

NEWSLETTER OF THE GEOPHYSICAL INSTITUTE

Issue 9, July 2016

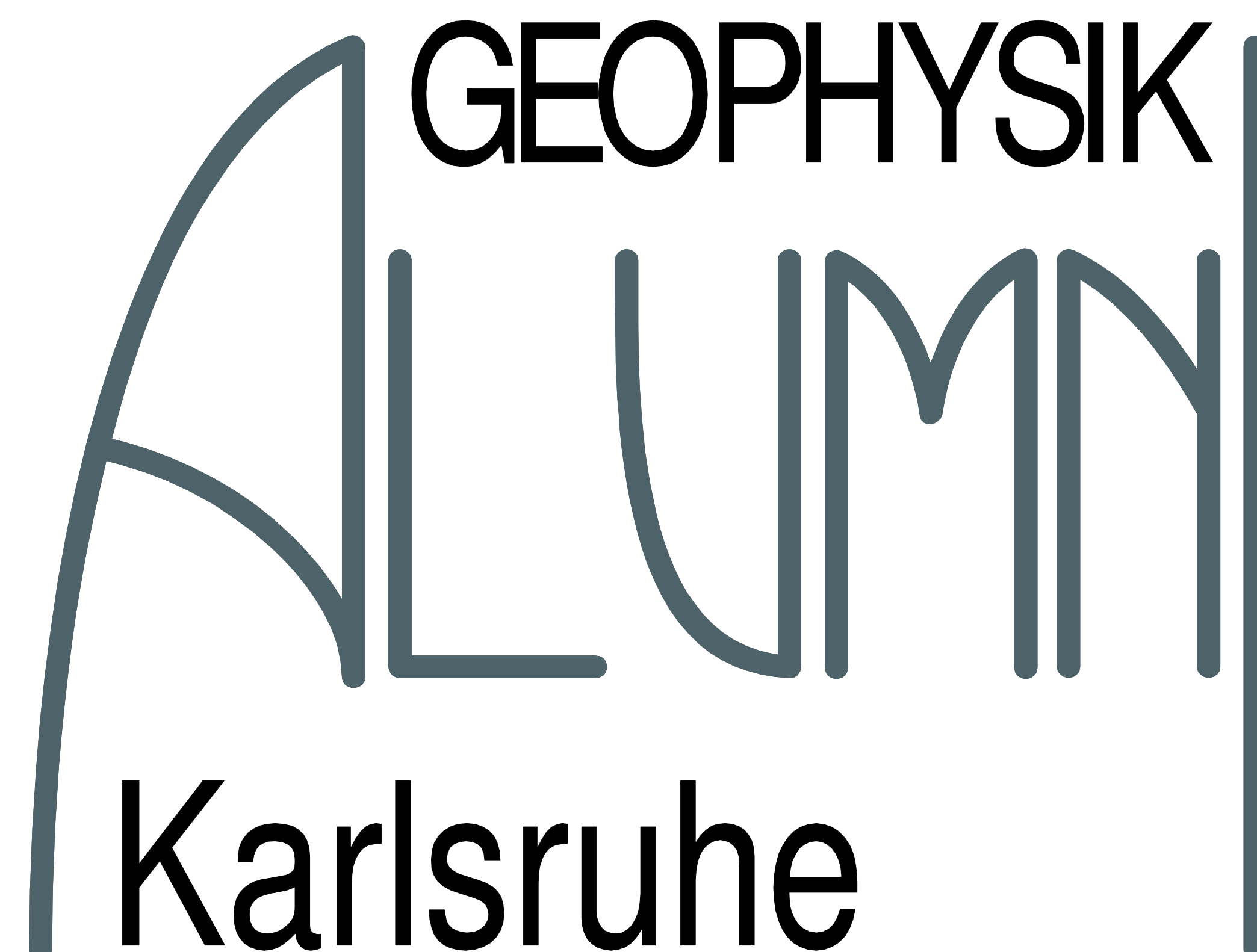
Page 1

DEAR GPI ALUMNI

This is the last Alumni Letter for which I am responsible. I will retire on September 30, 2016 and discontinue this kind of activities. As this is 'my' last letter it contains unproportioned much information on my working group (hazard and risk) and on the seismology group. After many years of work in this field, after many projects starting initially with the DFG (German Science Foundation) funded Collaborative Research Center on Strong Earthquakes (1996 to 2007), many PhDs, and many publications, we (James Daniell, Bijan Khazai, Andreas Schäfer, Friedemann Wenzel) decided to continue our work in the field of analysis and management of catastrophe risk in the frame of a commercial company. We established risklayer (<http://risklayer.com/>) in 2015 and currently focus on projects related to risk modelling, rapid loss, analysis, disaster risk management and disaster recovery.

I want to use this opportunity to express my gratitude to the students, who came to Karlsruhe, to my colleagues (in science, administration, and computing) at KIT, to the many international guests we could host, and to my collaborators in Europe, Asia, Australia, and the Americas. All of them created the environment and the conditions, within which I could develop my ideas, enrich my understanding of science and different cultures, and live a happy life.

Friedemann Wenzel



TEACHING

By Ellen Gottschämmer

A grant of the Ministry of Science, Research and Art of the State of Baden-Württemberg allows the Geophysical Institute to expand the Geophysics Master's degree course: Additional teaching staff can be financed for the next 3 years in the framework of the 'Master 2016' program. The GPI proposal to further develop the in-situ teaching concept and integrate it into the Master's degree course convinced the Ministry. Additional funding from the Ministry could be secured for the development of an interactive convergence course that aims at students who hold a Bachelor's degree in physics or mathematics and enroll in the MSc Geophysics course.

