

Johtokunta

Paula Kankaanpää 040-777 7825

Kokous	1/2012	Paikka: Arktinen keskus, Thule kokoushuone
Aika	Torstai 19.4.2012	klo 10-10:45
Läsnä	Jäsenet: +Matti Hepola (pj) Suvi Ronkainen (vpj) +Markku Heikkilä Lassi Heininen Timo Jokela Kari Laine Susan Meriläinen +Esa Poikela +Outi Snellman +Lotta Viikari	

1

Kokouksen laillisuus ja päätösvaltaisuus

Lapin yliopiston johtosäännön 59 §:n mukaan kutsu hallintoelimen kokoukseen on lähetettävä viimeistään kolme arkipäivää ennen kokousta, jollei hallintoelin ole toisin päättänyt. Kokouskutsussa on mainittava käsiteltävät asiat. Hallintoelin on päätösvaltainen, kun puheenjohtaja mukaan luettuna vähintään puolet jäsenistä on läsnä.

Esitys

Todettaneen kokouksen laillisuus ja päätösvaltaisuus


Päätös

Todettiin kokous lailliseksi ja päätösvaltaiseksi

Puheenjohtaja


Matti Hepola

Esittelijä


Paula Kankaanpää

Johtokunta

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Ilmoitusasiat

Aloite EU:n arktisesta informaatiokeskuksesta etenee. EU:n ulkosuhdekomissaari Lady Ashtonin ja Ministeri Tuomioja vierailivat Arktisessa keskuksessa Lady Ashtonin Suomen vierailun yhteydessä. Hän tuli Rovaniemelle nimenomaisesti tutustumaan EU Arctic Information Centre –aloitteeseen. Tilaisuutta varten järjestettiin pienimuotoinen seminaari ja vierailu näyttelyissä, sekä tapaaminen saamelaisten edustajien kanssa. Vierailu onnistui hyvin. Se sai medianäkyvyyttä sekä lehdistössä että kansallisissa TV:ssä. Tarkemmat tiedot löytyvät Arktisen keskuksen sivuilta www.arcticcentre.org <<http://www.arcticcentre.org>>.

Ashtonilla oli tuomisinaan vahvaa tukea mutta ei konkreettista päätöstä. Hän totesi Lapin yliopiston maineen olevan poikkeuksellisen hyvä. Hänellä ei kuitenkaan ollut viestiä siitä, missä ja milloin konkreettinen päätös informaatiokeskuksesta tehdään. Ilmeistä joka tapauksessa oli, että asia on komissiossa keskustelussa jo korkealla tasolla.

Komission budjetissa on parlamentin aloitteesta varattu miljoonan euron määräraha vuodessa kolmen vuoden ajalle valmistelualoitteelle strategisten vaikutusten arviointiin arktisella alueella. Rahoitus varmistuu vuodeksi kerrallaan.

Hankeen vastuuyksikkönä toimii komission ympäristöpääosasto, joka on viestittänyt avaavansa tarjouskilpailun pääsiäisen jälkeen. Hankkeen takana oleva verkosto on varautunut jättämään tarjouksen. Hankkeen avulla on tarkoitus

valmistautua siihen, että varsinainen EU AIC perustetaan. Valmisteluhanke on verrattavissa EU:n puiteohjelmakonsortioon, jota Lapin yliopisto vetäisi.

