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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*

Toppforskning på klima

Bjerknessenteret for klimaforskning var vertskap for møtet, som ble arrangert i regi av World Climate Research Programme (WCRP) denne uken. WCRP er det sentrale internasjonale klimaforskningsprogrammet etablert av Verdens meteorologiske organisasjon under FN og at de valgte å legge møtet hit er en fjær i hatten for Bergens internasjonale klima- og polarforskningsmiljø.

Bergen har lange tradisjoner å bygge på. Bergenskolen i meteorologi ble etablert av Vilhelm Bjerknes for snart 100 år siden, og den moderne værvarslingen som i dag brukes verden over ble utviklet her. I tillegg bygget Universitet i Bergen over tid opp et sterkt fagmiljø innen marin- og kvartærgeologisk forskning. Denne paleoklimaforskningen ved vårt institutt var kanskje viktigste grunnlag for at man fikk tildelt en av SSFene i 2003: Bjerknessenteret ble da utnevnt til Senter for Fremragende Forskning (SFF), og er i dag vokst til et stort, bredt fagmiljø med internasjonalt renommé. Dette illustrer viktigheten av langsiktighet for å skape topp forskning, inkludert internasjonale toppmiljø som slike senter representerer. En annen dimensjon er at slike sentre har vist seg å ha stor tiltrekkingskraft på dyktige forskere; også forskere fra andre land. En av dem er vår kollega førsteamanuensis Ulysses Ninnemann som i dag, sammen med en kollega fra Uni Research, har en ny publikasjon ute i prestisjetunge Science (se under).

Regjeringen gav nylig en langtidsbevilgning til klimaforskningen i Bergen, og universitetsstyret vedtok 30.09 opprettelse av et nytt klimaforskningscenter (Senter for klimadynamikk ved Bjerknessenteret). Dette vil sikre videreutvikling av et bredt og internasjonalt ledende fagmiljø som skal beskjeftige seg med naturlige og menneskeskapte klimaendringer, prosesser, usikkerhet, havnivå, karbonkretsløp og marint økosystem samt regionalisering, ekstremer og terskler. Også i fortsettelsen vil Universitetet i Bergens nåværende "lokale" samarbeidspartnere Uni Research, Havforskningsinstituttet og Nansensenteret være sentrale medspillere, selvsagt i tillegg til samarbeid med et internasjonalt nettverk av forskningsmiljø. Samarbeid internt og på tvers av forskningsmiljø er nøkkelen til å skape internasjonalt ledende multidisiplinære forskningsgrupper. I dette tilfellet for å kunne forstå og forutsi framtidens klimautfordringer – både de naturlige og de menneskeskapte.

Gunn Mangerud

From our research

Our colleague **Ulysses Ninnemann** and Uni Research colleague Are Olsen has a paper in today's Science:

New method revolutionizes our understanding of past ocean circulation changes.



Ulysses Ninnemann
Department of Earth
Science/Bjerknes

Microfossils deposited in deep ocean sediments reflect changes in ocean circulation and represent one of the most important archives of past ocean variability. In a recent report in the renowned scientific journal Science, Are Olsen and Ulysses Ninnemann from the Uni Bjerknes Centre and University of Bergen find that the modern isotopic ratio of carbon in the ocean, which is used when interpreting marine sediment core data, is strongly influenced by anthropogenic CO₂.

- This has limited our ability to explain the observed changes in sediments and hence our understanding of how ocean currents have varied in preindustrial times, says Are Olsen at the Uni Bjerknes Centre for Climate Research.

Deep ocean climate archives

Changes in the ocean are archived in small unicellular animals, foraminifera, which live on the seafloor. The relationship between light and heavy carbon isotopes is incorporated in the calcareous shells of these animals and gives a distinct signal, reflecting changes in the waters in which they grow. This provides information on the rate and pathways of deep water renewal in the ocean. Newly formed deep water is well ventilated and has high ¹³C-to-¹²C values, whereas this ratio is lower in older, less ventilated water. Changes in the ¹³C-to-¹²C values provide the primary evidence that the pattern of ocean circulation in the North Atlantic has changed with climate in the past, for example during ice ages and rapid climate events.

