

Mitigation and Adaptation Studies

Class 1: The Challenge we are Facing

Contents:

- The Challenge: Leaving the “Safe-Operating Space”
- Knowledge, Sustainability Science
- *Wicked Problems*
- *Mitigation and Adaptation - some definitions*
- *Adaptation Science*
- *Practicalities*



Our Quest for Sustainable Development

“Sustainable Development is a development that meets the needs of the present while safeguarding Earth's life-support system, on which the welfare of current and future generations depends.”

Griggs et al., 2013



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The Earth's Life-Support System

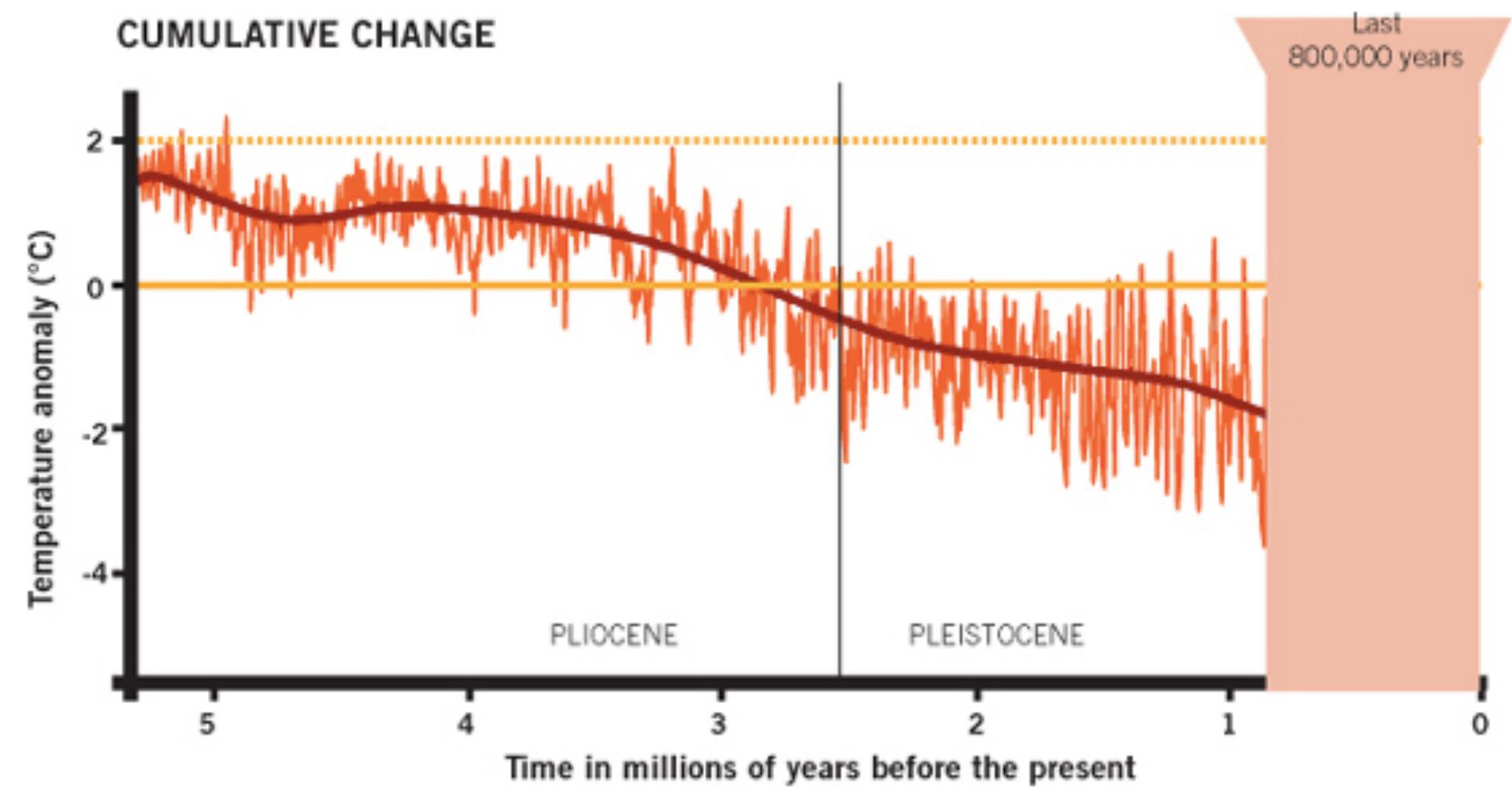
Five questions to address:

- What is the baseline?
- What is the syndrome?
- What is the diagnosis?
- What is the Prognosis?
- Is there a therapy and what would that be?

