GEOBULLETIN
APRIL 10TH, 2009

Geobulletin is distributed weekly, on Wednesday by E-mail. Contributions are requested! Anything and everything (well almost) that you want to see in print. If you have a news item, a request, an announcement etc. email it to geodept@geology.wisc.edu. or leave it at the reception desk, Room 236 by noon on Mondays.

LECTURE SCHEDULE ---- All lectures (unless otherwise noted) are held on Fridays at 3:30 PM in AB20 (Laudon Lecture Hall). Coffee & cookies are served in the lobby starting at 3:15 PM.

Apr. 8 - Peter Cook, CSIRO, NGWA Darcy Lecturer "Environmental Tracers in Modern Hydrogeology: Reducing Uncertainty in Ground Water Flow Estimation"

NGWA Darcy Lecture

April 8th, 2009
A259 Weeks Hall, 2:25 PM

ENVIRONMENTAL TRACERS IN MODERN HYDROGEOLOGY: Reducing Uncertainty in Groundwater Flow Estimation By Peter Cook, CSIRO Land and Water, Australia

Quantitative hydrogeology is often traced back to Henri Darcy in the mid 19th Century, who observed a linear relationship between flow rate and hydraulic gradient, the proportionality constant later becoming known as hydraulic conductivity. Even today, groundwater flow rates are most frequently determined as the product of measured hydraulic gradients and hydraulic conductivities, the latter determined using aquifer tests. However, estimation of aquifer hydraulic conductivity remains a significant source of uncertainty. Although within the past few decades, environmental tracer methods which can provide independent estimates of groundwater flow rates have been developed, these methods are still not widely used outside of the research community.

There are a large number of environmental tracers, all with different properties and hence different potential uses, although those that are most useful for estimating groundwater flow rates are those that provide information on the age of the groundwater (the time that has elapsed since recharge). Tracers which can be used for this purpose include a range of tracers with variable but well-known input history (e.g., chlorofluorocarbons), and radioactive isotopes for which the rate of input to the groundwater has been relatively constant over time, but which decay at a known rate (e.g., ^{14}C).

The potential of environmental tracers is most apparent in heterogeneous systems, where hydraulic conductivity can be highly spatially variable. Because tracers integrate over time and space, they are able to provide regional-scale estimates of groundwater flow rates, often with an accuracy which is much greater than is possible using hydraulic data alone. In fractured rock systems, hydraulic conductivity is extremely variable spatially, and diffusive exchange between young water moving through the fractures and old water stored in the matrix complicates interpretation of environmental tracers. In these systems, joint interpretation of hydraulic and environmental tracer data can correct for the effects of matrix diffusion on apparent tracer ages, and hence provide robust estimates of groundwater flow.

Apr. 10 - Joe Stoner (Oregon State University) (SPONSOR: CARLSON)
"Climatic implications of abrupt geomagnetic change"

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FRIDAY 3:30 PM -APRIL 10TH, 2009 SEMINAR IN ROOM 140 WEEKS HALL

Climatic Implications of Abrupt Geomagnetic Change

The representation of the geomagnetic field as a geocentric axial dipole (GAD) is well known, yet the present field shows both persistent and transient features that clearly deviate from such a simple structure. A number of lines of evidence suggest that these deviations from a GAD reflect the influence of the lower mantle on the geodynamo, yet their influence on the paleomagnetic record remains both poorly constrained and controversial. I will present new results from a series of high-resolution and well-dated Holocene sedimentary paleomagnetic records that are consistent with the present geomagnetic structure being a persistent and controlling aspect of the paleomagnetic secular variation record. Observations of abrupt paleomagnetic changes on centennial or short time scales reflect a reorganization of the geomagnetic field within these boundary conditions. These geomagnetic changes result in significant alteration of the geomagnetic shield and therefore influence Earth's near space boundary conditions. Correlations between paleomagnetic and paleoclimatic records, especially those reflecting atmospheric dynamics, suggest that the geomagnetic field may influence climate through changes in the regional patterns of cosmic ray induced atmospheric ionization influencing low cloud nucleation or the global electrical circuit.

Apr. 17 - Dept. of Geology and Geophysics – Board of Visitors Spring Meeting

Apr. 24 - Susanne Janecke (Utah State University) (SPONSOR: DEMETS)
"Reorganizing plate boundaries, evolving basins, pseudotachylyte, detachment faults, and crossing strike-slip faults: Southern California"

May 1 - Laurent Charlet, (Univ. Grenoble) (SPONSOR: SAHAI)

May 8 - Peter Visscher (SPONSOR: RODEN)
"Microbial mechanisms forming modern marine stromatolites - Using the present to predict the past"

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UNDERGRAD LOOKING FOR POSSIBLE EMPLOYMENT FOR THE SUMMER:

(Nick Dosch) Sophomore Geology/Geological Engineering undergrad looking for lab summer employment. 10-20 hours a week. Email ndosch@wisc.edu, Phone 608-444-7531

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SPRING BANQUET

The 2009 Departmental Spring Banquet will be held on Friday, April 17, at Olbrich Gardens beginning at 6:00 PM. Cost is $15.00/person, and the signup deadline is Thursday, April 10. Dinner and drinks will be provided by Blue Plate Catering, with the following entree options.