GPI will participate in the EUCOR (www.eucor-uni.org/en) program 'European Campus' intended to help students prepare for the European job market. Students will be able to take lectures and participate in exercises and field trips organized by the EUCOR universities (Basel, Strasbourg, Haute-Alsace, Freiburg, Karlsruhe). First ideas for cooperation have been developed with faculty members of L'École et Observatoire des Sciences de la Terre (EOST) of Strasbourg University and GPI.

NEWSLETTER OF THE GEOPHYSICAL INSTITUTE

Issue 9, July 2016

Page 2

KIT-PRICE 2016 FOR EXCELLENCY IN TEACHING AWARDED TO GPI

By Ellen Gottschämmer

The Presidential Committee of KIT, on a proposal from the Faculty of Physics, awarded Dr. Ellen Gottschämmer and PD Dr. Joachim Ritter again with the faculty's Teaching Award 2016 acknowledging their concept of in-situ-courses. The award is endowed with 10.000 €. It will be used for further improvement of courses, lab equipment, and teaching. The certificate was presented during KIT's annual celebration on May 14, 2016. The Geophysical Institute received this price for the third time after 2010 and 2012.

More information on the in-situ-courses is available at: <http://www.gpi.kit.edu/1138.php>



Foto: KIT

NEWS FROM KABBA (Karlsruhe BroadBand Array)

By Joachim Ritter

With the help of a grant by the Federal Ministry of Economic Affairs and Energy we could purchase seven new broadband seismic stations. KABBA now consists of 50 stations. KABBA was only possible through initial funding to Friedemann Wenzel. KABBA data can be freely downloaded from the KABBA waveform data center at <http://gpikabba.gpi.kit.edu/>.

