for recruitment of an administrator/communicator: 0.4 MSEK
Communication: 0.4 MSEK
Education: 0.2 MSEK
Research areas: 6 x 0.4 MSEK = 2.4 MSEK
Climate Research School: 2.0 MSEK

Reporting: Scientists who are responsible for Bolin Centre funds (Director, Research Director, Research Area Leaders, Coordinator of Climate Modelling), will 1) have full decision-making rights over these funds and 2) be required to submit a short report at the end of each year detailing how these funds were used.

Remaining "core theme" funds: If "core theme" funds remain on 31/12-2013 these should be transferred as follows: CT1 to RA5, CT2 to RA1, CT3 to RA6, CT4 to RA2, CT5 to RA3, CT6 to RA4, CT7 to Climate modelling Coordinator. If a core theme has a deficit, the core theme leader is responsible for submitting a plan towards securing funds to cover this deficit.

Long-term financing of permanent positions: Funds which have been assigned to permanent positions will be considered allocated for the lifetime of the Bolin Centre's existing grants. After termination or reduction of funds from the specific grant used to finance the respective position the host Departments will take over full responsibility for financing the position.

Additional costs: This proposal assumes that salary costs for the Director and Research Director, both at 50% (4.0 MSEK for the period 2013-2015 assuming 35% overheads), are not covered by the Bolin Centre resources and must be acquired elsewhere.

Economy administration: It is proposed that the Bolin Centre will have central accounts at the department which hosts the Directorate (currently IGV). It is further proposed that 2013 funds are transferred to and administered by MISU, ITM, INK and IGV as follows:

Strategic funds:
Contribution towards recruitment of an administrator/communicator: 0.5 MSEK → IGV
Funds for climate modelling coordination: 0.9 MSEK → MISU
35.3% of remaining strategic funds → MISU
31.3% of remaining strategic funds → ITM
16.7% of remaining strategic funds → INK
16.7% of remaining strategic funds → IGV

Linnaeus funds:
CRS Director of Studies: 0.45 MSEK → INK
Remaining CRS funds → IGV
Directorate and communication/administrative funds → IGV
Research area funds → Host departments for research area co-leaders

Usage of all funds must be reported annually to the Directorate. Usage of Strategic grant funds must also be reported to the Coordinator for Climate modelling

Overheads: The existing economic principles of each of the Bolin Centre funds differ regarding overheads. For Linnaeus grant funds, overheads are charged at 35%. For Strategic grant funds, overheads are charged according to the "full cost coverage model". This means that overheads are department-specific and should be charged on salary only. It is proposed to continue following these economic principles for all costs agreed before 31/12-2012, but to switch entirely to the new "full cost coverage model" for all costs agreed on or after 1/1-2013. In this respect, decisions made on the basis of this proposal become active on 1/1-2013.

Interim leadership: The original leadership structure is continued until December 31, 2012. However, recruitment recommendations should be made after consultation with the Directorate.

Immediate tasks for the Bolin Centre

The following immediate tasks are proposed for the Bolin Centre:

- **Research:** Each research area co-leader pair is tasked with preparing a list of members and climate-related questions which are being tackled by these members. Common interest questions should be highlighted. This task is to be conducted together with the Research Director.
- **New research funding:** Parts of the Bolin Centre's funding will expire in 2016. It is vital that continued funding is found to ensure the long term success of the Bolin Centre. The Bolin Centre needs to apply for new funds. This task is led by the Research Director in cooperation with the Science Advisory Group.
- **Climate modelling:** The evaluation of the climate modelling initiative is likely to occur during 2015. The Climate Modelling Coordinator is therefore tasked with preparing an action plan for this evaluation. The Climate Modelling Coordinator is also tasked with preparing guidelines for Bolin Centre members as to the support which is available for gaining access to climate modelling computer resources.
- **Database coordination:** The Bolin Centre needs database coordination. This task will be undertaken by a newly recruited person at 50% for which funds are allocated. The Directorate is tasked with ensuring that this person is recruited.
- **Research training:** The Bolin Centre should propose a new research training program in climate science. It is proposed that the Research Director is the program leader (ämnesansvarig) for this program. This task is to be coordinated by the Directorate supported by the Board.
- **Undergraduate education:** The Bolin Centre should promote undergraduate education in climate science. It is proposed that Directorate consults with the Faculty of Science's

Education Advisory Board ("Grundutbildningsberedningen") with the suggestion of a cross-departmental 30 credit free standing entry level course on Climate Science. Part of this suggestion is that the course will comprise four 7.5 credits moments, that each Department will lead one of those moments, and that the task would be coordinated by one representative from each Department, proposed by the respective Department Head.

