

# Information on the Bachelor's Program Marine Geosciences

ISI on May 10, 2023

Dr. Ulrike Wolf-Brozio  
Bremen May 02, 2023

# Studying the Earth and its Oceans...

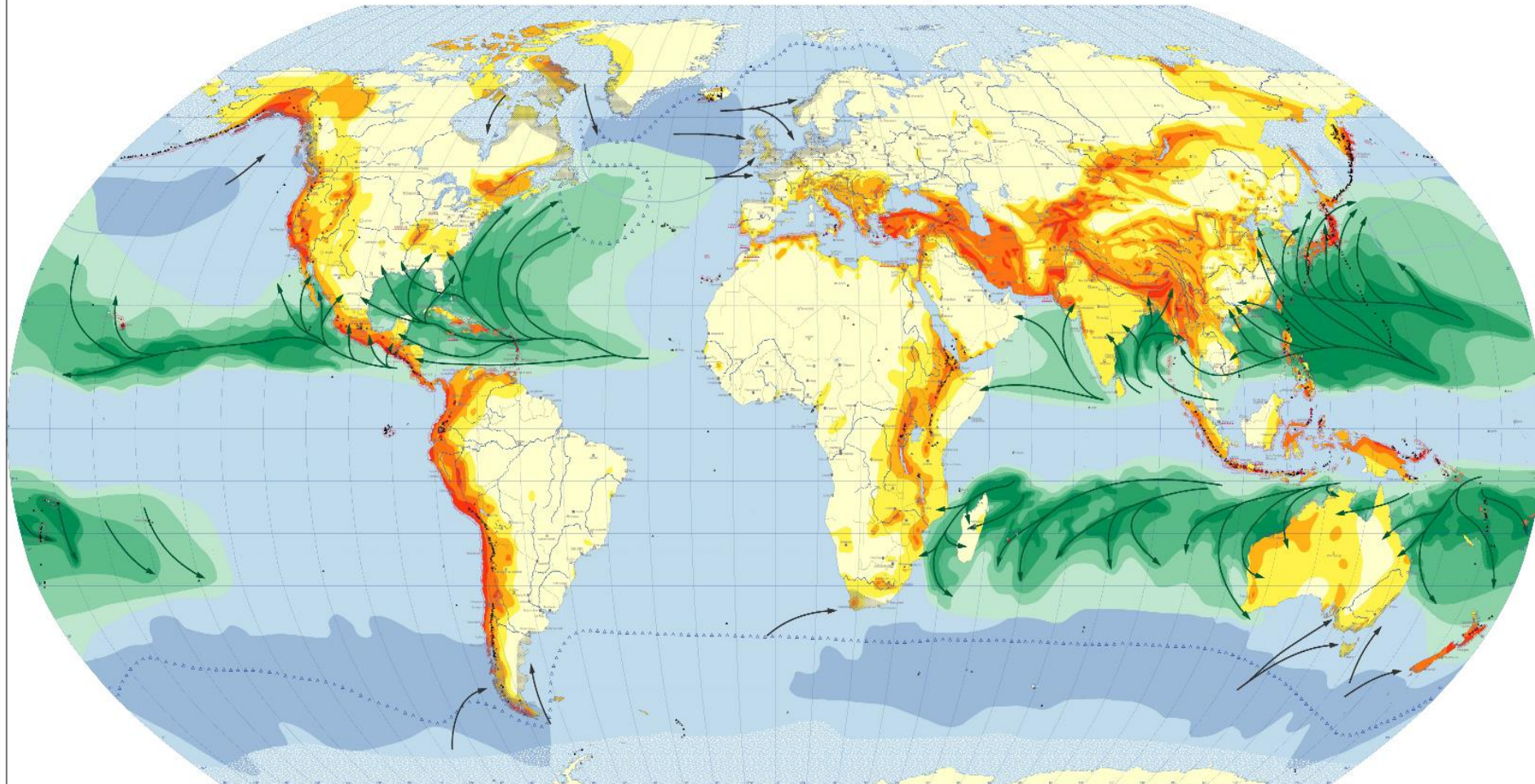






# World Map of Natural Hazards

## Weltkarte der Naturgefahren

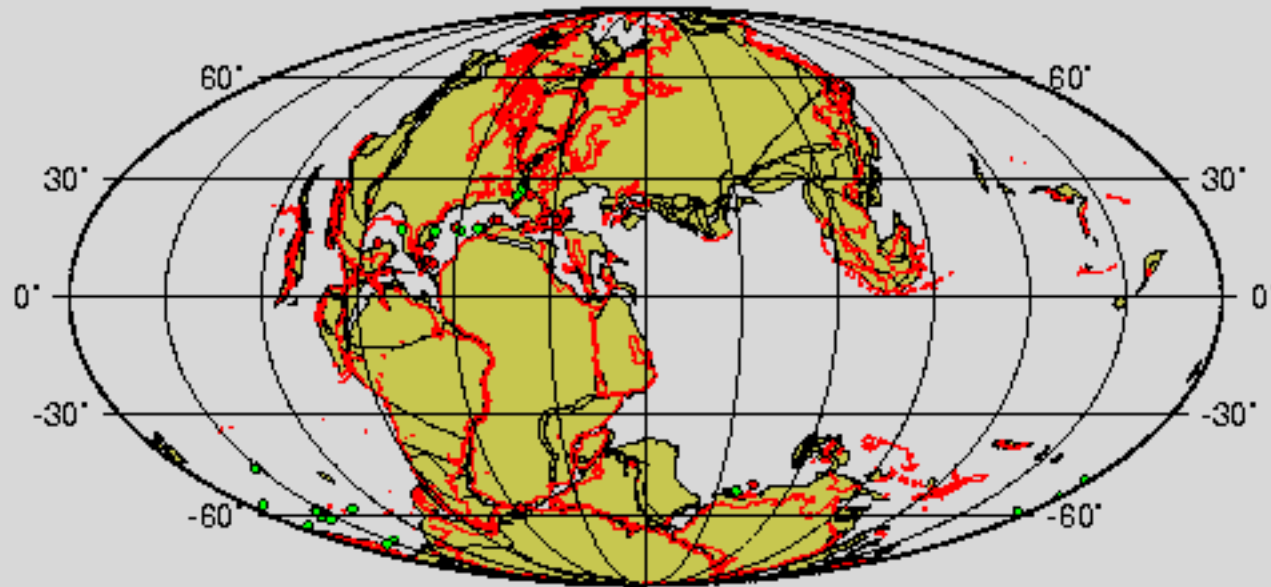


<b>Erdbeben</b> Zone 1: 0,01-0,10 Mw Zone 2: 0,1-0,3 Mw Zone 3: 0,3-0,5 Mw Zone 4: 0,5-0,7 Mw Zone 5: 0,7-0,9 Mw Zone 6: 0,9-1,0 Mw Zone 7: 1,0-1,1 Mw Zone 8: 1,1-1,2 Mw Zone 9: 1,2-1,3 Mw Zone 10: 1,3-1,4 Mw Zone 11: 1,4-1,5 Mw Zone 12: 1,5-1,6 Mw Zone 13: 1,6-1,7 Mw Zone 14: 1,7-1,8 Mw Zone 15: 1,8-1,9 Mw Zone 16: 1,9-2,0 Mw Zone 17: 2,0-2,1 Mw Zone 18: 2,1-2,2 Mw Zone 19: 