

M.Sc. Polar and Marine Sciences

POMOR

Semester in Germany

Potsdam University

Contact

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Term 1 (WS) Russia, St. Petersburg State University	Module 1 Ocean basins, sediments and climate change CP 9	Module 2 High seas and coastal waters oceanography CP 9	Module 3 Polar and marine ecosystem: structure, functioning and vulnerability CP 9	Core Module Part 1 CP 2/6
Term 2 (SS) Russia, St. Petersburg State University	Module 4 Natural resources CP 9	Module 5 Processes in the coastal zone and environmental management CP 9	Module 6 Periglacial environment CP 9	Core Module Part 2 incl. field practice in Russia or Germany CP 4/6
Term 3 (WS) Germany, Partner universities	Semester abroad at one of the partner universities and institutions in Germany, Specialization, Electives, Additional: <ul style="list-style-type: none"> • Hamburg University: Integrated Climate System Sciences (ICSS) • Bremen University: Marine Biology • Christian Albrecht University of Kiel: Marine Geosciences • University of Potsdam: Geosciences/Geology CP 30			
Term 4 (SS) Russia and Germany	M.Sc. Thesis Polar and Marine Sciences with Defence <ul style="list-style-type: none"> • St. Petersburg State University, Russia • University of Hamburg, Germany • Alfred Wegener Institute for Polar and Marine Research, Germany • Arctic and Antarctic Research Institute, Russia • Leibniz Institute for Baltic Sea Research Warnemünde, Germany • GEOMAR Helmholtz Centre for Ocean Research Kiel, Germany • Otto Schmidt Laboratory for Polar and Marine Research (OSL), Russia • University of Bremen, Germany • Christian Albrecht University of Kiel, Germany • University of Potsdam, Germany • University of Rostock, Germany CP 30			

Figure 1: Structure of the M.Sc. Program POMOR

Symbol	DS / University of Potsdam - overview	
Title	Semester abroad at University of Potsdam	
Learning outcomes	The students understand environmental processes and driving forces of the climate system through earth history. They have obtained advanced knowledge in geosciences with focus on permafrost and geology.	
Contents	Based on the modules of the M.Sc. Geosciences/Geology students can choose different courses: DS 1 UP: Specialization: Permafrost and Palaeoclimate DS 2 UP: Elective courses: Topics in Geosciences DS 3 UP: Additional: Internship at the AWI	
Educational concept	L, S, P, E	
Language	English	
Formal requirements for participation	None	
Recommended prerequisites	None	
Grading framework (possibly including examinations)	Type:	3-5 exams
	Language:	English
Credits	30.0	
Coordinator	H.-W. Hubberten	

Abbreviations: Lecture L. Practical training P. Seminar S. Excursion E.

Symbol	DS 1 UP	
Title	Specialization: Permafrost and Paleoclimate	
Learning outcomes	The students understand the principles of formation and the characteristics of permafrost and the formation and degradation of periglacial landscapes. They have studied environmental processes and driving forces of the climate system through earth history.	
Contents	Recommended courses of the M.Sc. Geosciences/Geology are: - Permafrost landscapes (MGEW15); L, S, P [H.-W. Hubberten] CP 6 - Paleoclimate dynamics (MGEW13); L, P [B. Dieckmann, M. Trauth] CP 6	
Educational concept	L, S, P	
Language	English	
Formal requirements for participation	None	
Recommended prerequisites	None	
Grading framework (possibly including examinations)	Type:	Written exam
	Language:	English
Credits	6.0-12.0	
Workload	Campus study:	50 hours
	Self-study:	160 hours
	Exam preparation:	90 hours
Module type	Elective	
Semester	Semester 3 of M.Sc. POMOR	
Frequency of offer	Every second year in winter semester	
Duration	1 semester	
Usability	Elective for M.Sc. POMOR	
Coordinator	H.-W. Hubberten	
Course lecturer(s)	See an extract from the module handbook of the M.Sc. Geosciences/Geology attached	
Literature	Specific literature will be announced during the courses	

Abbreviations: Lecture L. Practical training P. Seminar S. Excursion E.

