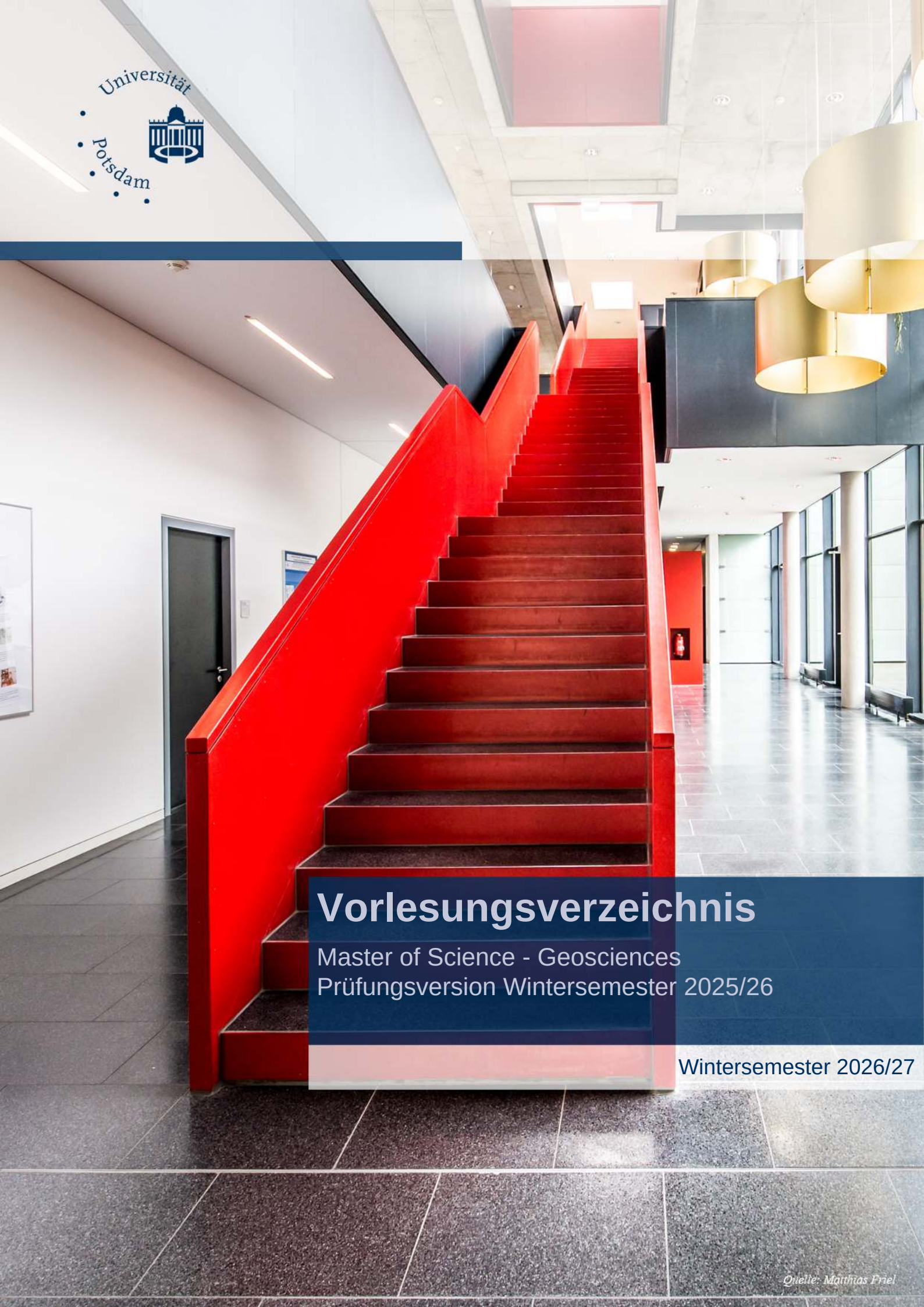

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Master of Science - Geosciences
Prüfungsversion Wintersemester 2025/26

Wintersemester 2026/27

Quelle: Matthias Friel

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Abkürzungsverzeichnis

Veranstaltungsarten

AG	Arbeitsgruppe
B	Blockveranstaltung
BL	Blockseminar
DF	diverse Formen
EX	Exkursion
FP	Forschungspraktikum
FS	Forschungsseminar
FU	Fortgeschrittenenübung
GK	Grundkurs
HS	Hauptseminar
KL	Kolloquium
KU	Kurs
LK	Lektürekurs
LP	Lehrforschungsprojekt
OS	Oberseminar
P	Projektseminar
PJ	Projekt
PR	Praktikum
PS	Proseminar
PU	Praktische Übung
RE	Repetitorium
RV	Ringvorlesung
S	Seminar
S1	Seminar/Praktikum
S2	Seminar/Projekt
S3	Schulpraktische Studien
S4	Schulpraktische Übungen
SK	Seminar/Kolloquium
SU	Seminar/Übung
TU	Tutorium
U	Übung
UN	Unterricht
UP	Praktikum/Übung
UT	Übung / Tutorium
V	Vorlesung
V5	Vorlesung/Projekt
VP	Vorlesung/Praktikum
VS	Vorlesung/Seminar
VU	Vorlesung/Übung
W	Werkstatt
WS	Workshop

Veranstaltungsrhytmen

wöch.	wöchentlich
14t.	14-täglich
Einzel	Einzeltermin
Block	Block
BlockSa	Block (inkl. Sa)
BlockSaSo	Block (inkl. Sa,So)

Andere

N.N.	Noch keine Angaben
n.V.	Nach Vereinbarung
LP	Leistungspunkte
SWS	Semesterwochenstunden
	Belegung über PULS
PL	Prüfungsleistung
PNL	Prüfungsnebenleistung
SL	Studienleistung
L	sonstige Leistungserfassung

Vorlesungsverzeichnis

Pflichtmodule

GEW-MM01 - Topics in Earth System Science

121453 SK - Kolloquium / Topics in Earth System Science

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	SK	Mo	16:15 - 17:45	wöch.	2.27.1.01	12.10.2026	Prof. Dr. Martin Trauth, Prof. Dr. Jens Tronicke, Professor Edward Sobel, Prof. Dr. Maria Mutti, Prof. Dr. Max Wilke, Prof. Dr. Patrick O'Brien, Prof. Dr. Bodo Bookhagen, Prof. Dr. Pieter van der Beek, Prof. Dr. Eva Eibl

Leistungen in Bezug auf das Modul

PNL 576221 - Kolloquium und Diskussion (unbenotet)

121483 S - Seminar / Topics in Earth System Science

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	S	Di	08:30 - 11:45	wöch.	2.32.2.02	13.10.2026	Prof. Dr. Bodo Bookhagen
1	S	Di	14:15 - 15:45	wöch.	2.27.2.36	13.10.2026	Tom Viry
1	S	Do	12:30 - 14:00	wöch.	2.27.2.36	15.10.2026	Prof. Dr. Jens Tronicke, Sophie Stephan, Dr. Julien Guillemoteau, Dr. Philipp Koyan
1	S	Do	14:15 - 15:45	wöch.	2.27.2.36	15.10.2026	Professor Edward Sobel, Prof. Dr. Pieter van der Beek
1	S	Fr	12:30 - 14:00	wöch.	2.27.2.07	16.10.2026	Prof. Dr. Max Wilke, Prof. Dr. Patrick O'Brien, Dr. Martin Jan Timmerman, Dr. rer. nat. Wolfgang Morgenroth
1	S	N.N.	N.N.	wöch.	N.N.	N.N.	Prof. Dr. Martin Trauth, Dr. Manfred Mudelsee, Dr. Markus Lothar Fischer

Kurzkommentar

Students are expected to attend the weekly seminars in the working group of their choice.

Leistungen in Bezug auf das Modul

PNL 576222 - Arbeitsgruppenseminar (unbenotet)

GEW-MM02 - Project Practical or Research Internship

121467 FP - Project Practical or Research Internship

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	PR	N.N.	N.N.	Block	N.N.	N.N.	Prof. Dr. Jens Tronicke, Prof. Dr. Martin Trauth, Prof. Dr. Max Wilke

Abkürzungen entnehmen Sie bitte Seite 5

Kommentar
Project practicals or internships have to be organized individually. Once, you found a place you need to register it with the examination board to have it approved. see: https://www.uni-potsdam.de/en/geo/study/examinationcommittee-1-1

Leistungen in Bezug auf das Modul	
SL	576231 - Praktikum (35 Tage oder 280 h) (unbenotet)

121468 S - Project Practical or Research Internship (Seminar)

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	S	Do	16:15 - 17:45	14t.	2.27.2.36	22.10.2026	Prof. Dr. Max Wilke, Prof. Dr. Martin Trauth, Prof. Dr. Jens Tronicke

Kommentar
In dem Seminar zu diesem Modul muss der Vortrag über das geleistete Praktikum gehalten werden. Dieser ist neben dem erfolgreichen Bericht nötig, um das Modul abzuschliessen. Er kann nicht durch einen Vortrag in der Praktikumsinstitution ersetzt werden. **Das Seminar startet am 22.10.26 und findet 14-tägig statt.** **Bitte melden Sie sich per e-mail bei Frau Heidemann, um einen Vortragstermin zu reservieren (sekretariat@geo.uni-potsdam.de).** Der Vortrag ist nach dem Praktikum zu halten. Der Bericht sollte am Tag des Vortrags abgegeben und durch den Betreuer akzepiert sein (Bestätigung des Betreuers durch e-mail), kann aber auch vor Abgabe des Berichtes geahlten werden. Der Vortrag sollte eine Länge von ca. 10 min haben, danach können Fragen gestellt werden. Bitte melden Sie sich nur zum Modul an, wenn Sie den Vortrag in diesem Semester halten wollen. Weitere Infos zum Projektpraktikum auf der Webseite des Prüfungsausschuss. In this Seminar of the module a talk has to be given about the internship. This talk and a successful report is needed to finalize the module. The talk cannot be replaced by one given at the institution of internship. **Seminar will start on 22.10.26 and takes place every other week.** **Please, register by e-mail with Mrs. Heidemann to reserve a slot for your talk (sekretariat@geo.uni-potsdam.de).** The talk needs to be given after the internship. The report should be submitted by the date of the talk and it should be accepted by the internship's supervisor (confirmation e-mail by supervisor). The talk can be also given before submission of the report. The talk should be 10 min long, afterwards questions can be posed. Please, only register for the module and seminar if you are determined to give the talk in the current term. Further info on the "project practical research internship" can be found on the webpage of the examination board.