NEWSLETTER OF THE GEOPHYSICAL INSTITUTE

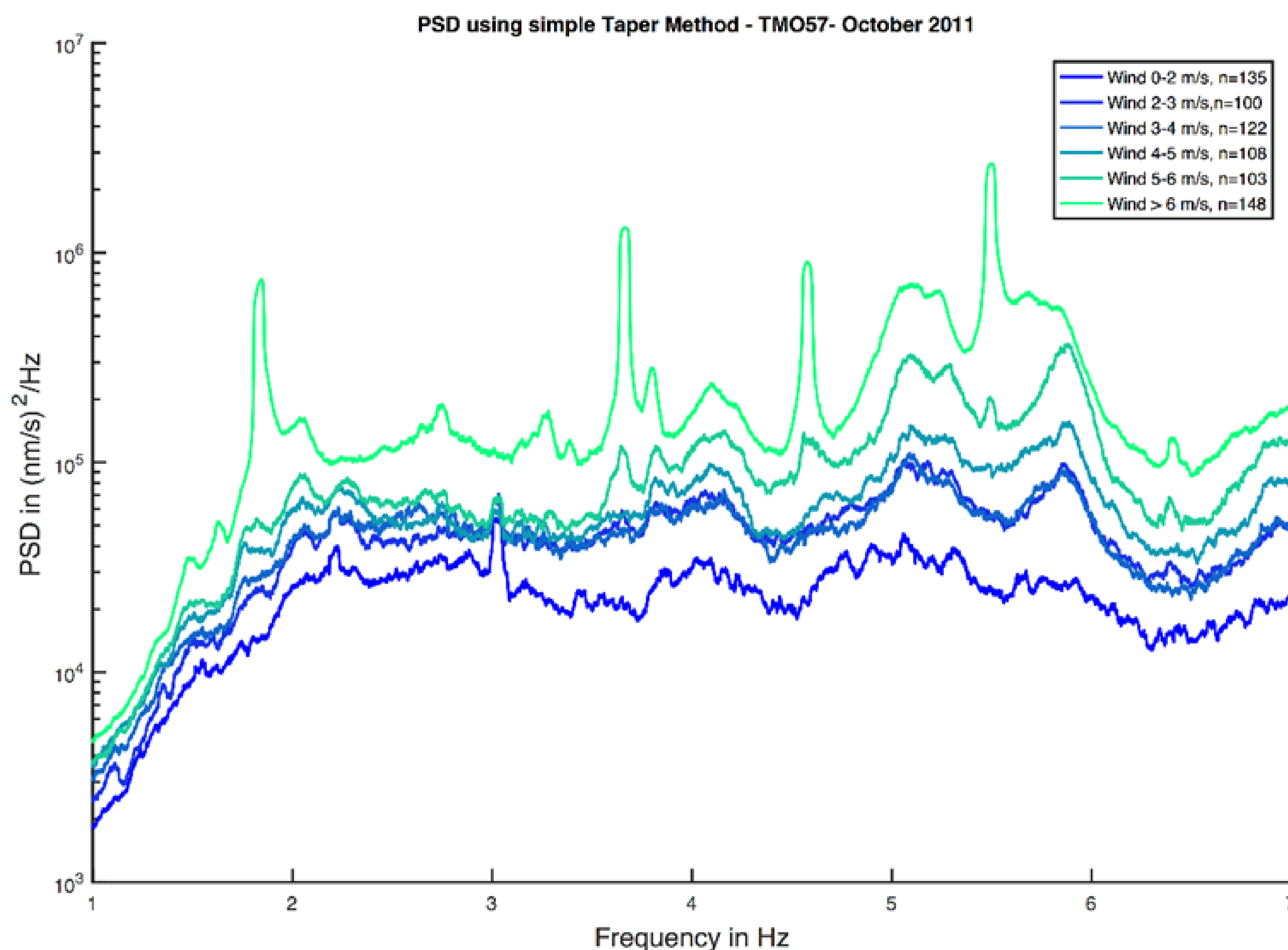
Issue 9, July 2016

Page 3

TECHNICAL SIGNALS AND THEIR ANALYSIS USING SEISMOLOGICAL RECORDINGS

By Joachim Ritter

The continuous broadband recordings of the ground motion allow us to study different kinds of signals even beyond traditional earthquake waves. E.g. Grund et al. (see Recent Publications) analyzed the emissions from the operation of the tunnel drilling underneath the Kaiserstrasse in Karlsruhe. In a new project called TremAc, Toni Zieger and Joachim Ritter take a look at ground shaking emissions from wind mills. Although there are still few reports by residents about disturbing ground shaking from wind mills, this aspect may gain more attention because more and larger wind mills will be installed in the future. Currently mainly seismological recordings are affected by wind mills (see figure): The emissions appear as ground motions with distinct frequencies and thus impair seismic detection. This problem was already identified at our observatory in Schiltach. There the protection radius against wind mills was just enlarged from 3 km to 5 km. Other examples are problems at the Gräfenberg Array and at several recording stations of state earthquake services. The TremAc project will study the propagation of wind mill induced signals for different underground properties, wind mill types and weather situations. Other partners in TremAc concentrate on infrasound emissions, engineering aspects and impact on residents.



Power spectrum of seismic recordings close to wind mills in the Upper Rhine Graben, station TMO57 (Bellheim). The peaks at discrete frequencies are generated by the rotating blades of wind mills. Note the increase in power spectral density with increase in wind velocity (blue to green); n is the number of stacked spectra determined from one hour long time windows in October 2011 (T. Zieger, KIT-GPI)