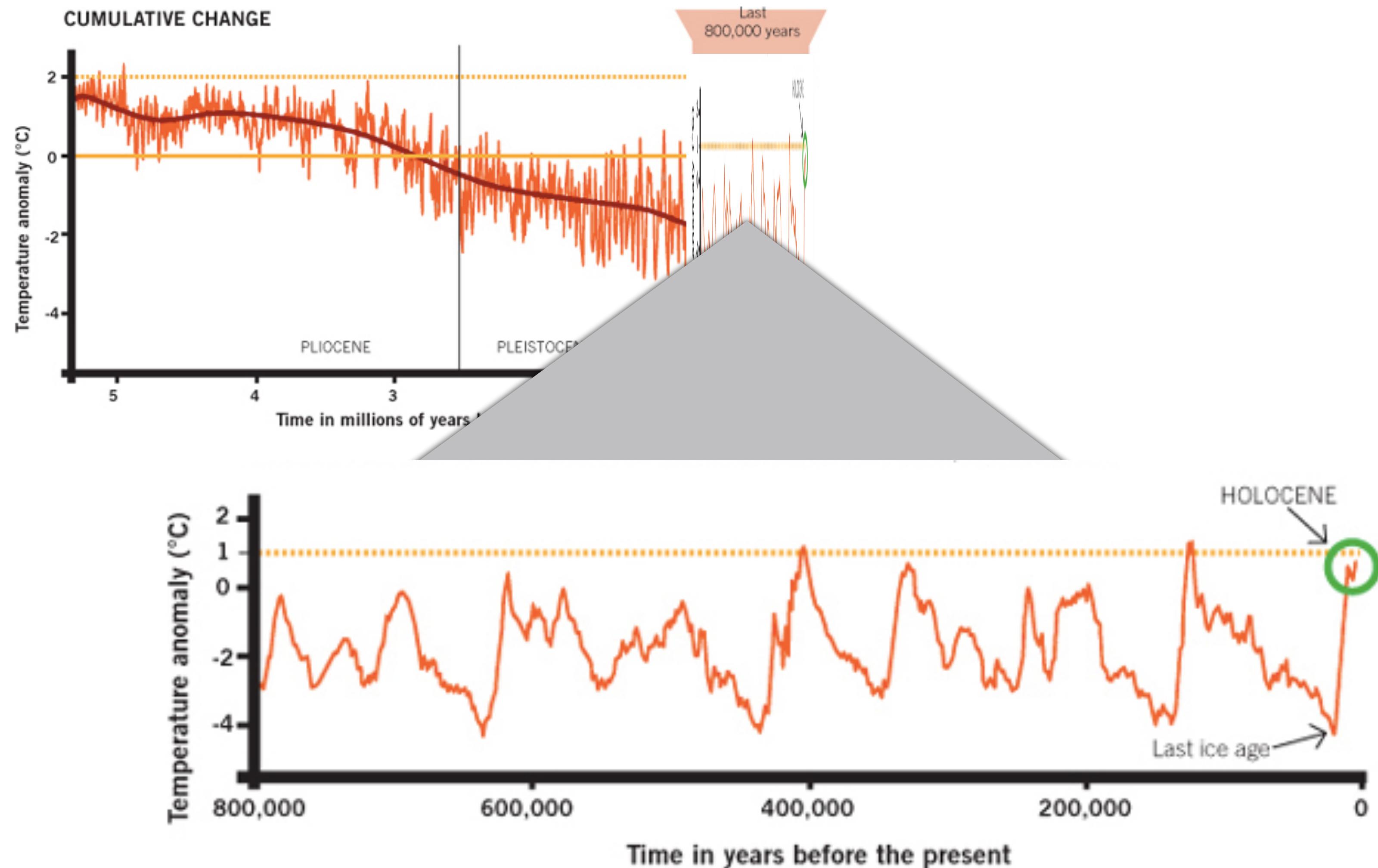


The Baseline: Past Climate and Global Change

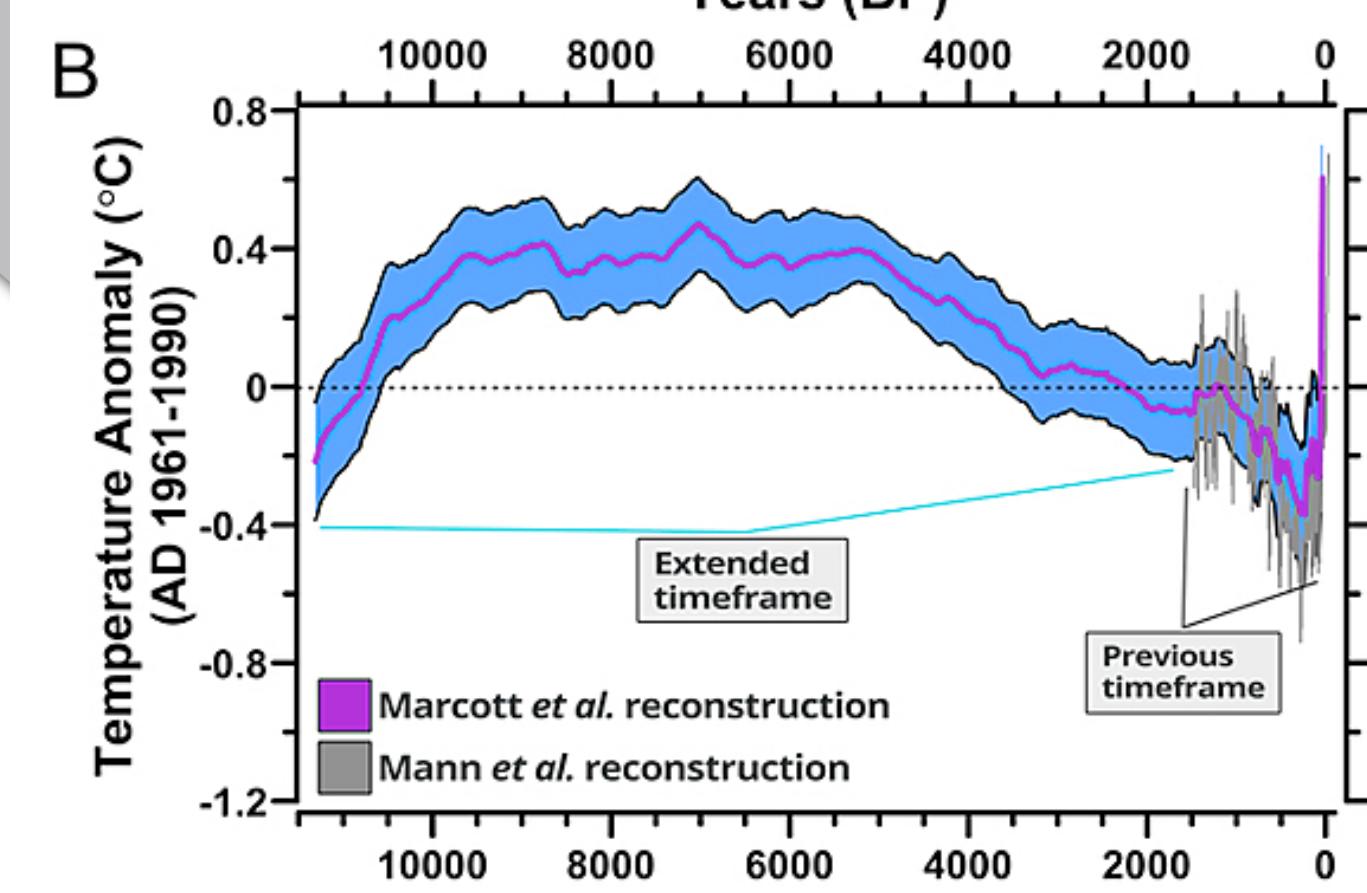
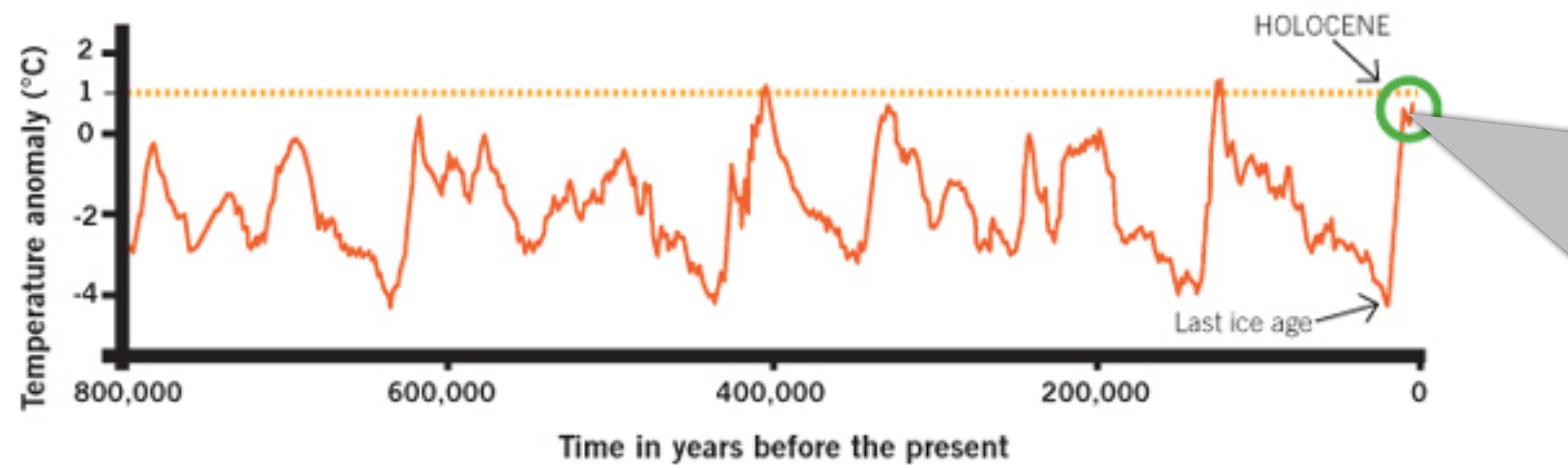
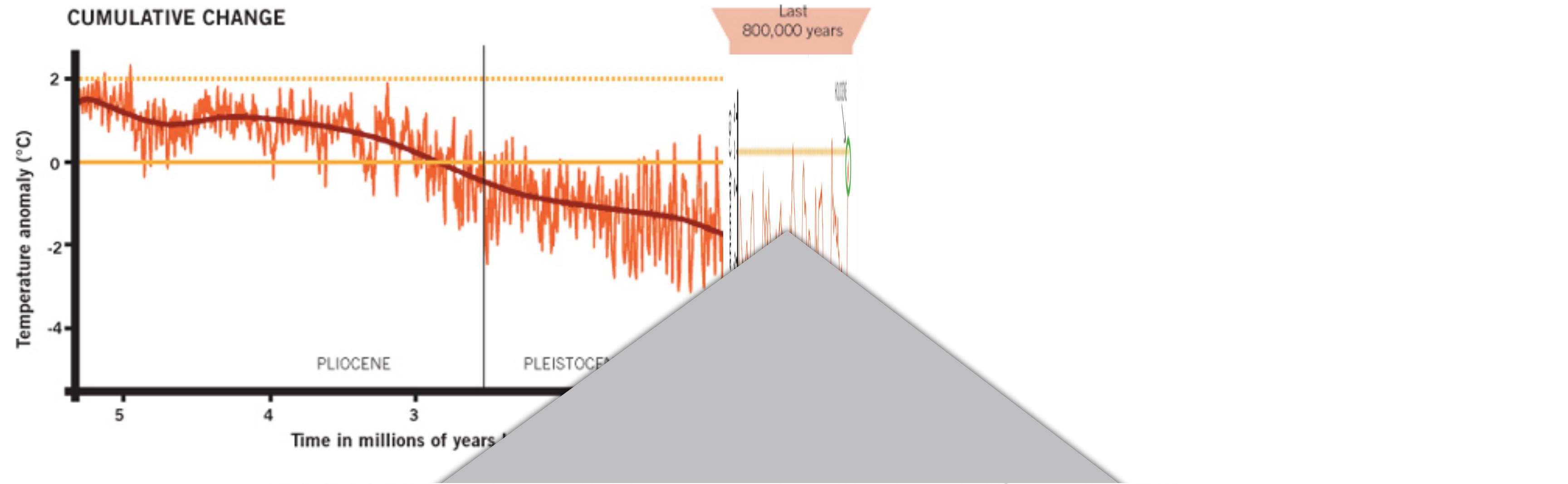
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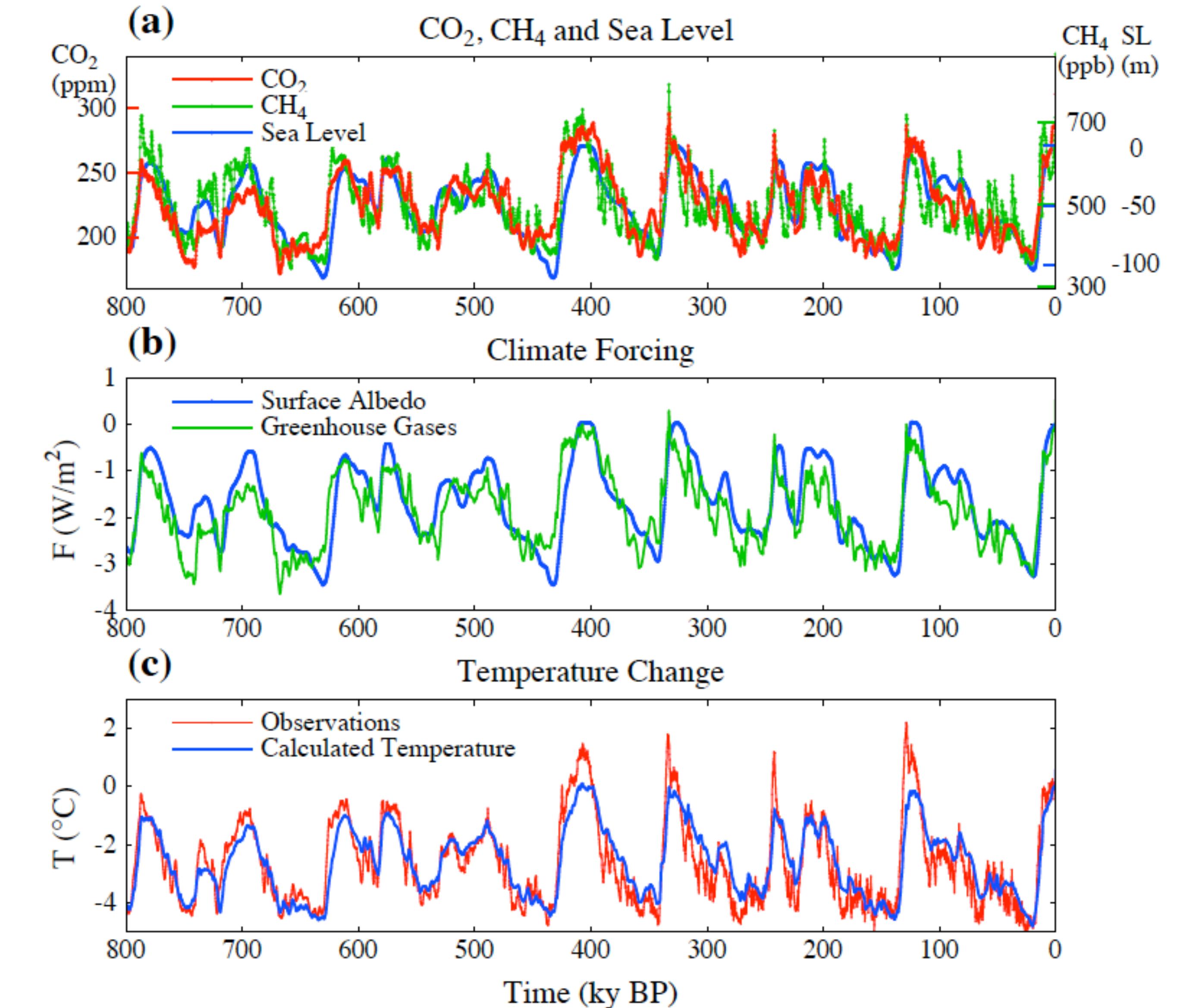
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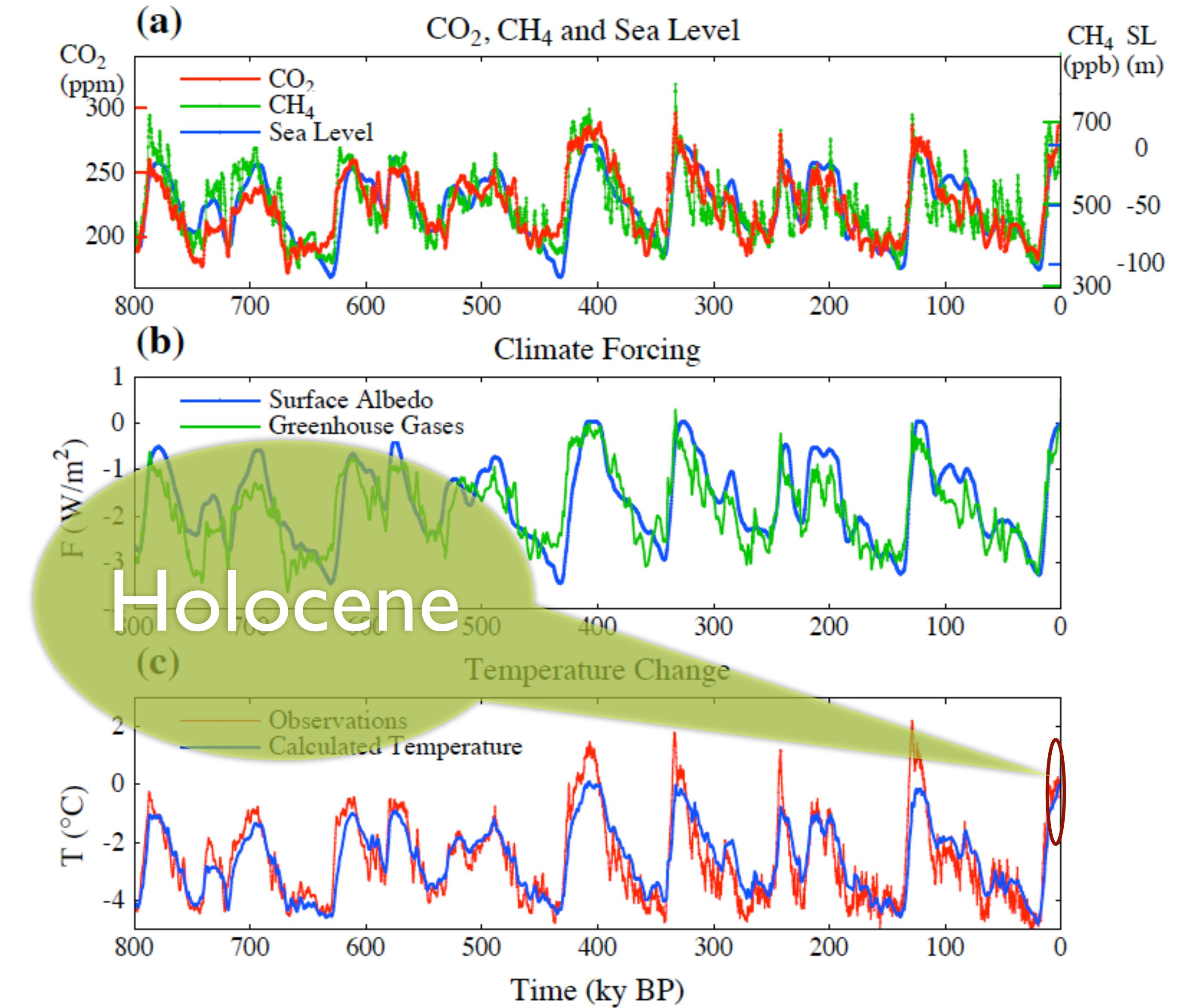
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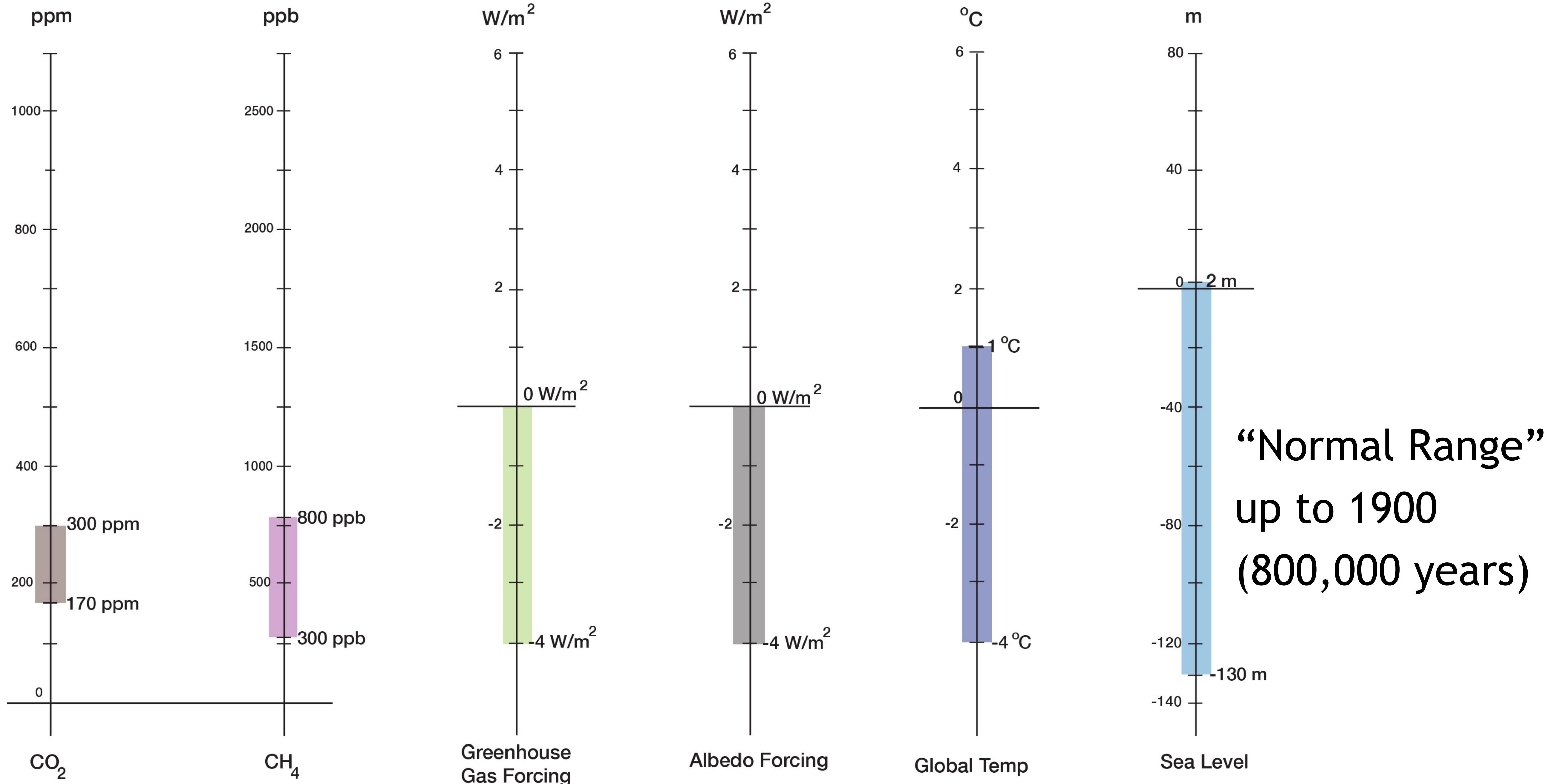
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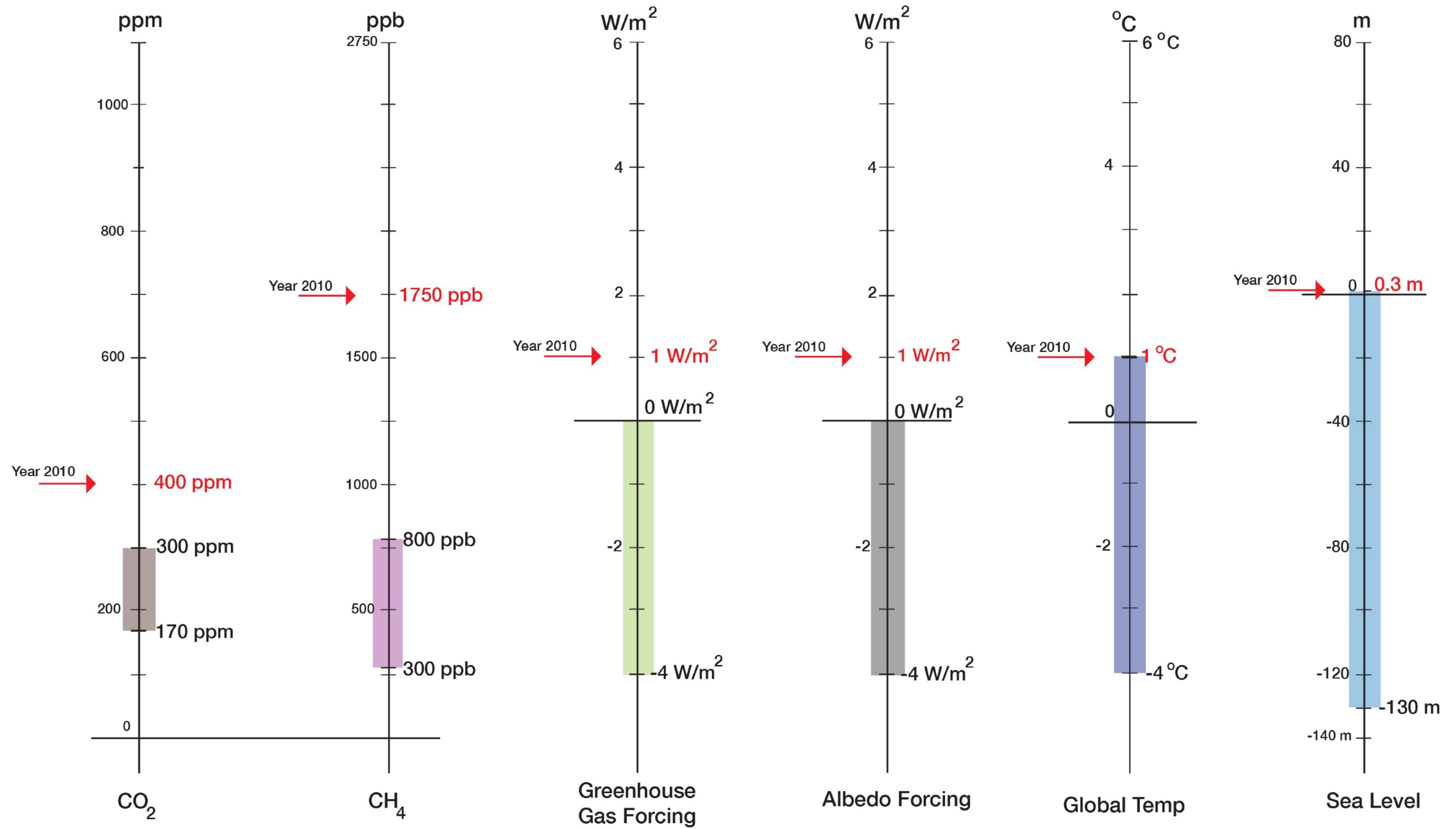
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The Baseline: Past Climate Change