Leistungen in Bezug auf das Modul	
SL	576232 - Seminar (unbenotet)

Kernmodule

GEW-MC01 - Earth System Record

121476 PU - Sedimentary Earth System Record (field practicals)

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	PU	N.N.	N.N.	Block	N.N.	N.N.	Prof. Dr. Maria Mutti, Dr. Laura Henrika Bührig

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Leistungen in Bezug auf das Modul

PNL 575942 - Exkursion (7 Tage) (unbenotet)

121477 VU - Sedimentary Earth System Record

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	N.N.	N.N.	Block	N.N.	N.N.	Prof. Dr. Maria Mutti

Leistungen in Bezug auf das Modul

PNL 575941 - Vorlesung und Übung (unbenotet)

GEW-MC02 - Tectonics and Geodynamics

121486 VU - Tectonics and Geodynamics

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Do	08:30 - 10:00	wöch.	2.27.2.37/38	15.10.2026	Prof. Dr. Pieter van der Beek, Prof. Dr. Sascha Brune
1	U	Do	10:15 - 11:45	wöch.	2.27.2.37/38	15.10.2026	Prof. Dr. Pieter van der Beek, Prof. Dr. Sascha Brune

Kommentar

Contents

This module aims to familiarize students with current concepts concerning the structure and mechanical behavior of the lithosphere, in relation to its thermal structure and rheology. Covered subjects include: the forces driving plate tectonics, the rheology of the lithosphere, the dynamics of orogenic processes, numerical modeling of lithospheric deformation, and the couplings of mantle dynamics and surface processes.

Qualification goals

Students:

- gain an understanding of the structure and dynamics of the lithosphere and the forces that drive its deformation

- gain familiarity with modern quantitative methods for observing and modeling the deformation of the lithosphere and its driving forces.

- learn to analyze modern research questions in tectonics and geodynamics by studying the literature on a chosen topic.

Literatur

Textbooks:C.M.R. Fowler, The Solid Earth: An Introduction to Global Geophysics (2nd Ed.). . D. Turcotte & G. Schubert, Geodynamics (3rd Ed.). . Additional background papers (available on Moodle)

Leistungen in Bezug auf das Modul

PNL 575951 - Vorlesung und Übung (unbenotet)

GEW-MC03 - Data Analysis and Statistics

121428 VU - Data Analysis and Statistics (MS GSC)

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	U	N.N.	N.N.	Block	N.N.	N.N.	Prof. Dr. Martin Trauth
1	VU	N.N.	N.N.	wöch.	N.N.	N.N.	Prof. Dr. Martin Trauth

Abkürzungen entnehmen Sie bitte Seite 5

Kommentar

The course includes an introduction to a higher-level programming languages such as MATLAB, Python and Julia; overview of data types and methods; one-, two-, and multi-variable statistics; time series analysis; statistics for spatial and directional data; numerical procedures; image processing and analysis. The course is based on the instructor's textbooks available for free.

Literatur

Trauth, M.H. (2025) MATLAB Recipes for Earth Sciences – Sixth Edition. Springer International Publishing, 567 p, https://doi.org/10.1007/978-3-031-57949-3.

Trauth, M.H. (2024) Python Recipes for Earth Sciences – Second Edition. Springer International Publishing, 491 p., https://doi.org/10.1007/978-3-031-56906-7.

Bemerkung

The course has two parts:

- weekly Zoom lectures and demonstrations. The tentative date is on Fridays 9:15-11:30 am, but we are flexible and can also postpone the date to suit everyone. I will send a Zoom link for the first Friday 9:15 and then we can talk about the exact time.
- a one-week practical in person after after the term, date to be determined.

You can also study the course at any time using my books and the recorded lectures. Please write me an email if you prefer asynchronous learning and we will find a way.

Leistungen in Bezug auf das Modul

PNL 575961 - Seminar und Übung (unbenotet)

GEW-MC04 - Field Practical

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-MC05 - Theoretical Geophysics

121481 VU - Theory of elastic seismic waves

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Do	08:30 - 10:00	wöch.	2.27.0.29/30	15.10.2026	Prof. Dr. Torsten Dahm
1	U	Do	10:15 - 11:45	wöch.	2.27.0.29/30	15.10.2026	Prof. Dr. Torsten Dahm

Kommentar

The course *Theory of Seismic Waves* provides a basic introduction to the theory of wave propagation needed to understand observations and to interpret seismological data. Emphasis is placed on the mode description of body and surface waves. Fundamentals of elasticity theory and elementary solutions of the wave equation are presented in detail. I start with a one-dimensional description of waves on a string to explain key features of free oscillation and wave modes on "membranes" (layers). Basic mathematical approaches and representation theorems are introduced. Later, reflection and refraction of seismic plane waves at plane boundary layers, guided waves and seismic surface waves are discussed. The theory of seismic sources will be covered in brief, but will be discussed in more detail in my course *Rupture Processes in Seismology and Volcanology* .

The theory of wave propagation is made understandable by calculating and discussing synthetic seismograms for a realistic Earth in practical courses. Students will learn how to use the latest seismogram calculation software and will be able to understand seismological analysis methods using examples they have generated themselves. The application of the analysis methods to observed data can be deepened in the following semester in the course *Advanced Methods in Observational Seismology* , which can contribute to finding a desired topic for a Master's thesis.

Potsdam, 15 October 2024, Torsten Dahm

Abkürzungen entnehmen Sie bitte Seite 5

Voraussetzung

- Bachelor in Geophysics / Physics / Geosciences

- Basics in physics, math and programming

Literatur

Dahm, T. Seismology II: body and surface waves. Lecture notes, ca. pp. 230. (will be provided as pdf)
Müller, G. (2007): Theory of elastic waves, (Scientific Technical Report STR ; 07/03), 228 S. https://doi.org/10.2312/GFZ.b103-07037
Aki, K.; Richards, P. (2002). Quantitative Seismology. University Science Books
Lay, Th.; Wallace, T.C. (1995). Modern Global Seismology. Academic Press

Leistungen in Bezug auf das Modul

SL 575981 - Vorlesung und Übung (unbenotet)

GEW-MC06 - Geophysical Inversion and Data Analysis

121444 VU - Geophysical Inversion

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	Di	12:30 - 14:00	wöch.	2.27.2.36	13.10.2026	Dr. Matthias Ohrnberger
1	VU	Mi	12:30 - 14:00	wöch.	2.27.0.29/30	14.10.2026	Dr. Matthias Ohrnberger

Kommentar

Inverse theory can be seen as the mathematical formalisation of the process of data interpretation. It is about the inference of properties (parameters) of a (hypothesized) physical system (model) from observed data.

We know what we (believe to) know about the Earth (and other physical systems) applying inverse problem techniques to those system observables we are capable to measure and quantify. Unfortunately, observations in earth sciences are often noisy, spatially or temporally sparse and sometimes even contradictory or inconsistent. Further, the physical systems we want to describe are often not well understood and thus simplified models are often used to allow quantification at all. It is therefore clear that within inverse problem theory model parameter uncertainty estimates are also of key interest as well as techniques allowing for selecting reasonable/appropriate models from a number of hypothesis regarding the physical system.

In the course, students will be introduced to the principal ideas of the formal treatment of inverse problems and will learn the application of inversion techniques to problems in geophysics and geosciences with hands-on examples.

Literatur

1) William Menke, Geophysical data analysis, discrete inverse theory

2) Andreas Fichter, Lecture notes on inverse theory (doi: 10.33774/coe-2021-qpq2j)

Leistungen in Bezug auf das Modul

SL 575991 - Vorlesung und Übung (unbenotet)

GEW-MC07 - Geophysical Laboratory

121445 U - Geophysical Laboratory

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	U	Mo	12:30 - 15:30	wöch.	2.27.2.36	12.10.2026	Dr. Jürgen Matzka, Prof. Dr. Jens Tronicke, Dr. Julien Guillemoteau

Kommentar

This course is a **core module** of the programe **MSc Geosciences** and is obligatory for students with a specialization/ major in Geophysics. As an elective module it is opened for all MSc students in Geosciences. This course includes a series of six lab experiments covering selected fundamental topics of applied and general geophysics (e.g., gravity, magnetics, electrical, and wave propagation methods). In addition to the actual experiments and experimental methods, the course conveys basic aspects of analyzing, interpreting, and presenting experimental data and also recaps and deepens some fundamentals of geophysics (additional lectures and exercises offered in a weekly fashion at the beginning of the semester).

The first meeting with an introduction, a detailed overview and time schedule will be on **Monday, Oct 12 at 12:30 (room 2.27.2.36)** .

Leistungen in Bezug auf das Modul

PNL 576001 - Laborübung (unbenotet)

GEW-MC10 - Advanced Mineralogy and Petrology

121422 VU - Advanced Geochemistry

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	Fr	08:30 - 10:00	wöch.	2.27.2.36	16.10.2026	Dr. Martin Jan Timmerman

Kommentar

Content

Whereas the geological evolutions of most other stony planets in our solar system have come to a halt billions of years ago, planet Earth, after 4,5 billion years, is still a dynamic system due to a vigorous mantle convection. Moreover, Earth is first and foremost a *chemical* system and using the tools of geochemistry to solve geological problems, we can understand Earth and how it works.

This course will focus on fundamental processes that gave rise to the characteristic geochemical features of the oceanic and continental crust, and the mantle. It will provide essential insights into magmatic processes (differentiation, assimilation and contamination, partial melting), role and use of major and trace elements, geochemical classification of magmatic rocks, variation diagrams, element behaviour during melting and fractionation, simple fractionation and melting models, selected phase diagrams, the structure and mineralogy of the shallow and deep mantle, generation of basaltic magmas at oceanic spreading ridges, oceanic intraplate magmatism, plume magmatism, continental flood basalts, layered mafic intrusions, magmatism in subduction settings (island arcs and continental arcs), granitoids, continental alkaline magmatism, anorthosites. Furthermore, alkaline vs. sub-alkaline rocks: classification, AFM diagram, alumina saturation index. Introduction to dating methods (Rb-Sr, Sm-Nd), isochrons, introduction to the U-Th-Pb system (decay equations, Concordia diagram), the Lu-Hf system in zircon, the geochemical and Sr-Nd-Pb(-Hf) isotope composition of the continental crust and the different mantle reservoirs. The geochemical evolution of the Earth since Precambrian times will be addressed, and standard analytical techniques will be explained.

Similar to studying mathematics or a foreign language, it is no use studying geochemistry without practicing. For this reason, several carefully prepared home works will be offered, which you can solve alone or in a group. Pitfalls and solutions will be jointly discussed in the lecture of the ensuing week. This home work is not compulsory, but it is nevertheless highly recommended to participate.

The students:

- gain an understanding of the chemical composition of the Earth and other planets, and the chemical processes that affect them
- gain familiarity with analytical methods used for geochemical analyses
- learn to analyse modern research questions in geochemistry by studying the literature on a chosen topic
- are able to critically analyze scientific literature containing geochemical data
- acquire the ability to critically analyse, interpret and present data.

Leistungen in Bezug auf das Modul

SL 576251 - Vorlesung und Übung I (unbenotet)

121425 VU - Basics of Thermodynamics

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	Fr	10:15 - 11:45	wöch.	2.27.2.36	16.10.2026	Prof. Dr. Max Wilke

Kommentar

This course will introduce to the principles of thermodynamics and how they can be used for understanding geological processes. You will learn about the thermodynamical state functions and how they can be determined. We will discuss what controls mineral stability, how mineral reactions can be used to deduce formation conditions of mineral assemblages. All topics will be associated by exercises to enhance understanding.