NEWSLETTER OF THE GEOPHYSICAL INSTITUTE

Issue 9, July 2016

Page 4

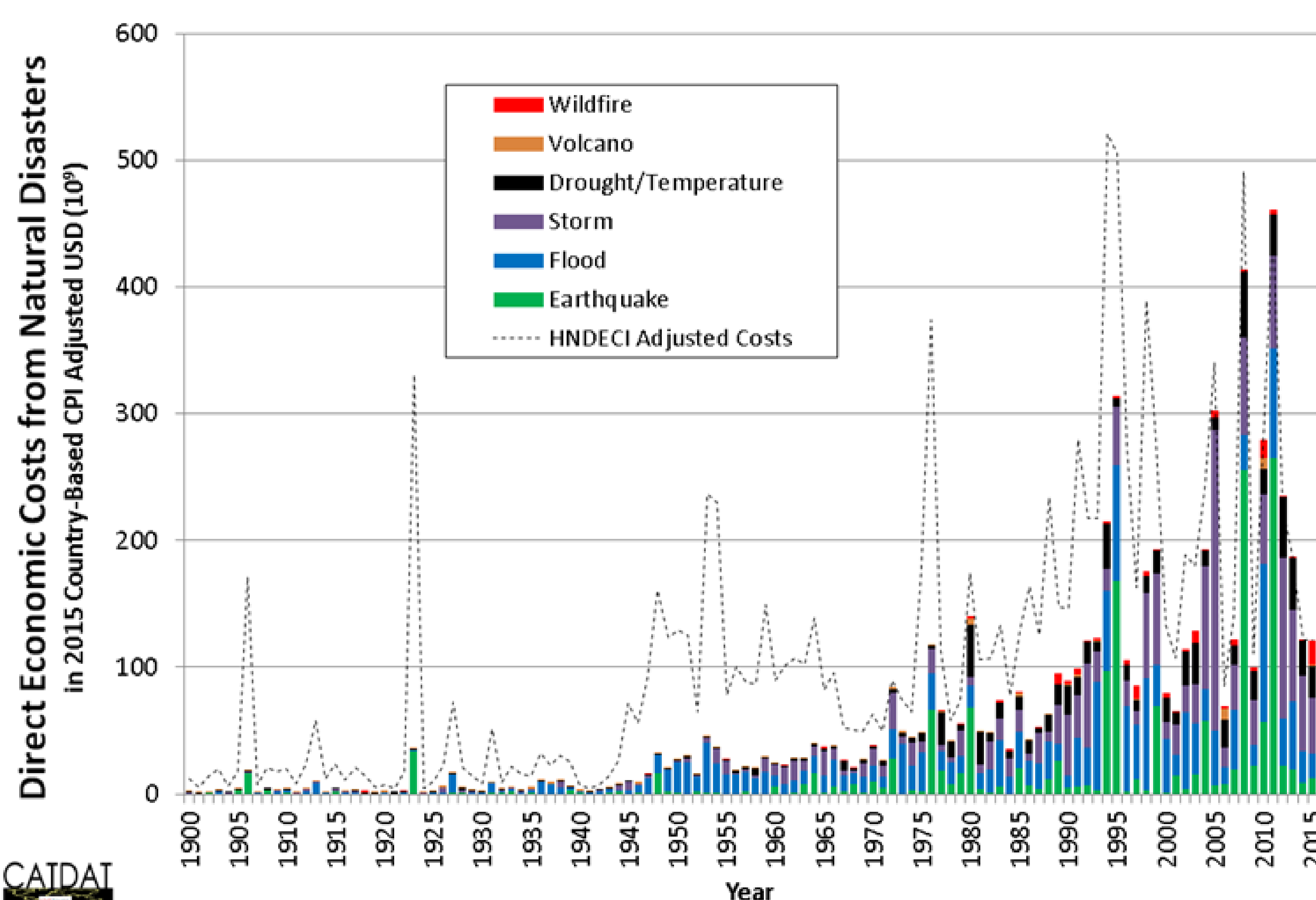
DISASTER DATABASE GOES GLOBAL AT THE ECU GENERAL ASSEMBLY

By James Daniell

Often, in the news, we are used to seeing disaster statistics reported as isolated figures, placed into context by the tragic human cost of floods, earthquakes and drought. At the European Geosciences Union (EGU) General Assembly in April 2016, I presented the full CATDAT Database including all natural perils for the first time globally. Over 50,000 events make up the database with at least 34,000 damaging events since 1900 sourced from over 90 languages. Up to \$7 trillion worth of economic losses have occurred globally since 1900. This value was revealed by comparing economic costs for various natural disasters including floods, earthquakes, volcanoes, storms and drought using a collection of socio-economic indicators called the CATDAT Damaging Natural Disaster database. Of this \$7 trillion, the majority of financial costs have been from flooding disasters, which accounted for around 40% of losses. Since the 1960's, however, this trend has started to shift, with storms and storm surges accounting for 30% of the losses. In terms of fatalities (8 million+ deaths globally since 1900), earthquakes have caused the highest percentage since 1950. By combining the data for disasters reported between 1900 and 2015, interesting trends in vulnerability across the globe are revealed. Although absolute losses are increasing, relative losses proportionate to the global economy seem to be quite constant or even decreasing depending on the peril looked at. In terms of fatalities these are reasonably constant versus the global death rate, with a decrease versus the global population. In the 2 weeks following the EGU, over 800 newspaper articles, TV spots, science reports in over 40 languages in 70+ countries reported upon the article.

<http://www.spiegel.de/wissenschaft/natur/acht-millionen-tote-durch-naturkatastrophen-seit-1900-a-1087842.html>

<http://www.bbc.com/news/science-environment-36078527>



Economic Costs 1900-2015: Flood, Earthquake and Storm have caused the highest losses
Dr.-Ing. James Daniell, Geophysical Institute, KIT.