Vegetarian Lasagna
Layers of Pasta, Fresh Steamed Spinach, Mushrooms, Leeks, Zucchini,
Yellow Summer Squash, Peppers, and Onions combined with Three Cheeses and Marinara
Sauce. Served with Tossed Garden Salad and Assorted Dressings
Prosciutto Chicken

Prosciutto with Smoked Mozzarella, Caramelized Garlic, and Fresh Spinach wrapped in a tender Breast of Chicken and served with Garlic Mashed Potatoes

Tropical Tilapia

A light, white fish fillet that is tortilla crusted and topped with a lime and chipotle sauce to add and little zing. Served with Saffron Rice…very pleasing to the eye and palate…

Please contact Amalia Doebbert (doebbera@geology.wisc.edu) with any questions.

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ANNOUNCEMENTS:

For any students who might be interested: Misasa International Student Intern Program 2009 at the Institute for Study of the Earth's Interior (ISEI), Okayama University, Misasa, Japan

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1. Institute for Study of the Earth's Interior, Okayama University, Japan would like to invite applications for the 2009 International Student Intern Program

2. About the institute

The Institute for Study of the Earth's Interior (ISEI) is a leading institute equipped with state-of-the-art experimental and analytical facilities. Active researches are being conducted in the basic research areas of isotope and trace element geochemistry, high-resolution geochronology, and high-pressure and temperature materials science, aimed at understanding the origin, evolution and dynamics of the Earth. The institute is rapidly developing into an international research and educational center for solid earth sciences through the embarkation of the Center of Excellence for the 21st Century (COE-21) program (Program Leader: Professor Eizo Nakamura), sponsored by the Ministry of Culture, Sports, Science and Technology of Japan (MEXT) in 2003, and is now constantly the host of a significant number of leading and young collaborative researchers from worldwide. The institute is located in Misasa town, which is well known in Japan for its hot-spring spa. For more information about ISEI, please visit the following website:
http://www.misasa.okayama-u.ac.jp/

3. About the program

The annual Misasa International Student Intern Program for advanced undergraduate (3rd to 4th year) and master's course students has been planned to promote international collaborative research and education. During the intern program, students will work closely with ISEI faculty members and their research groups on currently active research projects at ISEI. Researches at ISEI generally fall into one of the following areas: (1) geochemistry, cosmochemistry and geochronology (major/trace element and isotope analyses of crustal and mantle derived magmas, xenoliths, melt inclusions and meteorites using SEM, ICP-MS, TIMS, SIMS, IRMS, XRF, etc. to unravel the origin, evolution and dynamics of the Earth and the Solar System), (2) high-pressure experimental mineral physics (including high-pressure experiments using multi-anvil press, studies of phase equilibrium, electrical conductivity, elasticity and rheological property using X-ray diffraction (XRD), resonance ultrasonic spectroscopy (RUS), impedance spectroscopy (IS), etc.), and (3) magmalogy and crystal chemistry (including high-pressure experiments using DAC/multi-anvil press/piston cylinder/IHPV, and NMR/Raman/IR spectroscopic measurements of minerals, melts (glasses) and fluids). Perspective applicants are encouraged to contact ISEI faculty member(s) for more information. It is hoped that through this program, the participants will acquaint themselves with the state-of-the-art research facilities and activities at ISEI, and gain first-hand scientific research experience. At the conclusion of the program, an intern symposium will be held for all the participants to deliver oral presentations of their work (in English).

4. Eligibility

The program is open to advanced undergraduate (3rd to 4th year) and master's course students majoring in earth sciences, physics, chemistry, materials sciences, or related fields, who have a strong interest in a career of scientific research. Students from either within or outside Japan, regardless of nationality, are eligible to apply. Communication skill in English is required.

5. Date and Period:
July 2 (Thu)-August 11 (Tue), 2009

6. Financial support:
Travel expenses and daily allowance will be fully covered, and accommodation in the Misasa guesthouse will be provided.

7. Number of participants:
About 10.

8. Application procedure:
The application form for the internship program is available from the following website.

http://www.misasa.okayama-u.ac.jp/MISIP/2009/

9. Application deadline:
April 30, 2009 (10 am, JST)

10. Contact information
The application should be sent to:
Yoshiko Nakano
Institute for Study of the Earth's Interior
Okayama University
Misasa, Tottori, 682-0193 Japan
E-mail:misip@ pheasant.misasa.okayama-u.ac.jp
For inquires concerning the intern program, please contact Dr. Katsuyuki Yamashita, the program coordinator (coordinator@pheasant.misasa.okayama-u.ac.jp) or any other ISEI faculty members.