The course will start on **Fr, Oct 16** .

Moodlepage: https://moodle2.uni-potsdam.de/course/view.php?id=35856

Leistungen in Bezug auf das Modul

SL 576252 - Vorlesung und Übung II (unbenotet)

GEW-MC11 - Applications of Mineralogy and Petrology

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-MC12 - Methods in Mineralogy and Petrology

121459 VU - Micro-analytical Methods and X-ray Powder Diffraction

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	Mo	10:15 - 11:45	wöch.	2.27.2.49	12.10.2026	Georgii Kovalskii, Dr. rer. nat. Christian Ronny Singer
1	VU	Do	16:15 - 17:45	wöch.	2.27.0.29/30	15.10.2026	Dr. rer. nat. Wolfgang Morgenroth
1	U	N.N.	N.N.	Einzel	N.N.	N.N.	Dr. Martin Jan Timmerman, Dr. rer. nat. Christina Günter

Kommentar

This course consists of two parts in the winter semester: ‘Micro-analytical Methods’ and ‘X-ray Powder Diffraction’.

On Monday, October 12 th, we meet at 10:15 in room 2.49 (i.e. as scheduled) for an overview of the module, including a lab tour. All students interested in this module are asked to attend this meeting, as we will also arrange times for the practical hands-on training!!!

‘Micro-analytical Methods’ consists of a lecture and practical hands-on training on the Electron Microscope, Scanning Electron Microscope and Raman. The lecture will be held on **M ondays** at **10:15** a.m. in room **2.49** (building 27).

‘X-ray Powder Diffraction’ will start on **Thursday** , **October 15th** , in room **0.29/30, 16:15** a.m.

Learning goals ‘X-ray Powder Diffraction’:

- refresher in crystallography
- data collection methods in powder diffraction
- information content of a diffraction pattern (profile parameters, structure factors, background)
- least squares method and software for Le Bail- and Rietveld-refinement
- data treatment (data from software tutorials, data collected in practical part)
- practical part: X-ray Powder Diffraction

At the end of the course, you will be able to refine an X-ray powder diffractogram and discuss your results.

Learning goals ‘Micro-analytical Methods’:

- introduction to the following micro-analytical methods: Scanning Electron Microscopy (SEM), Electron Probe Micro Analysis (EPMA, Cathodoluminescence (CL) and Raman
- phase identification, qualitative and quantitative chemical analyses
- understanding limitations, uncertainties, detection limits and errors
- independent interpretation of (mineral) analyses

Voraussetzung

There are no prerequisites for this course.
Nevertheless, you should have refreshed your knowledge in crystallography on a BSc level before the course starts.
Recommended reading: F. Donald Bloss 'Crystallography and Crystal Chemistry'.

Literatur

For the PXRD part, be familiar with the basics of crystallography on a BSc level.
Recommended reading: F. Donald Bloss 'Crystallography and Crystal Chemistry'.

Additionally, at the beginning of the course, we will refresh our knowledge of crystallography.

Leistungen in Bezug auf das Modul

SL	576271 - Vorlesung und (Gelände-)Übung (unbenotet)

GEW-MC13 - Advanced Methods in Mineralogy and Petrology

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

Vertiefungsmodule

GEW-MF010 - Earth Surface Processes

121434 VU - Earth Surface Processes

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	Di	12:30 - 14:00	wöch.	2.27.2.37/38	13.10.2026	Prof. Dr. Pieter van der Beek, Prof. Dr. Taylor Schildgen
1	VU	Di	14:15 - 15:45	wöch.	2.27.2.37/38	13.10.2026	Prof. Dr. Pieter van der Beek, Prof. Dr. Taylor Schildgen

Kommentar

Contents

This course deals with the dynamics of Earth-surface processes: erosion, transport and deposition on slopes, by rivers and glaciers. Physical and mathematical models describing these processes are presented and analyzed using available field observations. In addition, the course examines the couplings between tectonics and climate-driven surface processes in landscape evolution. Topics are explored in depth through the reading of scientific papers, followed by group discussion and presentation of research topics to groups of students.

Qualification goals

Students:

acquire an understanding of the processes that drive erosion and sediment transport at the Earth's surface, as well as tectonically controlled landscape genesis at plate boundaries and tectonically active regions within continents.

become familiar with modern quantitative methods for observing and modeling Earth-surface processes and their controlling factors.

Learn to analyze and synthesize modern research questions in surface processes and their couplings through literature review, presentations, and group discussions.

Literatur

Textbooks :

R.S. Anderson & S.P. Anderson, Geomorphology: The Mechanics and Chemistry of Landscapes. .

D. Burbank & R.S. Anderson, Tectonic Geomorphology (2nd Ed.), .

P.R. Bierman & D.R. Montgomery, Key Concepts in Geomorphology (2nd Ed.), .

Additional background papers available on Moodle.

Leistungen in Bezug auf das Modul

PNL 576291 - Seminar und Übung (unbenotet)

GEW-MF011 - Earth Systems through Time

123693 VU - Earth Systems Through Time

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	Do	13:30 - 15:00	wöch.	2.27.2.49	15.10.2026	Hugues Bitault, Prof. Dr. Maria Mutti
1	VU	Do	15:15 - 16:45	wöch.	2.27.2.49	15.10.2026	Hugues Bitault, Prof. Dr. Maria Mutti

Kommentar

Carbonate rocks are valuable archives of Earth's history, recording changes in past oceans, environments, biological activity, and environmental conditions through geological time.

In this course, students will learn how to read this archive using carbonate petrography. Through lectures and hands-on microscope practicals, we will learn to recognise the main constituents of carbonate rocks, including skeletal grains, non-skeletal grains, microbial components, and pore systems. Particular attention will be given to the organisms represented by skeletal grains, the environments in which they lived, and the sedimentary processes responsible for the formation of non-skeletal components. We will explore carbonate mineralogy, including aragonite, high-Mg calcite, and low-Mg calcite, and its importance for preservation and rock evolution.

We will also investigate the physical and chemical processes that modify rocks after deposition and during burial through time (diagenetic processes), such as cementation, dissolution, recrystallisation, compaction, and dolomitization. Understanding these transformations is essential when interpreting ancient rocks, as many of their original textures, minerals, and pore systems may have been modified after deposition.

By combining these observations, students will learn how carbonate rocks can be used to reconstruct past environments and better understand how Earth's surface systems have evolved through geological time.

Literatur

Scholle & Ulmer-Scholle (2003) – A Color Guide to the Petrography of Carbonate Rocks – AAPG Memoir 77

Flügel (2004) – Microfacies of Carbonate Rocks: Analysis, Interpretation and Application
More detailed information on microfacies description, carbonate components, and environmental interpretation.

James & Jones (2016) – Origin of Carbonate Sedimentary Rocks More detailed background on carbonate mineralogy, sedimentary processes, depositional systems, and diagenesis.

Leistungen in Bezug auf das Modul

SL	576301 - Vorlesung und Übung (unbenotet)
PNL	576302 - Geländeübung (6 Tage) (unbenotet)

GEW-MF012 - Modern Carbonates

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-MF013 - Rates and Dates of Geological Processes

121472 VU - Rates and Dates of Geological Processes

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	Di	10:15 - 11:45	wöch.	2.27.2.07	13.10.2026	Professor Edward Sobel
1	VU	Do	12:30 - 14:00	wöch.	2.27.2.07	15.10.2026	Professor Edward Sobel

Leistungen in Bezug auf das Modul

PNL	576321 - Vorlesung und Übung (unbenotet)

GEW-MF014 - Geo-Information Systems

121454 VU - Mapping and Geoinformation Systems

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Fr	10:15 - 11:00	wöch.	2.25.D0.01	16.10.2026	Dr. Gerold Zeilinger
1	U	Fr	11:15 - 12:00	wöch.	2.25.D0.01	16.10.2026	Dr. Gerold Zeilinger
1	SU	Fr	12:15 - 13:45	wöch.	2.25.D0.01	16.10.2026	Dr. Gerold Zeilinger

Kommentar

This seminar-style course focuses on the comprehensive design of geoscientific projects and tasks using Geographic Information Systems (GIS), as well as the effective management of GIS content. Key topics include data exchange and the integration of modeling results, analysis of digital elevation models (e.g., river networks), and structural data analysis. Students learn techniques for extracting information from satellite and aerial imagery, as well as for calculating spatially derived parameters such as soil loss rates. Additionally, the module covers methods for data exchange and management via GIS servers to ensure seamless and efficient handling of geospatial information. It also includes programming automated tasks with Python within GIS tools to enhance efficiency and optimize workflows for geodata processing. Students further explore 3D geovisualization, enabling them to create and interpret three-dimensional representations of geodata to improve analysis and communication.

Learning Outcomes

Students will:

- Master the design and management of geoscientific projects using GIS, with a focus on content management
- Apply advanced methods for analyzing geological features and processes, including the extraction of insights from digital elevation models and other data sources
- Automate tasks in GIS using Python to optimize data processing efficiency
- Acquire the ability to create and interpret 3D visualizations to effectively communicate spatial data

Leistungen in Bezug auf das Modul

PNL 576331 - Seminar und Übung (unbenotet)

GEW-MF015 - Sedimentary Systems Modelling

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-MF017 - Active Tectonics

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-MF018 - Basin Analysis and Natural Resources

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-MF019 - Earth Observation and Modelling

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-MF020 - Field Exercise

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-MF110 - Fundamentals of Digital Seismology

121429 VU - Digital Seismology

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	N.N.	N.N.	Block	N.N.	N.N.	Prof. Dr. Eva Eibl
	tba, will be held in the time period from February 8 to 23						

Kommentar

The course is part of the module 'Fundamentals of Digital Seismology' (12 ECTS) which is composed of the 'Digital Seismology' class (6ECTS) offered in winter semester and the 'Array Seismology' class (6ECTS) taught in summer semester. The module exam will be held at the end of the summer semester and will be aboue the content of both classes. The natural order of visiting the classes in the module is first 'Digital Seismology' as a block course in February and then 'Array seismology'. However, this is not formally required. Note that there will be no exam offered at the end of the winter semester.

