COURSE DESCRIPTION

Paleoclimatology of Living Environments Academic year 2026-2027

1. Programme-related data

1.1. Higher Education Institution	Babeş-Bolyai University
1.2. Faculty	Biology and Geology
1.3. Doctoral School	Doctoral School of Theoretical and Applied Geology
1.4. Field of study	Geology
1.5. Level of study	3rd cycle: Doctorate

2. Course-related data

2.1. Course title	Paleoclimatology of Living Environments			Course code	**SDG01**
2.2. Course coordinator	Prof. Dr. Vlad A. CODREA				
2.3. Seminar coordinator	Prof. Dr. Vlad A. CODREA				
2.4. Year of study	1	2.5. Semester	2	2.6. Type of assessment	Exam
2.7. Course status	Optional			2.8. Course type	Specialisation subject

3. Total estimated time (hours per semester of teaching activities)

3.1. Number of hours per week	**4**	of which: 3.2. course	**2**	3.3. seminar/ laboratory/ project	**2**
3.4. Total of hours in the curriculum	48	of which: 3.5. course	24	3.6. seminar/ laboratory	**24**
Time allocation for individual study (IS) and self-taught activities (ST)					**hours**
Learning from textbooks, course materials, bibliography, and notes (IS)					60
Additional research in the library, on subject-specific electronic platforms, and on-site					68
Preparing seminars/ laboratories/ projects, assignments, reports, portfolios, and essays					48
Tutoring (professional guidance)					10
Examinations					4
Other activities: two-way communication with the course coordinator					12
3.7. Total hours of individual study (IS) and self-taught activities (ST)				202	
3.8. Total hours per semester				250	
3.9. Number of credits				**10**	

4. Prerequisites (where applicable)

4.1. curriculum-related	Not applicable
4.2 skills-related	Preparation of bibliographic reports (literature review)

5. Specific conditions (where applicable)

5.1. course-related	Video logistics support
5.2. seminar/laboratory-related	Attendance of at least 80% of the laboratory sessions is a prerequisite for being allowed to sit the exam

6. Subject-specific learning outcomes

Knowledge
1. Knows advanced research methods and techniques, theoretical and experimental
2. Understands the scientific methodology applied to their field
3. Knows advanced concepts, theories, and models in the field
4. Identifies frontier literature in the field

Skills
1. Applies knowledge to analyse complex problems
2. Integrates theoretical and practical concepts for innovative solutions
3. Formulates original problems and proposes creative solutions
Responsibility and autonomy
1. Works autonomously in investigating and expanding knowledge
2. Takes responsibility for the validity of conclusions
3. Takes responsibility for the quality and impact of solutions

7. Contents

7.1. Course	**Teaching and learning methods**	**Remarks[1]**
Introduction. Sources of paleoclimate data. Levels of paleoclimate data. Levels of paleoclimate analyses. Modelling paleoclimate research. Models and observations. The dimension of geological time	Expository lecture, using intuitive methods.	
Defining the principles of paleoclimatology. Causes of climate change. Climate and the nature of climatic variations. The climate system. Atmosphere vs. terrestrial substrate equilibrium. Variation of Earth's orbital parameters	Same as above.	
Climate proxies. Dating methods. Radioisotopic methods: radiocarbon dating, K–Ar method, uranium isotope dating, luminescence method, fission-track method	Same as above.	
Paleomagnetism. Dating based on chemical changes. Dating based on biological elements	Same as above.	
Dating based on ice cores	Same as above.	
The paleoclimate signal in marine sediments and corals	Same as above.	
Paleoclimate evidence from non-marine deposits: loess, lacustrine sediments, speleothems. Biological principles of paleoclimatology	Same as above.	
Evidence from paleovegetation: distribution and macrofossils. Insects	Same as above.	
Millennial-scale climate changes	Same as above.	
Interannual climate changes in tropical regions	Same as above.	
Reference paleoclimate events on the geological timescale: the climatic maximum at the end of the Paleocene	Same as above.	
The K/T boundary and associated paleoclimate aspects	Same as above.	
The Eocene/Oligocene boundary and associated climatic events	Same as above.	
Middle Miocene Climatic Optimum	Same as above.	
Bibliography Paleoclimatology. Eds: Gilles Ramstein, Amaëlle Landais, Nathaelle Bouttes, Pierre Sepulchre, Aline Govin. Springer, 2021 Summerhayes, Colin P. Paleoclimatology: From Snowball Earth to the Anthropocene. John Wiley & Sons, 2020. White, Sam, et al. "New Perspectives on Historical Climatology." Wiley Interdisciplinary Reviews: Climate Change, vol. 14, no. 1, 2023 Cronin Th. M. Principles of Paleoclimatology. Columbia University Press. 1999 Prothero D. After the Dinosaurs: The Age of Mammals. Indiana University Press, 2006		

[1] For example, organisational aspects, recommendations for students, specific aspects relating to the course/seminar, such as inviting experts in the field, etc.