POSITION OPENINGS:

- A Post-doctoral research scientist position in the broad area of experimental petrology / experimental mineral physics is available immediately for a term of two years at the Institut für Geologie, Mineralogie und Geophysik of the Ruhr-Universität Bochum.
- The GEOTOP research centre in geochemistry and geodynamics and the *Département des Sciences de la Terre et de l'atmosphère* of the *Université du Québec à Montréal* (UQAM) invite applications for a tenure-track faculty position for a Canada Research Chair Tier 2 in stable isotope geochemistry
- The hard rock research group at the University of Tromsø, Norway, invites applications for a 3-year PhD position in a new research project "Strength and rheological evolution of the lower continental crust".
- The California Department of Conservation is accepting applications from qualified individuals for the position of Energy and Mineral Resources Engineer (EMRE) for the Divisions of Oil, Gas, and Geothermal Resources.
- Post-doctoral position: Chemical dating of accessory phases - Department of Geography and Geology - University of Copenhagen

Post-doctoral position in experimental Petrology (2 years)

A Post-doctoral research scientist position in the broad area of experimental petrology / experimental mineral physics is available immediately for a term of two years at the Institut für Geologie, Mineralogie und Geophysik of the Ruhr-Universität Bochum. The position is available within the scope of the Interdisciplinary Research Program on Rheology of the crust [Sonderforschungsbereich (SFB) 526 supported by the German Science Foundation (DFG)].

The responsibilities will include performing experiments at high pressures and temperatures and participation in management of the laboratory resources. Skills related to electronic automation of controllers are particularly welcome.

We are equipped with several piston cylinder presses, a Walker type multi-anvil module, and hydrothermal pressure vessels in addition to several high temperature furnaces with controlled atmosphere. Analytical capabilities include an electron microprobe, scanning electron microscopes, cathodoluminescence, white light interference microscopy and accelerator based

methods (e.g. RBS, PIXE) in addition to more routine chemical and crystallographic analytical procedures. Our research in the past has focused on measurement of diffusion coefficients, phase relations and various kinetic processes.

The Ruhr Universität strives to increase the number of women and international scientists and applications from this pool of applicants are particularly welcome. Applications may be directed to

Prof. Sumit Chakraborty (Sumit.Chakraborty@rub.de <mailto:Sumit.Chakraborty@rub.de>)

Institut für Geologie, Mineralogie und Geophysik,

Ruhr Universität Bochum,

Universitätstrasse 150

D-44801 Bochum

Germany

Salary will be in accordance with the TVL-13 pay scale of the German Tarif system. Applications will be received until April 30 or until the position is filled, whichever is later..

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CRC - Stable Isotope Geochemistry

The GEOTOP research centre in geochemistry and geodynamics and the *Département des Sciences de la Terre et de l'atmosphère* of the *Université du Québec à Montréal* (UQAM) invite applications for a tenure-track faculty position for a Canada Research Chair Tier 2 in stable isotope geochemistry. The selected candidate will be presented to the Canada Research Chair Programme (www.chairs.gc.ca). Researchers who have obtained their doctoral degree less than ten years ago at the time of nomination and who are acknowledged by peers as having the potential to become a leader in their field of research are invited to apply.

Selection will be based on (i) the applicant's ability to develop original research programmes in stable isotope geochemistry, as demonstrated by his/her publication and funding records; (ii) his/her interest in the development, in collaboration with other GEOTOP researchers, of new long-term research programmes; (iii) his/her capacity to oversee the training of young researchersof all levels in stable isotope geochemistry and potential interdisciplinary applications. This search is therefore directed to applicants with experience in research and teaching who are willing to develop ambitious research programmes in stable isotope geochemistry (e.g. rare isotopologues). However, all applicants demonstrating an outstanding track record in stable isotope geochemistry (hydrological cycle, climate change, paleoceanography, environmental studies, etc) will be taken into consideration.

GEOTOP (www.geotop.ca) is principally located at UQAM and is an interdisciplinary research network with faculty members from UQAM, McGill University, Concordia University, UQAR, INRS-ETE and Université Laval. GEOTOP facilities include state-of-the-art laboratories in geochemistry of major and trace elements, noble gases, and isotopes (stable, radiogenic, and radioactive), in the analyses of biomarkers, biogenous residues, organo-mineral interfaces, the physical properties of sediments and of the lithosphere, also in geophysics and in numerical modeling.