Qualification goals of the module are:

- deepen your understanding of digital signal processing and systems theory using the example of seismic time series

- understand the mode of action of different types of filters

- design and apply different types of filters for seismogram analysis and interpretation, deconvolution of seismograms and instrument correction

- learn the analysis of seismic wave fields by means of array methods

- understand multichannel filter process

- understand the relationship between array geometry, inherent array resolution limits, or spatial aliasing artifacts, and strategies to avoid them

- develop, design and install an array in practice

- understand the advantages of array techniques and their fields of application, e.g. to investigate interdisciplinary geoscientific relationships in the Earth system

- being able to perform scientific analysis of interactions in the Earth system

- understand the basics for independent scientific work

Leistungen in Bezug auf das Modul

SL 576391 - Vorlesung und Übung (unbenotet)

GEW-MF111 - Array Seismology

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-MF112 - Seismic Hazard Analysis

121480 VU - Seismic Hazard Analysis

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Do	12:30 - 14:00	wöch.	2.27.2.37/38	15.10.2026	Prof. Dr. Fabrice Cotton
1	U	Do	14:15 - 15:45	wöch.	2.27.2.37/38	15.10.2026	Prof. Dr. Fabrice Cotton

Kommentar

In this course, the basics of earthquake hazard estimation will be presented and discussed. We will understand why earthquakes generate damages and how seismological (but also geological and geodetic) data can be used to estimate the size, location and frequency of future earthquakes (seismic source models). We will discuss the different factors that control the frequency and amplitude of seismic shaking and learn how to develop and use seismic motion prediction models. We will discuss the interface between science and decision making and how probabilistic seismic hazard estimation models are established and used. Finally, we will discuss the potential (and future) impact of earthquakes on urban areas and identify the main seismic hot spots on our planet. Practical applications of these notions will be taught from Jupyter notebooks. Training in the Python language and the most useful probabilistic notions in the field of risk estimation (e.g uncertainty evaluation) will be taught in this course.

Lerninhalte

Course content

- Key ingredients of seismic hazard analysis
- Understanding the probability concepts used in natural hazards evaluation
- Lessons from recent earthquakes
- Seismic hot spots (the seismic future of cities)
- Scientific programming (use of Python notebooks, Python programming)

Leistungen in Bezug auf das Modul

SL 576411 - Vorlesung und Übung (unbenotet)

GEW-MF113 - Seismological Data Science with Application to Volcano Systems

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-MF114 - Seismic Methods

121478 VU - Seismic Methods (block course)

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	B	N.N.	N.N.	Block	N.N.	N.N.	Prof. Dr. Jens Tronicke

Leistungen in Bezug auf das Modul

SL 576432 - Blocklehrveranstaltung (3 Tage Gelände-/Computerübung) (unbenotet)

121479 VU - Seismic Methods

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Mi	08:30 - 10:00	wöch.	2.27.2.36	14.10.2026	Prof. Dr. Jens Tronicke
1	U	Mi	10:15 - 11:45	wöch.	2.27.2.36	14.10.2026	Prof. Dr. Jens Tronicke

Kommentar

This course (GEW-MF114) is part of MSc Geosciene and represents a specialization module for students with a keen interest in Geophysics. It includes weekly lectures and exercises introducing active seismic methods (such as reflection and refraction seismics) and their diverse applications. In addition to the theoretical and physical fundamentals, the course conveys basic aspects of data acquisition, processing, and interpretation.

The first meeting with an introduction and more details will be on **Wednesday, Oct 14 at 8:30 (room 2.27.2.36)** .

Leistungen in Bezug auf das Modul

SL 576431 - Vorlesung und Übung (unbenotet)

GEW-MF115 - Electrical and Electromagnetic Methods

121436 VU - Electrical and Electromagnetic Methods

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Di	08:30 - 10:00	wöch.	2.27.2.37/38	13.10.2026	Dr. Julien Guillemoteau
1	U	Di	10:15 - 11:45	wöch.	2.27.2.37/38	13.10.2026	Dr. Julien Guillemoteau

Kommentar

This course is part of the in-depth module "Applied Geophysical methods II". It is recommended for the students following the focus in **Geophysics** with a keen interest in applied geophysics. It covers both theoretical and standard interpretation aspects for the subsurface geophysical imaging methods based on the theory of electromagnetics (i.e., **DC, EMI and GPR**).

The first slot is scheduled on 22.10.24. If you want to participate to this module, please register on PULS or contact me at julieng@uni-potsdam.de .

Leistungen in Bezug auf das Modul

SL 576441 - Vorlesung und Übung (unbenotet)

121437 PU - Electrical and Electromagnetic Methods (block course)

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	PU	N.N.	N.N.	Einzel	N.N.	N.N.	Dr. Julien Guillemoteau

Kommentar

This course is part of the in-depth module "Applied Geophysical methods II". It is recommended for the students following the focus in **Geophysics** with a keen interest in applied geophysics. It covers both theoretical and standard interpretation aspects for the subsurface geophysical imaging methods based on the theory of electromagnetics (i.e., **DC, EMI and GPR**).

The first slot is scheduled on 22.10.24. If you want to participate to this module, please register on PULS or contact me at julieng@uni-potsdam.de .

Leistungen in Bezug auf das Modul

SL 576442 - Blocklehrveranstaltung (3 Tage Gelände-/Computerübung) (unbenotet)

GEW-MF116 - Potential Field Methods

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-MF117 - Field Course Applied Geophysics

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-MF210 - Specialized Petrology

121421 VU - Advanced Petrology

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	Di	12:30 - 14:00	wöch.	2.27.2.49	13.10.2026	Prof. Dr. Patrick O'Brien
1	VU	Di	14:15 - 15:45	wöch.	2.27.2.49	13.10.2026	Prof. Dr. Patrick O'Brien

Leistungen in Bezug auf das Modul

SL 576471 - Vorlesung und Übung (unbenotet)

GEW-MF211 - Age Determination

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-MF212 - Physicochemical Mineralogy-Petrology

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-MF213 - Hands-On in Mineralogy and Petrology

121439 SU - Experimental Mineralogy-Petrology

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	S	N.N.	N.N.	Einzel	N.N.	N.N.	Dr. Sergey Lobanov, Dr. rer. nat. Wolfgang Morgenroth, Dr. rer. nat. Christian Ronny Singer
1	U	N.N.	N.N.	Einzel	N.N.	N.N.	Dr. Sergey Lobanov, Dr. rer. nat. Wolfgang Morgenroth, Dr. rer. nat. Christian Ronny Singer

Kommentar

This course ‘Experimental Mineralogy-Petrology’ is part of the module: GEW-MF213 'Hands-on in Mineralogy and Petrology'

learning goals of the module are:

- conducting high-pressure/high-temperature laboratory experiments on minerals, glasses and rocks to better understand magmatic and metamorphic processes in nature

component of the **module** is:

- one course in WiSe or SoSe ('Experimental Mineralogy-Petrology')

in this **course** 'Experimental Mineralogy-Petrology' you will be:

- conducting experiments
- examine the resulting material with various analytical methods
- prepare a short presentation and report

After a pre-meeting (**Wednesday** , **October 14** th, **14:00** , room **2.36**), you will carry out your experiments and analysis in approx. 4 - 6 laboratory appointments.

Leistungen in Bezug auf das Modul

SL 576501 - Seminar und Übung (unbenotet)

GEW-MF214 - Current Topics in Mineralogy and Petrology

121442 VS - Geofluids and Clay Mineralogy

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Mo	14:15 - 15:45	wöch.	2.27.2.49	12.10.2026	PD Dr. Anja Schleicher, Prof. Dr. Max Wilke, Dr. Maria Kokh
1	S	Di	16:15 - 17:45	wöch.	2.27.2.49	13.10.2026	Prof. Dr. Max Wilke, PD Dr. Anja Schleicher, Dr. Maria Kokh

Kommentar

One part of the course will deal with the role of aqueous fluids in geochemical processes. We will discuss their properties at geological conditions and the chemical thermodynamics of fluids. We will discuss what samples of geological fluids are available and how we can understand them. We will discuss fluid-rock interactions and how they influence large-scale geological processes. Knowledge of thermodynamics is very helpful to follow this course.

The second part of the course will deal with the role of clay minerals in geological processes. We will discuss their unique properties, analytical techniques to study clays and how they can be used as engineering materials.

We will meet for the first time on Oct 12th at 14:15 in room 2.49 with a short introductory meeting.

Leistungen in Bezug auf das Modul

SL 576511 - Vorlesung und Seminar (unbenotet)

GEW-MF215 - Special Topics in Mineralogy and Petrology

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-RCM01 - Remote Sensing of the Environment

121473 VU - Remote Sensing of the Environment

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Mo	10:15 - 11:45	wöch.	2.27.1.10	12.10.2026	Prof. Dr. Bodo Bookhagen
1	U	Mo	12:15 - 13:45	wöch.	2.27.1.10	12.10.2026	Prof. Dr. Bodo Bookhagen

Leistungen in Bezug auf das Modul	
PNL	574412 - Übung zu ausgewählten Themen (unbenotet)

Wahlpflichtmodule

GEW-ME01 - Modelling and Exploring the Earth System

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-ME02 - Geosciences Across Scales

121433 V - Earth System Science

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Di	14:15 - 15:45	wöch.	2.27.1.10	13.10.2026	Prof. Dr. Bodo Bookhagen, Dr. Sohini Bhattacharjee
1	V	Di	16:15 - 17:45	14t.	2.27.1.10	13.10.2026	Prof. Dr. Bodo Bookhagen, Dr. Sohini Bhattacharjee
1	S	Di	16:15 - 17:45	14t.	2.27.1.10	20.10.2026	Prof. Dr. Bodo Bookhagen, Dr. Sohini Bhattacharjee

Leistungen in Bezug auf das Modul	
SL	576041 - Vorlesung und Übung (unbenotet)

121440 VU - Fundamentals of geothermics of the Earth's crust

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	N.N.	09:00 - 17:00	Block	2.27.0.29/30	01.03.2027	Dr. rer. nat. Ben Norden, Dr. rer. nat. Sven Fuchs

Kommentar

Video Teaser (youtube)

Der Kurs wird wie folgt angeboten. Blockkurs KW 12/KW13 (17.-25.03.2026 (4 Blöcke a 90 min täglich + Feld und Laborarbeiten) am GFZ Potsdam (Telegrafenberg, Haus A69); Prüfung am 27.03.2026, 10 Uhr.

Der Kurs findet nur statt, wenn zum Ende der Belegungsfrist mind. 5 Teilnehmer eingeschrieben sind.

The course takes place only if a minimum of 5 students are registered by the end of the enrollment period.

Voraussetzung

- Grundlegende Kenntnisse in den Geowissenschaften (BS)
- Interesse an einem oder mehreren der folgenden Arbeits- und Forschungsfelder: Geothermie, Geodynamik, Geophysik

Literatur

- Turcotte, D.L., and Schubert, G. (**2002**). Geodynamics: Cambridge University Press.
- Beardsmore, G. R. and J. P. Cull (**2001**). Crustal Heat Flow: A Guide to Measurement and Modelling. Cambridge, University Press.
- Haenel, R., L. Rybach and L. Stegena (**1988**). Handbook of terrestrial heat-flow density determination. Dordrecht, Kluwer Academic Publishers.
- Allen, Philip A., and John R. Allen ( ). . John Wiley & Sons.

Leistungsnachweis

Präsentation mit Prüfungsgespräch.

Presentation with examination.