Arktisen keskuksen johtokunnan puheenjohtajan ja Arktisen keskuksen johtajan vahvistamana Arktinen keskus on sitoutunut seuraavien hankkeiden toteutukseen:

Vastuullinen johtaja: Monica Tennberg

Hanke: Neoliberal governance and sustainable development in the Barents region: Local communities' perspectives

Rahoituslähde: Pohjoismaisen ministerineuvoston Arktisen yhteistyön ohjelma

Haettu rahoitus: 33 000 € (Kokonaisrahoitus 120 000 €)

Vastuullinen johtaja: Timo Koivurova

Hanke: The legal protection of indigenous livelihoods

Rahoituslähde: Pohjoismaisen ministerineuvoston Arktisen yhteistyön ohjelma

Haettu rahoitus: 180 000 €

Vastuullinen johtaja: Monica Tennberg

Hanke: Neoliberal governance, sustainable development and local communities in the Barents region (NEO-BEAR)

Rahoituslähde: NOS HS Nordcorp

Haettu rahoitus: 515 630 €

Vastuullinen johtaja: Markku Heikkilä

Hanke: Pastori Samuli Pentikäisen haastatteluaineiston digitointi

Rahoituslähde: Rovaniemen kaupunki

Haettu rahoitus: 8 000 €

Vastuullinen johtaja: Sari Stark

Hanke: Porolaidunnus ja tundramaan hiilitase muuttuvassa ilmastossa

Rahoituslähde: Suomen Akatemia

Haettu rahoitus: 306 000 €

Vastuullinen johtaja: Nicolas Gunsley

Hanke: Kestävä kehitys ja informaali oppiminen: tiedekeskuspedagogiikkaa koulumaailmassa

Rahoituslähde: EAKR

Haettu rahoitus: 191 060 €

Vastuullinen johtaja: Nicolas Gunsley

Hanke: Green Science

Rahoituslähde: FP7-SCIENCE-IN-SOCIETY-2012-1

Haettu rahoitus: 74 686 €

Vastuullinen johtaja: Monica Tennberg

Hanke: The Barents Journal

Rahoituslähde: Kolarctic ENPI

Haettu rahoitus: 223 185 € (Kokonaisrahoitus 393 734 €)

Esitys

Todettaneen

Päätös

Todettiin esityksen mukaisesti ja lisäksi todettiin Paula Kankaanpään kokouksessa esille tuomat ilmoitukset:

Tanja Joonan väitöskirja *ILO Convention No. 169 in a Nordic Context with Comparative Analysis: An Interdisciplinary Approach*. tarkastettiin Helmikuussa 2012.

Nicolas Gunsлайн koordinoima EU Kolarctic ENPI CBC Programme 2007-2013 -ohjelman rahoittama, *Arctic Expo Centre – Nuclear-Powered Icebreaker Lenin – ICE-hanke* hyväksyttiin Lapin liitossa 19.12.2011.

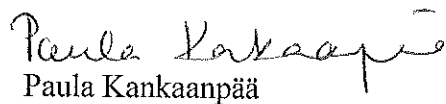
Markku Heikkilän koordinoima, Kolarctic ENPI CBC- prrogramme 2007-2013-ohjelman rahoittama, *Barents mediasphere-hanke* hyväksyttiin Lapin Liitossa 13.4.2012

Puheenjohtaja



Matti Hepola

Esittelijä



Paula Kankaanpää

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Esitys työsopimuksen tekemiseksi Rupert Gladstone'lle hankkeeseen Stability and Variability of Arctic Land Ice (SVALI)

Arktisen keskuksen tutkimusprofessori John Mooren johtama *Stability and Variability of Arctic Land Ice (SVALI)* tutkimushanke (Liite 1.), on saanut konsortion jäsenenä pohjoismaisen rahoituksen (Nordic Centre of Excellence NordForsk). Konsortiota johtaa Oslon yliopisto. Hankkeessa on varattu rahoitus post doc -tutkijan palkkaamiseksi 3 vuodeksi.

Tutkijan tehtävä hankkeessa on:

Ice flow modeling

Topic is finite element modelling using ELMER applied to ice flow and snow-drift wind fields over Nordaustlandet. One goal is a model of the Austfonna ice cap with emphasis on the fast flowing and calving glacier boundaries of the 7th largest ice cap in the world. The wind driven accumulation studies will also help determine the role of Austfonna in determining the geometry of the adjacent Vestfonna ice cap where we have an existing finite element ice flow model. The modelling efforts will provide process studies that will aid parameterization efforts for Earth System Models including ice sheet dynamics.

