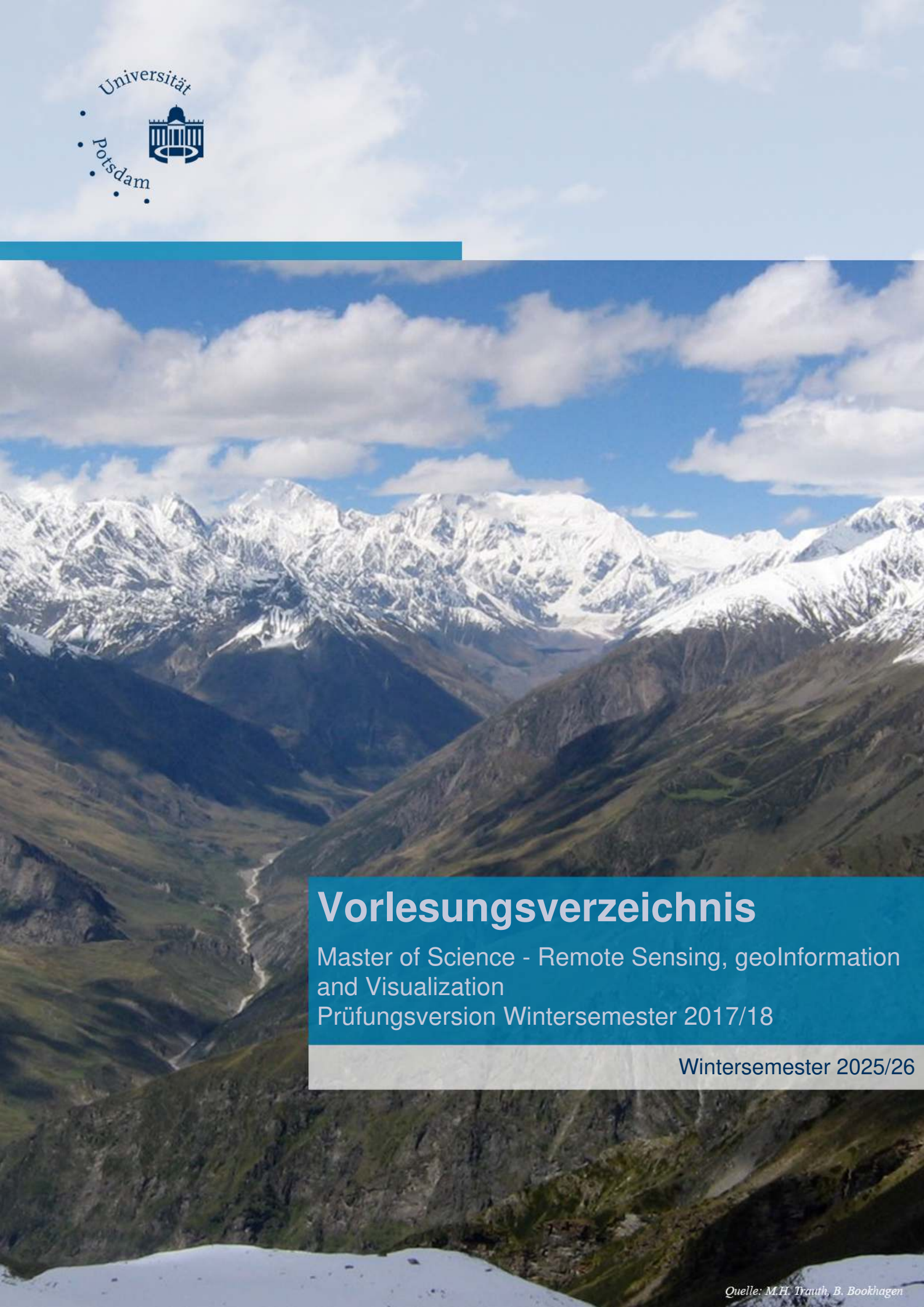

Vorlesungsverzeichnis

Master of Science - Remote Sensing, geoInformation and Visualization
Prüfungsversion Wintersemester 2017/18

Wintersemester 2025/26

Quelle: M.H. Trauth, B. Bookhagen

Inhaltsverzeichnis

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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
VE	Vorlesung/Exkursion
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-RCM01 - Remote Sensing of the Environment