The Syndrome: Recent Climate and Global Change

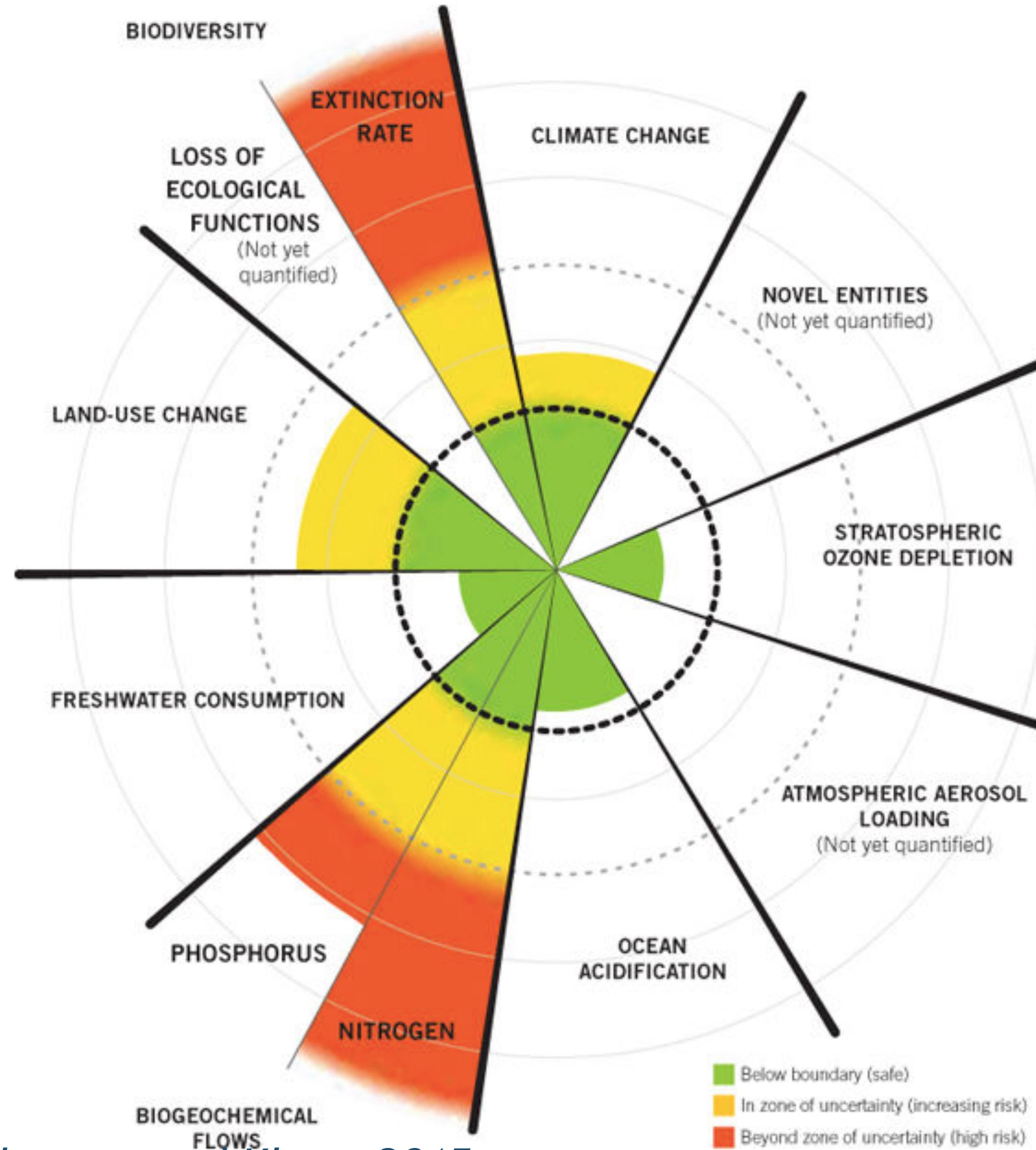


"Current State"

"Normal Range"
up to 1900
(800,000 years)

The Diagnosis: Leaving the “Safe Operating Space”

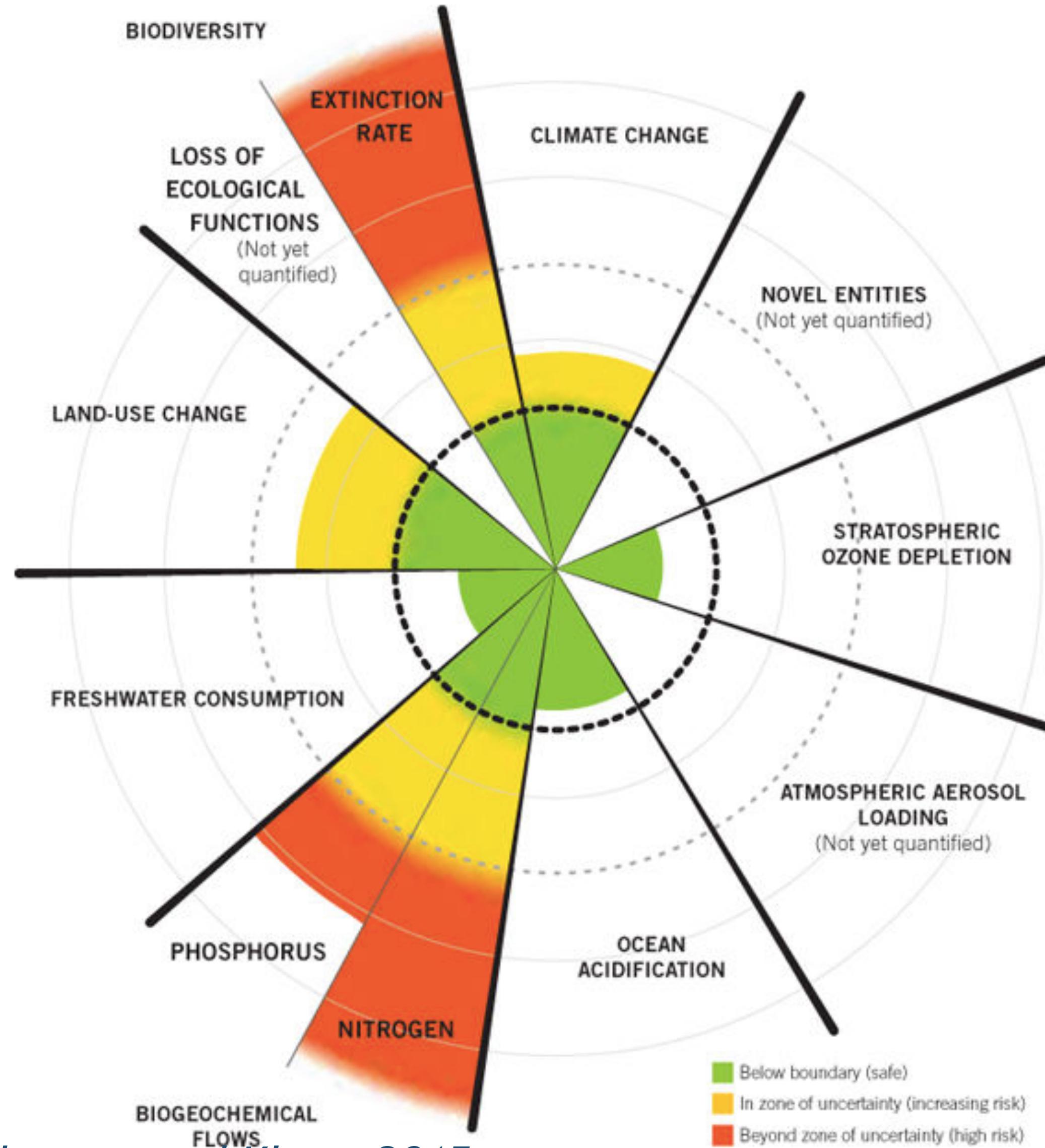
The Diagnosis: Leaving the “Safe Operating Space”



We are moving out of the Holocene and the “safe operating space for humanity” (Rockstroem et al., 2009):

- Climate Change (***)
- Ocean acidification (**)
- Stratospheric ozone depletion (*)
- Nitrogen (******) and Phosphorous cycles (**)
- Global freshwater (*)
- Change in land use (*)
- Biodiversity loss (******)
- Atmospheric aerosols (?)
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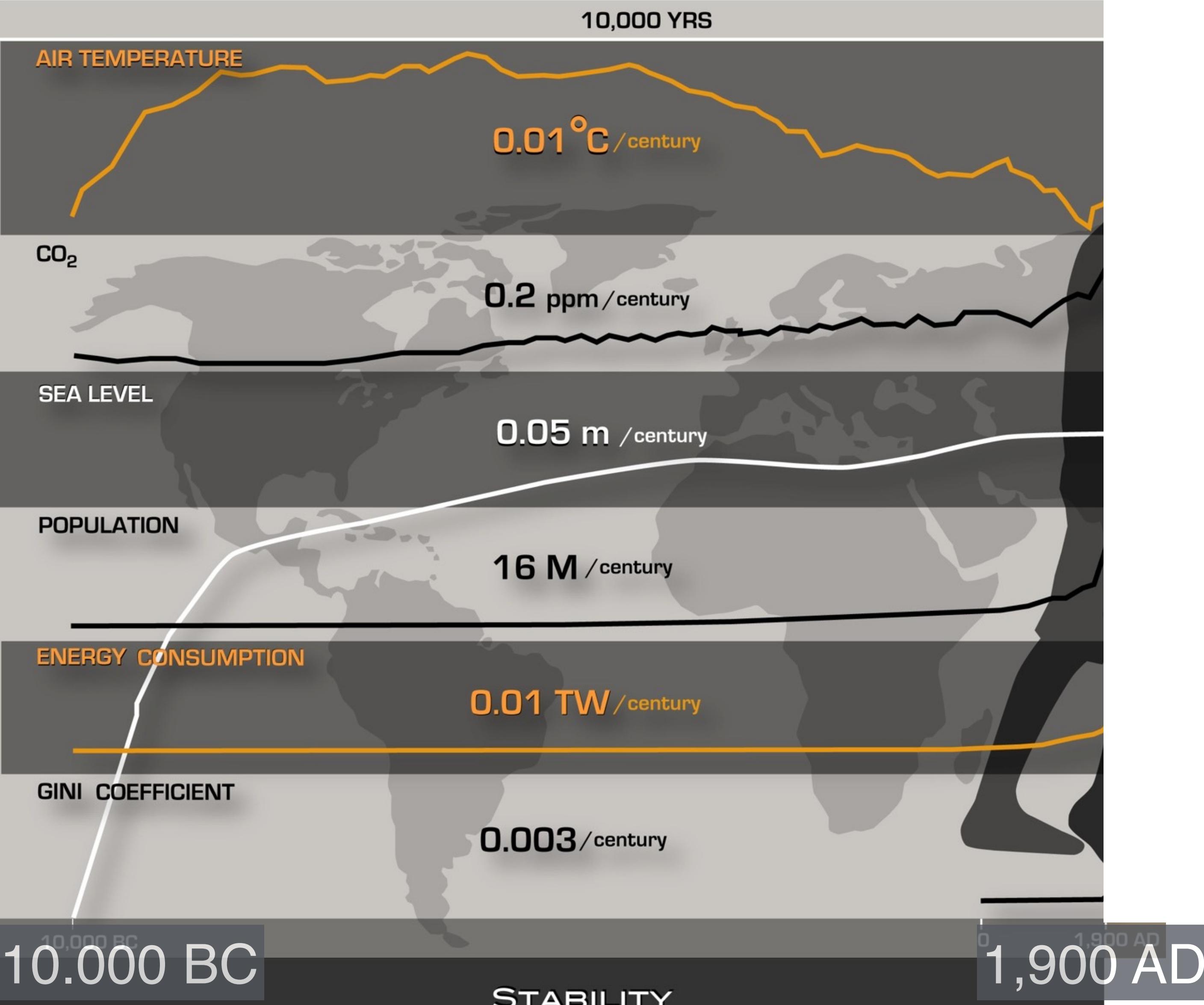
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Climate change and sea level rise are symptoms, not the cause, the “sickness.”



HUMANITY'S JOURNEY

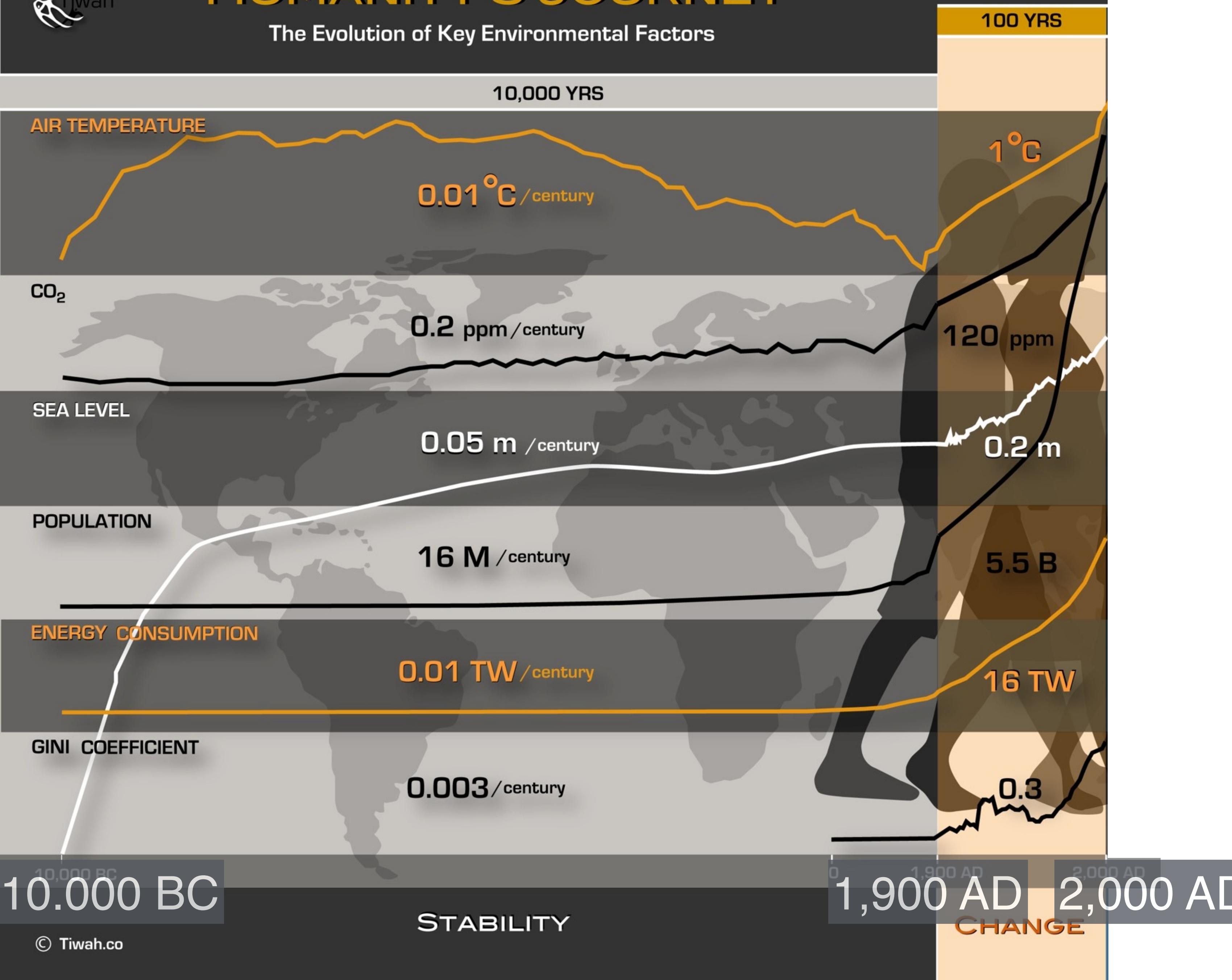
The Evolution of Key Environmental Factors





