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*Geoviten-ekstern er Institutt for geovitenskap ved Universitetet i Bergen sitt eksterne nyhetsblad og utgis en gang pr. måned. Geoviten-ekstern kan også leses fra vår eksterne nettside: www.uib.no/geo
Gunn Mangerud, instituttleder*

*Geoviten-ekstern is the Department of Earth Science at the University of Bergen's external newsletter. It is issued once per month and can also be read from our webpages <http://www.uib.no/geo/en>
Gunn Mangerud, Head of department*

GEO and geophysics in Polar Regions

A new five year strategy plan for GEO is now approved by the Department Council Board. Although we are awaiting the results of the ongoing international evaluation of the academic geo-science institutions in Norway (see below) which might lead a revision in 2012, we strongly believe that the relevance of geo-scientific research and education will be even more important in the years to come; the earth's crust has recently demonstrated its dynamic nature, which, together with the consequence of climate change, cause devastating conditions for millions of people around the world. Furthermore the energy demand is increasing, and the serious consequences of the nuclear catastrophe in Japan, further the stress the need to find more secure and sustainable ways of developing energy, from wind, geothermal heat and hydrocarbons – as well as developing systems for secure waste disposals, e.g. CO₂ sequestration. The curriculum of GEO makes it a highly relevant “player” in all these aspects.

GEO has since the 1960s been a national resource in the early geophysical exploration both at continental margin outside Norway, the mid-Atlantic ridge, as well as of vast regions in the Arctic and Antarctic. Almost 35 years ago the Seismological Observatory (now merged into GEO) conducted the first geophysical surveying of the continental margin of Antarctica, and with continuing effort, last year UoB led the first land seismic experiments using a vibrator source at the Antarctic ice sheet. UoB has furthermore been the main academic institution in Norway in doing seismic mapping of the geological strata on and outside Svalbard, and, consequently, GEO is strongly involved in the geo-scientific activities on behalf of The University Courses at Svalbard (UNIS). The geophysical experiments related the CO₂-sequestration pilot study is now mainly conducted with equipment and supervision from staff at GEO.

GEOs ability to plan and conduct geophysical campaigns in polar areas makes it unique both in a national and international perspective. The increased activity in the Arctic in the years to come, due to the predicted withdrawal of the ice-sheet of the North pole, and the recent agreement between Russia and Norway opening new areas for exploration, will further stress the need for research on methods related to both geophysical acquisition in polar environments – on permanently frozen land, on ice and at sea - and geological imaging based on the geophysical data (seismic, gravity, EM and magnetic data). This is an arena where GEO naturally should strive to take a leading academic position. To do so, we need to assure that GEO in the years to come holds the appropriate human and technical resources. As a part of this strategy, GEO now takes the initiative to establish a large-scale Arctic geophysical laboratory at Svalbard in cooperation with UNIS. If succeeding in this, we hopefully create an arena for research and education of candidates pushing the geo-scientific skills and knowledge towards the poles.

Gunn Mangerud

This edition's colleague

This edition's colleague is **Louise Wedderkopp Bjerrum**, who has been a PhD candidate at our department since August 2007. She is currently in the final stage of her 4-year PhD contract and plans to finish and defend her thesis before this summer.



Louise began her university education at the University of Copenhagen in 2001, where she obtained her BSc in physics-geophysics. She came to the University of Bergen as part of the student exchange program "Nordplus" during her bachelor studies in 2005 and completed her MSc in seismology and geodynamics at the Department of Earth Science in 2007.

In her MSc thesis Louise worked with assessing earthquake hazard for Izmir - the third largest city in Turkey with approximately 3.5 million inhabitants. She identified potential earthquake rupture scenarios along faults located in the vicinity of Izmir, and simulated the expected ground motions on bedrock level using a hybrid broadband simulation technique. As a continuation of this work, Louise's PhD project concerns improvements of the earthquake scenarios for the same area. In addition, she studies the effect of uncertainties in the input parameters used in the simulations in order to estimate the variability

and uncertainty of the simulated ground motions.

During her PhD Louise has conducted several fieldworks in Izmir. There she has collected ambient noise data with the aim of estimating site effect potential at different sites within the city. This is an important task in the hazard assessment for Izmir, since the city is underlain by thick sedimentary deposits. These sediments are expected to cause an amplification of the seismic waves during an earthquake, as they propagate through the soil layer overlying the bedrock. This work has been carried out in collaboration with the master student Torunn Lutro.