115792 VU - Remote Sensing of the Environment

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Mo	12:15 - 13:45	wöch.	2.27.1.10	13.10.2025	Prof. Dr. Bodo Bookhagen
1	U	Mo	14:15 - 15:45	wöch.	2.27.1.10	13.10.2025	Prof. Dr. Bodo Bookhagen

Leistungen in Bezug auf das Modul

PNL 574412 - Übung zu ausgewählten Themen (unbenotet)

GEW-RCM02 - Earth System Science

116204 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	14.10.2025	Prof. Dr. Bodo Bookhagen
1	V	Di	16:15 - 17:45	14t.	2.27.1.10	14.10.2025	Prof. Dr. Bodo Bookhagen
1	S	Di	16:15 - 17:45	14t.	2.27.1.10	21.10.2025	Prof. Dr. Bodo Bookhagen

Leistungen in Bezug auf das Modul

PNL 574512 - Seminare zu ausgewählten Themen (unbenotet)

GEW-RCM03 - Data Analysis and Statistics

115783 VU - Data Analysis and Statistics (MS RGV)

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	U	Fr	08:30 - 16:00	14t.	2.27.0.29/30	24.10.2025	Dr. rer. nat. Aljoscha Rheinwalt
1	VU	N.N.	N.N.	Block	N.N.	N.N.	Dr. rer. nat. Aljoscha Rheinwalt

Leistungen in Bezug auf das Modul

PNL 574612 - Vorlesung und Übung (unbenotet)

GEW-RCM04 - Geoinformation Systems

116743 VU - Geoinformation Systems

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	Mi	08:30 - 10:00	wöch.	2.27.0.29/30	15.10.2025	Dr. rer. nat. Wolfgang Schwanghart
1	VU	Mi	10:15 - 11:45	wöch.	2.27.0.29/30	15.10.2025	Dr. rer. nat. Wolfgang Schwanghart

Leistungen in Bezug auf das Modul

PNL 574711 - Geoinformation Systems - Vorlesung und Übung (unbenotet)

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GEW-RCM05 - Visualiziation and Communication

115818 VU - Visualization and Communication (MS RGV)

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Do	12:30 - 14:00	wöch.	2.27.1.10	16.10.2025	Prof. Dr. Manfred Strecker, Prof. Dr. Bodo Bookhagen
1	U	Do	14:15 - 15:45	wöch.	2.27.1.10	16.10.2025	Prof. Dr. Manfred Strecker, Prof. Dr. Bodo Bookhagen

Kommentar

Leistungen in Bezug auf das Modul

SL 574811 - Vorlesung und Übung (unbenotet)

Wahlpflichtmodule

Wahlbereich: Remote sensing Methods

GEW-RSM01 - Optical Remote Sensing

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-RSM02 - Terrestrial and Airborne Lidar and Photogrammetry Systems

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-RSM04 - Earth Surface Deformation and Radar Satellite Interferometry (InSAR)

115812 VS - Earth Surface Deformation and Radar Satellite Interferometry (InSAR)

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VS	Di	14:15 - 15:45	14t.	2.27.0.29/30	28.10.2025	Dr. Sabrina Metzger, Dr. Carlos Raul Pena Hormazabal
1	VS	Di	16:15 - 17:45	14t.	2.27.0.29/30	28.10.2025	Dr. Sabrina Metzger, Dr. Carlos Raul Pena Hormazabal

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

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Leistungsnachweis

Oral presentation, written report, oral exam

Leistungen in Bezug auf das Modul

PNL 575112 - Seminar (unbenotet)

115813 VU - Earth Surface Deformation and Radar Satellite Interferometry (InSAR) (Block)

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	N.N.	09:00 - 17:00	Block	2.27.0.29/30	06.10.2025	Dr. Sabrina Metzger, Dr. Carlos Raul Pena Hormazabal

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

PNL 575111 - Blockkurs oder Vorlesung mit Übung (unbenotet)

GEW-RSM05 - Advanced Topics of Remote Sensing

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

Wahlbereich: Objects of Observation

BIO-OBS03 - Biosphere of the Earth

116202 V - Wissenschaftliche Grundlagen des Naturschutzes

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Mi	12:15 - 13:45	wöch.	5.03.1.04	15.10.2025	Dr. Kolja Bergholz

Kommentar

Note: This lecture is also an optional part of the EEC module Scientific nature conservation , see module book. The lecture is in German but English slides will be provided via moodle.