Bemerkung

Das Modul vermittelt grundlegende Kenntnisse zu Wärmetransportvorgängen und die daraus resultierende Wärme- und Temperaturverteilung der Erdkruste. Neben theoretischen und physikalischen Grundlagen zu thermischen Gesteinsparametern und thermischen Feldern werden gängige Verfahren zur Bestimmung der thermischen Eigenschaften vorgestellt; dabei wird auf die Gewinnung und Bearbeitung der (Mess-) Daten und die Interpretation der Resultate eingegangen. Die Relevanz thermischer Prozesse wird für geodynamische Vorgänge (plattentektonische sowie bezogen auf Prozesse der Sedimentbeckenbildung) ebenso beleuchtet, wie für eine wirtschaftliche Nutzung des unterirdischen Raums (Geothermie, Endlagerung, Speicherung, etc.). In den begleitenden Übungen werden die erlernten Methoden an realen Beispieldatensätzen vertieft. Labormessungen , ein Messtag im Gelände , sowie ein anschließender 2-tägiger Modellierungskurs (im Rahmen des 1-wöchigen Blockkurses) zur Auswertung der gewonnen Daten führen praxisnah in die Gewinnung und Verwertung thermischer Daten und in die Grundzüge der thermischen Modellierung ein.

The module provides basic knowledge of heat transport processes and the resulting heat and temperature distribution of the Earth's crust. In addition to theoretical and physical fundamentals of thermal rock parameters and thermal fields, common methods for the determination of thermal properties are presented; the acquisition and processing of (measurement) data and the interpretation of the results are addressed. The relevance of thermal processes will be highlighted for geodynamic processes (plate tectonic as well as related to sedimentary basin formation processes) as well as for an economic use of the subsurface space (geothermal energy, disposal, storage, etc.). In the accompanying exercises, the learned methods are deepened on real example data sets. Laboratory measurements, a measurement day in the field, and a subsequent 2-day modeling course (as part of the 1-week block course) to evaluate the data obtained provide a practical introduction to the acquisition and utilization of thermal data and the basic principles of thermal modeling.

Lerninhalte

Lernziele :

- Verständnis der thermischen Gesteinsparameter, ihrer Variabilität und der thermisch wirksamen Prozesse innerhalb der Erdkruste
- Verständnis der Relevanz für geodynamische Vorgänge oder die Nutzung des unterirdischen Raums (Geothermie, Endlagerung, Speicherung, etc.)

Learning Objectives:
Understanding of thermal rock parameters, their variability, and thermally effective processes within the Earth's crust.
Understanding of the relevance to geodynamic processes or the use of subsurface space (geothermal energy, disposal, storage, etc.).

Leistungen in Bezug auf das Modul

SL 576041 - Vorlesung und Übung (unbenotet)

121463 VU - Organic Geochemistry

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	N.N.	N.N.	Block	N.N.	N.N.	Dr. Hans-Martin Schulz, Dr. Kai Mangelsdorf, Prof. Dr. Christian Hallmann, Dr. Stefanie Pötz, Dr. Andrea Vieth-Hillebrand

Kommentar

This course will cover the fundamentals of organic geochemistry, which is the discipline that studies the origin, conversion and fate of organic matter on Earth, and attempts to reconstruct the impact and processes that the biosphere had on the Earth system. In lectures we will cover (amongst other themes) carbon fixation and bioproductivity, aspects of lipid biosynthesis, biomass burial and the global carbon cycle, the formation and composition of fossil fuels, paleoclimate reconstructions, environmental geochemistry and what ancient molecules tell us about the evolution of life on Earth. In the practical part of the course, we will gain hands-on experience by processing rock samples, extracting and simplifying their molecular organic inventory and analyzing the latter using gas chromatography and mass spectrometry, followed by interpretation of fossil biomarker molecules.

The course will be held as a block at the end of the semester (Monday February 9th – Wednesday February 18th 2026), which allows us to mix lectures and laboratory work. The location will be external at the German Research Center for Geosciences (GFZ) that is located on the Telegrafenberg in Potsdam, and which can be conveniently reached by public transport.

Leistungen in Bezug auf das Modul

SL 576041 - Vorlesung und Übung (unbenotet)

121471 VU - Radiogenic Isotope Geochemistry and Geochronology

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	Mi	16:15 - 17:45	wöch.	2.27.2.49	14.10.2026	Dr. Masafumi Sudo, Prof. Dr. Rolf Romer
1	VU	Do	14:15 - 15:45	wöch.	2.27.0.29/30	15.10.2026	Dr. Masafumi Sudo, Prof. Dr. Rolf Romer

Kommentar

Radiogenic isotopes are important geochemical tools. The decay of a radioactive isotope eventually produces a stable (radiogenic) isotope. This process changes the isotopic composition of elements with one or several radiogenic isotopes. This change in isotopic composition can be used in two ways: (i) The concentration ratio of the produced daughter isotope to the present parent isotope can be used to determine the age of minerals and indirectly of geological processes. Systems suitable for the dating of geologically old magmatic and metamorphic rocks include among others the parent-daughter pairs of 40K-40Ar, 87Rb-87Sr, 147Sm-144Nd, and 238U-206Pb. (ii) The isotopic composition of elements with radiogenic isotopes changes through time. Because different geochemical reservoirs have contrasting parent-to-daughter ratios, they will with time develop different isotopic compositions, which in turn can be used to fingerprint the sources of rocks or to quantify contributions from different reservoirs by mass balance.
The class is presenting the most commonly used systems for isotopic dating and provides examples on the use of radiogenic isotopes as geochemical tracers. There will be reading assignments and short presentations by students in each following part:
- Rb-Sr, Sm-Nd, Lu-Hf, Re-Os and U-Pb systems, by apl. Prof. Dr. Rolf Romer
- K-Ar system and Ar/Ar dating, noble gas isotopes, by Dr. Masafumi Sudo
We start the first lecture (90 minutes) from 16:15 on the October 14th, at the room 2.49 of House 27.

Leistungen in Bezug auf das Modul

SL 576041 - Vorlesung und Übung (unbenotet)

121485 VU - Stress Field of the Earth's Crust

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	Mo	14:15 - 15:45	wöch.	2.27.1.10	12.10.2026	Prof. Dr. Arno Zang
1	B	N.N.	N.N.	Block	N.N.	N.N.	Prof. Dr. Arno Zang

Kommentar

This course aims to give an overview to the state of stress in the Earth’s crust and its application to local and regional tectonics. The first part of this course is the very foundation of rock mechanics, and introduces mechanical stress, fracture criteria and simple crustal stress models. The second part deals with stress measuring methods in practice today and is divided logically into borehole and core-based methods. Naturally, the more commonly accepted methods like overcoring, hydraulic fracturing, and borehole breakouts, are given added emphasis. The third part describes stress profiles in the Earth’s crust obtained in recent international field projects to investigate earthquake ruptures and fracture processes in energy technology context (geologic repositories and geothermal energy). Local stress data from specific wellbores are related to regional tectonic stresses and the plate tectonics.

Literatur

Zang A, Stephansson O (2010) Stress Field of the Earth’s Crust. Springer- Verlag. ISBN: 978-1-4020-8443-0

Leistungen in Bezug auf das Modul

SL 576041 - Vorlesung und Übung (unbenotet)

GEW-ME03 - Past and Present of the Earth System

121442 VS - Geofluids and Clay Mineralogy

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Mo	14:15 - 15:45	wöch.	2.27.2.49	12.10.2026	PD Dr. Anja Schleicher, Prof. Dr. Max Wilke, Dr. Maria Kokh
1	S	Di	16:15 - 17:45	wöch.	2.27.2.49	13.10.2026	Prof. Dr. Max Wilke, PD Dr. Anja Schleicher, Dr. Maria Kokh

Kommentar

One part of the course will deal with the role of aqueous fluids in geochemical processes. We will discuss their properties at geological conditions and the chemical thermodynamics of fluids. We will discuss what samples of geological fluids are available and how we can understand them. We will discuss fluid-rock interactions and how they influence large-scale geological processes. Knowledge of thermodynamics is very helpful to follow this course.

The second part of the course will deal with the role of clay minerals in geological processes. We will discuss their unique properties, analytical techniques to study clays and how they can be used as engineering materials.

We will meet for the first time on Oct 12th at 14:15 in room 2.49 with a short introductory meeting.

Leistungen in Bezug auf das Modul

SL 576051 - Vorlesung und Übung (unbenotet)

121465 VU - Permafrost Landscapes

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Mi	08:30 - 10:00	wöch.	2.27.2.07	14.10.2026	Dr. Jens Strauss, Anna Irrgang
1	SU	Mi	10:15 - 11:45	wöch.	2.27.2.07	14.10.2026	Dr. Jens Strauss, Anna Irrgang

Lerninhalte

Content:

This module offers a comprehensive introduction to the formation, structure, and transformation of permafrost landscapes. It covers fundamental processes related to the freezing and thawing of permafrost soils, including associated fluxes of matter. A central focus is the interaction between water, energy, and matter cycles—and how these influence the emission or uptake of greenhouse gases. Students will explore characteristic landforms of permafrost regions and how they are changing in response to environmental dynamics.

Qualification goals:

Students will acquire advanced knowledge of permafrost formation and properties and will be able to critically reflect on, analyze, and evaluate their significance within the global climate system. They will be capable of describing the geomorphological evolution of permafrost regions and of developing scenarios for past and future changes. Students will gain familiarity with the methods and techniques used to investigate permafrost characteristics and dynamics across various spatial and temporal scales. They will be equipped to participate in both discipline-specific and interdisciplinary discussions, provide constructive feedback on presentations, and critically assess, synthesize, and present scientific literature in this field of science.

Leistungen in Bezug auf das Modul

SL 576051 - Vorlesung und Übung (unbenotet)

GEW-ME04 - Modern Trends in Geosciences

123961 VU - Applied Causal Inference

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
Alle	V	Do	10:00 - 12:00	wöch.	2.70.0.08	15.10.2026	Prof. Dr. Jakob Runge
1	U	Do	12:00 - 14:00	wöch.	2.70.0.08	15.10.2026	Prof. Dr. Jakob Runge
2	U	Do	12:00 - 14:00	wöch.	2.70.0.09	15.10.2026	Sofia Faltenbacher
3	U	Do	12:00 - 14:00	wöch.	2.70.0.09	15.10.2026	Alexandrine Lanson

Leistungsnachweis

Presentation.

Lerninhalte

Leistungen in Bezug auf das Modul	
SL	576061 - Vorlesung und Übung (unbenotet)

GEW-ME05 - Geoscientific Data Science

121422 VU - Advanced Geochemistry

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	Fr	08:30 - 10:00	wöch.	2.27.2.36	16.10.2026	Dr. Martin Jan Timmerman

Kommentar

Content

Whereas the geological evolutions of most other stony planets in our solar system have come to a halt billions of years ago, planet Earth, after 4,5 billion years, is still a dynamic system due to a vigorous mantle convection. Moreover, Earth is first and foremost a *chemical* system and using the tools of geochemistry to solve geological problems, we can understand Earth and how it works.