Correcting for antropogenic influences

In the Science report, Olsen and Ninnemann study the modern ocean ¹³C-to-¹²C relationship, and show how this is affected by antropogenic carbon, which has particularly low ¹³C-to-¹²C values, this is known as the Suess effect. The results are startling and reveal that the Suess effect has removed crucial differences between North Atlantic water masses with respect to their carbon isotopic composition.

- The study reveals that the Suess effect has masked sharp differences between water masses, says Olsen.

Of course, one should use the natural oceans carbon isotope distributions as a reference when interpreting past ocean changes, as opposed to the modern ocean signal, which altered by antropogenic CO₂, no longer faithfully reflects ocean processes. "This is now in place, and our findings mean that we now have a far better footing for interpreting past changes in ocean ¹³C-to-¹²C ratios" says Ninnemann.



Are Olsen, Uni Research/Bjerknes

For example, it has been difficult to explain the occurrence of very high ^{13}C -to- ^{12}C ratio in sediments from the ice age because no similar waters exist in the North Atlantic today. Olsen and Ninnemann clearly show that this is a consequence of the Suess effect: "When we correct for the Suess effect, we find the same high values that have been observed in sediments from the ice age," says Olsen.

These similarities between the modern and past oceans remove some of the options for explaining past changes, shifting the emphasis from how water masses are formed to how much are formed and how they are distributed. This should set the terms for a clearer understanding of the relationship between climate change and ocean circulation in the future.

-The research shows the importance of interdisciplinary meeting points at the university, in this case at the Bjerknes Centre. By co-locating the chemical oceanography and paleoceanography groups at the Bjerknes Centre we have established new professional arenas that make such research possible.

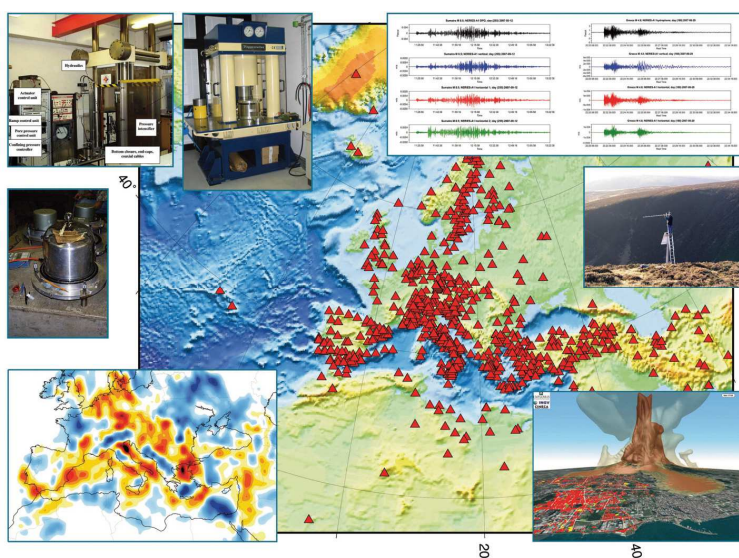
European Plate Observing System (EPOS)



Research Infrastructure and E-science for Data and Observatories on
Earthquakes, Volcanoes, Surface Dynamics and Tectonics

<http://www.epos-eu.org>

European Plate Observing System (EPOS) – (<http://epos.rm.ingv.it/>) is a research infrastructure and e-science for data and observatories on earthquakes, volcanoes, surface dynamics and tectonics. EPOS was included in the European Strategy Forum on Research Infrastructures (ESFRI) Road Map on December 2008. Currently, there are 22 European countries represented in the EPOS Consortium which is coordinated by INGV in Italy.