Leistungen in Bezug auf das Modul

SL 549091 - Vorlesung zur Biosphäre der Erde (unbenotet)

GEE-OBS01 - Soilscape Processes

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-OBS02 - Erosion and Earth surface dynamics

115790 VU - Earth Surface Processes

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	Di	12:30 - 14:00	wöch.	2.27.2.36	14.10.2025	Prof. Dr. Pieter van der Beek, Prof. Dr. Taylor Schildgen
1	VU	Di	14:15 - 15:45	wöch.	2.27.2.36	14.10.2025	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 573611 - Erosion and Earth surface dynamics - Vorlesung und Seminar (unbenotet)

GEW-OBS04 - Remote Sensing of Permafrost Regions

115809 VS - Remote Sensing of Permafrost Regions

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Di	08:30 - 10:00	wöch.	2.27.0.29/30	14.10.2025	Prof. Dr. Guido Große
1	SU	Di	10:15 - 11:45	wöch.	2.27.0.29/30	14.10.2025	Prof. Dr. Guido Große

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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

PNL 573712 - Seminar zum Projektverlauf (unbenotet)

GEW-OBS05 - Earthquake and Volcano deformation

115820 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	15.10.2025	Prof. Dr. Thomas Walter
1	VU	Mi	16:15 - 17:45	wöch.	2.27.2.37/38	15.10.2025	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 WS24-25).

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

PNL 573811 - Vorlesung und Seminar (unbenotet)

GEW-OBS06 - Earth Magnetic Field and Physics of the Upper Atmosphere

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-OBS08 - Planetary Remote Sensing

115819 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	15.10.2025	Prof. Dr. Gabriele Arnold, Dr. Solmaz Adeli
1	EX	N.N.	N.N.	Einzel	N.N.	N.N.	Prof. Dr. Gabriele Arnold

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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

PNL 574011 - Planetary Remote Sensing - Vorlesung und Übung (unbenotet)

GEW-OBS09 - Planetary Physics

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEE-M-V02 - Atmospheric Science in the Anthropocene

114801 VS - Atmospheric Science in the Anthropocene

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Do	14:00 - 15:30	wöch.	2.05.1.08	16.10.2025	Prof. Dr. Mark Lawrence
1	S	Do	15:45 - 17:15	wöch.	2.05.1.08	16.10.2025	Prof. Dr. Mark Lawrence

Kommentar

This lecture and exercise are part of the module "GEE-M-V02: Atmospheric Science in the Anthropocene". Module description (in German) | Module description (in English)

The course provides an overview of the main topics of atmospheric sciences in the context of global change will include: Basic principles of meteorology (meteorological elements, primitive equation theorem, horizontal and vertical structure of the atmosphere); atmospheric dynamics; weather systems; atmospheric composition and atmospheric chemistry; chemistry-climate interactions; and broader topics such as extreme air pollution, climate engineering, and the link between atmospheric science and society. Seminar presentations will refer to the IPCC WG-1 report. Recommended textbook: "Atmospheric Science, an Introductory Survey", by Wallace and Hobbs. (The book will be used mainly for the first half of the lecture, after which more specialised literature will be used).

Leistungen in Bezug auf das Modul

PNL 564711 - Vorlesung und Seminar (unbenotet)

GEW-OBS11 - Advanced Topics of Objects of Observations

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-MGEW26 - Coastal dynamics

115815 VS - Coastal Dynamics

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Mi	14:15 - 15:45	wöch.	2.27.1.10	15.10.2025	Prof. Dr. Hugues Lantuit
1	S	Mi	16:15 - 17:45	wöch.	2.27.1.10	15.10.2025	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
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- Coastal conservation
- Integrated Coastal Zone Management (ICZM)
- Legal statuses of coastal systems
- Coastal conservation

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Leistungen in Bezug auf das Modul

PNL 572511 - Vorlesung und Seminar (unbenotet)

Wahlbereich: Data Analysis and Programming

MAT-DAP01 - Bayesian Inference and Data Assimilation

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-DAP02 - Nonlinear Data Analysis Concepts