This course will focus on fundamental processes that gave rise to the characteristic geochemical features of the oceanic and continental crust, and the mantle. It will provide essential insights into magmatic processes (differentiation, assimilation and contamination, partial melting), role and use of major and trace elements, geochemical classification of magmatic rocks, variation diagrams, element behaviour during melting and fractionation, simple fractionation and melting models, selected phase diagrams, the structure and mineralogy of the shallow and deep mantle, generation of basaltic magmas at oceanic spreading ridges, oceanic intraplate magmatism, plume magmatism, continental flood basalts, layered mafic intrusions, magmatism in subduction settings (island arcs and continental arcs), granitoids, continental alkaline magmatism, anorthosites. Furthermore, alkaline vs. sub-alkaline rocks: classification, AFM diagram, alumina saturation index. Introduction to dating methods (Rb-Sr, Sm-Nd), isochrons, introduction to the U-Th-Pb system (decay equations, Concordia diagram), the Lu-Hf system in zircon, the geochemical and Sr-Nd-Pb(-Hf) isotope composition of the continental crust and the different mantle reservoirs. The geochemical evolution of the Earth since Precambrian times will be addressed, and standard analytical techniques will be explained.

Similar to studying mathematics or a foreign language, it is no use studying geochemistry without practicing. For this reason, several carefully prepared home works will be offered, which you can solve alone or in a group. Pitfalls and solutions will be jointly discussed in the lecture of the ensuing week. This home work is not compulsory, but it is nevertheless highly recommended to participate.

The students:

- gain an understanding of the chemical composition of the Earth and other planets, and the chemical processes that affect them
- gain familiarity with analytical methods used for geochemical analyses
- learn to analyse modern research questions in geochemistry by studying the literature on a chosen topic
- are able to critically analyze scientific literature containing geochemical data
- acquire the ability to critically analyse, interpret and present data.

Leistungen in Bezug auf das Modul	
SL	576071 - Vorlesung und Übung (unbenotet)

121425 VU - Basics of Thermodynamics

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	Fr	10:15 - 11:45	wöch.	2.27.2.36	16.10.2026	Prof. Dr. Max Wilke

Kommentar

This course will introduce to the principles of thermodynamics and how they can be used for understanding geological processes. You will learn about the thermodynamical state functions and how they can be determined. We will discuss what controls mineral stability, how mineral reactions can be used to deduce formation conditions of mineral assemblages. All topics will be associated by exercises to enhance understanding.

The course will start on **Fr, Oct 16** .

Moodlepage: https://moodle2.uni-potsdam.de/course/view.php?id=35856

Leistungen in Bezug auf das Modul

SL 576071 - Vorlesung und Übung (unbenotet)

121462 VS - Nonlinear Data Analysis Concepts

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VS	Do	08:30 - 10:00	14t.	N.N.	15.10.2026	Professor Norbert Marwan
	room 2.32.0.33/a						
1	VS	Do	10:15 - 11:45	14t.	N.N.	15.10.2026	Professor Norbert Marwan
	room 2.32.0.33/a						
1	VS	Do	08:30 - 10:00	14t.	N.N.	22.10.2026	Metheus Palmero, Professor Norbert Marwan
	room 2.32.0.33/a						
1	VS	Do	10:15 - 11:45	14t.	N.N.	22.10.2026	Metheus Palmero, Professor Norbert Marwan
	room 2.32.0.33/a						

Voraussetzung

- Basic understanding of mathematical concepts and statistics
- Capable to independently and creatively utilize numerical software like Python, Julia, or MATLAB
- Successful participation of the course "Data Analysis and Statistics" or similar course

Leistungsnachweis

The examination takes the form of a small project work. The project report is expected to be written in the form of a scientific article. To be eligible for the examination, 60% of the practice exercises during the semester must be successfully completed.

Lerninhalte

The lecture introduces the basic concepts of nonlinear dynamics and chaos and how they can be applied for the study of complex systems, spatiotemporal data, and nonlinear interrelationships in geosciences. The specific topics contain

- Basic terminology, dynamical systems, and simple prototypical models
- Dimensions, fractals
- Concept of symbolic dynamics
- Concept of phase space, phase space reconstruction, Lyapunov exponent and correlation sum
- Concept of recurrence in phase space, recurrence plots, recurrence quantification analysis
- Detection of regime transitions, statistical tests
- Concept of synchronization, coupling analysis
- Spatial and spatio-temporal data analysis using recurrence features
- Complex networks, network models, measures, network representations
- Functional networks, reconstruction of networks, climate networks
- Complex networks based time series analysis

Leistungen in Bezug auf das Modul

SL 576071 - Vorlesung und Übung (unbenotet)

121464 VS - Remote Sensing of Permafrost Regions

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Di	08:30 - 10:00	wöch.	N.N.	13.10.2026	Prof. Dr. Guido Große
	room 2.32.0.33/a						

1	SU	Di	10:15 - 11:45	wöch.	N.N.	13.10.2026	Prof. Dr. Guido Große
	room 2.32.0.33/a						

Kommentar

In this module, we will focus on remote sensing of terrestrial regions of the Arctic that are not glaciated but affected by permafrost - about one quarter of the northern hemisphere landmass is part of the permafrost zone and thus a huge diversity of landforms, land cover, processes, and dynamics are encountered that are partially or fully driven by freezing and thawing processes on various spatial and temporal scales. These regions are vast, far away, logistically challenging, and data-sparse. Remote sensing therefore provides important tools to better understand how permafrost regions change in a rapdily warming Arctic and what the local to global feedbacks are.

In this module, you will learn about Arctic Climate Change, the Cryosphere, and Permafrost in particular. Topics will include permafrost region land cover change, disturbances, and trends; Permafrost terrain and landforms; Thaw subsidence and frost heave; Permafrost coastal dynamics; and Thermokarst lake dynamics. You will learn how to use remote sensing data and techniques for characterizing and quantifying landscape dynamics in a rapidly changing Arctic. We will cover high resolution airborne data, high and medium resolution satellite imagery, LiDAR, Big Data and Machine Learning approaches with Google Earth Engine, and an overview into various remote sensing data processing and analysis methods. The remote sensing methods covered in this module can be applied also to other regions on Earth.

You also will work on a specific semester project in a two-student team and work on milestones throughout the semester. The project topic will be selected by you at the beginning of the module and an oral presentation on the project outcome will conclude the project at the semester end.

Voraussetzung

Seminars/Exercises will have a strong focus on Google Earth Engine and GIS Desktop systems. You will need to establish a free Google Earth Engine User Account. You will need to install QGIS on your computer. For one of the seminars on remote sensing of permafrost coastal erosion you will need to install the Digital Shoreline Analysis System (DSAS) on your computer.

Literatur

The module will rely on research papers on remote sensing of permafrost regions. Detailed literature lists will be provided through Moodle. Here are some general literature examples on the topic:

Permafrost: French, H. M. (2007) The Periglacial Environment, 3rd Edition, Wiley, ISBN: 978-0-470-86588-0, 478 pp.

Remote Sensing of Permafrost Regions: Jorgenson MT, Grosse G (2016): Remote Sensing of Landscape Change in Permafrost Regions. Permafrost and Periglacial Processes, 27(4): 324-338. doi: 10.1002/ppp.1914.

Remote Sensing of Permafrost Regions: Westermann S, Duguay C, Grosse G, Kääb A (2015): Remote sensing of permafrost and frozen ground. In: Tedesco M (ed.): Remote sensing of the Cryosphere, pp. 307-344. Hoboken, NJ, Wiley Blackwell, 408 p., doi: 10.1002/9781118368909.ch13.

Lerninhalte

The students will learn about Arctic climate change, the cryosphere, and permafrost; Permafrost landscapes, disturbances, trends; Northern land cover and vegetation; Permafrost terrain and landforms; Thaw subsidence and frost heave; Permafrost coastal dynamics; and Thermokarst lake dynamics. The students will learn to use large amounts of data and techniques for characterizing and quantifying landscape dynamics in a rapidly changing Arctic: We cover high resolution airborne data (aircraft, drones), high and medium resolution satellite imagery (multispectral, SAR), lidar, Big Data approaches with Google Earth Engine, and machine learning methods. The module consists of lectures, hands-on exercises on computer workstations, and practical work on a specific semester project students will be able to select at the beginning of the semester.

We will also have a Repetitorium / Q&A. Students will give a presentation of their remote sensing-themed semester project results. We will conclude the module with a written exam.

Zielgruppe

The module targets remote sensing enthusiasts with an interest in Polar Regions. Ideally, you like to play with diverse remote sensing datasets and are interested in testing and learning new methods. You should enjoy working with Earth Observation imagery as well as bits and bytes. You should already be aware of the importance of climate change in the Arctic. Overall, the remote sensing methods covered in the module are also applicable also in other regions.

Leistungen in Bezug auf das Modul

SL	576071 - Vorlesung und Übung (unbenotet)

121470 VU - Quantification of flow and transport processes for utilisation of the geological subsurface

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Mo	08:30 - 10:00	wöch.	2.27.2.37/38	12.10.2026	Prof. Dr. Michael Kühn, Dr.-Ing. Thomas Kempka
1	U	Mo	10:15 - 11:45	wöch.	2.27.2.37/38	12.10.2026	Dr.-Ing. Thomas Kempka
1	B	N.N.	N.N.	Einzel	N.N.	N.N.	Dr.-Ing. Thomas Kempka

Kommentar

Bei Interesse an der Veranstaltung bitte unbedingt per Mail bei mir (kempka1@uni-potsdam.de) melden, um **Informationen zum virtuellen Veranstaltungsort** zu erhalten.

Please contact me via mail (kempka1@uni-potsdam.de) if you are interested in participating to receive **information on virtual lecture room** .

Rückfragen zur Veranstaltung beantworte ich gerne via E-Mail.

Voraussetzung

Grundlegende Kenntnisse in den Geowissenschaften, Mathematik, Chemie und Physik. Der erfolgreiche Besuch der Kurse MGEW06 und MGEW20 ist hilfreich, aber nicht zwingend für die Veranstaltung notwendig.

Literatur

Ingebritsen, Sanford, Neuzil (2006) Groundwater in Geologic Processes, Cambridge University Press (mehrere Exemplare sind in der Bibliothek verfügbar).Weitere Literatur wird digital zur Verfügung gestellt.

Leistungsnachweis

Der Leistungsnachweis erfolgt über **Projektarbeiten in Gruppenform** einschließlich eines Abschlussprojekts mit **schriftlicher Ausarbeitung und mündlicher Präsentation** .

Lerninhalte

Dieses Modul vermittelt grundlegende Kenntnisse zur quantitativen Betrachtung von Prozessen in tiefen Grundwassersystemen mithilfe von analytischen und numerischen Modellen, welche im Rahmen der Veranstaltung durch die Studierenden unter Anleitung erarbeitet werden (Programmiersprache Python, keine Vorkenntnisse notwendig). Die erforderlichen mathematischen Grundlagen werden nachvollziehbar aufgefrischt und die Anwendung der Finite-Differenzen-Methode zur Erstellung numerischer Simulationsmodelle wird anhand zahlreicher praxisrelevanter Programmierbeispiele erarbeitet.

Zielgruppe

Studierende **MS GEW** und **MS GEE** mit Interesse an den Grundlagen zur quantitativen Beschreibung der wesentlichen Prozesse in tiefen geologischen Grundwassersystemen mithilfe numerischer Simulationen.