The Norwegian National EPOS Consortium consists of seven institutions and is lead by the Department of Earth Science, University of Bergen (professor **Kuvvet Atakan** as the EPOS national contact). Within the consortium, the main contributors of seismological data are the Norwegian National Seismic Network operated by the Department of Earth Science, University of Bergen (GEO-UiB) in collaboration with NORSAR, whereas the main contributor of the geodetic data is the Norwegian Mapping Authority (Statens Kartverk - SK). The Norwegian Geological Survey (NGU) collects and archives national geological and geophysical databases. The remaining institutions, Department of Geosciences, University of Oslo (GEO-UiO), the Norwegian Geotechnical Institute (NGI) and the Christian Michelsen Research (CMR) are interested in collaborating within the fields of seismological data analysis and modelling,

collaborating within the fields of seismological data analysis and modelling,

geodynamic modelling, geohazards assessment and management, computer visualization and application of these competence areas for the design of infrastructure subjected to earthquake loading.

Recently, the EPOS consortium was awarded with a Preparatory Phase Project (PPP) funded by the EU-FP7. The project starts in November 2010 and will last for 4 years with a total budget of 4.5 Million €. GEO-UiB participates in this project on behalf of the Norwegian National EPOS Consortium and will work in the preparation and the development of the Norwegian node of this large scale solid-earth based infrastructure. The preparatory phase of four years, will pave the way for the implementation and the operation of the EPOS which is envisaged to last for the next 40 years. As such, EPOS is a critical long term monitoring infrastructure which will influence the development of the future research in earth sciences in Europe to a large extent.

This edition's colleague

This edition's colleague is Rob Gawthorpe, who joined the department in July as Professor of Petroleum Geoscience.



After obtaining his PhD on Carboniferous basin evolution and base metal mineralization from the University of Leeds in 1985, Rob joined BP Exploration in their Sedimentology Group, working on internal consultancy and training projects around the world. Following a position as Elf Aquitaine Research Fellow at University of Durham, he moved to the University of Manchester. Here he developed the Basin Studies and Petroleum Geoscience Research Group (Basin Studies), which is one of the major research groups within Earth, Atmospheric & Environmental Sciences at Manchester, focusing on sedimentary basin analysis, earth surface processes and petroleum geoscience. With colleagues in Basin Studies, he also developed Manchester's petroleum geoscience and engineering degree programmes, including the Petroleum Geoscience taught masters course which attracts students from around the world. In 2000, he became Professor of Sedimentology and Tectonics.

Rob's research is wide-ranging, integrating geomorphology, sedimentology, stratigraphy and tectonics to study tectonically-active landscapes and sedimentary basin evolution. One of his major research areas is sedimentation and tectonics in rift basins, including the role of fault growth and linkage in controlling rift topography and syn-rift stratigraphy. His research also tackles sequence stratigraphic concepts, for example, controls on the 3D variability of basin margin sequences and the role of sea-level rise and fall in early diagenetic modification (cementation and leaching). These research areas utilize both outcrop and subsurface data and are important for reservoir characterization and the development of exploration concepts. The



significance of his research was recognized in 2005 when Rob was American Association of Petroleum Geologists Distinguished Lecturer.

Rob has helped to convene a number of meetings and conference sessions, most recently the three-day Geological Society of London meeting 'Landscapes into Rock' in September 2010 and the Rift Basins session at the Annual Convention of the American Association of Petroleum Geologists in New Orleans in April 2010. He has also been a member of the UK Natural Environment Research Council's Peer Review Committee and Peer Review College and he acted as a Specialist Advisor for the UK Research Assessment Exercise 2008. He has also been a member of the committee reviewing geoscience-based PETROMAKS proposals for NFR.