- **Communication:** The mid-term evaluations clearly stated the need for increased visibility, both internally and externally. It is therefore proposed that the Bolin Centre recruits an Administrator with expertise in communication who is tasked with coordinating this task together with the Directorate. This Administrator should be immediately tasked with restructuring the Bolin Centre website and preparing a communication plan for the Bolin Centre. This plan should encompass communication at all levels (e.g. Bolin Centre scientists, other scientists, decision-makers, funding bodies, general public, schools).

Annex 1: Climate evolution, variability and sensitivity

The Bolin Centre (originally SUCLIM) was formed following the success of the Linnaeus grant application entitled "Climate evolution, variability and sensitivity" in 2006. The co-applicants were: Johan Kleman, Jan Backman, Georgia Destouni, Örjan Gustafsson, Margareta Hansson, Martin Jakobsson, Anders Moberg, Henning Rodhe, Michael Tjernström, Barbara Wohlfarth, Bert Bolin, Patrick Crill, Jörg Gumbel, Karin Holmgren, Per Holmlund, Clas Hättestrand, Peter Kuhry, Erland Källén, Caroline Leck, Peter Lundberg, Johan Nilsson, Gunhild Rosqvist, Arjen Stroeven, Johan Ström, Gunilla Svensson and Stefan Wastegård.

The original structure was specified in this Linnaeus grant application as follows: "The program is led by a program steering board, chaired by a program director. Each core theme is led by a coordinator. The project steering board will consist of the project director, the core theme coordinators, the head of the climate research school and two external scientists." This structure refers both to the climate research school which preceded the Bolin Centre and to the core themes.

Five core themes are listed in the application. These are 1) Climate variability, 2) Atmospheric and oceanic circulation, 3) Boundary conditions for circulation system modelling, 4) Small-scale processes with large-scale impacts and 5) Biogeochemical and hydrological cycles. The fifth core theme was later subdivided into two themes: 5) Biogeochemical cycles and 6) Hydrological cycles. The goals of these core themes were also specified in the application as follows: "Development of collaboration within and between core themes. For each theme, research will be focused by stimulating collaboration around one fundamental question, or a tightly knit group of questions. The unifying factor is the *question*, not methods, data types, or established group structure. We strive for analytical depth by bringing together scientists that operate on a broad range of scales and methods."

The "unifying questions" were also specified in the application as follows: "1) How has climate evolved and varied? 2) How sensitive are the great heat transfer systems to different forcings? 3) What are the surface boundary conditions for climate modelling? 4) How shall we parameterize small-scale processes in climate models? 5) How do climate-relevant substances circulate?"

Annex 2: Modelling Initiative of the Bert Bolin Centre for Climate Research

The Bolin Centre was strengthened following the success of the strategic research application entitled "Modelling Initiative of the Bert Bolin Centre for Climate Research" in 2009. The co-applicants were: Johan Kleman, Georgia Destouni, Örjan Gustafsson, Karin Holmgren, Martin Jakobsson, Colin Jones (SMHI), Erik Lindborg (KTH), Johan Nilsson, Gunilla Svensson and Michael Tjernström.

The following aims are stated in the application: "This initiative will be of national value by completing the creation of a forceful academic climate research centre, strong in all the three pillars of climate research; process research, paleo-research, and climate modelling," and "Society requires climate scenarios for decision-making. The only tools available for scientifically based scenarios of the possible evolution of the climate system are numerical climate models. To be useful, scenarios must be provided on timescales meaningful for planning, i.e. decadal to centennial, and they must be accompanied by estimates of uncertainty. To meet this societal need, we intend to build a strong modelling group that will work along four scientific tracks: 1) Circulation, variability and decadal predictability; 2) Unresolved scales; 3) Paleo-climate modelling; and 4) Arctic climate change."