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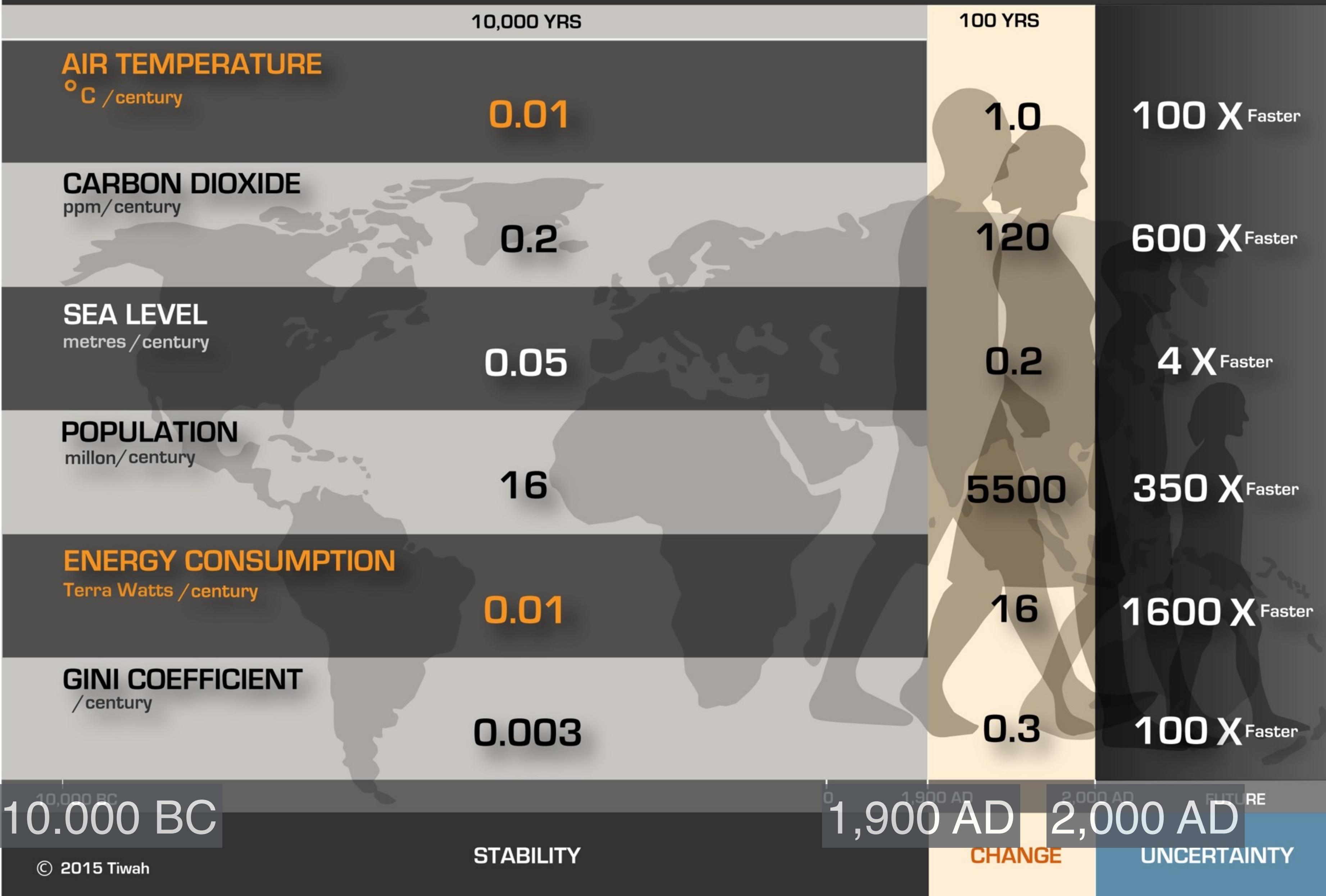
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HUMANITY'S JOURNEY

The Evolution of Key Environmental Factors



10,000 BC

STABILITY

1,900 AD 2,000 AD

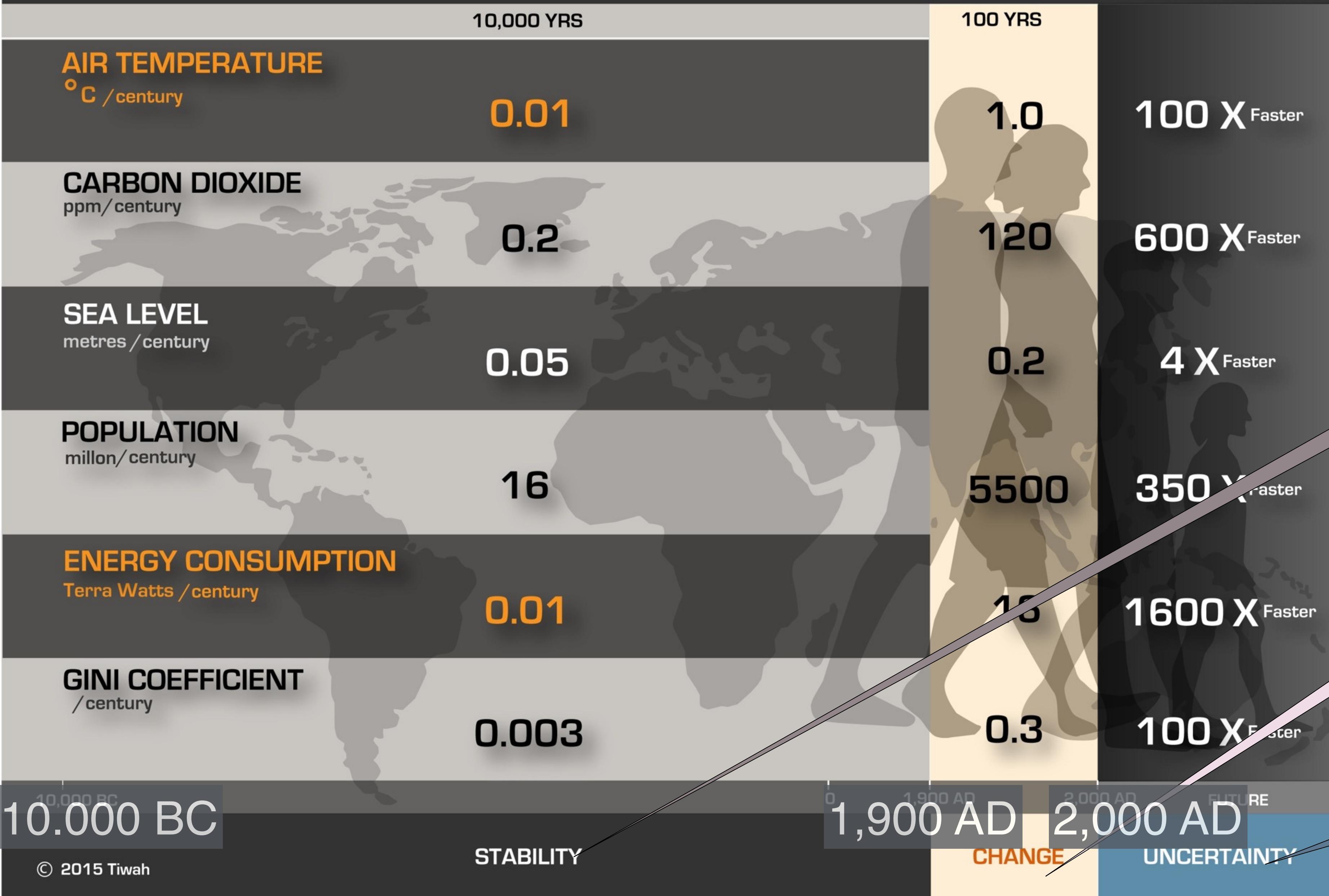
CHANGE

FUTURE
UNCERTAINTY



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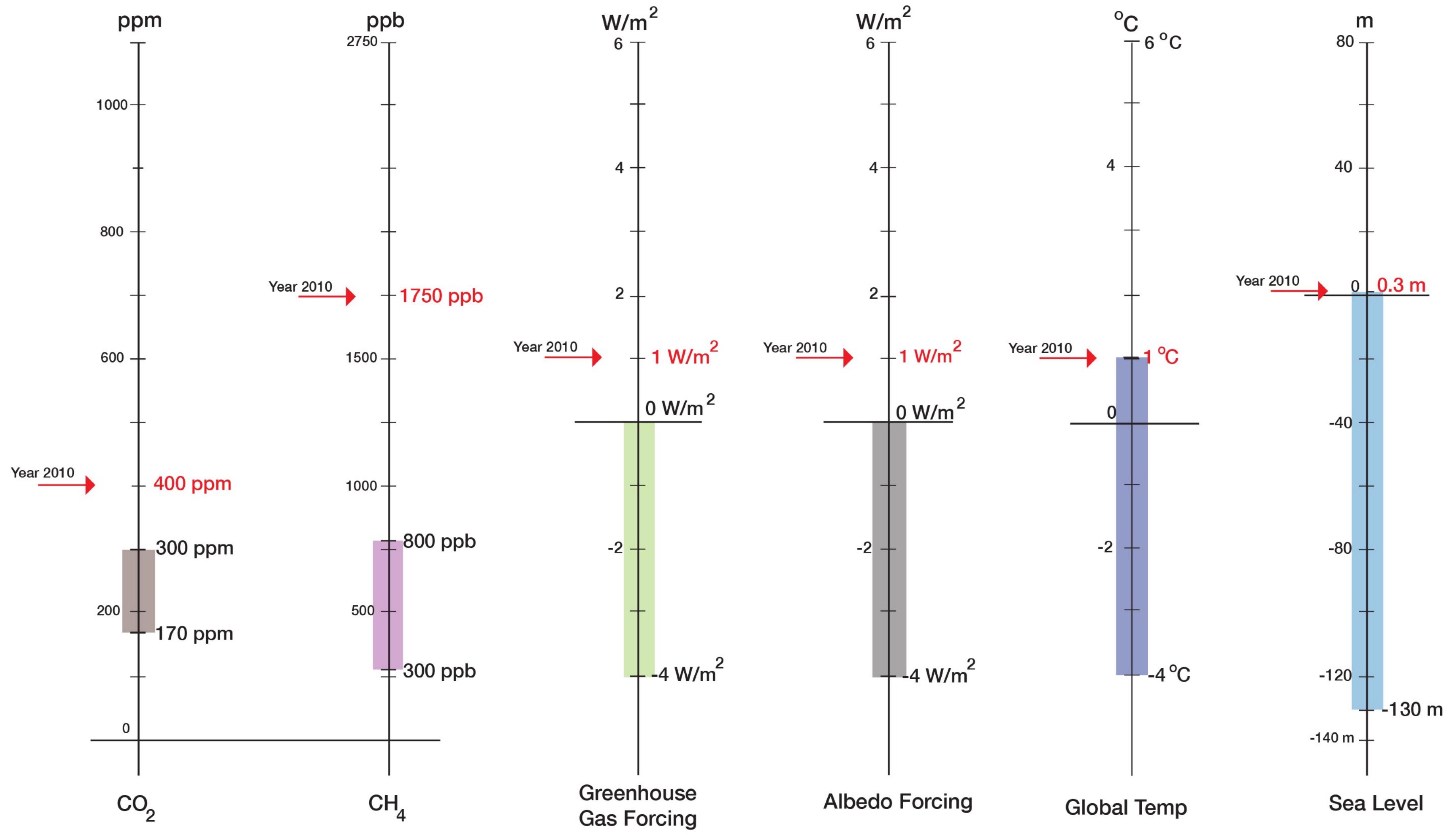