Rob has longstanding links with Norway, particularly with the oil and gas industry, including Saga Petroleum, Norsk Hydro and Statoil. In 2008 he spent six months as Visiting Professor in Statoil's Research Centre in Bergen, working on tectonics and sedimentation on continental margins with mobile substrates. Since arriving in the department, Rob has concentrated on setting up a new 3D Seismic lab with help of colleague Øyvind Natvik. The lab is nearing completion. It will have a suite of workstations configured for interpreting large 3D seismic surveys and imaging subtle sedimentological, structural and fluid flow-related features using techniques like spectral decomposition and RGB blending. The lab will then be a resource for the department where research that is based on 3D seismic data can be undertaken in a common area, using state-of-the-art facilities and where researchers can share their expertise with one another.

Three-dimensional seismic data will form an important part of Rob's research at UiB, particularly for a range of projects working on the Norwegian margin, such as the Salt-Influenced Rift Basins project (SIRB), which he co-leads with Dr Chris Jackson at Imperial College, and projects working on salt tectonics and sedimentation along continental margins. He will also continue to develop major outcrop-based projects such as The Rift Analogues Project (TRAP), which uses the exceptional outcrops along the Sinai margin of the Miocene Suez Rift to investigate various aspects of tectonics and sedimentation in rift basins. Rob would also like to carry out further work developing digital outcrop techniques and their applications - an area he had established in Manchester with Dave Hodgetts.



More new from our 3 Centres of Excellence:

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

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

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

Geo-letter from abroad

Nil Irvali in Woods Hole, Massachusetts,

I am now settled in Woods Hole, Massachusetts, for my 5-months research stay at the Woods Hole Oceanographic Institution (WHOI). Woods Hole is a small village, on the southwestern corner of Cape Cod, with a population of about 1000 residents. With its touristic attractions, beaches, ponds, and forests, it was very crowded with tourists when I first arrived in mid-August. Now, I am enjoying a quiet, warm, and sunny autumn in this cozy village. Despite its small size,



Woods Hole is the world center for marine research and has the largest scientific community. The scientific community consists of two large private organizations (the Marine Biological Laboratory and the Woods Hole Oceanographic Institution) and two federal government facilities (the National Marine Fisheries Service and the U.S. Geological Survey), which occupies most of the village. Woods Hole Oceanographic Institution (WHOI) is the largest independent oceanographic research institution in the U.S., which was established in 1930.

Moreover, my research stay at WHOI aims to acquire and apply sediment proxy techniques for investigating Greenland Ice Sheet activity under past climate conditions which were, in many ways, analogous to our expected future. These records will be a vital addition to my ongoing PhD work to depict the evolution of North Atlantic climate and surface ocean hydrography during the penultimate interglacial (Marine Isotope Stage 5e).

Microscoping (counting ice-rafted debris grains, picking foraminifera), analyzing data, attending some very interesting lectures and 'paleo-lunch' seminars is what I have been doing so far; as well as meeting new students and leading scientists within the U.S., and building long lasting collaborative ties.

I enjoy being a guest student at WHOI and living in Woods Hole. It is a great place to be; not only because of its beautiful nature, fresh air and friendly people, but also it is an ideal place to do science since it is very quiet and nothing can disturb you. The latter is perfect if you have also just started writing your PhD thesis. And of course, I also don't miss the opportunity to take a 2 hours bus trip to explore Boston or a ferry to Martha's Vineyard in a nice weekend!

Andre nyheter/other news

New 3D Seismic Lab at our department

The new 3D seismic research lab is nearly complete. It will contain a suite of high-performance workstations that complement the Department's existing 3D seismic teaching facilities.

The combination of high-specification hardware and our collaboration with key software vendors provides facilities capable of handling large 3D seismic volumes. More advanced interpretation techniques, such as spectral decomposition and attribute blending, allow us to image a wide range of structural, sedimentary, igneous and fluid-flow related features. Seismic interpretation and imaging software is supported by a variety of GIS, image analysis and structural analysis and restoration packages.

We are currently working on 3D datasets from sedimentary basins around the globe, including the Norwegian continental shelf. The projects using these datasets are wide-ranging in scope and include: structural style of rifted margins; seismic geomorphology of submarine channels, fans and slides; seismic-scale fluid flow (including gas hydrates).