NEWSLETTER OF THE GEOPHYSICAL INSTITUTE

Issue 9, July 2016

Page 5

NEPAL EARTHQUAKES

By Trevor Girard

The Center for Disaster Management and Risk Reduction Technology (CEDIM) responded to the April 2015 Nepal Earthquakes with a team of researchers producing valuable reports within days and weeks of the disaster and executing two separate field investigations within months. In April of 2016, one year after the devastation, CEDIM again sent a small team of researchers to Nepal. The team, consisting of Prof. Dr. Sebnem Düzgün, Dr. Bijan Khazai, and PhD candidate Trevor Girard, presented the results of their research at the International Conference on Earthquake Engineering and Post Disaster Reconstruction Planning in Bhaktapur, Nepal. The team presented research findings on the assessment of critical infrastructure vulnerabilities using a conceptual framework for earthquake triggered landslides, emergent issues and vulnerability factors in temporary shelters, and the communication behavior of the earthquake affected communities and local government, respectively. The team also revisited eight of the most affected districts to conduct further interviews with government officials, police, radio stations, journalists, and local businesses. The team was again joined by Utsav Upreti and Shyam Thapa from AAROH, an experienced Nepali NGO, who conducted and translated the interviews and provided invaluable logistical support.



Caption: the research team from left: Trevor Girard, Prof. Dr. Sebnem Düzgün, Utsav Upreti, Dr. Bijan Khazai, Shyam Thapa
Photo: T. Girard



Photo: S. Düzgün

NEWSLETTER OF THE GEOPHYSICAL INSTITUTE

Issue 9, July 2016

Page 6

HOTEL RESILIENT INITIATIVE

By Bijan Khazai

Many hotels do not have the systems and processes in place to reduce their risk to disasters, be prepared if and when they occur or continue their business operations. To improve climate and disaster risk management and to strengthen resilience in hotels and throughout destinations, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH within the framework of the Global Initiative on Disaster Risk Management (GIDRM) has initiated the Hotel Resilient Initiative in collaboration with the United Nations Office for Disaster Risk Reduction Asia and Pacific (UNISDR) and the Pacific Asia Travel Association (PATA).

Building on strong partnerships with the respective governmental agencies for tourism and disaster risk management, tourism and hotel associations, hotels and resorts, the Hotel Resilient Initiative in close cooperation with the Karlsruhe Institute of Technology (KIT) Center for Disaster Management and Risk Reduction Technology (CEDIM) and its partners (Bournemouth University, University of Queensland, Griffith University, Risklayer GmbH and TwoEco Inc.) aims to develop a multi-hazard risk management standards to create standardized approaches and market value in the tourism sector.



Bellevue Resort in Bohol, Philippines
Photo: B. Khazai

Dr. Bijan Khazai is coordinating the international consortium of universities and private sector partners and overseeing the development of the standards. The standards will assist hotels and resorts in reducing business risk and the risk of tourists to natural and technological hazards, while demonstrating the level of preparedness and safety of their premises to potential clients, wholesalers, tour operators, insurers and financiers. The draft standards have four elements: hazard risk, and the robustness of buildings, safety systems and crisis management respectively. Once adapted through a certification process, hotels and resorts would gain credits for basic resilience measures. Additional credits would be awarded for a more exemplary approach.

An initial validation workshop of the draft multi-hazard risk management standard will take place on August 2nd in Cebu, Philippines involving the private and public sector of pre-selected at-risk tourism destinations in Bohol, Cebu and Bantayan in the Philippines.

NEWSLETTER OF THE GEOPHYSICAL INSTITUTE

Issue 9, July 2016

Page 7

GUESTS AT GPI

By Friedemann Wenzel

Mr. Ahmed Zemmar

After his first visit in 2014 Mr. Zemmar joined the Hazard and Risk Group of GPI again in April 2016 for five weeks with a scholarship of his home university: University of Chlef (Hassiba Ben Bouali), Algeria. He is an architect with a magister degree in urban planning and prepares a doctorate in urban planning at the University of Biskra (Mohamed Khider), Algeria. His work focusses on an indicator system for the evaluation of seismic risk and its induced effects for Algerian cities. It aims to the identification of indicators able to allow the assessment of vulnerability to seismic hazard and the identification of the factors that contribute in its increase. Mr. Zemmar holds a Magister degree in urban planning from the Faculty of Architecture and Civil Engineering, University Hassiba Ben Bouali - Chlef, Algeria.