Holocene:
Stability

20th and
21st Century:
Change, imbalance

Future:
Uncertainty

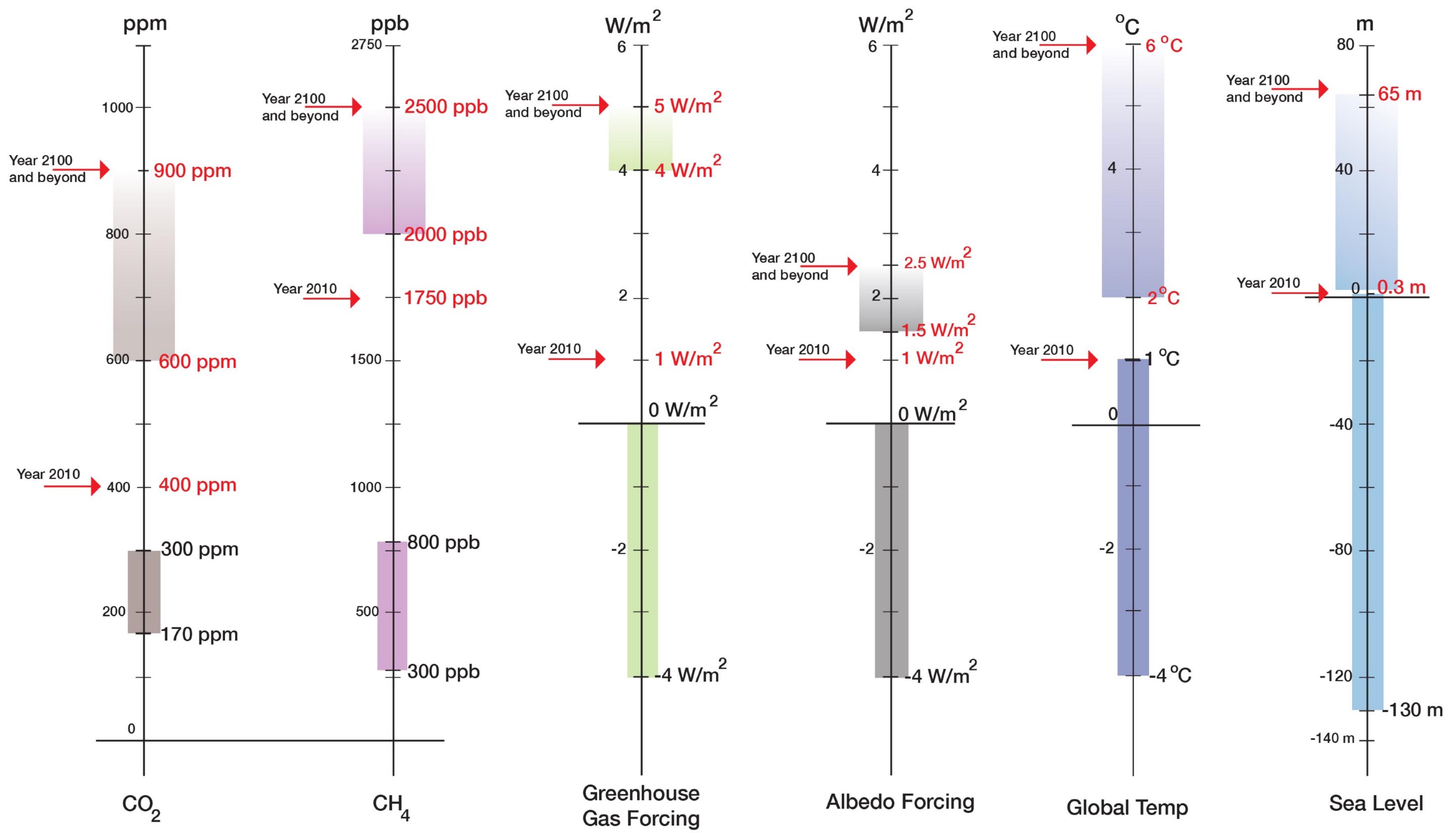
The Prognosis: Anticipating Surprises



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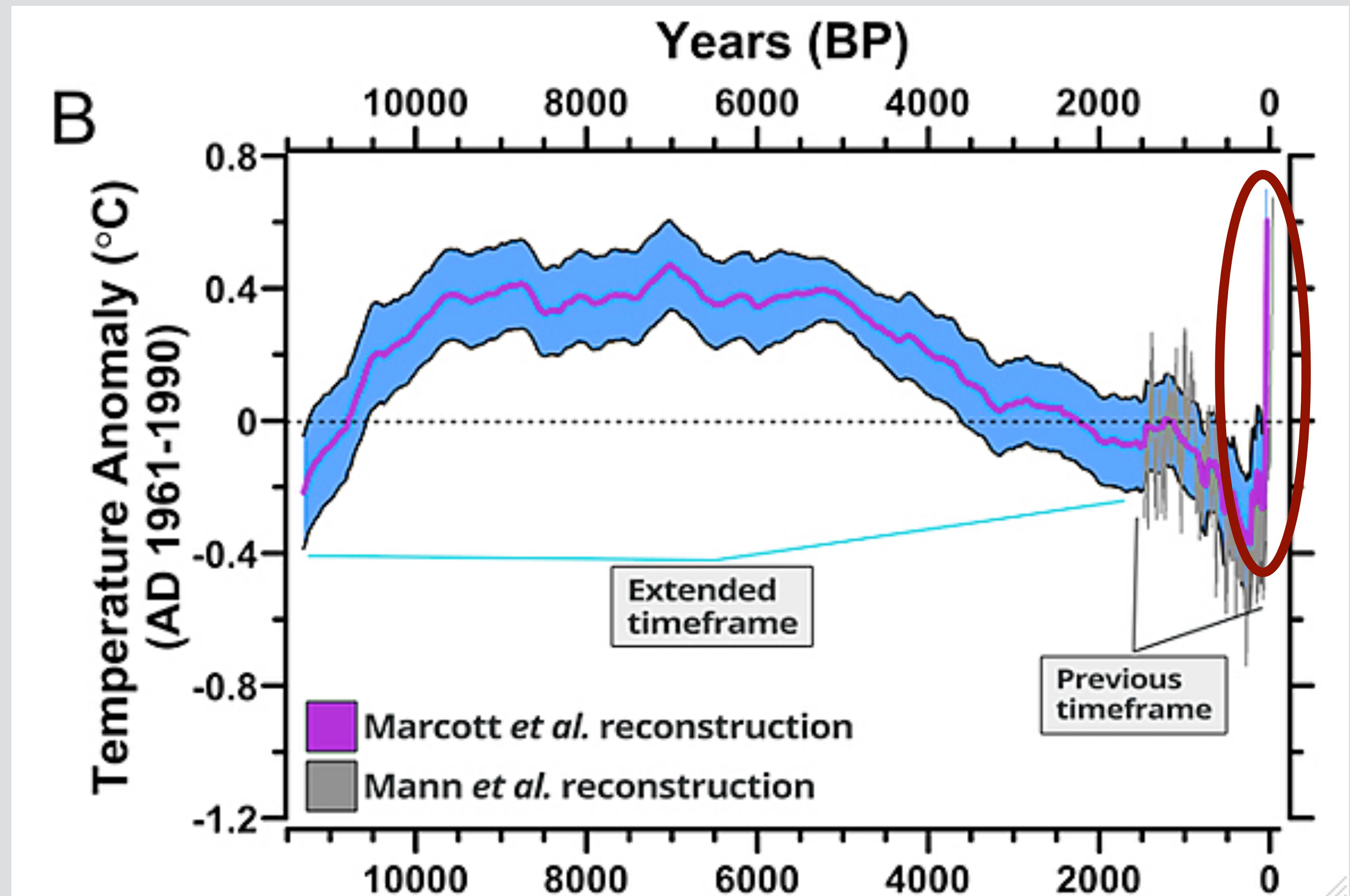
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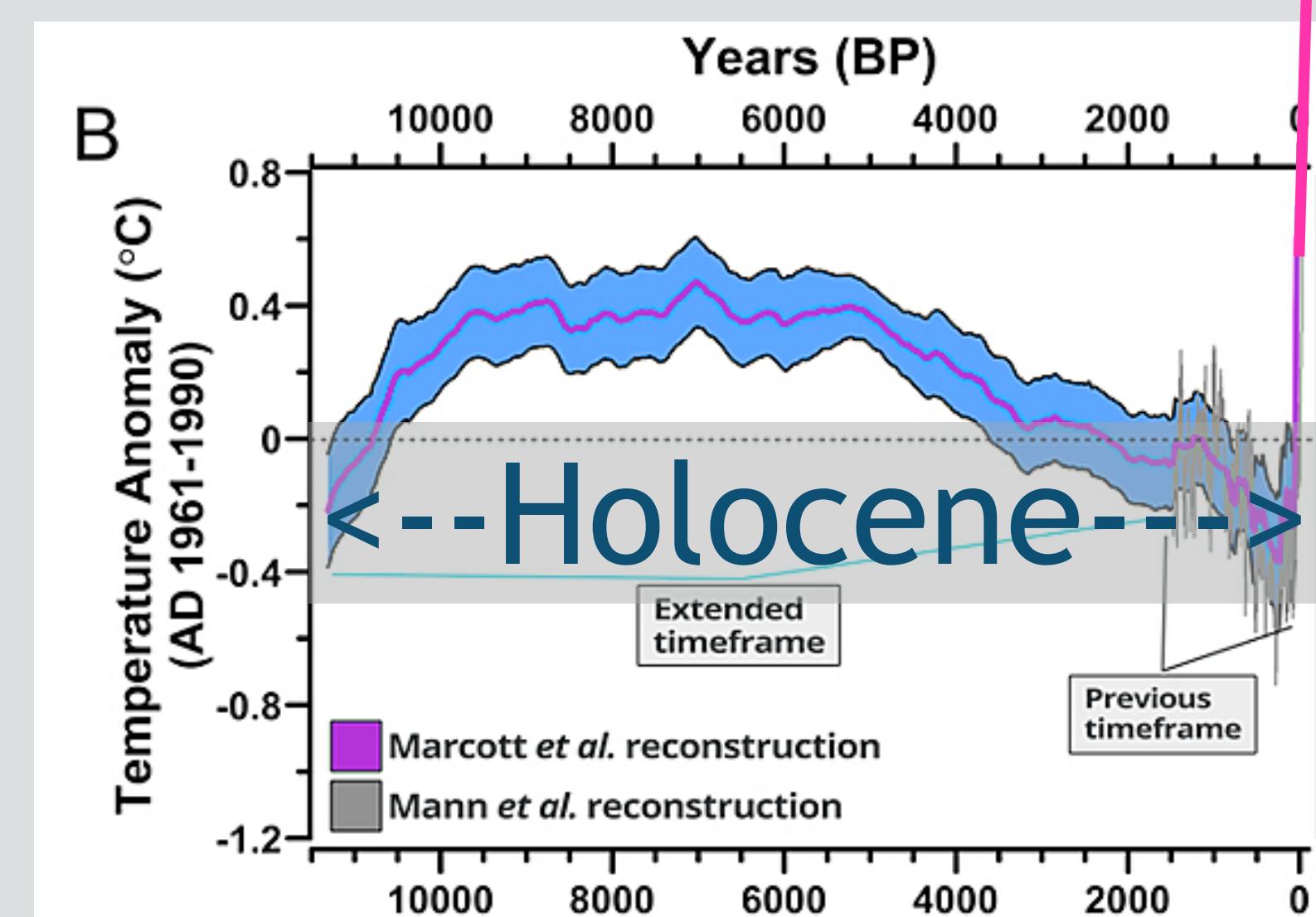
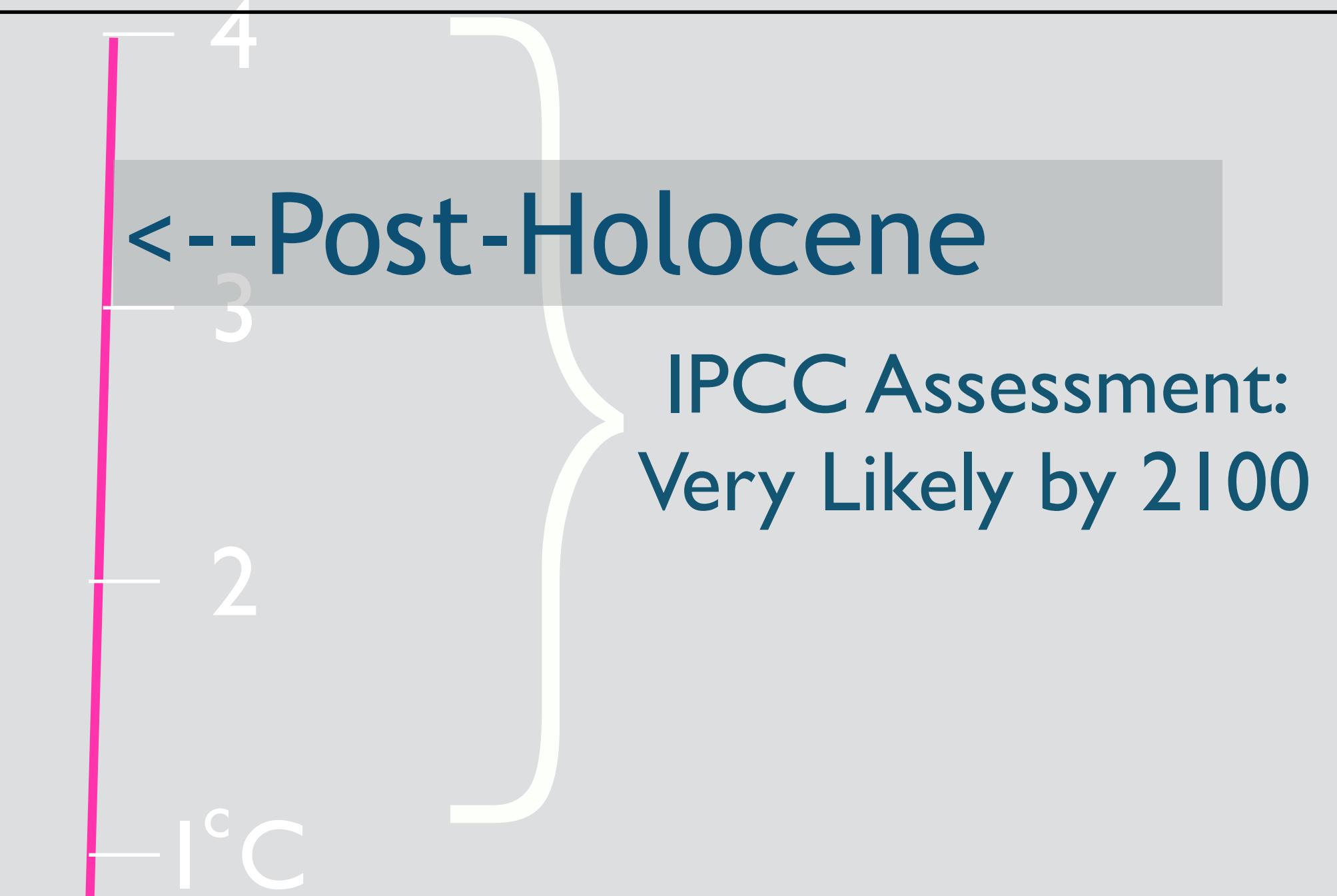
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The Prognosis: Anticipating Surprises



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Economy **for** humanity:

“An economy that meets our needs while safeguarding Earth’s life-support system, on which the welfare of current and future generations depends.”



The Therapy: Lifestyle Changes

Economy is the link between humanity and Earth's life-support system

Economy **for** humanity:

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“What is good for Earth’s life support system is good for humanity”



Creation of Knowledge

Epistemology (part of philosophy):

- develops a theory of knowledge
- separate from science

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Knowledge as justified true belief (JTB):

A subject S knows that a proposition P is true if and only if:

- 1 P is true, and
- 2 S believes that P is true, and
- 3 S is justified in believing that P is true

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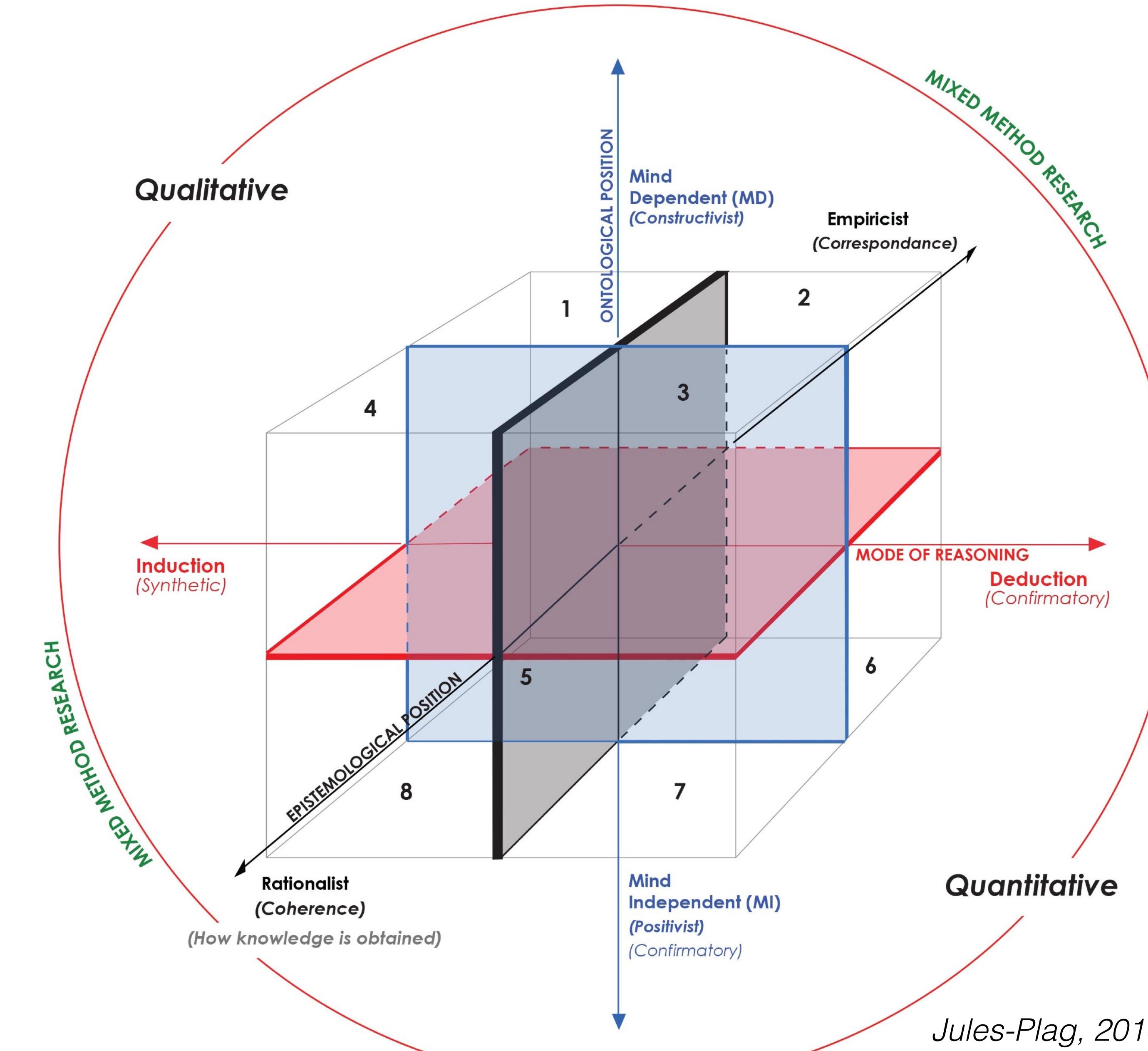
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Many think today that JTP is a necessary but not sufficient condition