"Grotter i Norge"

I dag kommer Norges første grottebok ut! Boken er skrevet av vår kollega professor **Stein Erik Lauritzen** som er Nordens eneste huleforsker (speleolog).

Boken leseren førsteklases fagstoff og selvopplevde beskrivelser av grotter.

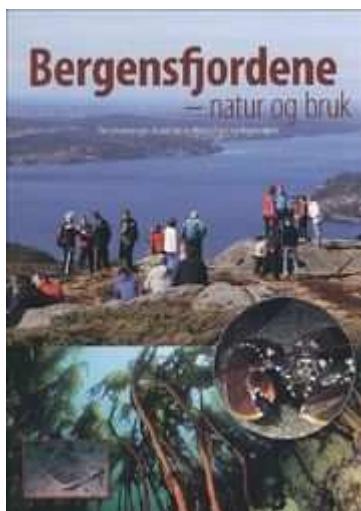


Her kan man lese om noe av det som skjuler seg under Norges landoverflate – om flere tusen naturlige grotter! Noen av grottene er over en million år gamle, og skjuler rester etter plante- og dyreliv gjennom istider og mellomistider. Her kan du lese om hvordan grotter dannes, om deres innhold og om hva dette kan fortelle oss. Man kan lese om løsmasser, dryppstein,

mineraler og knokkelrester, plante- og dyreliv, og om hvilken rolle grotter har spilt og spiller i menneskets kulturhistorie.

Boken henvender seg bl.a. til den interesserte turgåer, til dem som gjerne vil vite litt mer om naturen, men er helt klart spennende lesning for alle oss geologer. Rikt illustrert er dette en utrolig spennende bok!

Bok om fjordene i og rundt Bergen



Forrige uke kom boken "Bergensfjordene – nature og bruk" ut. Våre tre kollegaer **Inge Aarseth**, **Hafliði Hafliðason** og **Håkon Fossen** er blant bidragsyterne.

Boken dekker fjordområdet mellom Bjørnefjorden til Sognefjorden, fra de ytre kystområdene til de indre fjordstrøkene. Den tar for seg geologien, de kreftene som formet og former fjordene, de fysiske forholdene som oseanografi og klima, samt livet i fjordene. Også forskjellige typer menneskelig aktivitet som virker inn på tilstanden i fjordene er belyst i boken.

Boka, som er finansiert av Havforskningsinstituttet, UiB, Uni Research og Bergen kommune, kan kjøpes hos Studia. Overskuddet av salget skal gå i sin helhet til Kirkens Bymisjon i Bergen.

GEO i media

[Bergens Tidende](#) 22.10.10 s. 30 (Jan Mangerud)

Tittel: **Verdenshavne stiger ujevnt**

Hvis Grønlands innlandsis smelter så mye at verdens havnivå i gjennomsnitt stiger en meter, vil Norge likevel knapt berøres; havstigningen vil skje andre steder.

[På Høyden](#) (Endre Willassen, Bergen Museum, og Kuvvet Atakan, Institutt for geovitenskap)

Tittel: **Lager digitale forelesninger**

Forelesninger blir i disse dager filmet av formidlingsavdelingen, som en del av pilotprosjektet Dig UiB. Kravet er at ny teknologi skal heve kvaliteten på undervisningen, ifølge Kuvvet Atakan.

http://nyheter.uib.no/?modus=vis_nyhet&id=47344

[Fanaposten](#) (Øystein Jansen, Institutt for geovitenskap/Bergen Museum)

Tittel: **Fant mystisk stein**

Klassekameratene Anders Ness Totland og Andreas Tangnes ble nysgjerrige da de fant en høyst uvanlig stein på Apeltun. – Kan det være en meteoritt? undrer de. <http://www.fanaposten.no/artikler/article1174950.ece>

[InnoDesign](#) (Kronikk av Atle Rotevatn, CIPR)