The structure was described as follows: "The new core theme will be the only one with a formalized structure below the level of the steering committee, and will in volume be substantially larger than any of the other core themes. The task of the modelling group is to plan, lead and pursue the research tracks outlined in this proposal. The initially six members of this group will have three-year mandates, corresponding to the ramp-up phase of funding. After 3 years, when new recruitments are completed, leadership and organisational structure of the modelling initiative will be reviewed by the steering committee of the Bolin Centre in consultation with the Faculty of Science. Professor Gunilla Svensson will serve as the core theme leader for the Global and Regional Modelling core theme, hereafter called the modelling group. As core theme leader she will be member of the steering committee of the Bolin Centre." The following was also stated: "Leadership will be provided on two levels; within the Modelling Initiative Professor Gunilla Svensson will be research leader and chair the core theme Global and Regional Modelling. She will be member of the steering committee of the Bolin Centre, which comprises the core theme leaders, the Bolin Centre Director Professor Johan Kleman, and the Director of the Research School, Professor Henning Rodhe."

Following expansion of the Bolin Centre to including the Climate modelling initiative, the seven core themes and their leaders were as follows:
CT 1 Climate variability *Karin Holmgren*
CT 2 Atmospheric and oceanic circulation *Johan Nilsson*
CT 3 Boundary conditions for circulation system modelling *Martin Jakobsson*
CT 4 Small-scale processes with large-scale impacts *Michael Tjernström*
CT 5 Hydrological cycles *Georgia Destouni*
CT 6 Biogeochemical cycles *Örjan Gustafsson*
CT 7 Global and regional modelling *Gunilla Svensson*

Annex 3 Budget of the Bolin Centre

The income and the agreed and proposed expenditure of the Bolin Centre for the period 1/1-2013 to 30/6-2016 are shown in the following section. This budget is preliminary. It is based on spreadsheets provided by Johan Kleman and Gunilla Svensson. It is likely to be conservative because remaining CRS and core theme funds are not known and therefore not included.

Appendix 3

Mandate, Membership and *Modus Operandi* of the External Science Advisory Group (ESAG) of the Bolin Centre for Climate Research

Executive Summary

The Bolin Centre for Climate Research http://bolin.su.se is a multi-institutional organization based at Stockholm University targeting support of research and graduate education in Sweden on fundamental physical, chemical and biological processes in the climate system. As it evolves as a long-term feature of the Swedish research landscape, it requires strong guidance and support by the external science community. Following considerable discussion and consultation, this document defines the Mandate, Membership and *Modus Operandi* of the External Science Advisory Group to be engaged in 2014.

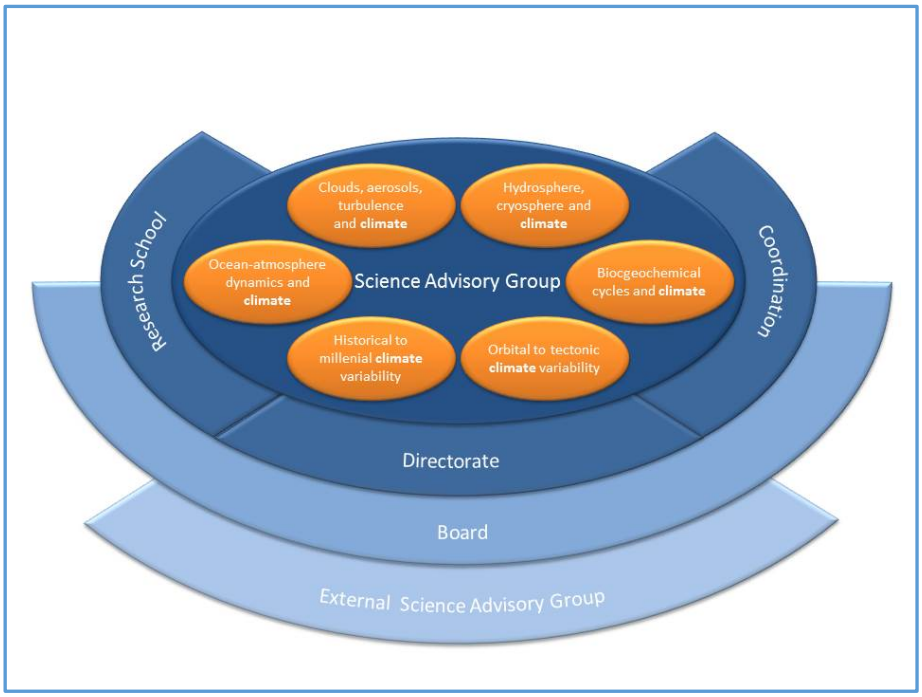
A. Role within the Bolin Centre Structure

The charter for the Bolin Centre outlines how the centre is to be run. It was approved by the Vice-Chancellor of Stockholm University initially 2007-11-22 and revised on 2012-12-20. Regarding an external scientific advisory function, it states

"Externt vetenskapligt råd: Bolincentrets styrelse ska utse ett externt vetenskapligt råd bestående av ledande nationella och internationella forskare inom klimatområdet. Rådets sammansattning föreslås till styrelsen av Bolincentrets direktörer. Rådets huvuduppgifter är: (i) att upplysa Bolincentret om dess styrkor, svagheter och mojligheter för utveckling samt (ii) att öka Bolincentrets kontakter till internationella nätverk och forskargrupper inom klimatforskningsområdet."