Need a fourth condition

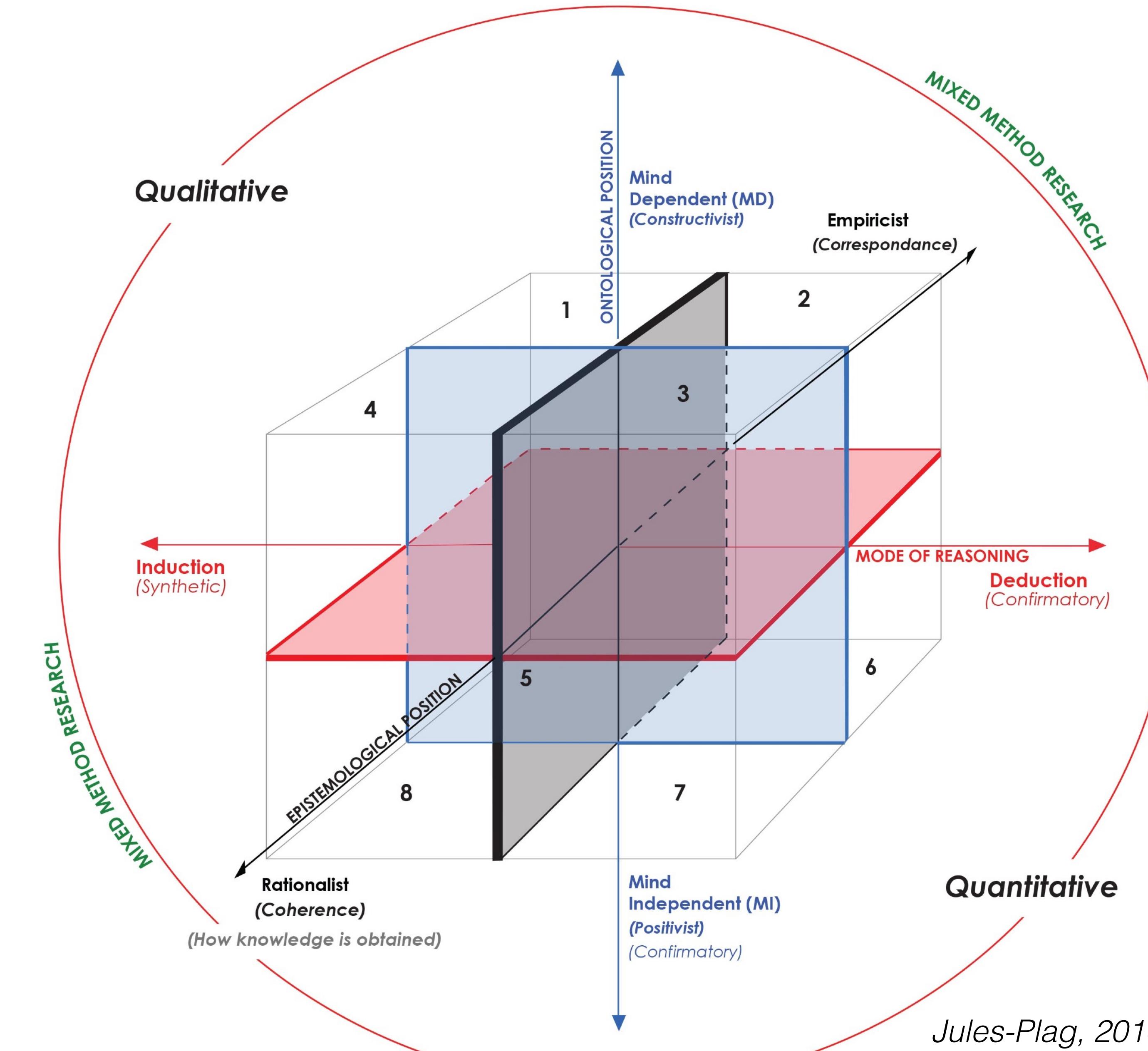
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Knowledge

Epistemology (part of philosophy):

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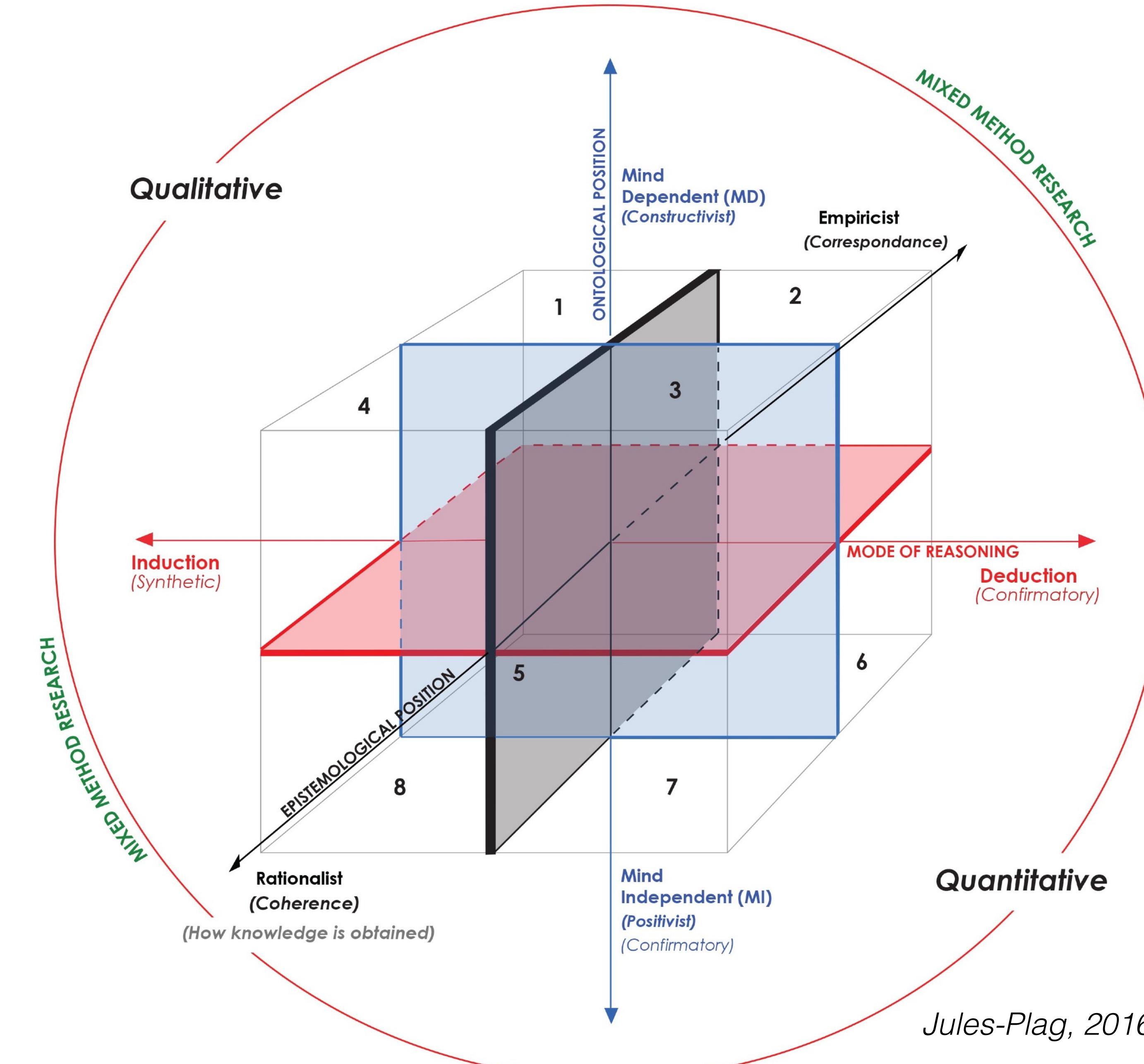
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Ontology (part of philosophy):

- studies the nature of things
- mind dependent
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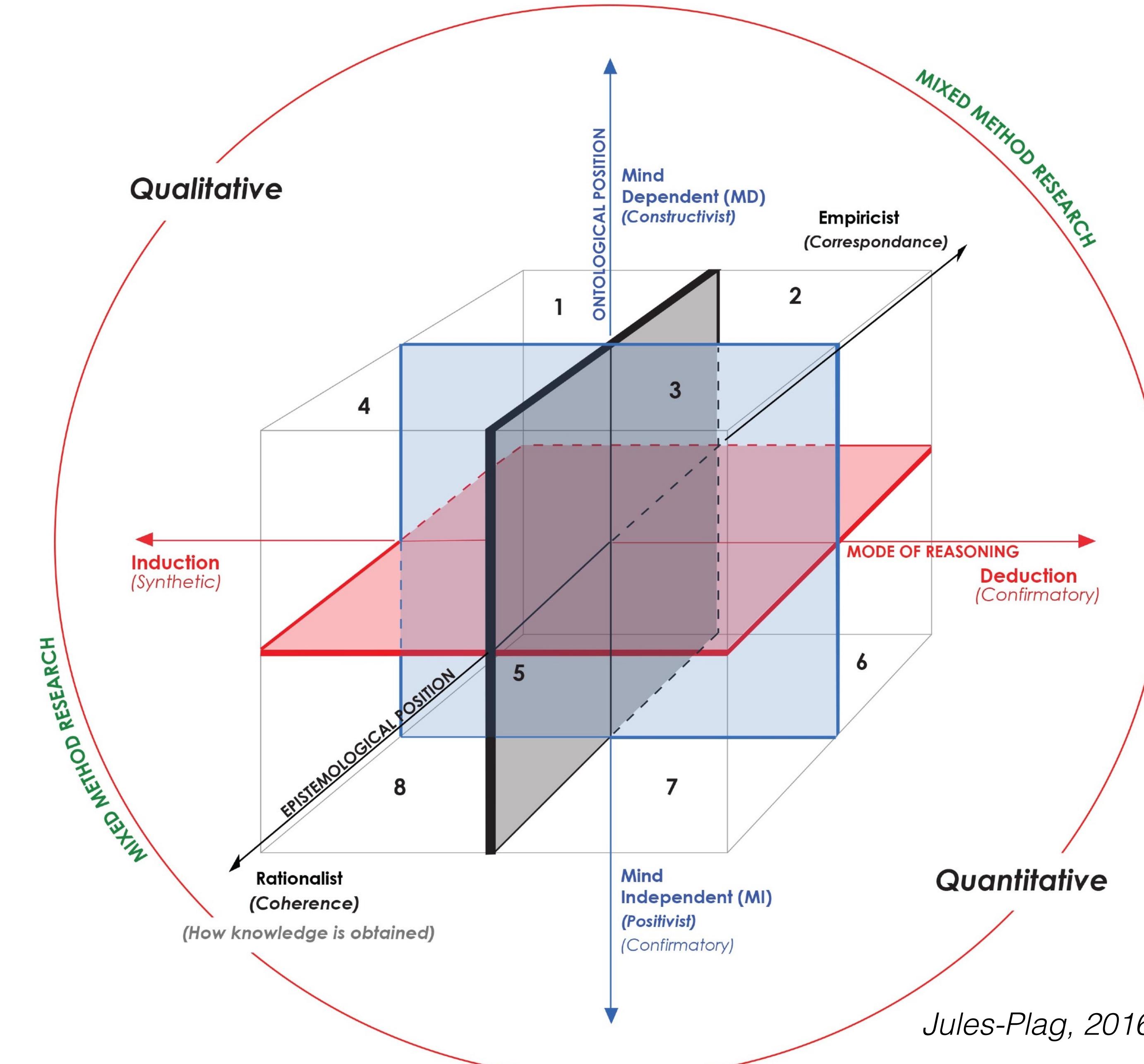
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Mode of reasoning:

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- Inductions



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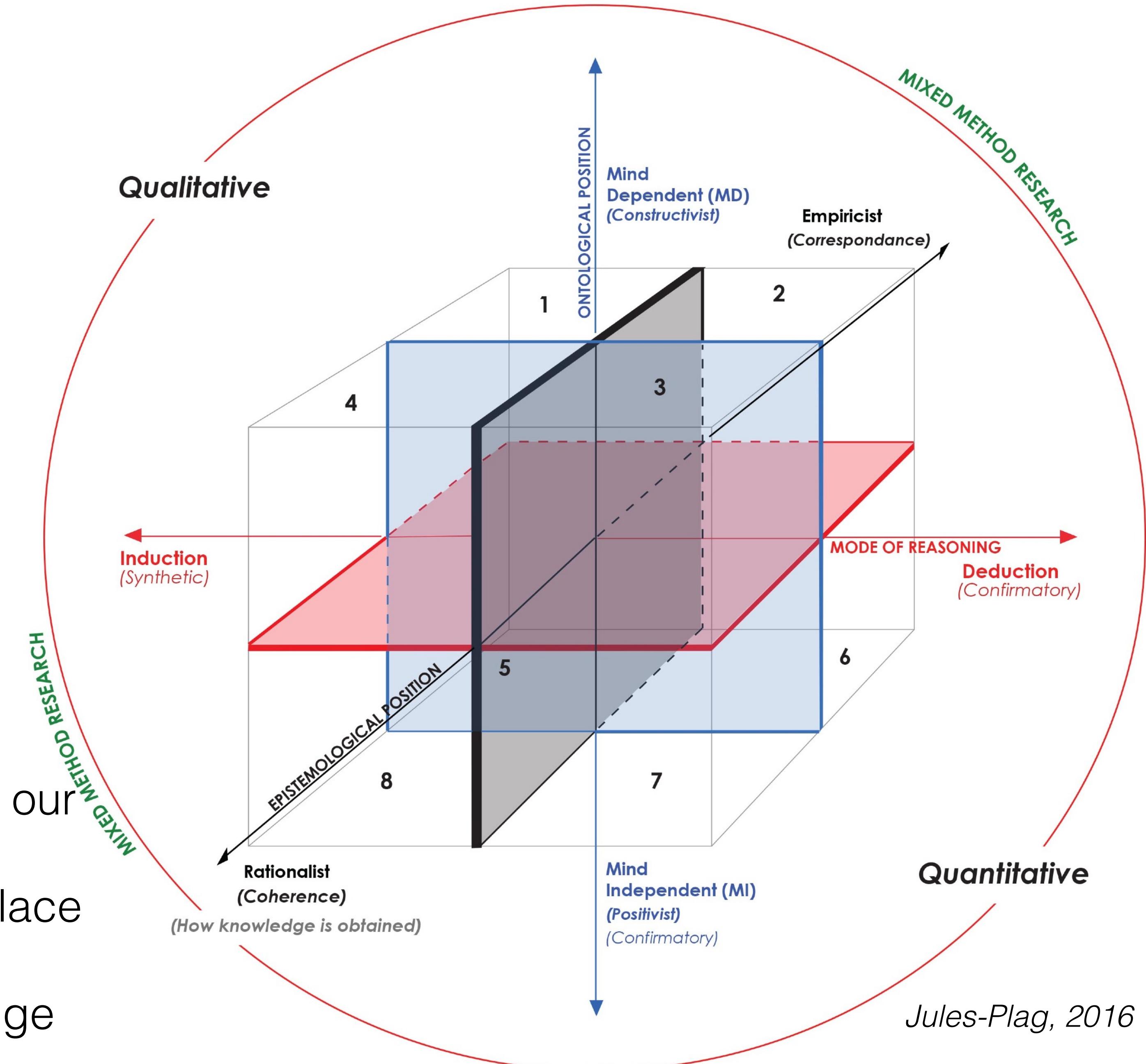
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- Knowledge and truth are core concepts of our civilization
- In a knowledge-based world, there is no place for “alternative facts”
- In a “post-truth” world, there is no knowledge



Foreseeability and Foresight:

- What might happen?
- Possible threats and hazards
- Knowing the system trajectory

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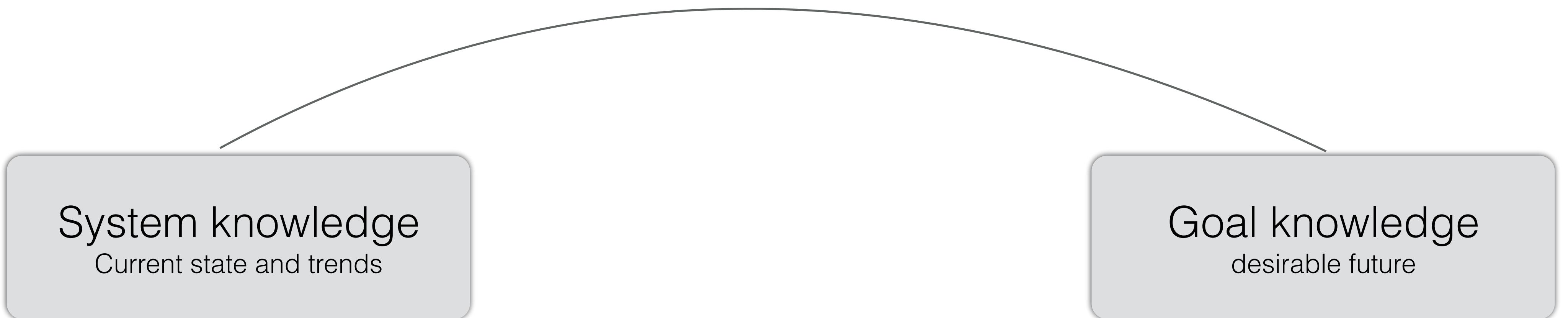
System Knowledge

System knowledge
Current state and trends

Foreseeability and Foresight:

- What might happen?
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- What do we want to happen?