115810 VS - Nonlinear Data Analysis Concepts

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VS	Do	08:30 - 10:00	wöch.	2.27.0.29/30	16.10.2025	Professor Norbert Marwan, Metheus Palmero
1	VS	Do	10:15 - 11:45	wöch.	2.27.0.29/30	16.10.2025	Professor Norbert Marwan, Metheus Palmero

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

PNL 572711 - Vorlesung und Seminar (unbenotet)

GEW-DAP03 - Big Data Analytics

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-DAP04 - Spatial data analysis with numerical methods

116208 VU - Spatial data analysis with numerical methods

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	N.N.	09:00 - 17:00	Block	2.27.0.29/30	09.02.2026	Dr. rer. nat. Aljoscha Rheinwalt

Kommentar

This seminar en block will take place on six full days in February in the computer lab of house 27 (ground floor). The dates are the 9th, 10th, 12th, 13th, 19th and 20th of February.

Leistungen in Bezug auf das Modul

PNL 572911 - Vorlesung und Übung (unbenotet)

GEW-DAP05 - Advanced Topics of Data Analysis and Programming

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-DAP06 - Earth Surface Process Modelling

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

Wahlbereich: Geoinformation System and Applications

GEE-GIS03 - Environmental Spatial Statistics and Models

116742 VU - Environmental Spatial Statistics and Models

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	Mo	14:15 - 15:45	wöch.	2.27.0.29/30	13.10.2025	Dr. rer. nat. Wolfgang Schwanghart
1	VU	Mo	16:15 - 17:45	wöch.	2.27.0.29/30	13.10.2025	Dr. rer. nat. Wolfgang Schwanghart

Leistungen in Bezug auf das Modul

PNL 573314 - Spatial statistics (unbenotet)

GEW-GIS01 - Analysis of Digital Elevation Models

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-GIS02 - Mapping and Geoinformation Systems (expiring module)

Dieses Modul gilt, aufgrund einer Änderungssatzung, nur noch für Studierende, die das Modul vor dem 01.10.2025 begonnen haben. Das Modul läuft spätestens am 30.09.2027 aus.

115793 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	17.10.2025	Dr. Gerold Zeilinger
1	U	Fr	11:15 - 12:00	wöch.	2.25.D0.01	17.10.2025	Dr. Gerold Zeilinger
1	SU	Fr	12:15 - 13:45	wöch.	2.25.D0.01	17.10.2025	Dr. Gerold Zeilinger

Kommentar

Main topics are: design of GIS-database, GIS content management, data distribution with GIS-servers, integration of modeling results in GIS, analyses of river networks and geomorphic parameters, analysis of structural data, remote sensed imagery interpretation and digital elevation model extraction, integration of LIDAR data and utilization of geological 3D models in immersive visualization environments.

Leistungen in Bezug auf das Modul

PNL 573212 - Mapping and Geoinformation Systems - Vorlesung und Übung (unbenotet)

GEW-GIS05 - Advanced Topics of Geographic Information Systems

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-MF014 - Geo-Information Systems

115793 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	17.10.2025	Dr. Gerold Zeilinger
1	U	Fr	11:15 - 12:00	wöch.	2.25.D0.01	17.10.2025	Dr. Gerold Zeilinger
1	SU	Fr	12:15 - 13:45	wöch.	2.25.D0.01	17.10.2025	Dr. Gerold Zeilinger

Kommentar

Main topics are: design of GIS-database, GIS content management, data distribution with GIS-servers, integration of modeling results in GIS, analyses of river networks and geomorphic parameters, analysis of structural data, remote sensed imagery interpretation and digital elevation model extraction, integration of LIDAR data and utilization of geological 3D models in immersive visualization environments.

Leistungen in Bezug auf das Modul

PNL 576331 - Seminar und Übung (unbenotet)

Wahlbereich: Visualization and Communication Methods

GEW-VCM01 - Examples of Visualization and Communication Methods

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

GEW-VCM02 - Industry Internship or Practical Application

116206 PR - Industry Internship or Practical Application

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	PR	N.N.	N.N.	Einzel	N.N.	N.N.	Prof. Dr. Bodo Bookhagen

Leistungen in Bezug auf das Modul

SL 575411 - Praktikum (mind. 3 Wochen) (unbenotet)

