

Course number		U-LAS70 10002 SE50					
Course title (and course title in English)	ILAS Seminar-E2 :Climate Change in the Earth system-Past,Present,Future (地球システムの気候変動-過去、現在、そして未来)		Instructor's name, job title, and department of affiliation	Graduate School of Science Professor,ZWINGMANN, Horst Friedrich August			
	ILAS Seminar-E2 :Climate Change in the Earth system-Past,Present,Future						
Group	Seminars in Liberal Arts and Sciences		Number of credits	2	Number of weekly time blocks	1	
Class style	seminar (Face-to-face course)		Year/semesters	2026・Second semester		Quota (Freshman)	20 (15)
Target year	Mainly 1st year students	Eligible students	For all majors		Days and periods	Tue.5	
Classroom	04, Yoshida-South Campus Bldg. No. 1				Language of instruction	English	
Keyword	Climate change / Earth system / Earth sciences / Global changes						
[Overview and purpose of the course]							
The main purpose of this course is to discuss the science of Earth climate change. In this seminar we will explore Climate Change in the Earth system based on (1) past geological records, (2) changes in the present and (3) implications for the future. We will jointly explore scientific papers and modelling tools related to climate change science. This course encourages students to develop self-learning skills and English expression skills through (A) individual assessment, (B) group discussions and (C) presentations of scientific results.							
[Course objectives]							
Students will gain knowledge about the scientific basis of the Earth system and climate change, and will explore and discuss related research in English.							
[Course schedule and contents)]							
General introduction and orientation to class (week 1 to 4). Week 1: class outline and objective. Self-introduction of all students. Discussion of schedule, assignments, evaluation, textbooks/references. Week 2: Short lecture Climate Change in the Earth system based on past geological records. Week 3: Short lecture Climate Change in the Earth system based on recent records. Week 4: Revision of Earth climate change. Can past and present climate change records be used for estimation of future climate change? Introduction to basic global change models on the Earth system using University of Berkeley website model (https://ugc.berkeley.edu/) to explore and understand global change caused by climate change and human place in the Earth system. Theme 1: Records of past geological climate change (week 5 to 8). Students to choose and read, discuss and present basic scientific result of past climate change based on a scientific paper. Possible topics include: (a) Plate tectonics and climate, (b) CO2 as Earth ' s Climate Driver-climate							
----- Continue to ILAS Seminar-E2 :Climate Change in the Earth system-Past,Present,Future (地球システムの気候変動-過去、現在、そして未来) (2) ↓ ↓ ↓							

regulation, (c) Snowball Earth and ice ages and (d) geological proxies, based on students interest.

Theme 2: Records of recent climate change (week 9 to 11).

Students to choose and read, discuss and present scientific result of recent climate change based on a scientific paper. Topics might comprise: (a) the Anthropocene, (b) the rise of atmospheric CO₂-Keeling curve and (c) ocean records (acidification, coral bleaching etc.), based on students interest.

Theme 3: Applications (week 12-14).

Based on study of past and recent climate change in the Earth system students will explore global change using basic interactive website models e.g. University of Berkeley (<https://ugc.berkeley.edu/>) to study what causes global change in the earth system. It will allow students to understand impacts of variables on global change caused by climate change and discover why the climate and environment changes in the Earth system. Students to present and discuss basic model results in seminar.

The format of themes 1 to 3 will depend on class size and may include individual or group presentations on the paper and model. Each student is required to choose one topic for (A) the discussion of a scientific paper (~ 20 min) and (B) global change model (~ 20 min).

Closing class and feedback (week 15)

General discussion of class and comments by all participants

[Course requirements]

None

[Evaluation methods and policy]

Assessment for the class will base on the following criteria:

1. Class attendance and active participation and discussion in class (30%).
2. Individual or group presentations for (A) scientific paper review (25%) and (B) basic global change model (25%).
3. Theme 1 or 2 presentation and theme 3 model results will be combined in a short assignment summary due on class 15 (20%).

Details will be announced during the first week of class.

[Textbooks]

Ellis, E.C. 『Anthropocene. A very short introduction.』 (Oxford University Press, 558,2018.)
 Lenton, T. 『Earth System Science.』 (Oxford University Press, 464.,2016)
 Maslin, M. 『Climate change. A very short introduction』 (Oxford University Press (4 th edition).,2021)
 Redfern, M. 『The Earth. A very short introduction』 (Oxford University Press, 90.2003)
 Books available online at KU library.

[References, etc.]

(References, etc.)

Introduced during class

(Related URL)

<https://ugc.berkeley.edu/>(University of Berkeley Global change website)

[Study outside of class (preparation and review)]

Students are expected to read and explore a (1) scientific manuscript in English, (2) prepare a short presentation of the scientific results in English, (3) conduct some basic global change modeling and (4) actively participate in class discussion.

Depending on class size, students may need to meet in between sessions, outside the class time to prepare for presentation.

[Other information (office hours, etc.)]

Students are expected to bring their own computer device (laptop, tablet, etc.).

Regarding office hours, use LMS to send an e-mail to request an appointment.

[Essential courses]