Module title	MGEW15 Permafrost Landscapes
Responsible party	Prof. Dr. H.-W. Hubberten
Additional teaching staff	Dr. B. Heim, Dr. H. Meyer, Dr. P. Overduin, Dr. L. Schirrmeister, Dr. G. Schwamborn, Dr. S. Wetterich
Semester	1
Language	German and/or English
Exam/Grading	Written exam, oral exercise
Credit points	6
Number of participants	No limit
Recommended Background	no
Course Type	Lecture on the formation and degradation of Permafrost Landscapes. Exercises (seminar-type) partly conducted by students on special topics and lead by lecturers. Exercises (practice-type) on remote sensing methods.
Educational goals	To understand the principles of formation and the characteristics of permafrost as well as the formation and degradation of periglacial landscapes.
Module contents	This module gives an overview and insights of the formation and degradation of permafrost during the last glacial and interglacial cycle. The basic features of freezing and thawing processes of frozen ground and the related energy, water and element fluxes are explained. The complex relationship between these fluxes and the emission of greenhouse gases is covered, with a special focus on processes related to climate change. Typical permafrost landscapes and their degradation along with Arctic warming are studied using remote sensing methods. The consequences of warming permafrost landscapes on the environment and on infrastructure will be shown. Specific topics will be prepared and presented by the students in oral exercises.
Workload	180 h Total charge (30 h x 6 LP = 180 h) 45 h Lecture and exercise 135 h Homework and preparation of the exam
Teaching materials	Textbooks, articles, material provided in the internet, maps and air photographs, satellite data,
Literature	French, H.M., 2007, The Periglacial Environment. 3rd edition. Longman, Harlow, 341 pages

Module title	MGEW13 Paleoclimate Dynamics
Responsible party	PD Dr. Bernhard Diekmann, apl. Prof. Dr. M. Trauth
Additional teaching staff	apl Prof. Dr. A. Brauer, Prof. Dr. U. Herzschuh
Semester	Optional
Language	German/ English (by arrangement)
Exam/Grading	Homework essay, talk, tests
Credit points	6
Number of participants	Unlimited
Recommended Background	Bachelor Course on Palaeoclimate
Course Type	Lectures and Exercises
Educational goals	Understanding of environmental processes and driving forces of the climate system through earth history.
Module contents	Modern atmospheric and oceanic circulation, dating problems, ice ages and greenhouse stages, global carbon cycle, palaeoclimate of low-latitude land areas, Quaternary geology of Europe, palaeoclimate of polar/subpolar regions.
Workload	180 h in total (30 h x 6 LP = 180 h) 30 h lectures 15 h exercises 15 h homework (essay) 120 h check of lectures
Teaching materials	Online handouts and online information on literature, text books, student contributions
Literature	Bradley, R.S., 1999, Paleoclimatology: Reconstructing Climates of the Quaternary, Academic Press, San Diego. Cronin, T.R., 2009. Paleoclimates - Understanding Climate Change Past and Present. Columbia University Press, New York, 448 pp.

Symbol	DS 2 UP	
Title	Elective courses: Topics in Geosciences	
Learning outcomes	Students have acquired in-depth knowledge of the methods of basin analysis and petroleum systems. Students understand the impact of the events in Earth history on the climate change	
Contents	Recommended courses of the M.Sc. Geosciences/Geology are: - Sedimentary Basins (MGEP05); L, S, P [M. Mutti] CP 6 - Petroleum Geology (MGEW03); L, S, P [G. Frija] CP 6 - Events in Earth History (MGEW04); L, S, P [M. Szurlies] CP 6	
Educational concept	L,S, P	
Language	English	
Formal requirements for participation	None	
Recommended prerequisites	None	
Grading framework (possibly including examinations)	Type:	Written and oral exams, seminar talks
	Language:	English
Credits	6.0-12.0	
Workload	Campus study:	50 hours
	Self-study:	160 hours
	Exam preparation:	90 hours
Module type	Elective	
Semester	Semester 3 of M.Sc. POMOR	
Frequency of offer	Every second year in winter semester	
Duration	1 semester	
Usability	Elective for M.Sc. POMOR	
Coordinator	H.-W. Hubberten	
Course lecturer(s)	See an extract from the module handbook of the M.Sc. Geosciences/Geology attached	
Literature	Specific literature will be announced during the courses	

Abbreviations: Lecture L. Practical training P. Seminar S. Excursion E.

Module title	MGEP05 Sedimentäre Becken Sedimentary Basins
Responsible party	Prof. Dr. Maria Mutti
Additional teaching staff	Department teaching staff
Semester	1
Language	Deutsch/Englisch,
Exam/Grading	Written or oral exam, Essay
Credit points	6
Number of participants	Not limited
Recommended Background	Fundamental concepts regarding depositional processes and stratigraphy
Course Type	Lecture, practicals
Educational goals	Advanced knowledge of depositional processes and basin-fill stratigraphy
Module contents	Students will acquire in-depth knowledge of the methods of basin analysis, with a particular focus on carbonate systems. The role of subsidence, sea-level fluctuations and climate changes in affecting basin-fill stratigraphy will be discussed. During practicals, students will acquire knowledge of the principles of basin-fill and the processes controlling different environments of deposition and their spatial distribution.
Workload	180 h total workload (30 h x 6 LP = 180 h) 45 h Lectures and practicals 135 h Own reading, exercises and preparation for the exam
Teaching materials	Books and reading materials of the internet pages of the department
Literature	Allen, P.A., Allen, J. R. , 2005, Basin analysis: principles and applications , Blackwell. Tucker, M., 1991, Carbonate Sedimentology, Blackwell. Angaben auf der Internetseite des Instituts