Tittel: **Bytt olje mot kunnskap**

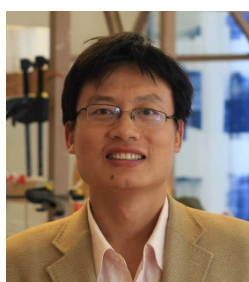
La oss investere deler av oljeformuen i en enorm satsing på skole, utdanning og forskning slik at vi i med rette kan betrakte oss som best i verden. Avkastningen vil være enorm - også i finanskrisetider. Det skriver seniorforsker Atle Rotevatn ved Centre for Integrated Petroleum Research, Universitetet i Bergen, i følgende kronikk. <http://www.innodelsign.no/nor/FoU-Offentlig/Bytt-olje-mot-kunnskap>

Nyansatte på instituttet



Karin Landschulze started as a new UiB-scholar in September. She was born in Berlin (Germany) and received a Master degree in Geophysics from the University of Hamburg in 2009 on a thesis about evaluation and modelling of magnetic and gravimetric data at the area of submarine volcano Columbo, near the island Santorini. While working on her Master thesis she moved to Bergen (Norway) in 2008 and learned to speak Norwegian. Due to her study background she has competence in both physics and mathematics and insight in geophysical and geological processes. Her PhD-project (supervised by R. Pedersen) will concentrate on modelling CO₂-leakage scenarios as part of the recently started research project SUCCESS, where open questions concerning safe long-term CO₂-storage, possible leakage and consequences to the (marine) biosphere will be addressed.

Mathilde Bøttger Sørensen is recently employed as an associated professor at our Department. She is an earthquake seismologist working mainly on seismic hazard and seismotectonics. Mathilde is currently involved in projects related to deterministic simulation of earthquake ground motions, probabilistic tsunami hazard assessment and the incorporation of earthquake source physics in seismic risk assessment. Furthermore, she is involved in the work with data from the Norwegian National Seismic Network, and she plan to study the seismicity in selected areas of Norway in detail to identify the sources causing this seismicity.



Liu Yunming, associate professor of Southwest University, Chongqing (China), graduated from Peking University in 2007 with majors in Geomorphology and Environment Evolution.

Funded by National Natural Foundation of China and the Research Council of Norway, Liu will work in the Paleomagnetic Laboratory at Department of Earth Sciences for 10 months on the project: "The Late Tertiary Terraces in the Middle Range of the Yellow River". This project will apply paleomagnetism to help answer the questions When did the Yellow River (one of the longest rivers in the world) form its present-day square bend?



Patrizia Imhof is visiting from the University in Bern, Switzerland. Patrizia did her masters on glacier fluctuations in Italy and received recently an internship to work with Professor Atle Nesje on reconstruction and comparison of glaciers between Switzerland and Norway.



Nye uteksaminerte



Nedenfor følger en oversikt over nye uteksaminerte i denne perioden.

Dato	Kandidat	Oppgavetittel	Veileder(e)	Sensor
13.10.10	Anny Sørvik	Sedimentasjonsprosesser og deglasiasjonshistorie i Skåneviksfjorden og Åkrafjorden basert på sedimentkjerner og akustiske data	B.Hjelstuen H.Haflidason	Dorthe K.Kristensen, Norsk polarinstitutt Helga Kleiven
20.10.10	Astrid Bjordal	Strandforskyvning på Sotra de siste 2000 år	J.Svendsen	Anna Bjune, Uni Research Henriette Linge



Disputaser

Dato	Tid/sted	Kandidat	Oppgavetittel	Veileder(e)	Bedømmelseskomite
9.11	Kl. 14.00, aud.5, Realfagbygget, 3.etg	Mohammad Reza Saberi	An integrated approach for seismic characterization of carbonates	Tor Arne Johansen, GEO Michael Talbot, GEO	Dr.ir. Aart-Jan van Wijngaarden Statoil Dr.Manika Prasad, Colorado School of Mines, Golden Dr. Ivar Brevik, GEO

Vitenskapelig produksjon

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