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Researching and Shaping Climate Futures

J. Baehr, J. Behrens, L. Borchert, M. Brüggemann, L. Kutzbach, K. Linscott, A. Oberg

5th course day – May 7th, 2026

Moderator: Lars Kutzbach

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Today's Schedule

- **"Can we predict climate?" (Johanna Baehr)** 40 min
- **Preparation of Role-Play** 13 min
- **Role-play on Role of Scientists** 25 min
- **Reflection on Role-Play** 10 min
- **Homework # 5** 2 min

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Can we predict climate?

Johanna Baehr

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What does ‘predict’ mean?

For today‘s purpose:

- Quantitative statement about the future evolution of climate

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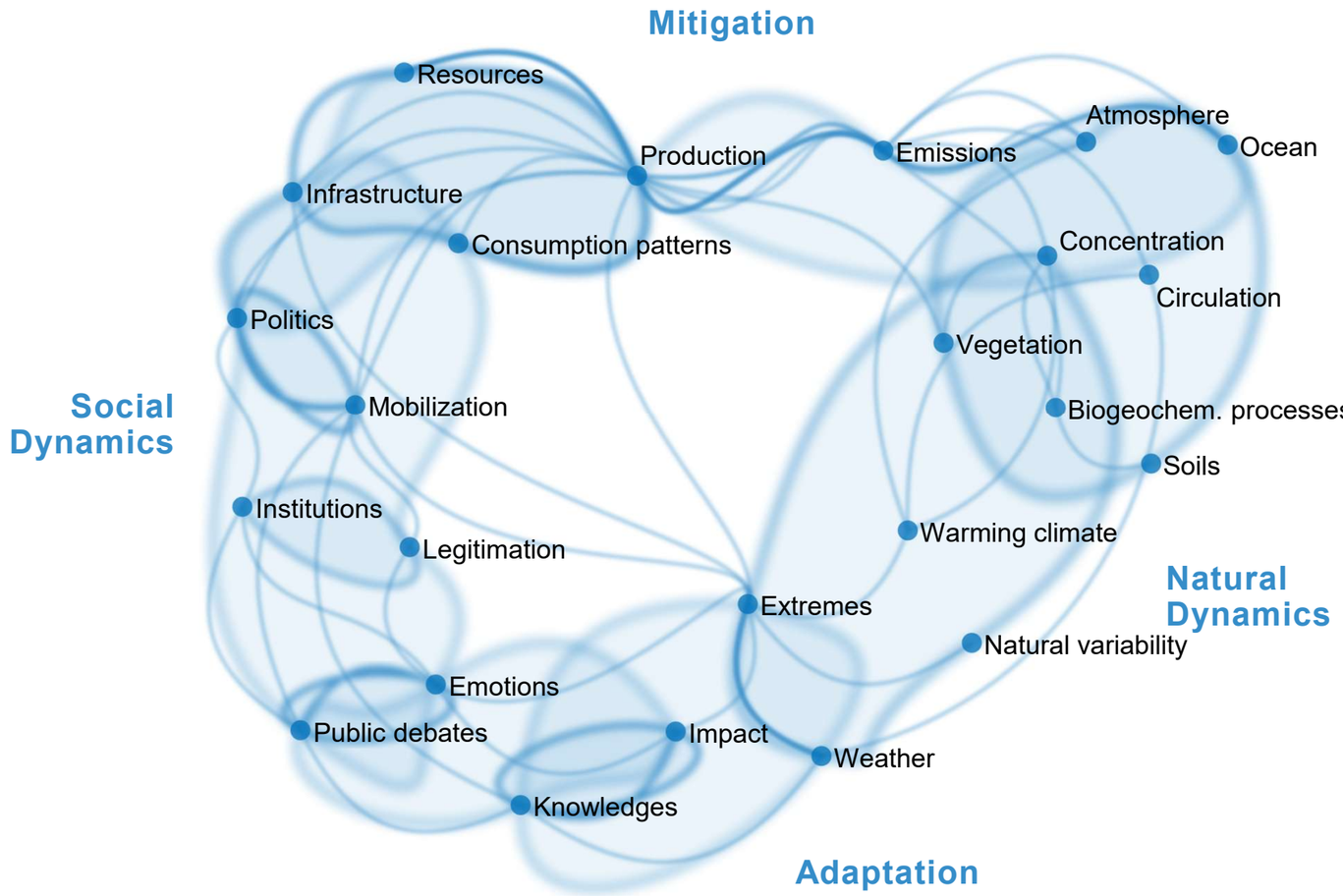
What is climate?



