

NEWSLETTER OF THE GEOPHYSICAL INSTITUTE

Issue 5, July 2014

Page 1

DEAR GPI ALUMNI

This is the fifth newsletter for our alumni's covering events in the first half of the year 2014 with relevance for GPI. Most people were very engaged in preparing and managing the annual meeting of the Deutsche Geophysikalische Gesellschaft (DGG, www.dgg-2014.de) in March 2014. We used the opportunity to combine the DGG 2014 with the celebration of the institute's 50th birthday. 50 years ago the Geophysical Institute Karlsruhe (GPI) started with the conviction of Stefan Müller that geophysics represents a science with enough potential to merit the establishment of an own institute and a field with enough job opportunities for the students who graduate in geophysics in Karlsruhe. This expectation did materialize in the history of research and education of the past 50 years. Reflecting on the past 50 years we issued a book entitled "50 Years Geophysical Institute Karlsruhe 1964 - 2014 Expectations and Surprises", to which all current and previous senior staff persons contributed their views (<http://www.gpi.kit.edu/download/GPI-50Jahre-Inhalt.pdf>).

I am very grateful to Ms. Kerstin Dick for her editorial work on this newsletter.

Friedemann Wenzel

DGG MEETING

by Thomas Bohlen

Almost 500 participants attended the 74th Annual Meeting of the German Geophysical Society (DGG) from March 10th to 13th, 2014 in Karlsruhe. The scientific program consisted of four plenary presentations, 174 oral presentations in up to five parallel sessions as well as 173 poster presentations. The GPI's organizing committee developed the new concept of main sponsoring and managed to attract 2 exclusive main sponsors (Allianz Global Reinsurance and IGM/Nanometrics). Furthermore, 25 other organizations directly sponsored single events or ordered the different services offered for sponsors. The company exhibition consisted of 19 booths which were occupied by geophysical companies and professional societies. For the first time, the DGG Meeting presented the very successful „Meet and Greet Breakfast“ which brought female students and experienced female geophysicists together for discussions and exchange. Altogether it was a very successful DGG Meeting and the organizing committee especially appreciates the great and solid help of many Bachelor and Master students.

The photo shows the participants of the Meet and Greet Breakfast.



Photo: A. Kurzmann

NEWSLETTER OF THE GEOPHYSICAL INSTITUTE

Issue 5, July 2014

Page 2

PROF. DR. HELMUT WILHELM BECAME HONORARY MEMBER OF DGG

During the 74th Annual Meeting of the German Geophysical Society (DGG) from March 10th to 13th, 2014 in Karlsruhe, Prof. Dr. Helmut Wilhelm was appointed as an honorary member of the Deutsche Geophysikalische Gesellschaft (DGG).

The photo shows Prof. Dr. Wilhelm addressing the audience.



Photo: A. Kurzmann

DR. ALEXANDER GERST arrived on the ISS

By Friedemann Wenzel

Dr. Alexander Gerst, Karlsruhe geophysics alumni and now ESA astronaut, arrived safely at the International Space Station (ISS) on the 29th of May 2014. Alex will stay on the International Space Station for half a year where he can observe our planet from above. He is the 11th German on a space mission. On May 28th, 2014 he took off from Baikonur to ISS where he is the 3rd German. Alexander studied Geophysics in Karlsruhe since 1996 and finalized his Diploma Thesis (in Karlsruhe) and M.Sc. in Wellington on the New Zealand volcano Ruapehu in 2003. He went to Hamburg for his PhD on the dynamics of volcanic eruptions awarded in 2010. We wish Alex a lot of interesting experiments and fun in space.

More on Alexander's mission can be found under:
<http://blogs.esa.int/alexander-gerst/>

Dr. Vladimir Sokolov

By Friedemann Wenzel

Dr. Vladimir Sokolov left GPI in February 2014 in order to take up a position at the Saudi Geological Survey (www.sgs.org.sa/english/) in Jeddah. His responsibility in his new position includes the development of approaches for seismic hazard assessment in Saudi Arabia.