Tutkimusprofessori Moore esittää, että tutkijaksi hankkeeseen valittaisiin Ph.D Rupert Gladstone (Iso-Britannia).

Liitteenä muistio valintaperusteista (liite 2.) ja Gladstonen ansioluettelo (liite 3.)

Rupert Gladstone'lle on jo tehty Arktisen keskuksen johtajan esityksestä
työsopimus tehtävään ajalle 23.4.2012-23.10.2012

Esitys

Päätettäneen esittää yliopiston vararehtorille, että Rupert Gladstone'n kanssa
tehtäisiin työsopimus tutkijatohtorin nimikkeellä SVALI hankkeeseen ajaksi
24.10.2012-22.4.2015.

Päätös

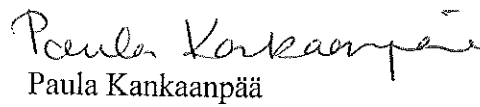
Esityksen mukainen

Puheenjohtaja



Matti Hepola

Esittelijä



Paula Kankaanpää

Liite 1.

Summary

Stability and Variations of Arctic Land Ice (SVALI)

The recent warming of the Earth has caused substantial changes in the cryosphere which have resulted in increased flux of meltwater and icebergs from glaciers and significantly contributed to global sea level rise. Increased freshwater discharge to the oceans has also potential world-wide impacts through effects on ocean circulation and regional and local effects on the Arctic Hydrological Cycle. This will all have potential global societal implications. Understanding and modelling the response of glaciers to climate change is a key science task, in which Nordic researchers are uniquely positioned to play a leading role.

The sea level rise is now accelerating more rapidly than predicted. This is partly caused by more rapid warming of the Arctic than expected and partly due to climate-cryosphere feedback mechanisms that have not been included in models. Hence, projection of future sea level rise calls for an improved understanding of glaciological processes and their inclusion in Earth System Models. The Arctic/N-Atlantic region includes a substantial part of the worlds terrestrial ice masses and a significant fraction of global glacial runoff originates in these areas.

Key questions:

1. How fast is land ice volume in the Arctic/N-Atlantic area changing?
2. Why is the ice-volume reduction more rapid than previously expected?
3. Will the mass loss continue to accelerate?
4. What are the consequences of ice-volume changes for sea-level and ocean circulation?
5. What are the societal implications of changes in glacial hydrology?

To answer these questions, we propose a comprehensive joint Nordic research programme (Nordic Centre of Excellence, NCoE) to study basic processes using remote sensing, airborne and in-situ measurements and carry out advanced Earth Systems Modelling with focus on glaciers in the Arctic/N-Atlantic area. The NCoE will constitute a platform for joint process studies, analyses, sharing of methods, researcher training and outreach activities and for reporting of scientific results regarding the impact of climate change on terrestrial ice. Institutes and research groups in the Nordic countries will pool their efforts to study:

1. current ice volume changes, underlining their contribution to sea level rise,
2. mass-balance and ice-dynamic processes to improve Earth System Models,
3. future changes in terrestrial ice and their societal implications.

The NCoE will be a platform for international collaboration of Nordic scientists in cryospheric research.

Liite 2.

Memo on hiring of mathematical modeller (Rupert Gladstone)

Rupert Gladstone was the outstanding applicant out of 14 candidates (see names and assessment below). He is an experienced ice modeller with several publications behind him, and is quite well known in the international community. The selection was also supported by advice from Thomas Zwinger (CSC-Espoo) who knows him a little from meetings and conferences. He has excellent references, and after a long Skype interview with Martina Schaefer and Thomas Zwinger, we decided to offer him the position.