2,2-2,3 Mw Zone 20: 2,3-2,4 Mw Zone 21: 2,4-2,5 Mw Zone 22: 2,5-2,6 Mw Zone 23: 2,6-2,7 Mw Zone 24: 2,7-2,8 Mw Zone 25: 2,8-2,9 Mw Zone 26: 2,9-3,0 Mw Zone 27: 3,0-3,1 Mw Zone 28: 3,1-3,2 Mw Zone 29: 3,2-3,3 Mw Zone 30: 3,3-3,4 Mw Zone 31: 3,4-3,5 Mw Zone 32: 3,5-3,6 Mw Zone 33: 3,6-3,7 Mw Zone 34: 3,7-3,8 Mw Zone 35: 3,8-3,9 Mw Zone 36: 3,9-4,0 Mw Zone 37: 4,0-4,1 Mw Zone 38: 4,1-4,2 Mw Zone 39: 4,2-4,3 Mw Zone 40: 4,3-4,4 Mw Zone 41: 4,4-4,5 Mw Zone 42: 4,5-4,6 Mw Zone 43: 4,6-4,7 Mw Zone 44: 4,7-4,8 Mw Zone 45: 4,8-4,9 Mw Zone 46: 4,9-5,0 Mw Zone 47: 5,0-5,1 Mw Zone 48: 5,1-5,2 Mw Zone 49: 5,2-5,3 Mw Zone 50: 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# The Earth – a dynamic planet