After the Wenchuan earthquake in China (2008), Louise visited the earthquake damaged area as part of a post-conference trip in connection with the 14th World Conference on Earthquake Engineering in Beijing, October 2008. This field trip initiated the second part of her PhD project which concerns a retrospect simulation study of the earthquake as well as a reconnaissance study of building damage in the earthquake affected area.

Louise's research interests include strong ground motion simulation, understanding of earthquake damage and engineering implications of these as well as site effect potential during an earthquake. Supervisors on her PhD project are Kuvvet Atakan, Lars Öttemoller and Mathilde B. Sørensen, all from the Department of Earth Science.



Louise is employed by the Department of Earth Science in a 4-year PhD position with teaching obligations and has throughout her PhD been responsible for the exercises on the introductory course in Geophysical Methods.

From our research

Professor **Joachim Jacobs** paper, "The Kalahari Craton during the assembly and dispersal of Rodinia" in *Precambrian Research*, Volume 160, Issue 1-2 (2008), Pages 142-158 is recognized as one of the "Top-50 most cited articles" published in *Precambrian Research* January 2006 - February 2011.



Link to our three Centres of Excellence:

<http://www.bjerknes.uib.no/>

<http://www.cipr.uib.no/>

<http://www.uib.no/geobio/en/>

Andre nyheter/Other news

The evaluation of earth sciences research in Norway

Evaluation of Norwegian research in Earth Sciences is presently being performed. The subject-specific evaluations is initiated from the Norwegian Research Council with the aim to provide a critical review of the Norwegian research system in an international perspective, and to provide recommendations on measures to encourage increased quality and efficiency of research. The international committee visited Norway from March 21 til April 1. The hearing meeting and the site visit to the Department of Earth Science, University of Bergen took place March 22 and 23. The hearing lasted 3 hours and in addition to Head of Department, one representative from each of our five research groups was represented. The focus was on a SWOT analyses at both department level as well as research group level. Since the evaluation process is delayed and our self-evaluation was handed in April 1st 2010 we also presented two research highlights from each research groups that had been published or reached after the hand-in of our report.

During the site visit about half the time was spent together with 5 representative young scientists from our department: Kristian Vasskog (PhD candidate; paleoclimate), Erling Hugo Jensen (PhD candidate; petroleum/geophysics), Heidi Kjennbakken (PhD candidate; marine geology), Cedric Alexandre Thieulot (post doc, geodynamics, computational fluid dynamics, numerical modelling) and Nicola McLoughlin (researcher, geobiology). Their enthusiastic and engaged approach seemed to be passed on to the committee members who all gathered around the various posters to discuss and ask questions.

The remaining time for the site visit was spent on visiting selected laboratories and according to their expertise we chose to split the group in two in order to



be able to have short visits to our sedimentological lab and the state-of-the-art corelogger system, to our brand new 3D seismic lab suite, to the Bergen Analytical facility equipped for inductively coupled plasma optical emission and mass spectrometry analyses and to the to GMS-lab. On all the sites they were met by academic staff that shortly demonstrated the applications and answered questions from the committee.

The committee members are:

Marjorie Wilson, Igneous Petrogenesis, University of Leeds (Committee leader)

Peter Haynes, Atmospheric Sciences, University of Cambridge

Michael Kendall, Seismologist, University of Bristol

Monika Rhein, Physical Oceanography, University of Bremen

François Roure, Structural Geology, Institut Français du Pétrole

Ellen Thomas, paleoceanography/micropaleontology, Yale University

Johan Kleman, Physical Geography, Stockholm University

Ezio Todini, Hydrology, University of Bologna

GEO i media

Nyheter - Japan - Kuvvet Atakan

Klassekampen

Tittel: Marerittet ble virkelighet

PANIKK: Eddy Haavik (39) satt på en kafé i Tokyo da Japan ble rystet av gigantskjelvet i går. - Jeg har aldri sett bygninger riste slik de gjorde, sier han.

<http://www.klassekampen.no/58608/article/item/null/marerittet-ble-virkelighet>

TV2

Tittel: Jordskjelveksperter frykter gigantskjelv ved Tokyo

Det kraftige jordskjelvet fredag kan ha økt faren for et katastrofalt skjelv nær den japanske hovedstaden.