NEWSLETTER OF THE GEOPHYSICAL INSTITUTE

Issue 5, July 2014

Page 3

CAUSAL LOSS ANALYSIS

By Susan Brink

The Causal Loss Analysis project of the Center for Disaster Management and Risk Reduction Technology (CEDIM, www.cedim.de) aims to identify the root causes and key indicators that aggravate disaster losses, focusing on population displacement and shelter demands. This project is a response to the Integrated Research on Disaster Risk (IRDR, www.irdrinternational.org) which called for Forensic investigations of Disasters (FORIN) in order to increase understanding of the underlying causes of disaster. The leading scientist of the project is Dr. Susan Brink, who joined KIT in 2013, after having finalized her PhD at the University of Delaware. Using the methodology developed in Daniell (in press), it is possible to generate a socio-economic fragility function that gives an understanding of a 'normal' impact in an event. The Causal Loss Analysis project involves a forensic investigation of case study disasters to understand why they differ from the expected population displacement and shelter demand. Khazai et al. provides a model to show some influences that drive shelter demand including physical damage, but also other factors such as weather, utility outages, risk perception and shelter access (2014). The causal loss analysis project studies these influences, as well as those found in other literature in order to determine the aggravating factors in each case study. Ultimately the project aims to lead to a deeper understanding of the causes of population displacement and how these interact.

References:

Daniell, J. (in press). "The development of socio-economic fragility functions for use in worldwide rapid earthquake loss estimation procedures." Karlsruhe Institute of Technology.

Khazai, B., Daniell, J. E., Duzgun, S., Kunz-Plapp, T., Wenzel, F. (2014). "Framework for Systemic Socio-economic Vulnerability and Loss Assessment" in K. Pitilakis, P. Franchin, B. Khazai, H. Wenzel (Ed.), SYNER-G: Systemic Seismic Vulnerability and Risk Assessment of Complex Urban, Utility, Lifeline Systems and Critical Facilities (pp.89-131), Geotechnical, Geological and Earthquake Engineering (Vol 31), Springer, Dordrecht. ISBN 9401788340.

Susan Brink

traveled to the Philippines on 04-06 June 2014 for the ASEM Manila Conference on Disaster Risk Reduction and Management. As a conference delegate, she toured some of the areas that were hardest hit by Typhoon Haiyan in November 2013. Although many people are still in temporary shelter, she is pictured here with one of the first families to receive permanent housing in a safe zone away from the storm surge risk.

The CEDIM Forensic Disaster Analysis of Haiyan can be downloaded from www.cedim.de/download/CEDIM_FDA_Haiyan_Rep2.pdf.



Photo: S. Brink

NEWSLETTER OF THE GEOPHYSICAL INSTITUTE

Issue 5, July 2014

Page 4

SCANarray – LITHOS-CAPP

By Joachim Ritter

This summer the seismology group gets involved in an experiment in Scandinavia. The SCANarray passive broadband experiment is an international effort to reveal the crustal and upper mantle structure in northern Scandinavia. About 100 mobile and 30 permanent broadband instruments will continuously monitor local and world-wide seismicity for 2-3 years. Partners are from Sweden (Uppsala), Norway (Oslo, Trondheim, Kjeller), Denmark (Copenhagen, Aarhus) and the UK (Leicester). The German contribution is a cooperation between GPI (J. Ritter) and GFZ Potsdam (F. Tilmann) which is funded by DFG under the project name LITHOS-CAPP (LITHOspheric Structure of Caledonian, Archaean and Proterozoic Provinces). We will deploy 20 broadband stations from the pool in Potsdam and continue to study deep anisotropic structures in the lithosphere and asthenosphere. Michael Grund, a recently graduated M.Sc., will work at GPI for the project.

EGU SPECIAL SESSION

By Susan Brink

At the European Geosciences Union General Assembly (www.egu2014.eu/), a session “Forensic Disaster Analyses – Learning from Disasters” was led by colleagues from the GPI affiliated Center for Disaster Management and Risk Reduction Technology (CEDIM). As part of this session, members of GPI contributed to 3 oral presentations and 5 poster presentations. These presentations focused on techniques and case studies within the CEDIM Near Real Time Forensic Disaster Analysis project in which GPI members are leading contributors.

Oral:

- The Central European Flood in June 2013: Experiences from a Near-Real Time Disaster Analysis in Germany: Kai Schröter, Bijan Khazai, Bernhard Mühr, Florian Elmer, Tina Bessel, Stella Möhrle, André Dittrich, Heidi Kreibich, Joachim Fohringer, Tina Kunz-Plapp, Werner Trieselmann, Michael Kunz, and Bruno Merz
- A comparison of socio-economic loss analysis from the 2013 Haiyan Typhoon and Bohol Earthquake events in the Philippines in near real-time, James Daniell, Bernhard Mühr, Tina Kunz-Plapp, Susan A. Brink, Michael Kunz, Bijan Khazai, and Friedemann Wenzel
- Information Gap Analysis: near real-time evaluation of disaster response, Trevor Girard

Poster:

- Forensic Disaster Analysis in Near-real Time, Michael Kunz, Jochen Zschau, Friedemann Wenzel, Bijan Khazai, Tina Kunz-Plapp, and Werner Trieselmann
- The near real time Forensic Disaster Analysis of the central European flood in June 2013 - A graphical representation of the main results, Kai Schröter, Florian Elmer, Werner Trieselmann, Heidi Kreibich, Michael Kunz, Bijan Khazai, Doris Dransch, Friedemann Wenzel, Jochen Zschau, Bruno Merz, Bernhard Mühr, Tina Kunz-Plapp, Stella Möhrle, Tina Bessel, and Joachim Fohringer
- Analysis of the Potential Resilience and Preparedness of Districts affected by the June 2013 Flood in Germany, Bijan Khazai, Anna Benkler, Tina Bessel, Stella Möhrle, and Kai Schröter
- Near real time Forensic Disaster Analysis of the central European flood in June 2013 in Germany: Impact and management, Bijan Khazai, Tina Bessel, Stella Möhrle, André Dittrich, Kai Schröter, Bernhard Mühr, Florian Elmer, Tina Kunz-Plapp, Werner Trieselmann, and Michael Kunz
- Development of fragility functions to estimate homelessness after an earthquake, Susan A. Brink, James Daniell, Bijan Khazai, and Friedemann Wenzel

NEWSLETTER OF THE GEOPHYSICAL INSTITUTE

Issue 5, July 2014

Page 5

WORKSHOP ON "MICROSEISMIC MONITORING"

By Andreas Barth

On March 14th, one day after the DGG Annual Meeting the EAGE and DGG held a workshop on "Microseismic Monitoring" in Karlsruhe, which was locally organized by the GPI. The scientific committee consisted of Prof. Manfred Joswig (University of Stuttgart), Dr. Ralf Fritschen (DMT, Essen) and Dr. Andreas Barth (GPI) who presented ten invited speakers to 61 international participants. Recent studies and reviews were presented on improving monitoring sensitivity and resolution, as well as strategies for preventing seismic hazard by induced seismicity. Extended abstracts may be accessed via <http://www.earthdoc.org/publication/search/?pubedition=385>.

GPI CONTRIBUTES TO THE HELMHOLTZ EARTH SYSTEM KNOWLEDGE PLATFORM ESKP

By Tina Kunz-Plapp

In May 2014, the new online platform "Earth System Knowledge Platform ESKP" has been launched. On www.eskp.de the eight Centers of the Helmholtz-Association in the Field of Earth and Environment provide the public with information on recent research activities' results and articles with solid basic knowledge in the three fields of (1) natural hazards, (2) climate change and (3) pollutants. Together with colleagues of the Institute of Meteorology and Climate Research at KIT, the GPI is responsible for contributions to ESKP in the field of natural hazards. Latest articles by GPI members on ESKP are focused on urbanization and increased disaster risk and on loss assessments after the Bohol earthquake and the Typhoon Haiyan in November 2013 carried out in the Center of Disaster Management and Risk Reduction Technology CEDIM. Within ESKP, GPI has additionally initialized dialogues with relevant stakeholders to learn more about their needs and to tailor the near-real-time disaster analyses of CEDIM better according to their needs. Currently Dr. Tina Kunz-Plapp and Dr. Bijan Khazai are working for ESKP at GPI.

GUESTS HOSTED BY GPI

Dr. Kapil Mohan

DAAD funds a 2 year research and exchange project with the Institute of Seismological Research (ISR, www.isr.Gujarat.gov.in/) in the Indian State of Gujarat on seismic hazard assessment. In the context of this project Dr. Kapil Mohan visited GPI between May 15th and June 15th, 2014 in order to develop ground motion prediction equations for the large magnitude Khachchh earthquakes. During his work period we could also welcome Dr. Bal Rastogi, the director of ISR for 3 days in order to discuss future research opportunities for both institutions, aiming specifically at risk quantification.

Prof. Dr. Katsu Goda

Prof. Katsu Goda spends his second term of Humboldt Scholarship since May 1st, 2014 at GPI. He will stay until end of August 2014. Main research topics are loss of tsunami after earthquake focussing on the wealth of data from the March 2011 Tohoku earthquake. Prof. Goda uses the same Tohoku data base to address the question of aftershock loss potential from observed main shock – ground motion observations. He co-supervises two M.Sc. thesis dealing with ground motion correlation in Japan and the Istanbul area.

FEEDBACK

If you have any comments, questions or remarks, please do not hesitate to contact us. We appreciate your feedback.