For today's purpose, let's assume we can describe climate by:

- A finite number of processes that interact
- Identified climate dynamics within a climate system

Note: Uncertainties remain.

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What does ‘predict’ mean?

For today‘s purpose:

- Quantitative statement about the future evolution of climate

How do we predict climate? How do we model the evolution of climate?

- Use a model that describes the future evolution of climate
- Assumptions:
  - Closed system, which can be described by partial differential equations
  - Known initial conditions
  - Formulated boundary conditions -> scenarios

Hypothesis: We cannot model climate futures.

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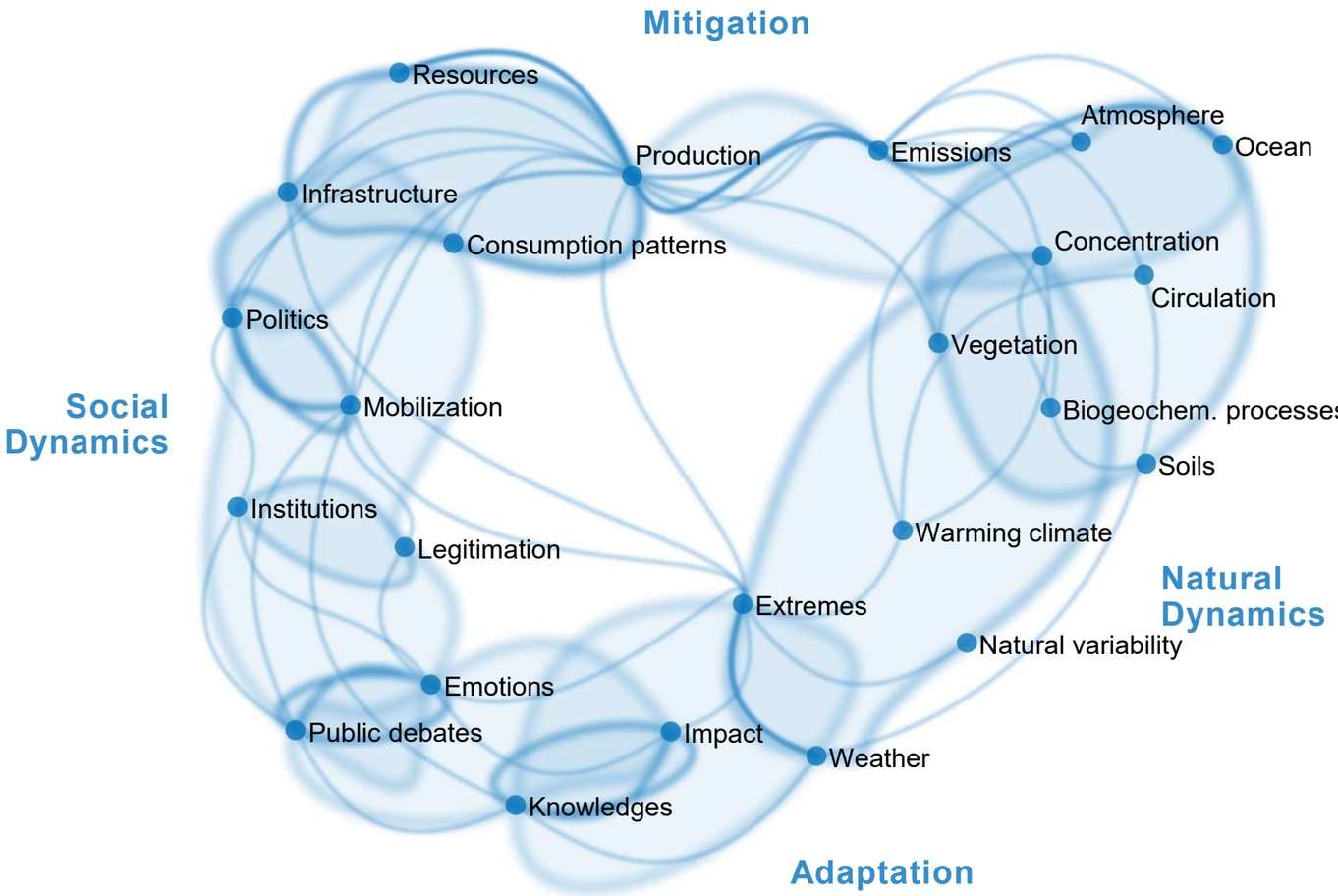
Can we predict climate futures?