<http://www.tv2nyhetene.no/utenriks/jordskjelveksperter-frykter-gigantskjelv-ved-tokyo-3440454.html>

TV2

Tittel: Seismolog: – Kloden vil skjelve i flere dager

Norske seismologer merket godt jordskjelvet som rammet utenfor Japan i morgentimene fredag. De venter flere kraftige etterskjelv.

<http://www.tv2nyhetene.no/utenriks/seismolog-kloden-vil-skjelve-i-flere-dager-3440019.html>

VG

Tittel: Norsk jordskjelveksperter: - Vi visste det ville komme

Kraftigste skjelvet noensinne <http://www.vg.no/nyheter/utenriks/jordskjelv-i-japan/artikkel.php?artid=10099137>

ABCnyheter

Tittel: - Dødstallene kunne vært en tiendedel

<http://www.abcnyheter.no/verden/100121/dodstallene-kunne-vaert-en-tiendedel>



Dagbladet

Tittel: 1412 ganger kraftigere enn Kobe-jordskjelvet

- Katastrofalt mye energi ble utløst, sier geofysiker.

<http://www.dagbladet.no/2011/03/11/nyheter/jordskjelv/utenriks/japan/15769505/>

På Høyden (Jan S. Vaagen, Institutt for fysikk og teknologi, og Kuvvet Atakan, Institutt for geovitenskap)

Tittel: Markerte støtte for Japan

Auditorium 2 på Dragefjellet var nesten helt full da ansatte og studenter markerte støtte til de katastroferammede i Japan i dag.

http://nyheter.uib.no/?id=48516&modus=vis_nyhet

På Høyden (Jan S. Vaagen, Institutt for fysikk og teknologi, og Kuvvet Atakan, Institutt for geovitenskap)

Tittel: Et sjokk for japanstudenter

I dag holder UiB et åpent solidaritetsmøte om forholdene i Japan etter jordskjelvødeleggelser. For studentene Ayako Ijima og Keiji Watanabe har de siste ukene vært et langt sjokk.

http://nyheter.uib.no/?modus=vis_nyhet&id=48507

På Høyden (Peter M. Haugan, Geofysisk institutt, og Rolf-Birger Pedersen, Senter for geobiologi)

Tittel: Fremtidens havobservatorium

Forskere planlegger å etablere observatorier i dyphavene utenfor Norskekysten som skal fjernsende data kontinuerlig til land. – Dette er neste generasjons infrastruktur, sier prosjektleder Peter M. Haugan om prestisjeprosjektet.

http://nyheter.uib.no/?id=48520&modus=vis_nyhet

Universitetet i Stavanger (Eystein Jansen, Bjerknessenteret/Institutt for geovitenskap)

Tittel: Torsdagsseminar: Pådrivere for klimaendring i fortid og nåtid

Hva skyldes nåtidens klimaendringer og hva er årsaken til endringene som skjedde 1000 år tilbake? Det er spørsmål Eystein Jansen tar opp i sitt foredrag 24. mars. <http://www.uis.no/nyheter/article35431-12.html>

Vitenskapelig produksjon

Andersson C., Pausata F.S.R., **Jansen E.**, Risebrobakken B. & Telford R.J., 2011. Holocene trends in the foraminifer record from the Norwegian Sea and the North Atlantic Ocean. *Climate of the Past*, 6, 179-193. Doi: 10.5194/cp-6-179-2010

Janbu A.D., Paasche Ø. & **Talbot M.R.** 2011. Paleoclimate changes inferred from stable isotopes and magnetic properties of organic-rich lake sediments in Arctic Norway. *Journal of paleolimnology*, x, x – x. Doi: 10.1007/s10933-011-9512-2

Fliegel D., Wirth R., Simonetti A., Schreiber A., **Furnes H.** & Muehlenbachs K. 2011. Tubular textures in pillow lavas from a Caledonian west Norwegian ophiolite: A



combined TEM, LA-ICP-MS, and STXM study. Geochemistry geophysics and geosystems, 12, 1 – 21. Doi: 10.1029/2010GC003255

Kleiven H.F., Hall I.R., McCave I.N., G. Knorr G. & **Jansen E.** 2011. Coupled deep-water flow and climate variability in the middle Pleistocene North Atlantic. *Geology*, 39, 343–346. Doi: 10.1130/G31651.1

Kjennbakken H., **Sejrup H.P.** & **Hafliðason H.** 2011. Mid – to late - Holocene oxygen isotopes from Voldafjorden, western Norway. *The Holocene*, 1-13. Doi: 10.1177/0959683610391318