He interacted with scientists of the Geophysical Institute, CEDIM (www.cedim.de) and the KIT Climate and Environmental Center (www.klima.umwelt.kit.edu/english/).

Dr. Fouzi Bellalem

Dr. Bellalem stayed at GPI for one week in May. He holds a PhD in Geophysics and is affiliated with the Centre de Recherche en Astronomie, Astrophysique et Géophysique in Algiers, Algeria. He is currently working on risk Assessment for the city of Blida province using SELENA open source software. He interacted with scientists of GPI and CEDIM (www.cedim.de)

Dr. Tsang Hing-Ho

Dr. Hing-Ho is a senior lecturer at Swinburne University in Melbourne, Australia. He stayed at GPI for a research visit from June 11 to July 17. He is a structural engineer who graduated from University of Hong Kong and developed his research focus on earthquake loss analysis.

Dr. Hing-Ho is working with the hazard and risk group of GPI on residual fatality risk of earthquakes and loss modelling. He co-supervises a MSc thesis on residual risk modelling and provided 5 lectures in the MSc course on Engineering Geophysics on Earthquake Engineering during his stay at GPI.

PH.D. DEFENCE

Dr. Friederike Lott

In July 2016 Ms. Friederike Lott successfully defended her PhD thesis.

Title: "Wind Systems in the Dead Sea Region and Footprints in Seismic Records"

Supervisors: Prof. Dr. Ch. Kottmeier (KIT Institute of Meteorology and Climate Research)
PD Dr. J. R.R. Ritter (KIT)

NEWSLETTER OF THE GEOPHYSICAL INSTITUTE

Issue 9, July 2016

Page 8

NEW PH.D. STUDENT AT GPI

By Joachim Ritter

M.Sc. Toni Zieger started his PhD work on ground motion properties due to wind mills.

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.: Location and source mechanism of the Karlsruhe earthquake of 24 September 2014
Journal of Seismology, 20 (3), 865-874. doi:10.1007/s10950-016-9563-y, 2016.

Hing-Ho, T., **Wenzel, F.:** Setting structural safety requirement for controlling earthquake mortality risk, Safety Science 86, pp 174-183, 2016.

Wagener, Th., Goda, K., Erdik, M., **Daniell, J.** and **Wenzel, F.:** A Spatial Correlation Model of Peak Ground Acceleration and Response Spectra Based on Data of the Istanbul Earthquake Rapid Response and Early Warning System, Soil Dynamics and Earthquake Engineering, in print, 2016.

Ali, S.M., **Barth, A.,** Mostafa, T., **Wenzel, F.:** Analysis of the similar epicenter earthquakes on 22 January 2013 and 01 June 2013, Central Gulf of Suez, Egypt; Journal of African Earth Sciences 121, 274-285, 2016.

Lott, F., Al-Qaryouti, M., Corsmeier, U. and **Ritter, J.R.R.:** Dead Sea Seismic Array, Jordan for DESERVE Project (Feb. 2014 - Feb. 2015). Scientific Technical Report, STR16/01, GFZ Potsdam, DOI: <http://doi.org/10.2312/GFZ.b103-16011>, 11 pp., 2016

Ritter, J.R.R.: Von Menschen gemachte Erdbeben - Induzierte Seismizität. Physik in unserer Zeit, 47, 1, 28–32, online: <http://onlinelibrary.wiley.com/doi/10.1002/piuz.201601409/abstract>, 2016

Grund, M., Ritter, J.R.R. and Gehrig, M.: Ground motion relations while TBM drilling in unconsolidated sediments, Rock Mechanics and Rock Engineering, 49, 1773-1787, DOI, 10.1007/s00603-015-0887-7, 2016.

Kunz-Plapp, T., J. Hackenbruch, J.W. Schipper: Factors of subjective heat stress of urban citizens in contexts of everyday life, Natural Hazards and Earth Systems Sciences, 16, 977-994, doi:10.5194/nhess-16-977-2016, 2016.

Feedback

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