Evolution of the Earth's surface,  
life and climate



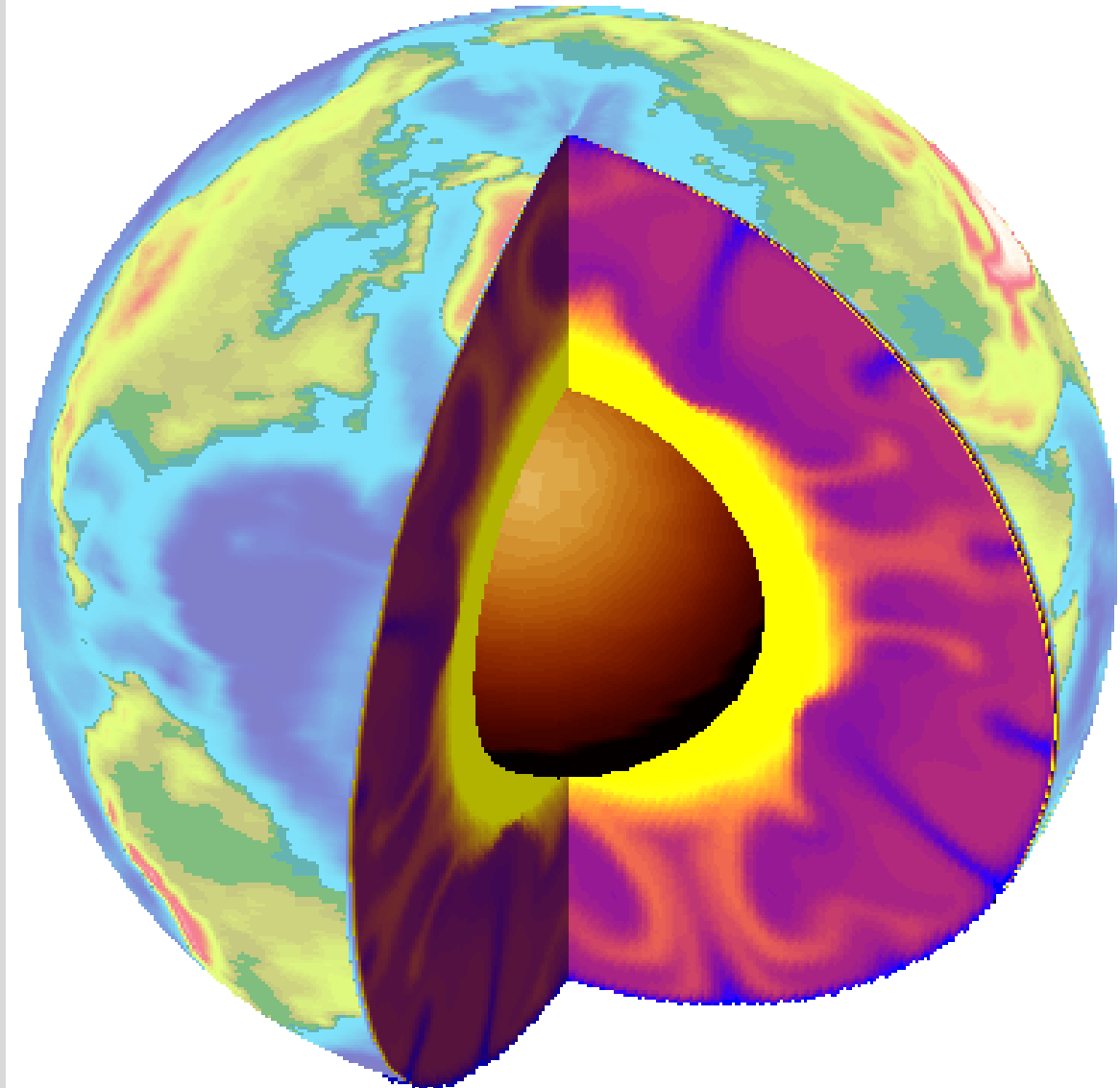
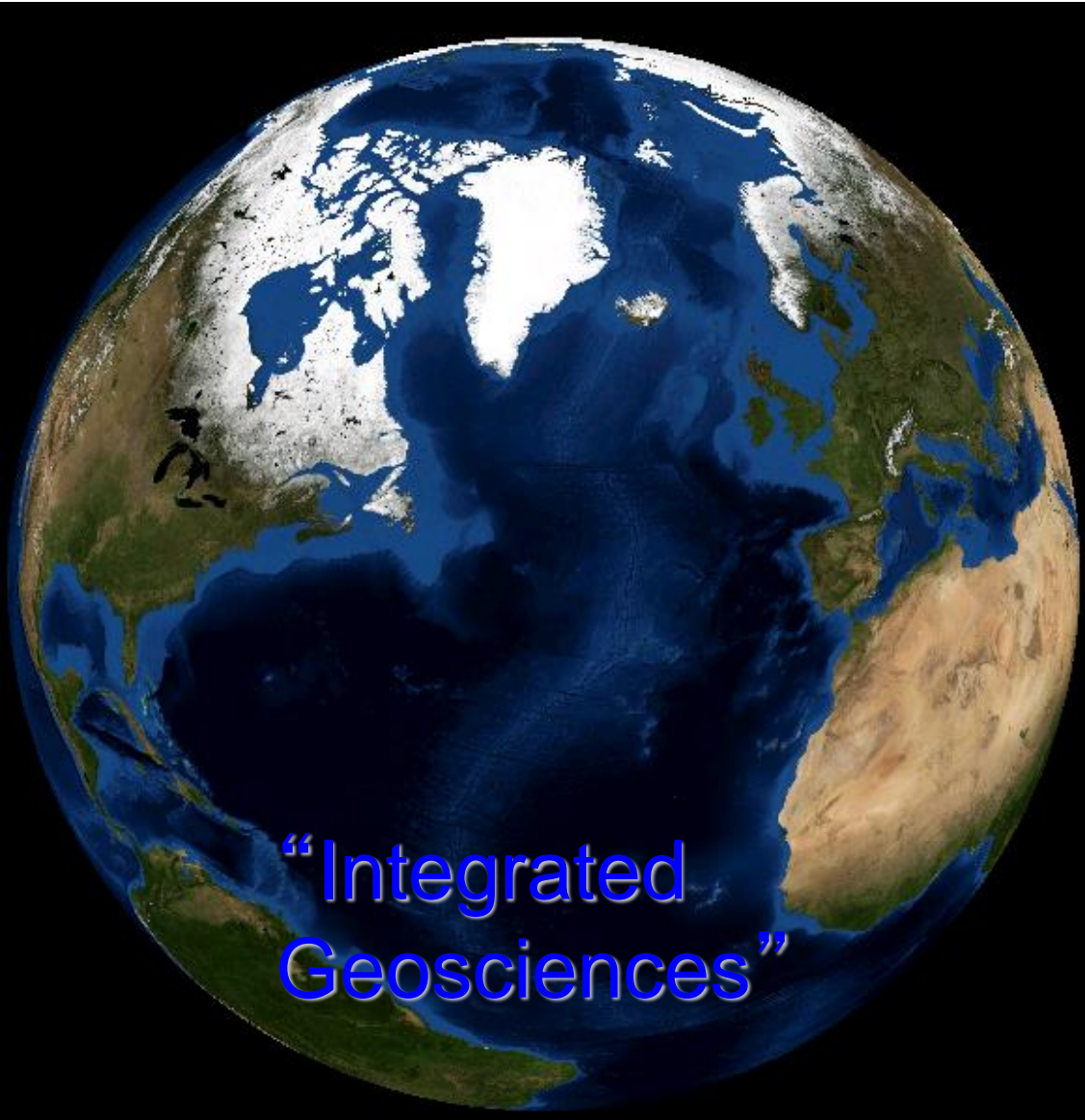
150 My Reconstruction