Bradley R.: Paleoclimatology, 3rd Edition, Academic Press, 2014 https://opengeology.org/historicalgeology/paleoclimatology-earth-systems-change-through-time/

7.2. Seminar/ laboratory	**Teaching and learning methods**	**Remarks**
Paleoclimate models and observations. The dimension of geological time	Individual practical work.	
Variation of Earth's orbital parameters as a control factor of climate change	Same as above.	
Dating methods for calibrating paleoclimate events	Same as above.	
Biological evidence of paleoclimate events	Same as above.	
Ice cores	Same as above.	
Latest Quaternary paleoclimate changes based on loess deposits: case studies	Same as above.	
Reference paleoclimate events on the geological timescale: the climatic maximum at the end of the Paleocene	Same as above.	
The K/T boundary and associated paleoclimate aspects	Same as above.	
The Eocene/Oligocene boundary and associated climatic events	Same as above.	
Middle Miocene Climatic Optimum	Same as above.	
Paleoclimate deteriorations during the European Pliocene	Same as above.	
The Messinian crisis and its climatic context	Same as above.	
Last Glacial climate and associated anthropogenesis events (I)	Same as above.	
Last Glacial climate and associated anthropogenesis events (II)	Same as above.	

Bibliography

Paleoclimatology. Eds: Gilles Ramstein, Amaëlle Landais, Nathaelle Bouttes, Pierre Sepulchre, Aline Govin. Springer, 2021
Summerhayes, Colin P. Paleoclimatology: From Snowball Earth to the Anthropocene. John Wiley & Sons, 2020.
White, Sam, et al. "New Perspectives on Historical Climatology." Wiley Interdisciplinary Reviews: Climate Change, vol. 14, no. 1, 2023
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8. Evaluation

Type of activity	8.1 Evaluation criteria[2]	8.2 Evaluation methods[3]	8.3 Percentage in the final grade
8.4. Course	Knowledge of the informational content	Written exam	
	Ability to use the information in a new context		
8.5. Seminar/ laboratory	Skills in following a laboratory protocol	Written exam	
8.6 Minimum standard for passing			
Knowledge of 50% of the information covered in the course Knowledge of 60% of the information covered in the laboratory			

[2] The evaluation criteria must directly reflect the learning outcomes targeted at the level of the degree programme respectively at the level of the subject. More specifically, the learning outcomes set out in the expected learning outcomes are assessed.

[3] Both final evaluation methods and ongoing evaluation strategies should be established.

9. SDG labels (Sustainable Development Goals)[4]

		Sustainable Development Generic Label						
1 FĂRĂ SĂRĂCIE	2 FOAMETE „ZERO"	3 SĂNĂTATE ȘI BUNĂSTARE	4 EDUCAȚIE DE CALITATE	5 EGALITATE DE GEN	6 APĂ CURATĂ ȘI SANITAȚIE	7 ENERGIE CURATĂ ȘI LA PREȚURI ACCESIBILE	8 MUNCĂ DECENTĂ ȘI CREȘTERE ECONOMICĂ	9 INDUSTRIE, INOVAȚIE ȘI INFRASTRUCTURĂ
10 INEGALITĂȚI REDUSE	11 ORAȘE ȘI COMUNITĂȚI DURABILE	12 CONSUM ȘI PRODUCȚIE RESPONSABILE	13 ACȚIUNE CLIMATICĂ	14 VIAȚA ACVATICĂ	15 VIAȚA TERESTRĂ	16 PACE, JUSTIȚIE ȘI INSTITUȚII EFICIENTE	17 PARTENERIATE PENTRU REALIZAREA OBIECTIVELOR	No label applies
			x					

Date of entry:
11.03.2026

Signature of course coordinator

Signature of seminar coordinator

Date of approval in the department:

Signature of the head of department

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[4] Select a single label which, according to the *Implementation of SDG labels in the academic process*, best matches the subject. If the subject addresses sustainable development in a generic manner (i.e. by presenting/introducing the general framework of sustainable development, etc.), then the Sustainable Development generic label may be applied. If none of the labels describe the subject, select the last option: *"No label applies."*