NEWSLETTER OF THE GEOPHYSICAL INSTITUTE

Issue 5, July 2014

Page 6

PHD DEFENSES

In the first part of 2014 there have been 3 PhD defenses at GPI:

Dr. James Daniell

Title: The development of socio-economic fragility functions for use in worldwide rapid earthquake loss estimation procedures

Supervisors: Prof. Dr. Friedemann Wenzel (KIT),
Prof. Dr. Kay Mitusch (KIT)

In February 2014 Mr. James Daniel defended successfully his PhD thesis.

In his thesis, he combined geophysical, engineering, and socio-economic analysis in order to produce a software package containing a set of functions to accurately determine the economic loss and number of fatalities from a damaging earthquake anywhere within the world, within the minutes and hours after an event.

Dr. Sven Heider

Title: 2D Elastic Full-Waveform Tomography of Vibro-Seismic Data in Crystalline Host Rock at the GFZ-Underground-Lab, Freiberg

Supervisors: Prof. Dr. Thomas Bohlen (KIT),
Prof. Dr. Friedemann Wenzel (KIT)

In July 2014 Mr. Sven Heider defended successfully his PhD thesis.

The main focus in this work was the application of full waveform inversion (FWI) on a field dataset acquired at the GFZ-Underground Laboratory in the Reiche Zeche mine, Freiberg. He investigated the influence of the pre-processing of the field dataset of the inversion results with synthetic tests. Finally, he showed a successful application of a 2D elastic FWI to the field data.

Dr. Martin Schäfer

Title: Application of full-waveform inversion to shallow-seismic Rayleigh waves on 2D structures

Supervisors: Prof. Dr. Thomas Bohlen (KIT),
Dr. Thomas Forbriger (KIT) and
Prof. Dr. Wolfgang Rabbel (CAU)

In July 2014 Mr. Martin Schäfer defended successfully his PhD thesis.

The main objective of his work was the application of 2D elastic full-waveform inversion (FWI) to recorded shallow-seismic Rayleigh waves on 2D structures. During his thesis he focused on methodological improvements in preparation for shallow-seismic applications, investigations of line-source implementation in order to consider 3D wave propagation effects in a 2D FWI and applications to field data recorded at the southern rim of the Taunus which is a significantly 2D-heterogeneous structure.

New alumni e-mail address

Please note that
the new alumni
e-mail address is
as follows:

gpi-alumni@lists.kit.edu

NEWSLETTER OF THE GEOPHYSICAL INSTITUTE

Issue 5, July 2014

Page 7

RECENT PUBLICATIONS

In this section we would like to inform those of you who are still active in Geophysics about recently published peer-reviewed journal papers authored by current members of GPI:

- Barth, A.:** Significant release of shear energy of the North Korean nuclear test on February 12, 2013 J. Seismol., 2014, Volume 18, 605-615. DOI:10.1007/s10950-014-94
- Khazai, B., T. Kunz-Plapp, C. Büscher, A. Wegner,** 2014: VuWiki: An ontology-based semantic wiki for vulnerability assessments, International Journal of Disasters Risk Science 5: 55–73, doi: 10.1007/s13753-014-0010-9
- Ritter, J.R.R.,** 2014. Experimental Seismology in Karlsruhe: Passive Field Experiments and Their Main Results. In: Prodehl, C. (ed.) 50 Years Geophysical Institute Karlsruhe, Expectations and Surprises, KIT-GPI (Publ.), 229-265.
- Gottschämmer, E., Bohlen, T., Forbriger, T., Knopf, P., Ritter, J. and Wenzel, F.,** 2014. The Geophysical Institute (GPI) today. In: Prodehl, C. (ed.) 50 Years Geophysical Institute Karlsruhe, Expectations and Surprises, KIT-GPI (Publ.), 321-332.
- Forbriger, T., Groos L., Schäfer, M.:** 2014. Line-source simulation for shallow-seismic data. Part 1: theoretical background. Geophys. J. Int., 198(3), 1387-1404. (doi: 10.1093/gji/ggu199)
- Schäfer, M., Groos, L., Forbriger, T., Bohlen, T.:** 2014. Line-source simulation for shallow-seismic data. Part 2: full-waveform inversion — a synthetic 2-D case study Geophys. J. Int., 198(3), 1405-1418. (doi: 10.1093/gji/ggu171)

PROF. DR. PETER HUBRAL

Prof. Dr. P. Hubral, emeritus of GPI, has published a book entitled:

The Sokrates Code: Rediscovering the long lost Secrets of Ancient Philosophy with Tai Chi

Peter Hubral analyses the remarkable equivalence between the philosophy of Laotsi and Sokrates.

The book can be ordered at: <http://www.amazon.com/dp/B00LJ2TE6E>