# “System Earth”

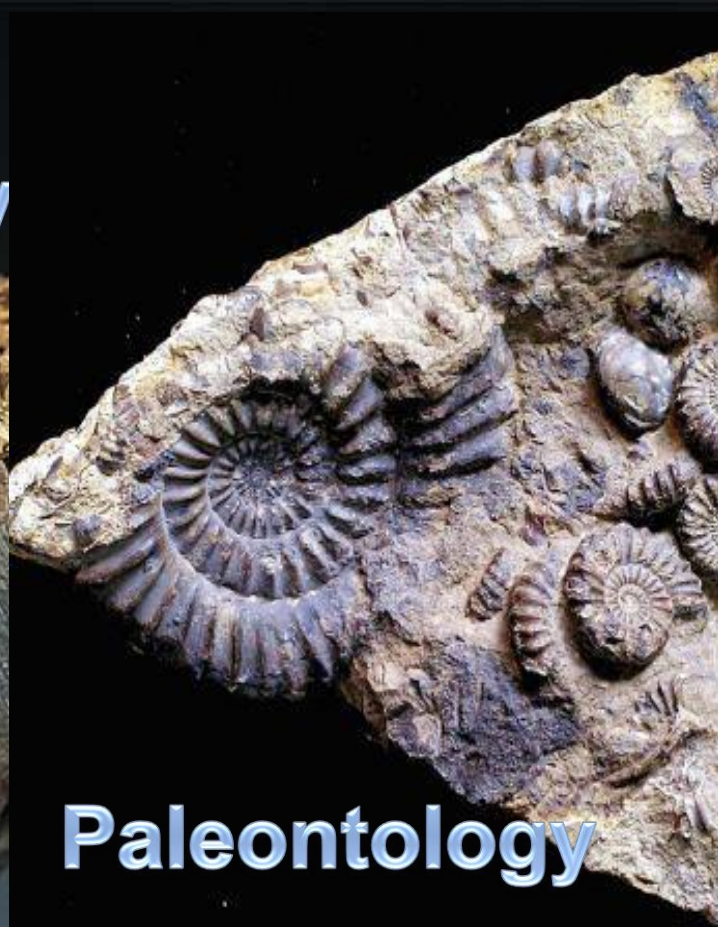


# Geology

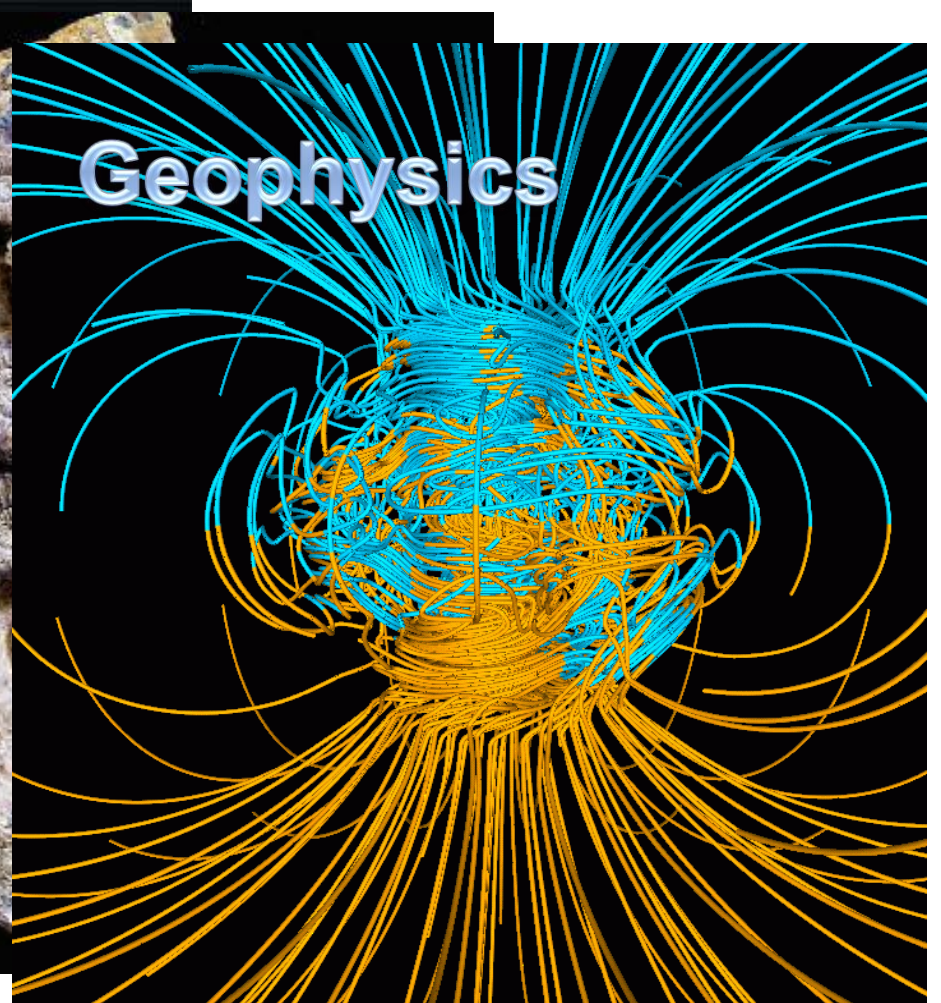
## Mineralogy



## Paleontology



## Geophysics





# Bachelor of Science Marine Geosciences, University of Bremen



# Bachelor Marine Geosciences

**Content:** studying System Earth and the oceans = record and analyze physical, chemical and geological processes on the earth's surface as well as in its interior using scientific methods.