Starting date 23rd April 2012

Description of the position and project

Three- year position as part of the SVALI Nordic Centre of Excellence. The task is to model dynamics of the Nordaustlandet ice caps in Svalbard using the finite element suite ELMER developed at the CSC, Espoo. This Full Stokes ice-flow model will be applied to the Austfonna ice cap, similar to an already existing application for Vestfonna. Coupling between the ice flow and mass balance models will be required, prognostic runs for scenarios of future climate performed. In a latter step, CFD simulations of blowing snow, driven by down-scaled climate data to improve the mass-balance distribution may be conducted (optional).

[6months of the funding are SVALI external from SvalGlac.]

Application/filling procedure of the position

The position was advertized (see advert below) on the International glaciology Society list server (Cryolist), and the Nature jobs on-line page. We received about 15 applications and several other inquiries. We also advertized at many international meetings where the Ice and Climate group presented results, e.g. in Ohio, Oslo, Uppsala and Beijing. Applicants sent full Cvs and proposals for research. The position was open for PhD candidates and post-docs.

Rupert Gladstone was the outstanding applicant out of 14 candidates. He is an experienced ice modeller with several publications behind him, and is quite well known in the international community. The selection was also supported by advice from Thomas Zwinger (CSC-Espoo) who knows him a little from meetings and conferences. He has excellent references, and after a long Skype interview with Martina Schaefer and Thomas Zwinger, we decided to offer him the position.

Phd/post docs applicants

1. Rupert Michael Gladstone – Post doc, works in bristol with ice2sea tony payne – EXCELLENT
- 2=. Valentina Isabel Olmos Salvo – PhD application – finite volume method, geophysics Lic (Chile) - GOOD
- 2= Dorothée VALLOT PhD application MSC engineering, Stockholm embassy, enrolled in glaciology courses – GOOD – applied for ricard position
- 2= AMALYA Z. KHURSHUDYAN PhD app. Finite element experience mechanics. GOOD
- 2= Philipp Hancke PhD app sicopolis experience, Stockholm based GOOD
6. Konstantinos Petrakopoulos - PhD application – astrophysics accepted in Scotland and France, looked in Uppsala. - POSSIBLE
7. Lovecchio Salvatore PhD application. Computational climate fortran experience, GOOD
8. Consiglieri – Postdoc, crap application, Maths 45 yr old, retired in 2009 due to speech. Fluid dynamics - WEIRD
9. Trinca – Postdoc, no LOI, biological computing - REJECT
10. ANDREA BARBOLLA - PhD application glaciology geology MSC, no LOI – NO MATHS REJECT
11. Riccardo Campari – Post doc MS statistical Physics – no continuum mechanics – REJECT
- 12 Nili – postdoc maths, no interest. REJECT

- 13 Premachandra – postdoc – math networks , needs position for husband – REJECT
14. Peema – engineering, PhD application very general, no relevant experience REJECT
15. Ashraf Sami El-kotb Akl – PhD app, geologists remote sensing. REJECT

Advert

A mathematical modeller wanted for an international project funded by European Science Foundation. The person would focus on numerical modelling of Nordaustlandet glaciers especially the consequences of warming climate on ice cap decay and threats to shipping posed by ice bergs from the calving glaciers. We are also interested in the long-term evolution of the ice caps and how the climate conditions of the past have affected their behaviour.

The disappearance of Arctic sea ice in summer expected to occur before the middle of the 21st century will be unprecedented in the at least the last 100 000 years. This change in albedo and energy balance of the moisture source for the large Nordaustlandet ice caps will have very significant impact on their future evolution. The seasonal opening of the Arctic Ocean to shipping is likely to be economically attractive, though risks to shipping in the form of large ice bergs from the remaining large glaciers and ice caps could be very serious. Damage to shipping will result in potentially extremely serious harm to the delicate ecosystems of the Arctic Ocean that are likely to be also under severe climate stress. The fresh water input to the Barents Sea is also a key driving force of thermohaline circulation and sea ice formation. Ocean circulation and sea ice changes have large impacts on ecosystems and therefore the economy of indigenous and commercial fisheries.