The successful candidate will hold his/her teaching appointment at the *Département des Sciences de la Terre et de l'atmosphère* of UQAM, and will benefit from a reduced teaching workload (50%) during the first five years of service. A working knowledge of French is an asset. Applications from women and minorities are welcome.

Applications, including a letter outlining the applicant's career objectives, a proposed research programme for the next five years (approx. 5 pages), a detailed curriculum vitae, and the names and email addresses of three referees should be submitted before April 30, 2009. The selected candidate will be invited to prepare a dossier for submission to the Canada Research Chair Programme in autumn 2009. Assumption of duties will begin on June 1st, 2010.

Applications should be sent by email to

Mario Morin (geotop@uqam.ca), Chair of the Selection Committee

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The hard rock research group at the University of Tromsø, Norway, invites applications for a 3-year PhD position in a new research project "Strength and rheological evolution of the lower continental crust". The group comprises 2 structural geologists, 2 petrologists/geochemists, and 3 postdocs. The project includes the study of high temperature natural shear zones in Northern Norway and experimental rock deformation at elevated pressures and temperatures.
The PhD-project will focus on experimental rock deformation on feldspars using solid medium Griggs-apparatus-technology. The analysis of the experimental microstructures will be combined with that of natural examples. We are seeking a highly motivated candidate with experience in one of the following fields: structural geology, deformation and reaction microstructures, deformation processes, mineralogy, petrology, and fluid-rock interaction. In addition, some knowledge or experience in the use of electron beam instruments, like SEM, microprobe, EBSD, etc. are preferred.
The successful applicant will work in an interdisciplinary team of petrologists and structural geologists in Tromsø, together with partner institutions in Switzerland, Germany, Australia, and the USA. The earliest start of the project will be July 1st.
Informal enquiries and/or applications containing a full C.V., names and details of two professional referees should be addressed to **Holger Stunitz** (e-mail: holger.stunitz@uit.no , tel: +47 77 62 31 17).
Evaluation of applications will start **April 15th, 2009** and will continue until the position is filled. There will be an opportunity for interviews at the EGU meeting in Vienna.

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The California Department of Conservation is accepting applications from qualified individuals for the position of Energy and Mineral Resources Engineer (EMRE) for the Divisions of Oil, Gas, and Geothermal Resources.
The Division regulates upstream oil and gas operations throughout the State of California. EMRE's conduct geologic and engineering studies of oil and gas fields and witness various field tests, verifying industry compliance with Division regulations. EMRE positions are located in Cypress, Ventura, Santa Maria, Bakersfield, Coalinga, and Sacramento.

As a California State agency, the department of Conservation, Division of Oil, Gas, and Geothermal Resources offers a stable work environment, competitive salaries, excellent training, opportunities for advancement and comprehensive health, dental, vision, and retirement benefits.

The EMRE is an entry-level position. Typically, minimum qualifications for the position are met with a 4-year degree in geology or petroleum engineering, or a related major. Interested individuals who meet the minimum qualifications as stated on the job announcement bulletin are encouraged to participate in the examination process.

To learn about the Department of Conservation, Division of Oil, Gas, and Geothermal Resources, and to access the examination bulletin, visit our website at www.conservation.ca.gov. You may also visit the State Personnel Board's website at www.spb.ca.gov for other information regarding employment with the State of California, Please contact Michael Ackerman at (916) 322-1015 if you have any questions.

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Post-doctoral position: Chemical dating of accessory phases - Department of Geography and Geology - University of Copenhagen

A two-year post-doctoral position in chemical dating of accessory phases by electron microprobe is offered at the Department of Geography and Geology, University of Copenhagen, Denmark. The project will involve contributing to establishment and testing of the total Pb dating method on the electron microprobe in Copenhagen. The post-doc will apply the technique to a variety of geological problems in particular in collaboration with workers at GEUS (Geological Survey of Denmark and Greenland www.geus.dk) and others from the Geochemistry-Mineralogy research group (more details on ongoing research within the group can be seen on our homepage http://geo.ku.dk/forskning/forskergrupper).

The successful applicant must have a PhD in geoscience, will be highly motivated, creative and innovative with a strong background in geology, a dedicated interest in petrology, mineralogy and/or geochemistry and preferably with considerable experience in using an electron microprobe and/or other similar instruments. Previous experience with chemical dating of accessory phases is an advantage. Salary depends on seniority as regulated between the Ministry of Finance and The Danish Confederation of Professional Associations.

Applications should include a curriculum vitae including documentation for a PhD, list of publications, contact details for three personal references, and a short statement of personal research interests and plans. Further information can be obtained from Dr. Tod Waight (todw@geo.ku.dk).

The University of Copenhagen wishes to reflect the surrounding society and encourage all qualified applicants regardless of background to apply for the position.

Applications should be sent electronically as pdf to job@geo.ku.dk closing date for application is April 14th 2009. Start date for the position is 1st June 2009.

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