GEW-VCM03 - Extended Industry Internship or Practical Application

116207 PR - Extended Industry Internship or Practical Application

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	PR	N.N.	N.N.	Einzel	N.N.	N.N.	Prof. Dr. Bodo Bookhagen

Leistungen in Bezug auf das Modul

SL 575511 - Praktikum (mind. 3 Wochen) (unbenotet)

GEW-VCM04 - Advanced Topics of Visualization and Communication Methods

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

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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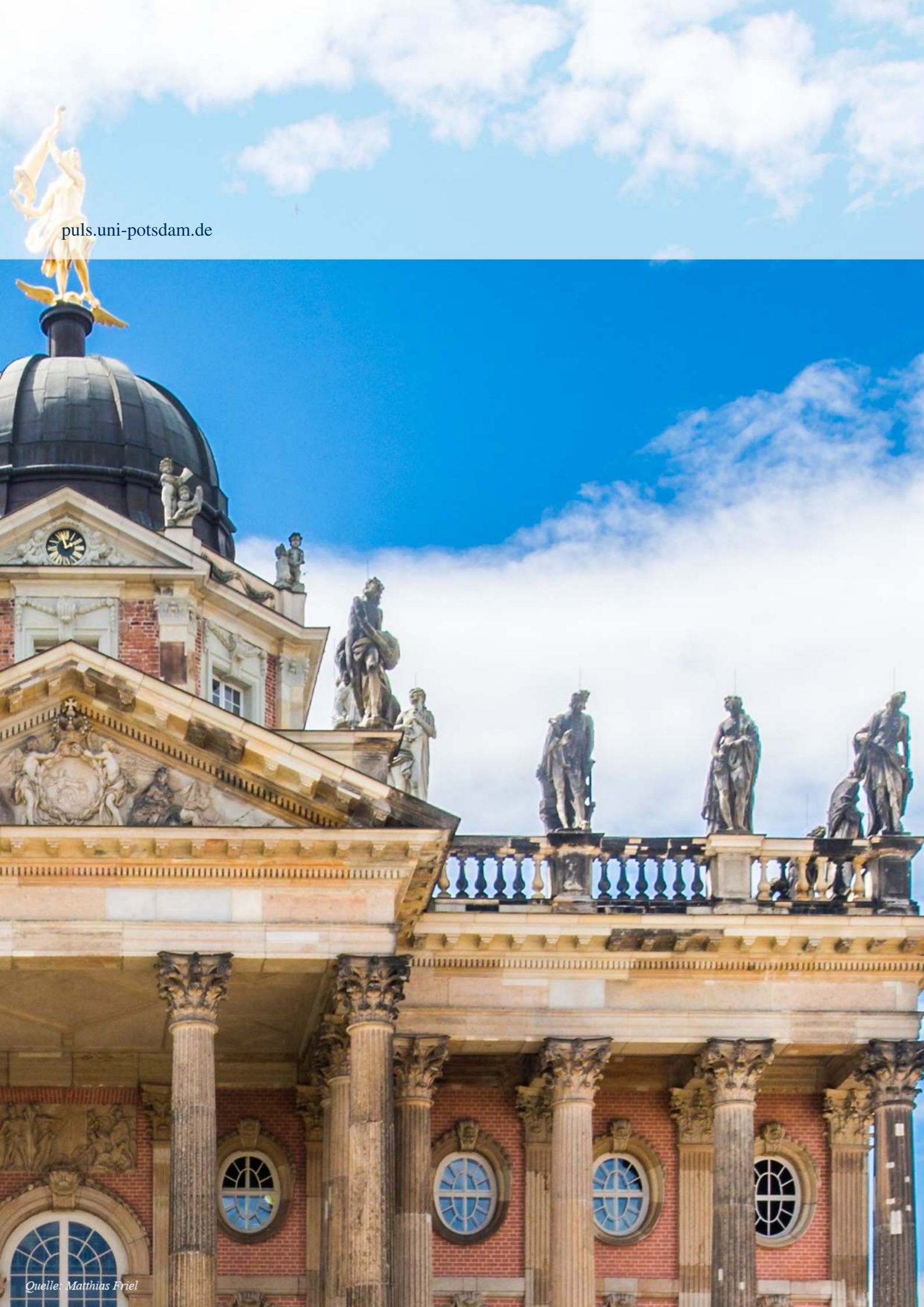

Quelle: Matthias Friel