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Preparation of Role-Play

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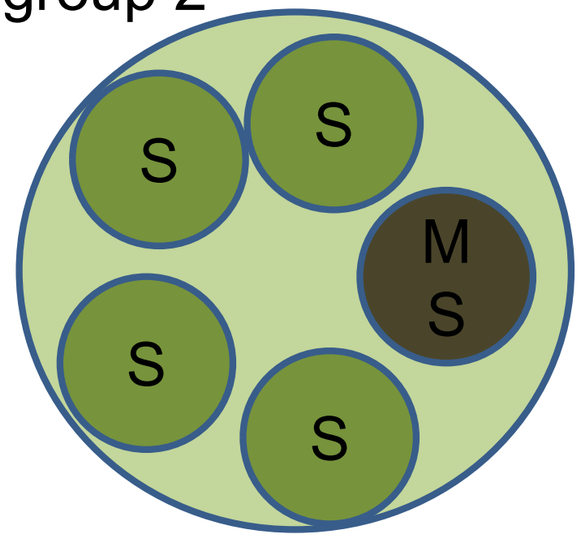
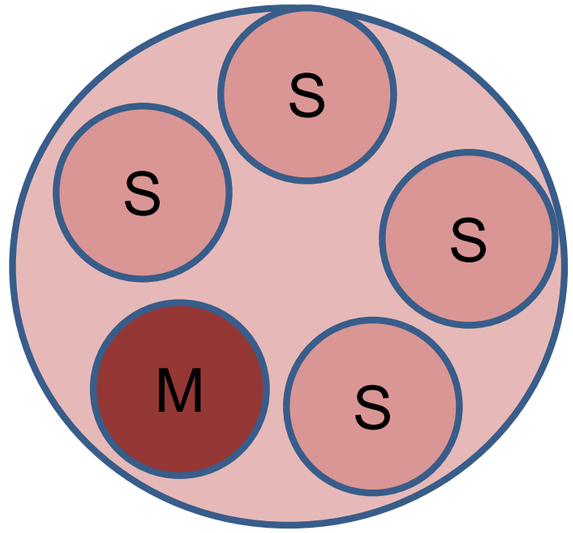
Organisation of role-plays

Role-group 2

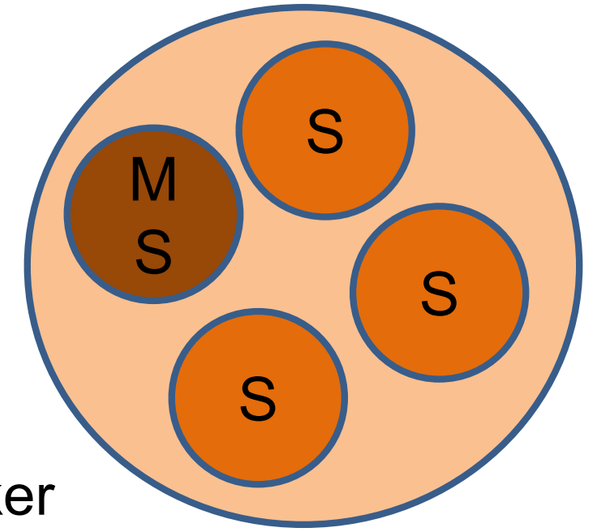


Role-group 3

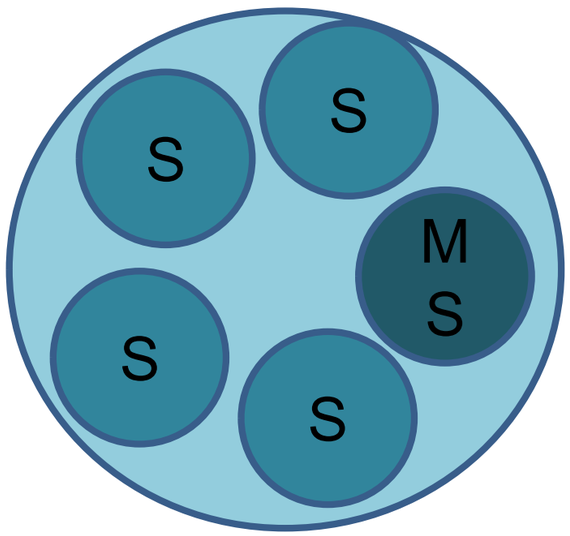


Role groups are fixed for the entire semester

Role-group 4



Role-group 1



- Main speaker takes part in the discussion as the representative of a role
- Moderator leads the discussion

MS = Main Speaker

M = Moderator

S = Support

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How is the role-play happening?