Vasskog K., **Nesje A.**, **Støren E.N.**, **Waldmann N.**, Chapron E. & Ariztegui D. 2011. A Holocene record of snowavalanche and flood activity reconstructed from a lacustrine sedimentary sequence in Oldevatnet, western Norway. *The Holocene*, Doi: 10.1177/0959683610391316

MUNTlige OG POSTER PRESENTASJONER PÅ KONFERANSER

Irvåli N., **Ninnemann U.S.**, **Galaasen E.V.**, Rosenthal Y., Kroon D. & **Kleiven H.F.**. Abrupt changes in North Atlantic Climate and hydrography and their relationship to deep ocean ventilation during the penultimate interglacial (MIS 5e). European Science Foundation EuroMARC meeting, Cascais, Portugal, 06.-09.02.2011

ANDRE FOREDRAG

Hannisdal B. Phanerozoic Earth System Evolution. Geodynamics Seminar, UiB, 28.02.2011.

Jacobs J. Geological expedition to the Sør Rondane mountains 2010-11, eastern Dronning Maud Land, Antarctica. Department seminar, UiB, 10.03.2011.

Kleiven H.F. Hvilke klimaendringer kan vi vente oss? Fagpedagogisk dag, Universitetet i Bergen, 04.02. 2011.

Kleiven H.F. & Thorleifsson T. Et populærvitenskapelig foredrag om nåtids og fortidsklima. Expedition Finse, 05.02. 2011.

Konopasek J. Tectonic evolution of the Neoproterozoic Kaoko Belt in NW Namibia. Department seminar, UiB, 24.03.2011.

Mangerud J. Byfjorden var varmere før siste istid enn i dag. Havforskningsinstituttet, Bergen, 26.01.2011.

Minakov A. Formation of the Lomonosov Ridge: Insights from numerical geodynamic modelling. Department seminar, UiB, 15.03.2011.

Nesje A. "Den vesle istid" – klima og konsekvensar. Maihaugen, Lillehammer, 26.01. 2011.

Raeesi M. On two likely future great earthquakes along the South America subduction zone. Geodynamics Seminar, UiB, 08.03.2011.



Superkontinentet som ikke var super nok

Kosuke Ueda disputerte fredag 11. mars 2011 for ph.d.-graden ved Universitet i Bergen med avhandlingen:

"Orogenic decay from collision to rifting – characteristics and implications of delamination illustrated by a case study of the East African-Antarctic Orogen in NE Mozambique"

Flertallet av de nåværende kontinentene dannet et sammenhengende superkontinent, Gondwana, for om lag 500 millioner år siden. Kontinentet var drapert med en rekke store fjellkjeder som kan sammenlignes med Himalaya i dag. Mye senere laget oppsprekning mellom Øst-Afrika, India og Antarktis nye oseaner. Merkelig nok fant denne oppsprekningen sted akkurat der hvor fjellkjeden ble dannet før.

Avhandlingen omhandler forandringer i fjellkjeder, som kan føre til oppsmelting og svekkelse av skorpe som følge av at den nedpressede skorpen løsner og synker inn i mantelen. Om tektoniske plater delaminerer på denne måten, så kollapser fjellkjeden. De seneste faser i livet av en fjellkjede er derfor karakterisert av store mengder granittiske smeltebergarter, sakte avkjøling, og en tektonisk ekstensjon som kan gå over i oppsprekning.

I hoveddelen av avhandlingen tar Ueda for seg utviklingen i Nord-Mosambik under overgangen fra fjellkjede til osea. Det har vist seg at overgangen var preget av høye temperaturer, ekstensjon og sakt avkjøling som fortsetter minst 100 millioner år etter fjellkjededannelsen.

I tillegg viser numeriske modeller at slike svekkelser av jordskorpen kan overleve i opp til 300 millioner år, og at delaminering kan allerede begynne under fjellkjededannelse. Det er derfor sannsynlig at Gondwana brakk i stykker igjen også som følge av sin vekst.

Personalia:

Kosuke Ueda er født i 1980 i Tokyo og oppvokst i Tyskland. Han er uteksaminert diplomkandidat i naturvitenskap i 2007, med spesialisering i strukturgeologi og tektonikk, fra ETH Zürich, Sveits. I perioden 2007-2010 har han jobbet med doktorgraden ved Institutt for Geovitenskap, Universitetet i Bergen.