The nature of the new climate conditions will drive the glaciers towards a fundamentally different dynamic regime than they have experienced recently – this is likely to be dominated by increased superimposed ice formation, by reduction in fast ice around the floating glaciers, and by changes in type and seasonality of precipitation falling on their surfaces. These factors require considerable modeling expertise and observational datasets to capture. This requires the collaboration of the type expounded in the full SvalGlac project.

Specific aims focus on our experience on modeling, and our past experience of research on Vestfonna ice cap. We will also be closely cooperating with projected ice core drilling planned in Nordaustlandet, specifically China plans, participating in the drilling and analyses of an ice core.

Requirements

Degree and potentially a PhD in a physics or mathematics, knowledge of programming in Fortran and Matlab, together with Windows and Unix operating systems. The ability to understand and program mathematical equations will be key. Preferably already with experience of Finite Element modelling

Tasks

- Create a time-evolving fully Stokes equation finite element model of the dynamically complex parts of Vestfonna ice cap
- Create a similar model for relevant parts of Austfonna ice cap
- Use the model together with simpler approximate models of the ice caps to infer reactions of these large ice masses to changes in climate.
- Study the past evolution of the Nordaustlandet ice masses over the last glaciological cycle /about the last 1000 000 years, and in higher detail over the last few millennia
- Make inferences from these large Arctic ice masses to other ice caps in the Arctic, especially the Canadian and Siberian ice caps

Contact John Moore, john.moore.bnu@gmail.com, supply CV, and cover letter. Standard Finnish university pay and conditions for PhD student or post doc apply.

Liite 3.

Curriculum Vitae for Dr Rupert Michael Gladstone

Date of birth: 13th December 1972
Nationality: British
Email: r.gladstone@bristol.ac.uk

Research aims and expertise

Key aim: to improve capability for quantitative model-based predictions of cryosphere response to climate change.

My areas of expertise focus around the use of computer models in several areas of climate and cryosphere science: Marine ice sheet instability and grounding line migration; ice sheet-ocean interactions; ice sheet dynamics; snow pack modelling; iceberg trajectories; palaeoclimate.

Technical skills: Mathematical modelling (finite difference methods, mesh adaptivity); sampling methods for ensemble computer experiments; model analysis and intercomparison techniques (e.g. principal component analysis). Scientific software engineering and data management. Computer languages/applications include Python, FORTRAN (90 & 77), Subversion, CVS, IDL, NetCDF, MATLAB, Arc Info, SQL, Postgres, SQL Server, and VB.

Employment

April 2008 to present	Post Doctoral Research Associate with Professor Tony Payne at Bristol University. Ice sheet model development , grounding line modelling, ocean-ice sheet interactions. Focus on the West Antarctic Ice Sheet .
Jan 2006 to Jan 2008	Post Doctoral Research Associate with Professor Jonathan Bamber at Bristol University. Surface energy and mass-balance modelling of the Greenland ice sheet.
Jan 2004 to Dec 2005	Post Doctoral Research Assistant with Professor Paul Valdes at Bristol University. Palaeoclimate Modelling , model-model and model-data comparisons. Focus on simulated North Atlantic Oscillation during the Mid-Holocene.
Jul 2001 to Dec 2002	Analyst programmer for Tessella Scientific Software Support Services. Database design and maintenance as a scientific software consultant.
Sep 1998 to Dec 2000	Teaching Assistant at UEA. Basic maths, programming (mostly using Fortran90) and mathematical modelling in environmental science .

Education

2001 to 2002	Open University. Postgraduate module "Relational Database Systems".
1997 to 2001	University of East Anglia (UEA). PhD "A Modelling and Remote Sensing Study of Antarctic Icebergs ". Included model development and validation.
1996 to 1997	UEA. MSc " Modelling in Applied Mathematics ".
1991 to 1995	Sheffield University. BSc (Hons) in Pure and Applied Mathematics.