- The main speakers and the moderator will engage in a discussion in class. If someone else wants to make a statement, speaking time can be requested via raising your hand. The moderator will grant you speaking time.
- At the beginning of the role-play, the moderator introduces the question and starts the role-play by asking each role group to answer the question. The debate develops around differences, similarities or other aspects. The point is to understand both the justifications behind different perspectives, as well as the unifying ideas.
- After 25-30 minutes we stop the actual (moderated) role play and give you about 10 minutes to reflect on your experiences, ideas and thoughts.

Role-play for Thursday, 7.5.2026: *Role of scientists*

Background story:

Imagine you are the council directing a fictional research institute dedicated to climate change: *The Climate Institute* (TCI). Imagine there is a national government that advocates a rollback on promoting renewable energies and increases subsidies for fossil fuels. A scientist from the NGO *Scientists for Change* asks the leadership of *The Climate Institute* to clearly take a political stance on the need to get out of coal and gas faster, rather than slower than planned. The NGO also wants *The Climate Institute* to call for a halt to fossil fuel subsidies and to limit the climate research footprint (less air travel to conferences, etc.). It also asks to revise the research program of *The Climate Institute* to take epistemic pluralism more seriously.

The council discusses how to position the *The Climate Institute* regarding the requests from *Scientists for Change*.

Role-play for Thursday, 7.5.2026: *Role of scientists*

The council of *The Climate Institute* consists of:

(1) A group of scientists who do not want to interact with the public, focus on science, and leave communication to the outreach team and policy-making to policymakers.

(2) A group of scientists who identify with the role of scientists as honest brokers that should not advocate any kind of values and policy directions, but lay out options for policy making.

(3) A group of scientists who identify strongly with the idea of transformative science, that science should help to enable socio-ecological transformation towards more sustainable ways of living.

(4) A group of scientists who strongly believe that the idea of epistemic pluralism should lead to a revision of the research priorities.

(5) A moderator team that was hired to help resolve conflicts within The Climate Institute in a civil way.

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Role-groups for 1st role-play: *Role of scientists*

Role-Nr.	Role	Group Nr. (members)
1	Pure scientist	1 (Lucy, Alina, Ibolya)
2	Honest broker	2 (Tara, Divanshu, Marlene)
3	Transformative scientist	3 (Alyx, Sarah, Carmen, Rami)
4	Transdisciplinary scientist/epistemic plurality advocate	4 (Mareike, Asli, Prashamsa)
5	Moderator	5 (Toni, Eva, Alicja)

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Please prepare role-play so that we can start at 11:10.

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Role-Play on Role of Scientists

Students

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Reflection on Role-Play

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Homework # 5

Homework # 5

a) Until Tuesday, May 14th: Comment on the blog on one poster idea (50-100 words).

b) Until Thursday, May 21st: Post on the blog a more developed proposal for your poster topic including references (300-400 words).

c) Continue planning the poster session in your task groups.

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Poster: Updated Timeline

Task	until
Class: Introduction to poster tasks and grading (Lars)	23.04.26
Homework: Post first ideas for a poster on the blog (100-200 words)	30.04.26
Class: Input on poster design (Kat); Starting organisation of self-organized poster session (Kat)	30.04.26
Homework: Comment on the blog on one poster idea (50-100 words)	14.05.26
Homework: Post proposal for your poster topic including references (300-400 words)	21.05.26
Class: Poster session organization (Kat)	21.05.26
Q&A poster task	04.06.26
Homework: prepare first version of poster (digital and A4 printout)	11.06.26
Class: Poster drafts feedback - speed dating	11.06.26
Time for students to prepare poster session	18.06.26
Poster clinic; Time for students to prepare poster session	25.06.26
Poster Session events I and II	02.07.26, 09.07.26
CLICCS Retreat: Presentation of awarded posters	30.09.-02.10.26

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Updated preliminary session plan