**Structure:** modular, 29 modules, 180 credits

**Degree:** Bachelor of Science (B.Sc.) in Marine Geosciences

**Duration:** 3 years

**Language of instruction:** English

**Application deadline:** until July 15, non-EU citizens need a VPD by UniAssist

**Language test deadline:** until September 15

**Orientation Week:** Oct. 09 - 13, 2023

**Start of lectures:** Oct. 16, 2023



# Credit Point System



- You start with a target of 180 points
- Each successfully completed module from the study plan earns points
- If you have collected 180 points according to the study plan, the bachelor's degree is completed
- 1 credit point stands for a workload of 30 h



# Grading system

- all passed exams already count for the final grade (in the ratio CP number to 180 CP)
- passed means: grade is better than 4.05 (1.0 is the best)
- failed: 4 following semesters time to pass, otherwise: exmatriculation





# Study Plan

What belongs to your studies?

**BSc Marine Geosciences** University of Bremen, FB 5

1. Year WiSe	6 CP	6 CP	6 CP	6 CP	6 CP
	<b>Introduction Earth Dynamics</b> Introduction Earth sciences Minerals + rocks Field trip 1	<b>From Atoms to Minerals</b> From atoms to minerals - L From atoms to minerals - E	<b>Chemical Principles I</b> General chemistry General chemistry exercise	<b>Physical Principles I</b> Physics for natural sciences I Physics of the solid Earth I	<b>Mathematical Principles I</b> Mathematical principles for geosciences I
1. Year SuSe	<b>Evolution of Earth and Life</b> Earth and life history Basics biology Introduction to fossils	<b>Struct Geology + Tectonics</b> Structural geology Geol mapping Field trip 2	<b>Chemical Principles II</b> Introduction to geochemistry Chemistry lab practise	<b>Physical Principles II</b> Physics for natural sciences II Physics of the solid Earth II	<b>Mathematical Principles II</b> Mathematical principles for geosciences II
	<b>Ph, Ch, Biol Oceanography</b> Climate and Ocean	<b>Marine Sediments</b> Intro marine geology Ship-based survey sediments Stratigraphy marine sediments	<b>Dynamics of Ocean Crust</b>	<b>Princ Applied Geophysics</b> Fund applied geophysics Geophysical field exercise	<b>Sediment Core Project</b> Sediment core project
2. Year SuSe	<b>Core field MarGeo 1</b> Core fields (choose 3 out of 5) Sedimentology Geochemistry	<b>Core field MarGeo 2</b> Paleontology Paleoceanography	<b>Core field MarGeo 3</b> Geoinformatics	<b>Geoscientific Competences</b> 2x 7 day field camps	General Studies 1 <b>Digital competences</b> e.g. GIS, GMT, Matlab, etc.
	<b>Core field MarGeo 1</b> Core fields (choose 3 out of 5) Sedimentology Geochemistry	<b>Core field MarGeo 2</b> Paleontology Paleoceanography	<b>Core field MarGeo 3</b> Geoinformatics	General Studies 2 <b>Professional competences</b> 4 week internship	General Studies 3 <b>Interdisciplinary skills</b> e.g. soft skills, language, economics, etc.
3. Year SuSe	<b>Core field MarGeo 1</b> Core fields (choose 3 out of 5) Sedimentology Geochemistry	<b>Core field MarGeo 2</b> Paleontology Paleoceanography	<b>Core field MarGeo 3</b> Geoinformatics	<b>Bachelor thesis + defense</b>	

or choose 1 core field from BSc Geosciences  
 Geodynamics                      Exploration Geophysics



# Bachelor Marine Geosciences -1rst year

- Chemistry, Physics, Mathematics (2 modules each)
- Marine Geoscientific Basics
  - Introduction Earth Dynamics
  - From Atoms to Minerals
  - Evolution of Earth and Life
  - Structural Geology and Tectonics
  - incl. 2 field trips:
    - introduction to geological field work, structural geology

## B.Sc. Marine Geosciences (BMG) - starting WiSe 2021/22

	Evolutionary Processes of Earth and Ocean	Materials and Structures of the Earth	Chemical Principles of Geosciences	Physical Principles of Geosciences	Mathematical Principles of Geosciences
Principles	English/German	English/German	English/German	English/German	English/German
Language	English/German	English/German	English/German	English/German	English/German
Modules Sem. 1	Introduction to Earth Dynamics	From Atoms to Minerals - Mineralogy and Crystallography	Chemical Principles of Geosciences I	Physical Principles of Geosciences I	Mathematical Principles of Geosciences I
Title, Form, CP Lect. 1	Earth Dynamics L 2	From Atoms to Minerals L+E 6	General Chemistry for Geoscientists L 4	Physics f. Natural Science I L+E+P 4	Fundamentals of Mathematical for Geosciences I L+E 6
Title, Form, CP Lect. 2	Identification of Rocks E 2		General Chemistry for Geoscientists Exercise E 2	Physics of the Solid Earth I L 2	
Title, Form, CP Lect. 3	Introduction to Geoscientific Fieldwork F 2				
	6 SWS	4 SWS	6 SWS	6 SWS	4 SWS
Modules Sem. 2	Evolution of Earth and Life	Structural Geology and Tectonics	Chemical Principles of Geosciences II	Physical Principles of Geosciences II	Mathematical Principles of Geosciences II
Title, Form, CP Lect. 1	Earth and Life History L 2	Structural Geology L+F 3	Introduction to Geochemistry L 4	Physics for Natural Science II L+E+P 4	Fundamentals of Mathematics for Geosciences II L+E 6
Title, Form, CP Lect. 2	Basics of Biology L 3	Regional Geology L 1	General Chemistry Lab Practice E 2	Physics of the Solid Earth II L 2	(Huhn, Kasemann)
Title, Form, CP Lect. 3	Introduction to Fossils E 1	Geological Maps E 2			
	5 SWS	6 SWS	6 SWS	6 SWS	4 SWS



# 1rst year: Mathematics and Science minors

Chemical Principles of Geosciences	Physical Principles of Geosciences	Mathematical Principles of Geosciences
English/German	English/German	English/German