Recent Conference Presentations

September 2011	NCEO annual science meeting in Warwick, UK. Oral presentation "Model based predictions of marine ice sheets".
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- June 2011 IGS Symposium in interactions of ice sheets and glaciers with the ocean. Oral presentation "Are Ice Sheet Models capable of simulating grounding line migration in real world situations?"
- September 2010 NCEO annual science meeting in Leicester, UK. Invited oral presentation "Simulating Antarctic marine ice sheets and their interactions with ocean and climate".
- May 2010 European Geosciences Union General Assembly in Vienna, Austria. Oral presentation "Parameterising the grounding line in ice sheet models" and poster presentation "Simulated ocean changes near the Antarctic Ice Shelves".
- March 2010 Ice2sea open forum meeting 1 in Krakow, Poland. Oral presentation "Parameterising the grounding line in ice sheet models".
- September 2009 NCEO annual science meeting in Oxford, UK. Posters "Grounding line movement in ice sheet models" and "Coupled Cryosphere/Atmosphere/Ocean Modelling".
- June 2009 **14th Annual CCSM Workshop in Breckenridge, Colorado. Oral presentation "Grounding line migration in an adaptive mesh ice sheet model".**
- April 2009 European Geosciences Union General Assembly in Vienna, Austria. Oral presentation "Simulating grounding line motion in a 1D AMR (Adaptive Mesh Refinement) ice sheet model".
- September 2008 FRISP/WAIS meeting in the Peak District, UK. Oral presentation "Structured adaptive mesh refinement (SAMR) ice sheet modelling".

Other Scientific Activities

- September 2011 Reviewed paper "A three-dimensional full Stokes model of the grounding line dynamics: effect of a pinning point beneath the ice shelf" by Favier et al., for the Cryosphere, published online for interactive discussion.
- March 2011 Reviewed grant proposal for the United States NSF (details confidential).
- August 2010 Reviewed grant proposal for the United States NSF (details confidential).
- March 2010 Co-wrote (as co-investigator) successful bid for EPSRC pilot funding "Using artificial intelligence to support computer experiments in ocean science".
- March 2010 Reviewed paper "Characterization of subglacial landscapes by a two-parameter roughness index" by X. LI et al. for Journal of Glaciology.
- August 2009 Reviewed paper "Stability of ice-sheet grounding lines" by R. Katz and G. Worster for Proceedings of the Royal Society.
- Summer 2007 Co wrote (as named researcher) alpha 4 rated unsuccessful (i.e. near miss) funding bid for NERC standard grant "Quantifying and reducing uncertainty in predictions of Greenland mass balance".

Referees

Professor Tony Payne (lecturer, current PI)
 Tel: 0117 3314156
 a.j.payne@bristol.ac.uk
 Geographical Sciences
 University of Bristol
 University Road
 Bristol BS8 1SS

Professor Paul Valdes (head of department, previous PI)
 Tel: 0117 3317222
 p.j.valdes@bristol.ac.uk
 Geographical Sciences
 University of Bristol
 University Road
 Bristol BS8 1SS

Professor Grant Bigg (lecturer, PhD supervisor)
 Tel: 0114 2227905
 Grant.Bigg@sheffield.ac.uk
 Department of Geography
 University of Sheffield
 Winter Street
 Sheffield S10 2TN

Forthcoming publications (please contact Dr Gladstone for a current draft)

Gladstone, R.M., Rougier, J., Lee, V.L., Payne, A.J., LeBrocq, A., Shepherd, A., Hellmer, H., Cornford, S.L., Gregory, J.M., Edwards, T.L. (in prep. for submission to Earth and Planetary Science Letters Nov 2011), 'Ensemble Pine Island Glacier predictions with a flowline ice sheet model'

Cornford, S.L., Martin, D.F., Graves, D.T., Ranken, D.F., LeBrocq, A.M., Gladstone, R.M., Payne, A.J., Ng, E.G., Lipscomb, W.H. (in prep. For submission to Journal of Computational Physics Nov 2011) 'Adaptive mesh, finite volume modeling of marine ice sheets'