Module title	MGEW03 Petroleum Geology
Responsible party	Dr. G. Frijja, Dr. Michael Szurlies
Additional teaching staff	Department teaching staff
Semester	2
Language	English/German
Exam/Grading	Oral or written exam
Credit points	6
Number of participants	-
Recommended Background	-
Course Type	Lecture, Excercies, Field Practical
Educational goals	Introduction to Petroleum Geology and regional knowledge of petroleum systems
Module contents	This course will provide an overview over the geological conditions that lead to the developmement of petroleum reservoirs. Students will become familiar with the basic definitions used in Exploration Geology as well as with commonly used exploration methods. Furthermore, important reservoir systems in the world will be discussed.
Workload	180 h total workload (30 h x 6 LP = 180 h) 45 h lectures and exercises 135 h own pre- and post-reading, exercises, and exam preparation
Teaching materials	Books and reading materials of the internet pages of the department
Literature	Richard C. Selley, 1998, Elements of Petroleum Geology, Academic Press

Module title	MGEW04 Events in Earth History
Responsible party	Dr. M.Szurliés, Prof. Dr. M. Mutti, Dr. S. Tomas, Dr. G. Frijia,
Additional teaching staff	Department teaching staff
Semester	1, every two years
Language	German/English (by arrangement)
Exam/Grading	Seminar talk and written/oral exam
Credit points	6
Number of participants	Unlimited
Recommended Background	Fundamental concepts of stratigraphy and sedimentology
Course Type	Lectures, exercises, student oral presentations
Educational goals	Advanced knowledge in stratigraphy, Earth History and sedimentology. Skills in oral presentation and scientific discussion
Module contents	Students will acquire knowledge in events in Earth's history and their impact on the geo- and biosphere (e.g. climate change, mass extinctions); students will give oral presentations, which will be discussed.
Workload	180 h total workload (30 h x 6 LP = 180 h) 45 h lectures and exercises 135 h own pre- and post-reading, exercises, and exam preparation
Teaching materials	Reading materials on the internet pages of the institute.
Literature	Kiessling, W., Flügel, E., Golonka, J., 2002, Phanerozoic Reef Patterns, SEPM Spec. Publ., Courtilot, V.E., Renne, P.R., 2003, On the ages of flood basalt events, C.R. Geosciences.

Symbol	DS 3 UP	
Title	Additional: Internship at the AWI	
Learning outcomes	The students have obtained practical knowledge and skills in selected areas of geosciences	
Contents	Internship at the AWI	
Educational concept	S, P, E	
Language	English	
Formal requirements for participation	None	
Recommended prerequisites	None	
Grading framework (possibly including examinations)	Type:	Written report
	Language:	English
Credits	12.0	
Workload	360 h	
Module type	Elective	
Semester	Semester 3 of M.Sc. POMOR	
Frequency of offer	Every second year in winter semester	
Duration	1 semester	
Usability	Elective for M.Sc. POMOR	
Coordinator	H.-W. Hubberten	
Course lecturer(s)	See an extract from the module handbook of the M.Sc. Geosciences/Geology attached	
Literature	Specific literature will be announced during the courses	

Abbreviations: Lecture L. Practical training P. Seminar S. Excursion E.

Module title	MScP01 Project Practical
Responsible party	Prof. Dr. J. Tronicke, apl. Prof. Dr. M. Trauth, PD Dr. U. Altenberger
Additional teaching staff	Department teaching staff
Semester	3
Language	German/ English (by arrangement)
Exam/Grading	Written report (not graded)
Credit points	12
Number of participants	Unlimited
Recommended Background	None
Course Type	Practical training
Educational goals	In-depth practical knowledge in selected areas of geosciences. Studying and practicing presentation techniques
Module contents	Supervised field-, industrial, laboratory or computer-internship in a chosen field of geosciences. Preparation and presentation of the achieved results
Workload	360 h total workload (30 h = 360 x 12 credit hours) 280 h (35 days) Supervised internship 24 h internship search and application 40 h preparation of internship report 14 h preparing presentations 2 h seminar presentation
Teaching materials (or teaching tools)	Special materials on the website of the course
Literature	-