Chemical Principles of Geosciences I		Physical Principles of Geosciences I		Mathematical Principles of Geosciences I	
General Chemistry for Geoscientists	L 4	Physics f. Natural Science I	L+E+P 4	Fundamentals of Mathematical for Geosciences I	L+E 6
General Chemistry for Geoscientists Exercise	E 2	Physics of the Solid Earth I	L 2		
<b>6 SWS</b>		<b>6 SWS</b>		<b>4 SWS</b>	

Chemical Principles of Geosciences II		Physical Principles of Geosciences II		Mathematical Principles of Geosciences II	
Introduction to Geochemistry	L 4	Physics for Natural Science II	L+E+P 4	Fundamentals of Mathematics for Geosciences II	L+E 6
General Chemistry Lab Practice	E 2	Physics of the Solid Earth II	L 2	(Huhn, Kasemann)	
<b>6 SWS</b>		<b>6 SWS</b>		<b>4 SWS</b>	

# 1rst year: marine geoscientific basics

<b>Principles</b>	<b>Evolutionary Processes of Earth and Ocean</b>		<b>Materials and Structures of the Earth</b>	
	English/German		English/German	
<b>Modules Sem. 1</b>	<b>Introduction to Earth Dynamics</b>		<b>From Atoms to Minerals - Mineralogy and Crystallography</b>	
	Title, Form, CP Lect. 1	Earth Dynamics L 2	From Atoms to Minerals L+E 6	
	Title, Form, CP Lect. 2	Identification of Rocks E 2		
	Title, Form, CP Lect. 3	Introduction to Geoscientific Fieldwork F 2		
	<b>6 SWS</b>		<b>4 SWS</b>	
<b>Modules Sem. 2</b>	<b>Evolution of Earth and Life</b>		<b>Structural Geology and Tectonics</b>	
	Title, Form, CP Lect. 1	Earth and Life History L 2	Structural Geology L+F 3	
	Title, Form, CP Lect. 2	Basics of Biology L 3	Regional Geology L 1	
	Title, Form, CP Lect. 3	Introduction to Fossils E 1	Geological Maps E 2	
	<b>5 SWS</b>		<b>6 SWS</b>	

# Bachelor Marine Geosciences-from 2nd year on

- marine geoscientific Basics (continued)
  - Geology and Stratigraphy of marine Sediments; multidisciplinary Sediment Core Project; physical, chemical and biological Oceanography; Principles of applied Geophysics; Rock-forming Processes
- marine geoscientific Specializations (elective subjects)
  - 3 out of 7 Specialty Subjects, 3 Modules in each
- interdisciplinary Skills
  - field trips, digital Competences, professional Internship, interdisciplinary Competences
- Bachelor Thesis
  - nine-week thesis + defense/colloquium



# Specializations: 3 out of 7 Minors

**2. Year SuSe**

**Core field MarGeo 1**

Core fields (choose 3 out of 5)

Sedimentology

Geochemistry

**Core field MarGeo 2**

Paleontology

Paleoceanography

**Core field MarGeo 3**

Geoinformatics

**3. Year WiSe**

**Core field MarGeo 1**

Core fields (choose 3 out of 5)

Sedimentology

Geochemistry

**Core field MarGeo 2**

Paleontology

Paleoceanography

**Core field MarGeo 3**

Geoinformatics

**3. Year SuSe**

**Core field MarGeo 1**

Core fields (choose 3 out of 5)

Sedimentology

Geochemistry

**Core field MarGeo 2**

Paleontology

Paleoceanography

**Core field MarGeo 3**

Geoinformatics

or choose 1 core field from BSc Geosciences

Geodynamics

Exploration Geophysics

# Bachelor Marine Geosciences-from 2nd year on

- Marine geoscientific minors

- Exploration Geophysics
- Geochemistry
- Geodynamics
- Geoinformatics
- Paleoceanography
- Sedimentology
- Paleontology