(translated into English "External Scientific Advisory Group: The Bolin Centre's Board shall appoint an external scientific advisory group comprised of leading national and international scientists within climate research. The composition of the group is proposed to the Bolin Centre Board by the Directors. The external scientific advisory group's main tasks are: (i) to inform the Bolin Centre of its strengths, weaknesses and possibilities for development as well as (ii) increase the Bolin Centre's contacts to international networks and research groups within the climate research area".)

In the document "Bolin Centre Structure" approved by the Board in December 2012, the governance structure of the Bolin Centre for climate research shown in the Figure below explicitly includes the External Science Advisory Group.



B. Mission

The tasks assigned by the Faculty of Science to the External Science Advisory Group as outlined in the Bolin Centre charter are (repeated from Section A):

Task 1 Inform the Bolin Centre of its strengths, weaknesses and possibilities for development

Task 2 increase the Bolin Centre's contacts to international networks and research groups within the climate research area

Specifically, fulfilment of these tasks can be achieved by undertaking the following two Missions:

1. **Strategic Planning.** Assist the Directors and Board in their efforts to ensure that the added-value of the Bolin Centre activities are strong and well communicated to stakeholders including University, government, other sponsors and the public by:
    a) reviewing strategic plans and directions
    b) advising the Bolin Centre on its strengths, weaknesses and about opportunities for climate and Earth system science research

2. **Science Support**. Promote the quality as well as the national and international visibility of science and graduate education in the Bolin Centre by:
    a) providing constructive feedback to scientists and students on their research
    b) being spokespeople for Bolin Centre science and graduate education internationally
    c) increasing the Bolin Centre's contacts to organized international networks and research groups of climate and Earth Systems research

The External Science Advisory group will have a chair that is an Ex Officio Member of the Board of the Bolin Centre for Climate Research and reports to the Board once annually on Mission 1:

Strategic Planning and to the Directors, once annually on Mission 2: Science Support. See section D for more details on the way the group operates (*modus operandi*).

C. Membership of the External Science Advisory Group

The membership of the Bolin Centre External Science Advisory Group should fulfil the following criteria:

a) members are well known active researchers in climate and/or Earth system research
b) members are linked to national and international research networks and programs in climate and Earth Systems research
c) the group can relate collectively to the Stockholm University and the Swedish research environment
d) adequate gender representation

Members will serve three year terms consistent with the founding charter of the Bolin Centre. Renewal of Membership by the Board will be possible for an extra one to three years. This practice is essential in ensuring that ultimately a situation is reached where replacement of Membership is done fractionally each year rather than all at once.

D. Modis Operandi

The External Science Advisory Group will have a chair that is automatically an Ex Officio Member of the Board of the Bolin Centre for Climate Research and reports to the Board once annually on Mission 1 Strategic Planning and to the Directors on Mission 2 Science Support. All travel costs and per diem costs to conduct the chairmanship will be covered.

D.1 Routinely

In autumn each year, the External Science Advisory Group attends the two-day annual Bolin Centre Meeting. In addition, the group will be asked to spend an extra one to two days around the time of the Bolin Days to make scientific presentations, meet staff and to draft the report. There will be two parts to the short report, one to the Bolin Centre Board on Mission 1: **Strategic Planning** and, one on Mission 2: **Science Support to Directors and the Bolin Centre science community** providing constructive feedback on research.

All travel and per diem costs of the members will be covered for their participation in this annual event in Sweden. Members will be granted an honorarium consistent with University standards.

D.2 Occasional Advice

Occasionally, the group will be requested to act as reviewers of strategic plans under development by the Bolin Centre. An honorarium consistent with University standards may be offered by the Directorate of the Bolin Centre to cover efforts spent to provide solicited advice requested by the Directorate and the Board of the Bolin Centre.