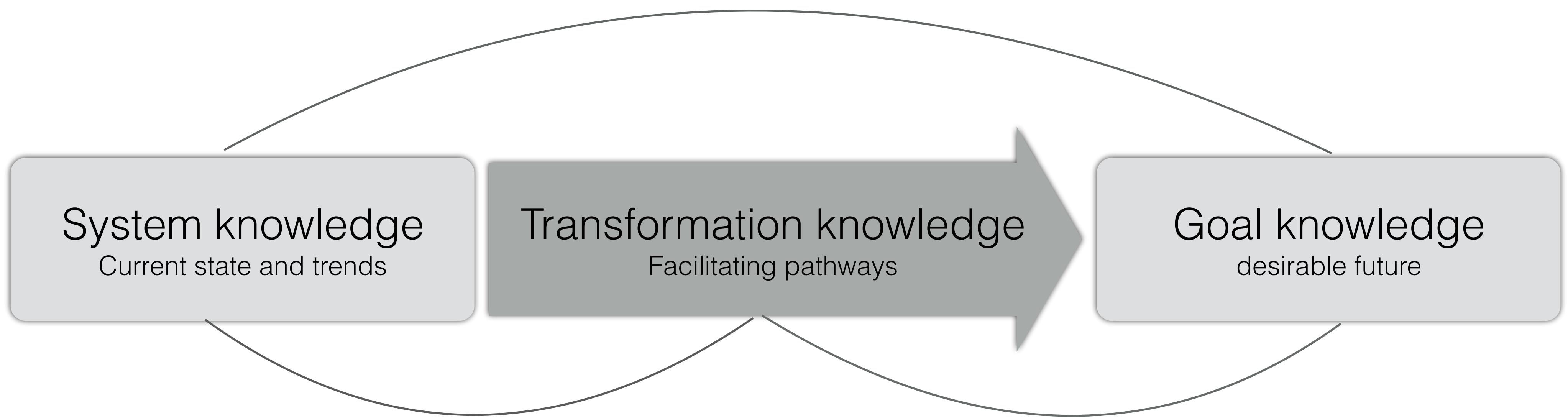
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Foreseeability and Foresight:

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- What do we want to happen?
- How can we impact the system trajectory?

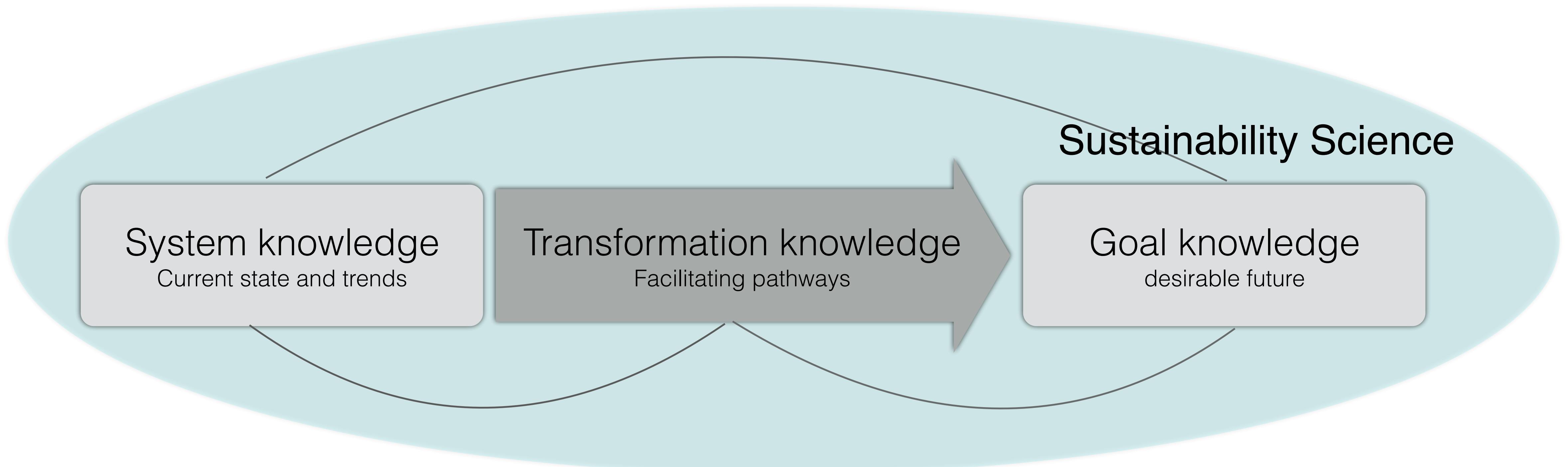
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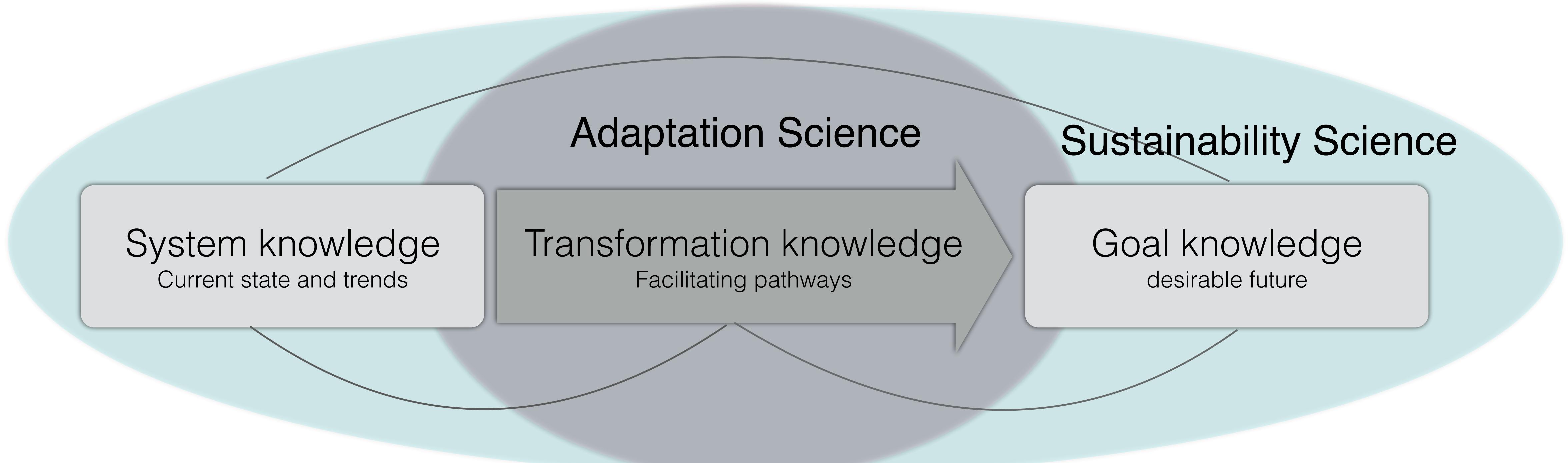
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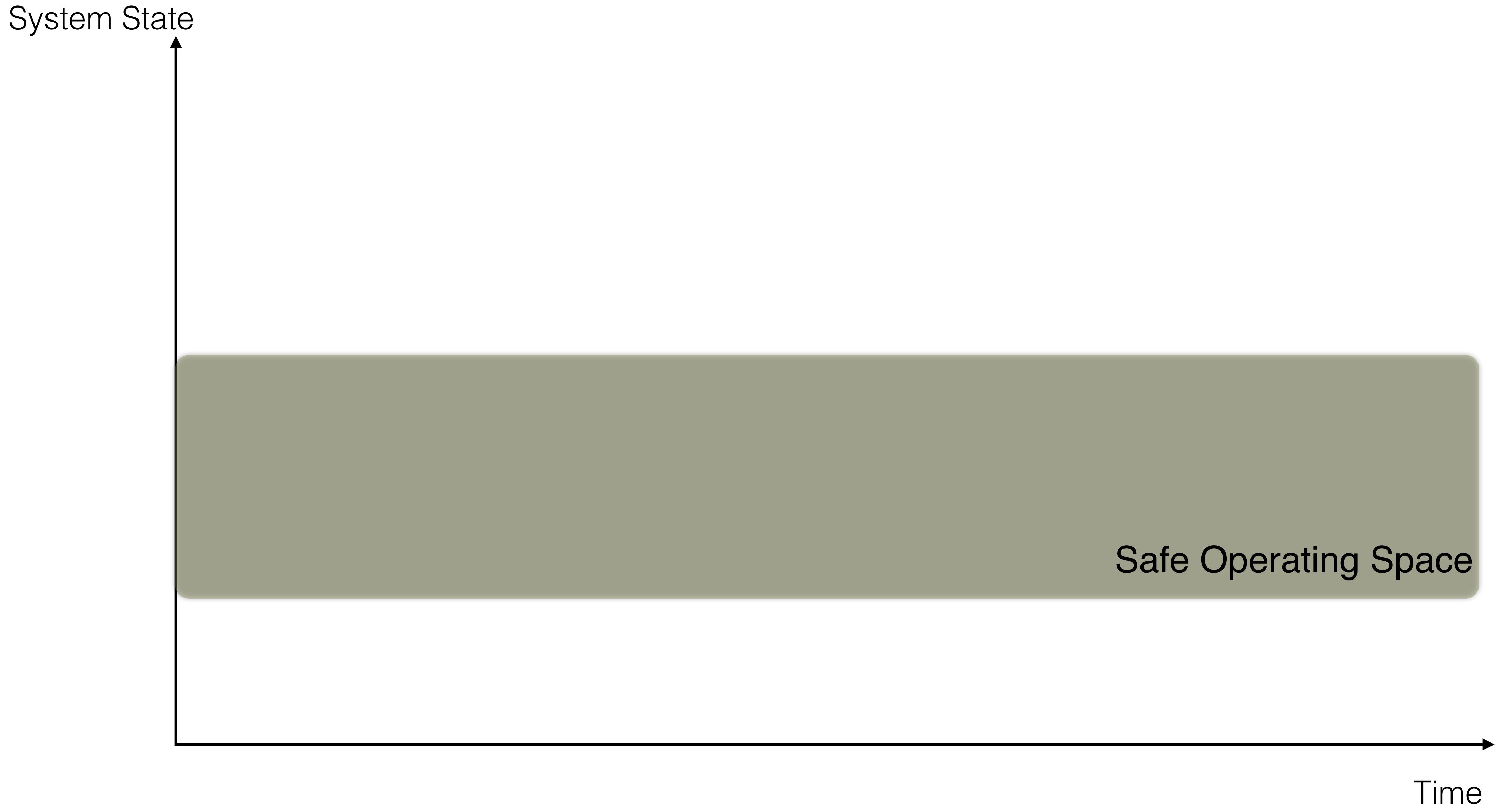
Sustainability Science