# BSc Marine Geosciences

## Requirements

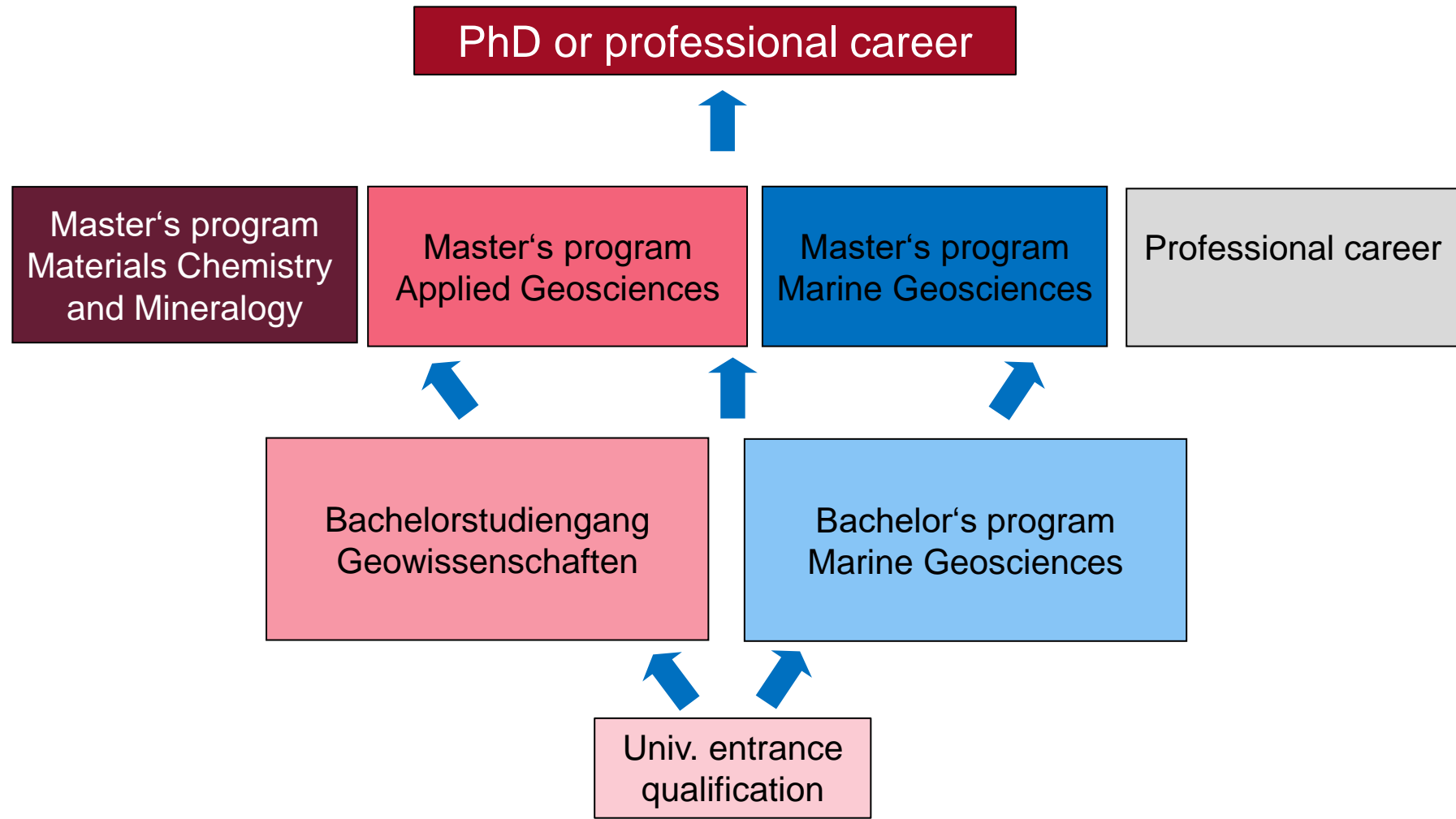
- university entrance qualification
- enthusiasm for the earth at our feet!
- interest in Science
- solid fundamentals in physics, maths and chemistry
- good spatial imagination
- weather resistance and ability to work hard in the field
- ability to work individual and in a team (no contradiction!)
- very good knowledge of English ( B2 (CEFR))
- German language knowledge A1 (CEFR)







# Geosciences Education at University of Bremen





# What makes us attractive to prospective students

- cutting-edge research in marine science/climate change
- interdisciplinarity
- internationality (English-taught programs)
- practical relevance (field exercises)
- excellence in research opens up a wide range of opportunities for students (participation in exciting expeditions, etc.)
- numerous cooperation professorships with AWI, thus also polar research and glaciology in the study program
- geoscientific collection with diverse outreach activities



# “Geosciences play an essential role in solving societal challenges”

## Climate neutral energy production

- building site exploration for wind farms
- "new" raw materials (high-tech elements)
- efficient use of hydrocarbons
- use of geological formations as storage (CO<sub>2</sub>, H<sub>2</sub>, NH<sub>3</sub>)

## Recognize and help to avoid natural risks

- volcanism
- earthquakes
- landslides/mudslides

## Recognize and minimize consequences of human interventions in geosphere

## Climate and ocean dynamics

- understanding climate change
- generating knowledge to act
- coastal protection

## Natural science basics for sustainable use of resources

## Materials science

- corrosion protection
- recycling of raw materials





## What is actually the USP of the geosciences in Bremen?

- MARUM - Centre for Marine Environmental Research  
Research Field "Ocean and Climate"  
with the excellence cluster „Oceanfloor“
- International Core Repository with ocean sediments  
(one of three institutions in the world)
- GLOMAR graduation qualification "Ocean & Climate„  
physical oceanography, paleoceanography, climate- and ocean modelling
- international graduate college ArcTrain  
processes and effects of climate change in the North Atlantic and the Canadian arctic
- international graduate college SLATE  
Submarine landslides and their effects on the coastal areas in Europe



# Excellence in Research is visible

The screenshot shows the ShanghaiRanking website interface. At the top, there are navigation links for Home, Rankings, Universities, News, and Activities. The main heading is "2022 Global Ranking of Academic Subjects" with a year selector set to 2022. Below this, there are two main sections:

- Oceanography (200 Institutions):** A table listing the top 17 institutions. The University of Bremen is ranked 15th.
- Earth Sciences (500 Institutions):** A table listing the top 33 institutions. The University of Bremen is ranked 31st.

Text overlays on the image highlight specific rankings: "Place 15 in 2019" (referring to the Oceanography ranking), "Place 39 in 2020" and "Place 41 in 2018" (referring to the Earth Sciences ranking).