09.04.	Introduction to the course (L. Kutzbach); Introduction to the course blog (J. Behrens); Introduction to *Climate Futures* (L. Kutzbach)
16.04.	Mapping natural and societal dynamics constituting climate futures (A. Oberg);
23.04.	Introduction to poster task and grading criteria; poster session task (L. Kutzbach); Input on *Epistemic Pluralism in Climate Science* (K. Linscott et al.); Input on *Transformative Science* (M. Brüggemann)
30.04.	*Mathematical perspectives on climate futures* (J. Behrens); Introduction to poster design and starting organisation of poster session task (K. Linscott)
07.05.	*Can we predict climate?* (Johanna Baehr); 1st role-play on *epistemic plurality and transformative science in CLICSS* (students)
21.05.	*What is the future of the Arctic in a warming world? Combining observations, experiments and modelling* (L. Kutzbach); Poster session organization (K. Linscott)
28.05.	*Communicating climate futures* (Michael Brüggemann); 2nd role-play (students)
04.06.	*Narrative-based near-term prediction of climate futures* (Leo Borchert); Q&A poster task
11.06.	Poster drafts feedback - speed dating, 3rd role-play
18.06.	Organisation of poster session
25.06.	Poster clinic; preparation of poster session
02.07.	Poster Session event I
09.07.	Poster Session event II
16.07.	Feedback and Conclusions (students and lecturers)

Extra slides

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Introduction into roles and role-play

Role conflict in sociology

Role conflict := conflicting or competing demands associated with a role

1. **Inter-role conflict** occurs if a person in order to perform one role well must violate another important role.

   Examples:

   - 'work-life-balance'
   - scientist vs. political activist?

2. **Intra-role conflict** occurs if a person in order to live up to one role expectation must violate another important role expectation because these demand are competing (e.g., for time) or even conflicting.

   Example: “Researcher-Fund Raiser-Project Manager-Supervisor-Teacher”

Role-play as didactical method

Draws on: **The presentation of self in everyday life** (*Intro to Social Sciences* class)

- **Social Role** := set of social expectations that people direct to a person
- We can often expect and understand others because they act in a specific social role (professional role, family role, public transport user role, etc.)
- Roles trigger questions such as “why is this scientist more cautious with his predictions than her colleague?”, “why does this politician not act upon the knowledge that scientists provide as politicians in country xy do?”; “why is this climate journalist not as knowledgeable as his colleague?”

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Example: Scientific climate policy advice under uncertainty

Question: „Given the inherent uncertainties in the results of climate models, should climate mitigation and adaptation policy rely on the projections based on climate models?“

Roles:

- **Politician I:** Decision-maker of a green-party arguing for drastic action
- **Politician II:** Decision-maker of a more conservative party being sceptic of climate projections and arguing for less climate action
- **Scientist I:** scientific expert in a discipline related to climate sciences arguing for the use of climate projections
- **Scientist II:** scientific expert in a discipline related to climate sciences who is skeptical of climate modelling and/or the use of climate projections
- **Moderator**

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Example: Scientific climate policy advice under uncertainty

“The real problem is: If we choose to wait for more certainty before actions are initiated, then can our models be improved in time to prevent an irreversible drift toward a future calamity? (…) This dilemma rests, metaphorically, in our need to gaze into a **very dirty crystal ball**; but the tough judgment to be made here is precisely how long we should clean the glass before acting on what we believe we see inside.”

(Schneider 1976, p. 149)

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Different role understandings of climate scientists

"On the one hand, **as scientists** we are ethically bound to the scientific method, in effect promising to tell the truth, the whole truth, and nothing but — which means that we must include all the doubts, the caveats, the ifs, ands, and buts. On the other hand, we are not just scientists **but human beings as well**. And like most people we'd like to see the world a better place, which in this context translates into our working to reduce the risk of potentially disastrous climatic change. To do that we need to get some broadbased support, to capture the public's imagination. That, of course, entails getting loads of media coverage. So we have to offer up scary scenarios, make simplified, dramatic statements, and make little mention of any doubts we might have."

Schneider, S.H., Discover Magazine, pp. 45–48, October 1989

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Different role understandings of climate scientists

"Frustrated with what appeared to be an **activist spirit** motivating socially-aware scientists like Schneider, Landsberg believed that scientists who studied the climate should stay out of the spotlight given what he considered to be a myriad of scientific uncertainties about the causes of climatic change. Concerned about the **credibility of climatology as a professional discipline** given his own role in its maturation since the 1940s, Landsberg cast considerable doubt on the validity of relying on computer-based models to inform policy makers and the general public. Unless one could adequately quantify the scientific uncertainties that underlay scientific claims based on models, he believed that reticence was the only appropriate course of action until such uncertainties could be identified and resolved. Staying behind closed doors, cautiously hedging one's claims by quantifying and emphasizing scientific uncertainty, and diligently collecting and analyzing data to resolve such uncertainties were **hallmark characteristics of what he envisioned to be a professional atmospheric scientist."** (Henderson 2014 , p. 54)

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Literature

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Merton, R. K. (1957): Social Theory and Social Structure. Glencoe: The Free Press.

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