

COURSE FEES

Registration deposit	50 €
Students*	20 €
External	40 €

*Including PhD students. Employees and students of the University of Potsdam are exempted from the fee

REGISTRATION (max. 20 participants)

Write an e-mail to:
wichura@geo.uni-potsdam.de

and submit the 50 € deposit on the following

Bank account:

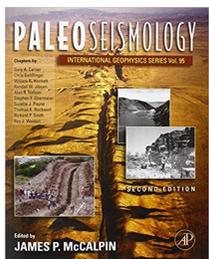
Henry Wichura

IBAN. DE44100500002154217748

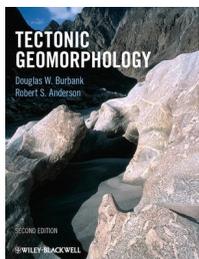
BIC. BELADEVXXX

Purpose. Earthquake Cycle *your name*

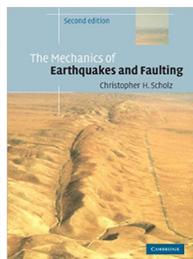
TEXTBOOKS



McCalpin



Burbank &
Anderson



Scholz

SOFTWARE REQUIREMENTS

MATLAB

CloudCompare (free version)

AGIsoft photoscan (free version)

ORGANIZER

“StRATEGy” Coordination Office

Dr. Henry Wichura

University of Potsdam

Institute of Earth and Environmental Sciences

Karl-Liebknecht-Str. 24/25, House 29

D-14476 Potsdam-Golm

Tel. +49/331 977 5791

E-mail. wichura@geo.uni-potsdam.de

Webpage. <http://www.irtg-strategy.de>

LECTURER

Olaf Zielke, PhD

KAUST, Saudi Arabia

Olaf Zielke is senior research scientist since 2012 at King Abdullah University of Science and Technology (KAUST, Saudi Arabia) in the Computational Earthquake Seismology (CES) group. He earned the PhD in Geosciences in 2009 at Arizona State University and carried out post-doctoral work at GFZ Potsdam. He is specializing earthquake studies (active crustal deformation) investigating the rupture characteristics of individual earthquakes and the recurrence of earthquakes in a range of tectonic and climatic environments by employing high-resolution topographic data and paleoseismic excavations. Additionally, he utilizes computational methods (multi-cycle rupture simulations) to investigate a fault system's behavior for given sets of initial and boundary conditions. The overall goal is to identify patterns in earthquake occurrence – if they exist – in relation to primary geologic parameters such as fault geometry, fault slip rates, and fault system complexity.

Active Tectonics & the Earthquake Cycle

October 9-11, 2017

9am - 5pm

O. Zielke

COURSE OBJECTIVES

Earthquakes represent the increments by which the motion of tectonic plates is accommodated. Knowledge of the physical processes and interactions that control the size and recurrence characteristics of those strain-releasing events will enable better informed models of plate motion and the underlying driving forces. The recurrence of earthquakes, especially of large and surface rupturing ones, is also important for well informed seismic hazard assessments. Surface and shallow sub-surface data (topography and stratigraphy) are commonly used to constrain occurrence of past surface-rupturing earthquakes, following the assumption that the observed past behavior of a fault is representative for its future seismic behavior. Based on this assumption a range of earthquake recurrence models have been formulated in the past. Recently, the growing amount of high-resolution data (along with laboratory and numerical experiments as well as theoretical analysis) has helped to further inform those models.

Within the course we will provide an overview of the current understanding of earthquake rupture and its recurrence. We will introduce techniques that are used to identify past earthquake ruptures and how they are used to reconstruct past earthquake ruptures and learn how to identify evidence of faulting and thus (re-)construct a rupture history. After brief lectures to introduce key concepts, the participants will have the opportunity to work on real data to analyze evidence of faulting and slip accumulation. The participants will analyze geomorphic and stratigraphic data to constrain accumulation as well as release of tectonically accumulated strain. The exercises will be in part computer-based, in part with pen and paper.

COURSE PROGRAM

MONDAY OCTOBER 9th
Potsdam University, Golm

Plate tectonics and the earthquake cycle

- Introduction to the course
- Physical basis of the earthquake cycle
- Stick-slip motion and friction
- Interseismic strain accumulation
- Slip rate variation in space and time

TUESDAY OCTOBER 10th
Potsdam University, Golm

Earthquake rupture characteristics and patterns in slip accumulation

- Single-earthquake slip constrained by high-resolution topographic data
- Accumulation of (surface-) slip over multiple earthquake cycles
- Measurement uncertainties and potential of bias
- Limitations of the geomorphic record
- Effect of geometric fault system complexity, fault segmentation

WEDNESDAY OCTOBER 11th
Potsdam University, Golm

Timing of earthquakes

- Paleoseismic trenching to constrain earthquake ages
- Structure-from-motion in paleoseismic investigations
- OxCal for earthquake age estimates
- Scarp diffusion modeling
- Possible pit falls in combining surface- and sub-surface earthquake data
- Wrap-up and summary