Ranking > 2022 Global Ranking of Academic Subjects

## 2022 Global Ranking of Academic Subjects

ShanghaiRanking began to publish world university ranking by academic subjects in 2009. By introducing improved methodology, the Global Ranking of Academic Subjects (GRAS) was first published in 2017. The 2022 GRAS contains rankings of universities in 54

[Read More](#)

## 2022 Global Ranking of Academic Subjects

2022

ShanghaiRanking began to publish world university ranking by academic subjects in 2009. By introducing improved methodology, the Global Ranking of Academic Subjects (GRAS) was first published in 2017. The 2022 GRAS contains rankings of universities in 54

[Read More](#)

Oceanography 200 Institutions

World Rank

Institution

14



University of Bergen

15



University of Bremen

16



Columbia University

17



Paul Sabatier University (Toulouse 3)

Earth Sciences

500 Institutions

Search a university

World Rank

Institution

Country/Region

Total Score

Q1

31



University of Bremen



210.9

63.1

32



University College London



209.9

56.7

33



University of California, Irvine



208.1

44.4



219.7

61.4



210.8

55.0

Place 39 in 2020

Place 41 in 2018

Place 15 in 2019

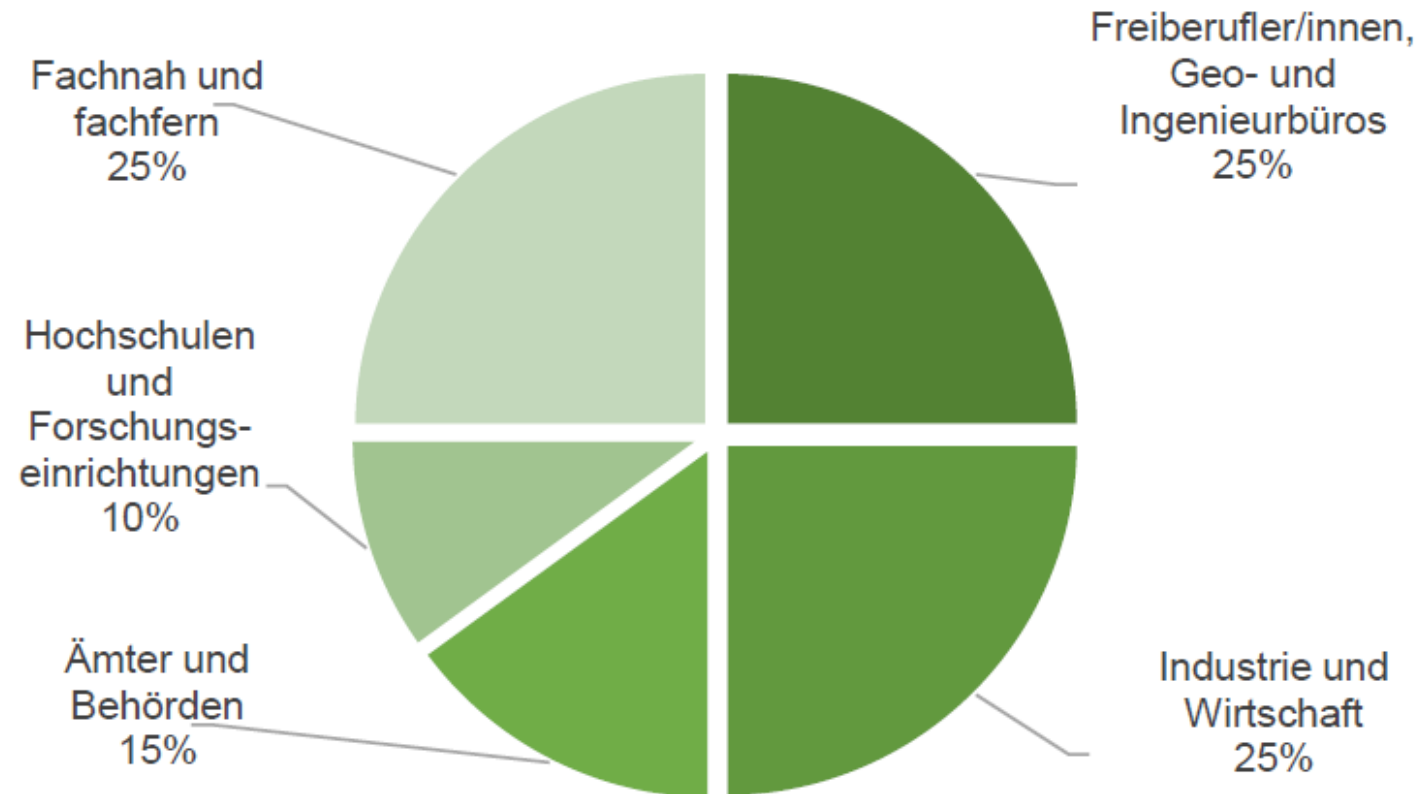


## Professional fields of Marine Geosciences

- analysis and remediation of contaminated sites
- data analyzing and modelling services
- energy, water and soil management
- investigations for environmental and climate protection
- marine geotechnics
- marine research
- marine resources industry
- natural hazards forecast and protection
- various tasks in administration, media and PR



### Hauptbeschäftigungsbereiche von Geowissenschaftler/innen



Quelle: BDG 2020



# Geosciences Department



Founded: 1986

Staff: 18 professorships

150 research assistants

45 non-research staff

Study offer

2 B.Sc. and 3 M.Sc. study programs

PhD-Training (about 80 students)

graduate qualification training “GLOMAR”

international graduate colleges



## RESEARCH FOCI AND STRUCTURES



- the focus lies on basic research across the breadth of the discipline
- many joint projects, third-part funding, approx. 25 M€/year (with Marum)
- connection to applied research, technology development, georesources, geanalytics, geotechnics, materials research



[www.geo.uni-bremen.de](http://www.geo.uni-bremen.de)

Fachbereich 05 Geowissenschaften



↑ Fachbereich 05 Studium Forschung Organisation Öffentlichkeit Intern

→ Studierende  
→ Studieninteressierte  
→ Doktoranden  
→ Förderer & Alumni  
→ Unternehmen  
→ Besucher  
→ Beschäftigte

INFOS FÜR


Start

MELDUNGEN

Partnerinstitutionen

→ Termine





**Individual Advisory:**

**by appointment**

**via [studfb5@uni-bremen.de](mailto:studfb5@uni-bremen.de)**

**(Dr. Ulrike Wolf-Brozio, Dr. Barbara Ventura)**