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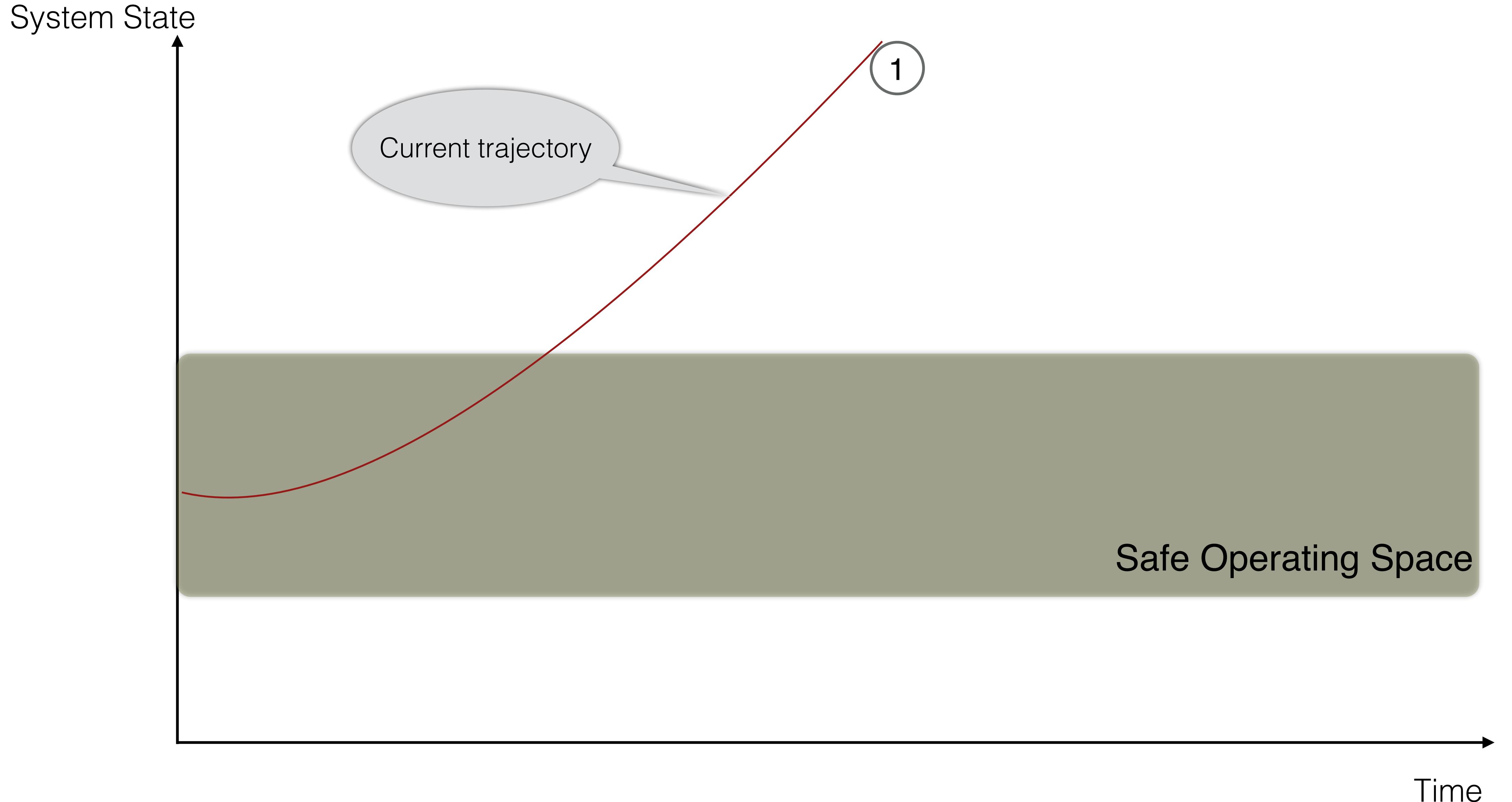
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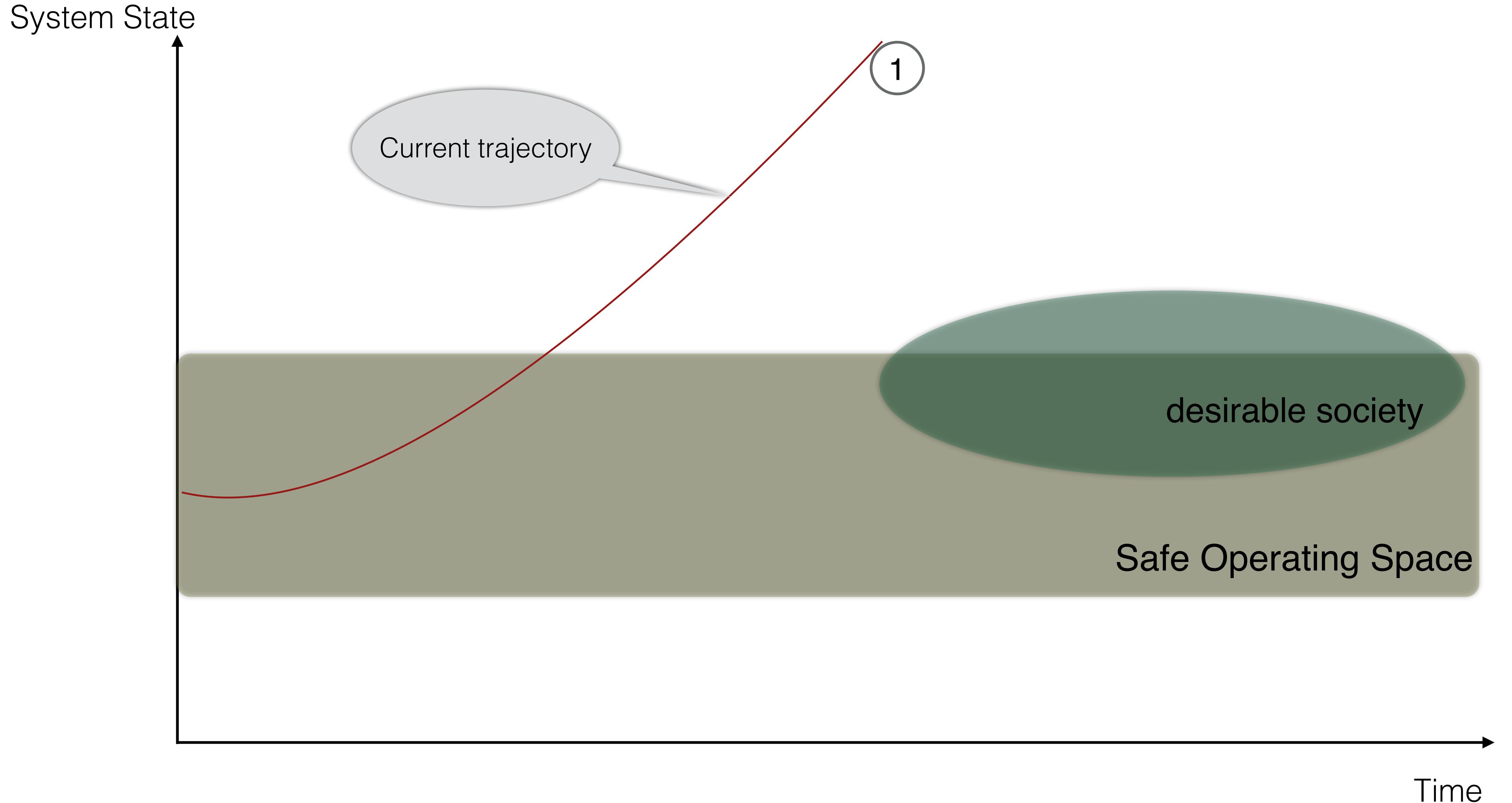




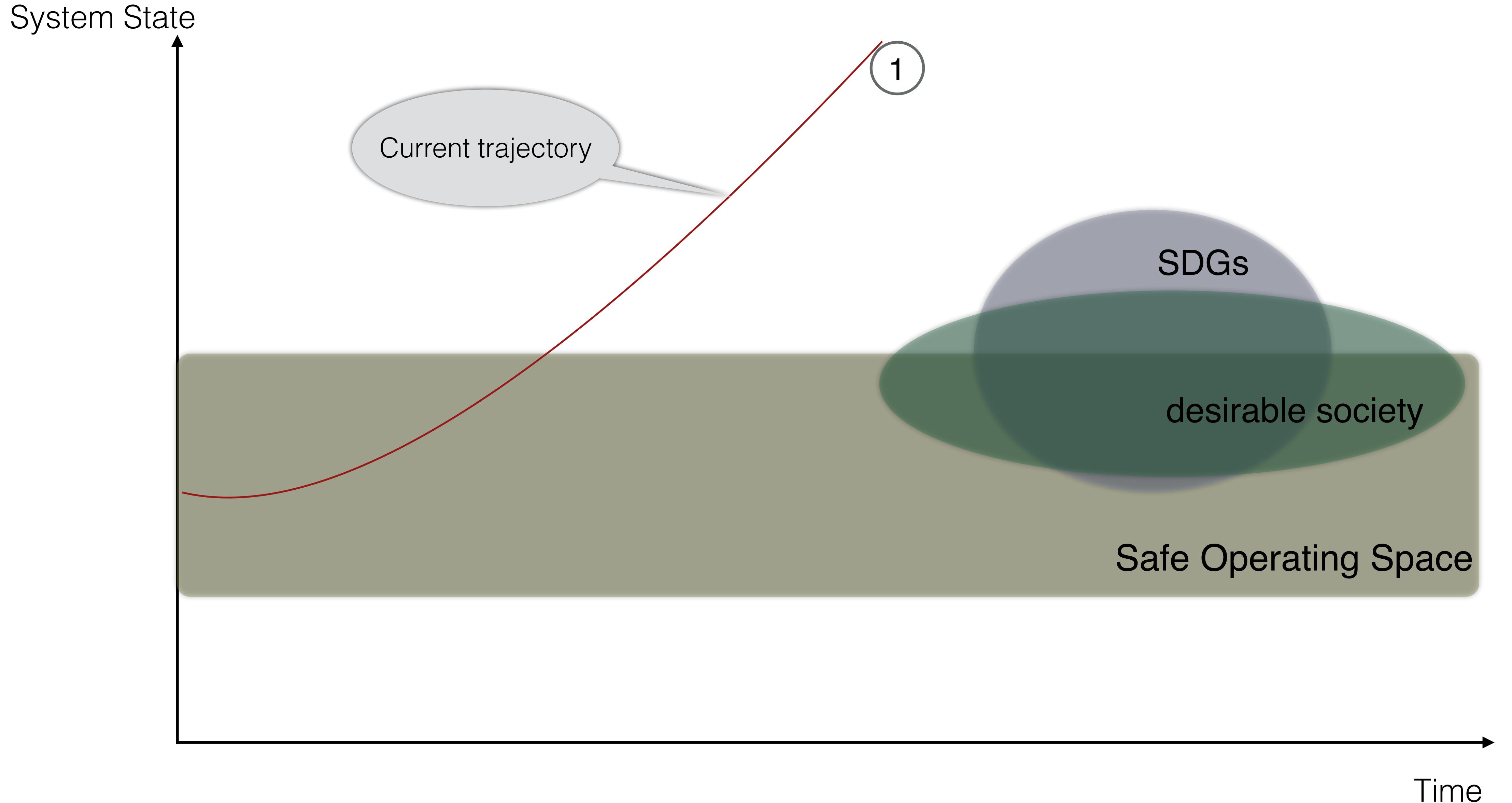
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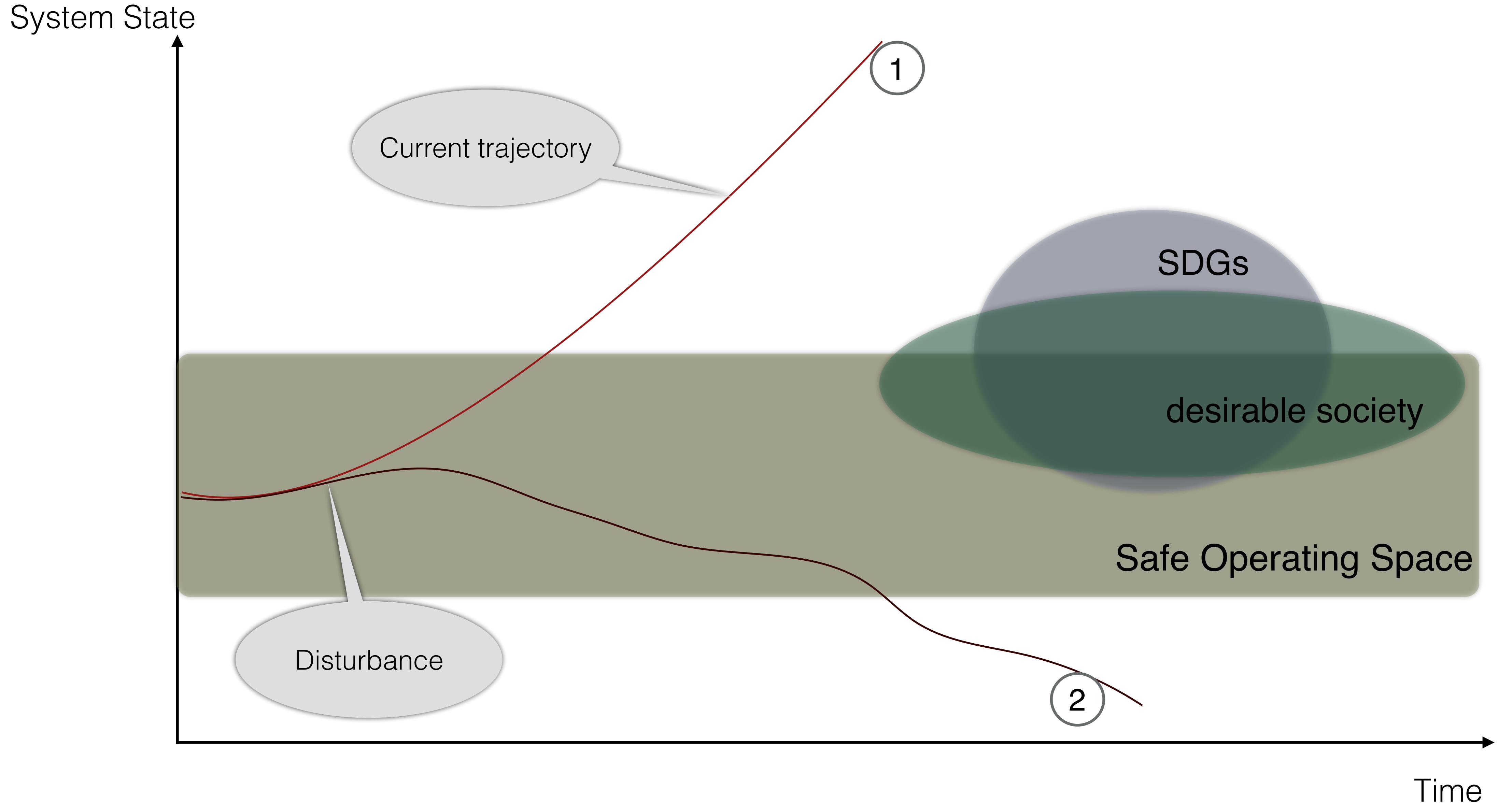
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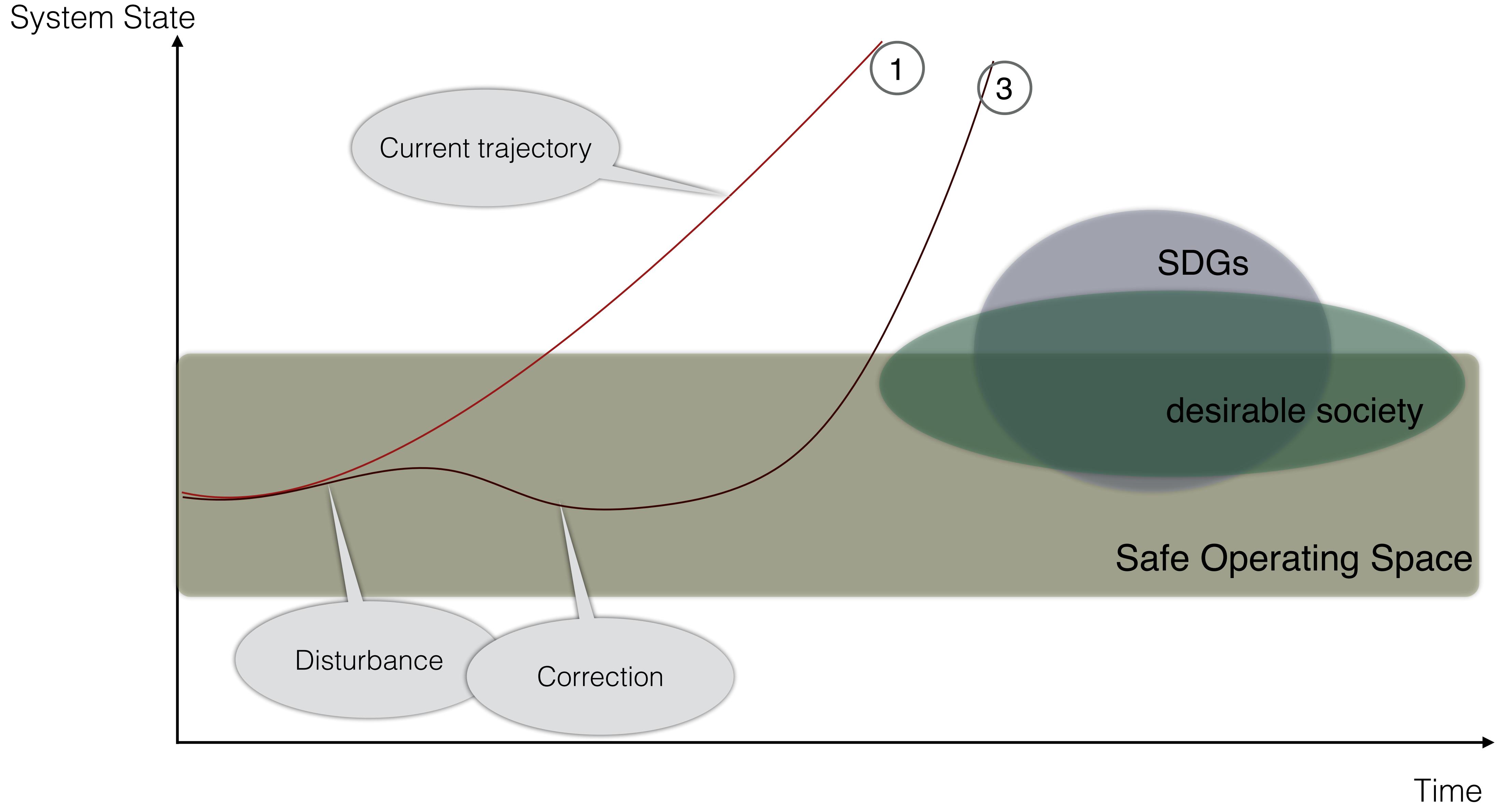
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