Leistungen in Bezug auf das Modul

SL 576071 - Vorlesung und Übung (unbenotet)

GEW-ME06 - Special Remote Methods in Geosciences

121431 VU - Earth Surface Deformation and Radar Satellite Interferometry (InSAR) (Block)

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	N.N.	08:30 - 16:30	Block	N.N.	05.10.2026	Dr. Sabrina Metzger
	room 2.32.0.33/a						

Kommentar

You will learn the basic theory of, and how to get access to, process, interpret and model radar interferometric (InSAR) data to study crustal deformation phenomena like earthquakes, volcanic inflation, and interseismic strain accumulation. We will work with the open source software SNAP , kite and talpa from the pyrocko-software-suite. A basic knowledge of MATLAB and shell scripting is advantageous, but not mandatory.

The main part will be taught in a 1-week-block course before the semester, plus some additional seminars during the semester. After familiarizing yourself with the processing routines during the block course you will pursue a personal project study during the semester and deliver a report on it. Additional SAR and InSAR methods and aspects will be touched in a student presentation cycle.

Literatur

Hanssen, R. F. (2001), Radar Interferometry - Data interpretation and Error Analysis, Kuwer Academic Publishers, ISPB 0-7923-6945-9

Franceschetti, G., Lanari, R. (1999), Synthetic Aperture Radar processing, CRC Press, ISBN 0-8493-7899-0

Leistungsnachweis

Oral presentation, written report, oral exam

Leistungen in Bezug auf das Modul

SL 576081 - Vorlesung und Übung (unbenotet)

121432 VS - Earth Surface Deformation and Radar Satellite Interferometry (InSAR)

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VS	Di	14:15 - 17:45	14t.	N.N.	20.10.2026	Dr. Sabrina Metzger
	room 2.32.0.33/a						

Kommentar

You will learn how to get access to, process, interpret and model radar interferometric data to study crustal deformation phenomena like earthquakes, volcanic inflation, and interseismic strain accumulation. We will work with the open source software SNAP , kite and talpa from the pyrocko-software-suite. A basic knowledge of MATLAB and shell scripting is advantageous, but not mandatory.

The main part will be taught in a 1-week-block course before the semester, plus some additional seminars during the semester. After familiarizing yourself with the processing routines during the block course you will pursue a personal project study during the semester and deliver a report on it. Additional SAR and InSAR methods and aspects will be touched in a student presentation cycle.

Literatur

Hanssen, R. F. (2001), Radar Interferometry - Data interpretation and Error Analysis, Kuwer Academic Publishers, ISPB 0-7923-6945-9
Franceschetti, G., Lanari, R. (1999), Synthetic Aperture Radar processing, CRC Press, ISBN 0-8493-7899-0

Leistungsnachweis

Oral presentation, written report, oral exam

Leistungen in Bezug auf das Modul

SL 576081 - Vorlesung und Übung (unbenotet)

GEW-ME07 - Special Topics in Geosciences

121424 VU - Applied Mineralogy and Cultural Heritage

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Di	08:30 - 10:00	wöch.	2.27.2.49	13.10.2026	Prof. Dr. Steffen Laue, Prof. Dr. Max Wilke, Dr. rer. nat. Wolfgang Morgenroth

Abkürzungen entnehmen Sie bitte Seite 5

1	U	Di	10:15 - 11:45	wöch.	2.27.2.49	13.10.2026	Prof. Dr. Steffen Laue, Prof. Dr. Max Wilke, Dr. rer. nat. Wolfgang Morgenroth

Kommentar

Many minerals and rocks are used as building materials or as materials in general. Historical buildings and artifacts are subject to weathering or general deterioration due to environmental influence.

This course will introduce into mineralogical work on samples dealing with problems in cultural heritage, restoration and conservation. It will introduce to the field of building stones, cements and plaster, pigments and other materials. Further, there will be practical exercises with various methods on realistic samples.

Bemerkung

This course will start on **Tuesday, 13th of October** at **9:00 h** in room **2.49** with an introduction of 30 - 45 min.

Details (place and time) for the other dates will be announced during this event.

Leistungen in Bezug auf das Modul

SL 576091 - Vorlesung und Übung (unbenotet)

121426 VS - Coastal Dynamics

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Mi	14:15 - 15:45	wöch.	2.27.2.07	14.10.2026	Prof. Dr. Hugues Lantuit
1	S	Mi	16:15 - 17:45	wöch.	2.27.2.07	14.10.2026	Prof. Dr. Hugues Lantuit

Kommentar

This course is meant to provide future practitioners with a holistic understanding of coastal change and its implications. It is geared towards students in several fields taught at the university, including geoscience, remote sensing and geoecology

1) Skills:
The students will learn basic concepts of coastal geomorphology and coastal processes. They will learn about the relevance of these processes in the real world and the methods used to study and/or address them

2) Methods:
The students will learn how to quantitatively analyze wave dynamics, sediment transport and coastline dynamics

3) The students will be able to use the skills taught in the course to devise holistic studies of coastal dynamics, understanding coastal processes and their implications for coastal management

The lecture will cover the following topics:

- Coastal classifications
- Shoreline definitions
- Tectonics and coasts
- Coastal landforms
- Sea level change / Bruun rule
- Wave theory
- Littoral sediment budgets and cells
- Wave energy and energy flux
- Wave refraction and wave breaking
- Wave set-up, set-down and run-up
- Shoreface profiles
- Cross-shore sediment transport
- Nearshore currents
- Longshore currents
- Coastal engineering and coastal protection
- Coastal ecology – aquatic ecosystems
- Coastal ecology – subaerial ecosystems
- Coastal biogeochemistry – natural carbon and nutrient influx
- Coastal biogeochemistry – anthropogenic fluxes and eutrophication
- Coasts and climate change - adaptation and mitigation strategies
- Legal statuses of coastal systems
- Coastal conservation
- Integrated Coastal Zone Management (ICZM)
- Legal statuses of coastal systems
- Coastal conservation

1) Fachkompetenzen:
Die Studierenden kennen die Grundlagetheorie der Küstenmorphologie sowie der Küstenprozesse, kennen wichtige Anwendungsfälle und können die einschlägigen Methoden verstehen.

2) Methodenkompetenzen
Die Studierenden können Sedimenttransport und Küstenliniendynamik quantitativ analysieren.

3) Handlungskompetenzen
Mit den erworbenen Fach- und Methodenkompetenzen können die Studenten eigenverantwortlich eine integrierte Studie zur Küstenbewegung planen, die relevante Aufgabenstellung setzen und diese selbständig bearbeiten.

Die Vorlesung wird sich mit folgenden Aspekte der Küstendynamik befassen:
- Coastal classifications
- Shoreline definitions
- Tectonics and coasts
- Coastal landforms
- Sea level change / Bruun rule
- Wave theory
- Littoral sediment budgets and cells
- Wave energy and energy flux
- Wave refraction and wave breaking
- Wave set-up, set-down and run-up
- Shoreface profiles
- Cross-shore sediment transport
- Nearshore currents
- Longshore currents
- Coastal engineering and coastal protection
- Coastal ecology – aquatic ecosystems
- Coastal ecology – subaerial ecosystems
- Coastal biogeochemistry – natural carbon and nutrient influx
- Coastal biogeochemistry – anthropogenic fluxes and eutrophication
- Coasts and climate change - adaptation and mitigation strategies
- Legal statuses of coastal systems
- Coastal conservation
- Integrated Coastal Zone Management (ICZM)
- Legal statuses of coastal systems
- Coastal conservation

Abkürzungen entnehmen Sie bitte Seite 5

Leistungen in Bezug auf das Modul

SL 576091 - Vorlesung und Übung (unbenotet)

121488 VU - Visualization and Communication (MS GSC)

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Do	12:30 - 14:00	wöch.	2.27.1.10	15.10.2026	Prof. Dr. Martin Trauth
1	U	Do	14:15 - 15:45	wöch.	2.27.1.10	15.10.2026	Prof. Dr. Martin Trauth

Kommentar

The course syllabus is based on the instructor's textbook and includes literature and data research, identifying scientific and controversial material, drafting a data analysis project, using modern visualization techniques, and presentation techniques for an expert or lay audience as well as decision-makers. The course, which has been redesigned in light of recent developments, now incorporates the use of artificial intelligence across all subject areas.

Literatur

Trauth, M.H., Sillmann, E. (2026) Collecting, Processing and Presenting Geoscientific Information with MATLAB® – Third Edition. Springer International Publishing, ISBN 978-3-662-73932-7. Due: 22 Oct 2026

Trauth, M.H., Sillmann, E. (2026) Collecting, Processing and Presenting Geoscientific Information with Python – First Edition. Springer International Publishing, ISBN 978-3-032-27914-9. Due: 12 Sep 2026

Bemerkung

The course consists of three parts:

(1) Lectures and demos on Thursdays 12:30-15:45 in person in room 2.27.1.10 and live on Zoom.

(2) Q/A and student's weekly challenges.

(3) Seminar with invited lectures / departmental colloquium.

Leistungen in Bezug auf das Modul

SL 576091 - Vorlesung und Übung (unbenotet)

122188 PR - Environmental Mineralogy (Praktikum)

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	PR	Mi	08:15 - 10:30	wöch.	N.N.	14.10.2026	Prof. Dr. Stefan Norra
	same room as Umweltmineralogie (German): building 1, room 1.15						

Leistungen in Bezug auf das Modul

SL 576091 - Vorlesung und Übung (unbenotet)

122189 S - Environmental Mineralogy (seminar)

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	S	Mi	10:45 - 11:45	wöch.	N.N.	14.10.2026	Prof. Dr. Stefan Norra
	same room as Umweltmineralogie (German): building 1, room 1.15						

Leistungen in Bezug auf das Modul

SL 576091 - Vorlesung und Übung (unbenotet)

GEW-ME08 - Monitoring Techniques and Data Analysis in Geosciences

121430 VU - Earthquake and Volcano Deformation

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	Mi	14:15 - 15:45	wöch.	2.27.2.37/38	14.10.2026	Prof. Dr. Thomas Walter
1	VU	Mi	16:15 - 17:45	wöch.	2.27.2.37/38	14.10.2026	Prof. Dr. Thomas Walter

Kommentar

Volcanoes and earthquakes deform on different scales. Magma chambers inflate and cause a volcano to rise. Faults are displaced and cause surface deformation. Slow changes such as cooling, compaction, or creep lead to major landforms on geologic time scales.
The goal of this module is to better understand deformation processes and learn basic techniques and data analysis methods for quantifying them. This module provides an introduction to volcanic and tectonic deformation processes, with a special emphasis on cross-disciplines that include geological field observations, geodetic monitoring technologies, and geophysical interpretation tools.
Geologic and geophysical field techniques as well as active and passive remote sensing methods are explained and applied to study deformation processes related to gravity tectonics, spreading, body forces, magma tectonics, dyke emplacement and cooling, and faulting associated with earthquakes and slip events. In addition, the course examines the couplings between volcanoes and tectonic processes.
The student will learn many different techniques and analysis approaches, from manual pixel and feature tracking, to image cross correlation and particle image velocimetry, to topography change and DEM of difference analysis, to radar interferometry (InSAR), and finally gain insight into basic modeling techniques.
During the course, theory and examples will be explained by the instructor, followed by group work in class and a small weekly homework assignment to practice the analysis.
The main objectives of the course are (1) to gain a better understanding of the processes and sources associated with volcanoes and earthquakes, (2) to gain an overview of commonly used and innovative methods for quantifying and analyzing deformation, and (3) to train creative thinking and selection strategies for data and methods.
Detailed materials for the online course, data and tools, weekly homeworks and results are available on the Moodle site (Earthquake and Volcano Deformation).