Gladstone, R.M., Payne, A.J., Cornford, S.L. (submitted to Annals of Glaciology July 2011), 'Resolution requirements for grounding line modelling: sensitivity to basal drag and ice shelf buttressing'

Peer reviewed publications

Gladstone, R.M., Payne, A.J., Cornford, S.L. (2010), 'Parameterising the grounding line in ice sheet models', The Cryosphere, vol 4 (4), pages 605-619, doi: 10.5194/tc-4-605-2010

Gladstone, R.M., Lee, V.L., Vieli, A., Payne, A.J. (2010), 'Grounding line migration in an adaptive mesh ice sheet model', Journal of Geophysical Research, vol 115, article no.: F04014, doi: 10.1029/2009JF001615

Lunt, D.J., Flecker, R., Valdes, P.J., Gladstone, R.M., Salzmann, U., Haywood, A (2008), 'A methodology for targeting palaeo proxy data acquisition: A case study for the Late Miocene', Earth and Planetary Science Letters, vol. 271(1-4), pages 53-62, doi: 10.1016/j.epsl.2008.03.035.

Bougamont, M., J. L. Bamber, J. K. Ridley, R. M. Gladstone, W. Greuell, E. Hanna, A. J. Payne, and I. Rutt (2007), 'Impact of model physics on estimating the surface mass balance of the Greenland ice sheet', Geophysical Research Letters, 34, L17501, doi:10.1029/2007GL030700.

Gladstone, R.M., Flecker, R., Lunt, D., Valdes, P.J. and Markwick, P. (2007) 'The Mediterranean hydrologic budget from a Late Miocene global climate simulation' Palaeogeography, Palaeoclimatology, Palaeoecology, vol. 251(2), pages 254-267, doi: 10.1016/j.palaeo.2007.03.050.

Masson-Delmotte, V. and PMIP2 participants including Gladstone, R.M. (2006), 'Past and future polar amplification of climate change: climate model intercomparisons and ice-core constraints' Climate Dynamics vol. 26(5), pages 513-529.

Gladstone, R.M., Ross, I., Valdes, P.J. and PMIP2 participants (2005) 'Mid Holocene NAO: a PMIP2 model intercomparison' Geophysical Research Letters. vol. 32, L16707, doi:10.1029/2005GL023596.

Gladstone, R.M. and Bigg, G.R. (2002), 'Satellite Tracking of Icebergs in the Weddell Sea' Antarctic Science vol. 14 (3): pages 278-287.

Gladstone, R.M., Bigg, G.R. and Nicholls, K.W. (2001) 'Iceberg Trajectory Modelling and Meltwater Injection in the Southern Ocean' Journal of Geophysical Research, vol. 106(C9), pages 19,901-19,915.

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3
Arktisen keskuksen taloustilanne

Esitys

Keskusteltaneen kokouksessa annettavan selonteon perusteella Arktisen keskuksen taloustilanteesta


Päätös

Esityksen mukainen

Puheenjohtaja


Matti Hepola

Esittelijä


Paula Kankaanpää

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4
Muut asiat

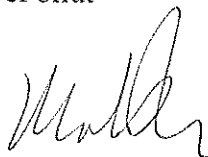
Lapin yliopiston johtosäännön 59 §:n mukaan kokouskutsussa on mainittava käsiteltävät asiat. Hallintoelin voi kuitenkin läsnä olevien jäsenten yksimielisellä päätöksellä ottaa käsiteltäväkseen asian, jota ei ole mainittu kokouskutsussa.

Esitys

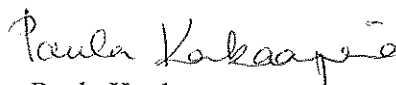
Päätös

Muita asioita ei ollut

Puheenjohtaja


Matti Hepola

Esittelijä


Paula Kankaanpää