Voraussetzung

Being enthusiastic about volcanoes and earthquakes, and learning new technologies of deformation analysis

Literatur

Segall, P. 2010, Earthquake and Volcano Deformation, Princeton University Press, 456 pp.; Dzurisin, D. 2006, Volcano Deformation, Springer Verlag, 256pp.; additional materials will be posted on the course website

Lerninhalte

More details and exchange of materials will be provided on the moodle pages related to the course .

Zielgruppe

Students in all fields of Geosciences, from Geophysics, Remote Sensing, Geology and others are warmly welcome!

Leistungen in Bezug auf das Modul

SL 576101 - Vorlesung und Übung (unbenotet)

121459 VU - Micro-analytical Methods and X-ray Powder Diffraction

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	Mo	10:15 - 11:45	wöch.	2.27.2.49	12.10.2026	Georgii Kovalskii, Dr. rer. nat. Christian Ronny Singer
1	VU	Do	16:15 - 17:45	wöch.	2.27.0.29/30	15.10.2026	Dr. rer. nat. Wolfgang Morgenroth
1	U	N.N.	N.N.	Einzel	N.N.	N.N.	Dr. Martin Jan Timmerman, Dr. rer. nat. Christina Günter

Abkürzungen entnehmen Sie bitte Seite 5

Kommentar

This course consists of two parts in the winter semester: ‘Micro-analytical Methods’ and ‘X-ray Powder Diffraction’.

On Monday, October 12 th, we meet at 10:15 in room 2.49 (i.e. as scheduled) for an overview of the module, including a lab tour. All students interested in this module are asked to attend this meeting, as we will also arrange times for the practical hands-on training!!!

‘Micro-analytical Methods’ consists of a lecture and practical hands-on training on the Electron Microscope, Scanning Electron Microscope and Raman. The lecture will be held on **M ondays** at **10:15** a.m. in room **2.49** (building 27).

‘X-ray Powder Diffraction’ will start on **Thursday** , **October 15th** , in room **0.29/30, 16:15** a.m.

Learning goals ‘X-ray Powder Diffraction’:

- refresher in crystallography
- data collection methods in powder diffraction
- information content of a diffraction pattern (profile parameters, structure factors, background)
- least squares method and software for Le Bail- and Rietveld-refinement
- data treatment (data from software tutorials, data collected in practical part)
- practical part: X-ray Powder Diffraction

At the end of the course, you will be able to refine an X-ray powder diffractogram and discuss your results.

Learning goals ‘Micro-analytical Methods’:

- introduction to the following micro-analytical methods: Scanning Electron Microscopy (SEM), Electron Probe Micro Analysis (EPMA, Cathodoluminescence (CL) and Raman
- phase identification, qualitative and quantitative chemical analyses
- understanding limitations, uncertainties, detection limits and errors
- independent interpretation of (mineral) analyses

Voraussetzung

There are no prerequisites for this course.
Nevertheless, you should have refreshed your knowledge in crystallography on a BSc level before the course starts.
Recommended reading: F. Donald Bloss 'Crystallography and Crystal Chemistry'.

Literatur

For the PXRD part, be familiar with the basics of crystallography on a BSc level.
Recommended reading: F. Donald Bloss 'Crystallography and Crystal Chemistry'.

Additionally, at the beginning of the course, we will refresh our knowledge of crystallography.

Leistungen in Bezug auf das Modul

SL	576101 - Vorlesung und Übung (unbenotet)

121466 V - Planetary Remote Sensing

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Mi	12:15 - 13:45	wöch.	2.27.1.10	14.10.2026	Prof. Dr. Gabriele Arnold, Dr. Solmaz Adeli
1	EX	N.N.	N.N.	Einzel	N.N.	N.N.	Prof. Dr. Gabriele Arnold

Kommentar
The lecture is intended for Master students of Earth Sciences and the course Remote Sensing, Geoinformation and Visualization. The lecture covers the basics of remote sensing with a focus on the specifics of planetary remote sensing. The course will also focus on the inner solar system and its exploration using the developed methods. The course includes a field trip to the Institute of Planetary Research of the German Aerospace Center (DLR) in Berlin-Adlershof.
Literatur
Literature will be announced during the lecture.
Lerninhalte
Fundamentals of planetary remote sensing and inner solar system.
Leistungen in Bezug auf das Modul
SL 576101 - Vorlesung und Übung (unbenotet)

Abkürzungen entnehmen Sie bitte Seite 5

Glossar

Die folgenden Begriffserklärungen zu Prüfungsleistung, Prüfungsnebenleistung und Studienleistung gelten im Bezug auf Lehrveranstaltungen für alle Ordnungen, die seit dem WiSe 2013/14 in Kranft getreten sind.

Prüfungsleistung	Prüfungsleistungen sind benotete Leistungen innerhalb eines Moduls. Aus der Benotung der Prüfungsleistung(en) bildet sich die Modulnote, die in die Gesamtnote des Studiengangs eingeht. Handelt es sich um eine unbenotete Prüfungsleistung, so muss dieses ausdrücklich („unbenotet“) in der Modulbeschreibung der fachspezifischen Ordnung geregelt sein. Weitere Informationen, auch zu den Anmeldemöglichkeiten von Prüfungsleistungen, finden Sie unter anderem in der Kommentierung der BaMa-O
Prüfungsnebenleistung	Prüfungsnebenleistungen sind für den Abschluss eines Moduls relevante Leistungen, die – soweit sie vorgesehen sind – in der Modulbeschreibung der fachspezifischen Ordnung beschrieben sind. Prüfungsnebenleistungen sind immer unbenotet und werden lediglich mit "bestanden" bzw. "nicht bestanden" bewertet. Die Modulbeschreibung regelt, ob die Prüfungsnebenleistung eine Teilnahmevoraussetzung für eine Modulprüfung oder eine Abschlussvoraussetzung für ein ganzes Modul ist. Als Teilnahmevoraussetzung für eine Modulprüfung muss die Prüfungsnebenleistung erfolgreich vor der Anmeldung bzw. Teilnahme an der Modulprüfung erbracht worden sein. Auch für Erbringung einer Prüfungsnebenleistungen wird eine Anmeldung vorausgesetzt. Diese fällt immer mit der Belegung der Lehrveranstaltung zusammen, da Prüfungsnebenleistung im Rahmen einer Lehrveranstaltungen absolviert werden. Sieht also Ihre fachspezifische Ordnung Prüfungsnebenleistungen bei Lehrveranstaltungen vor, sind diese Lehrveranstaltungen zwingend zu belegen, um die Prüfungsnebenleistung absolvieren zu können.
Studienleistung	Als Studienleistung werden Leistungen bezeichnet, die weder Prüfungsleistungen noch Prüfungsnebenleistungen sind.

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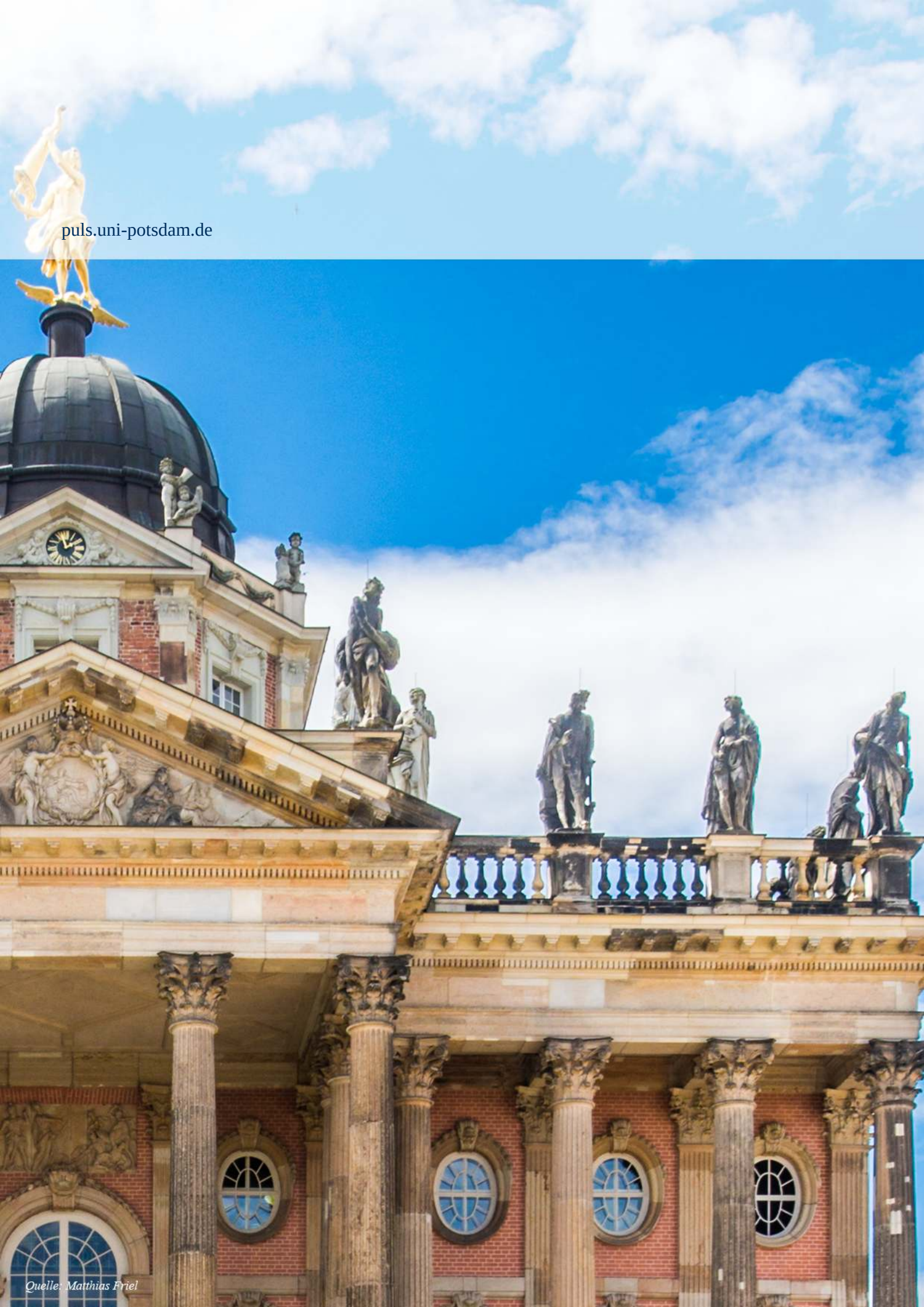

Quelle: Matthias Friel