Addressing Climate Change as an 'Engineering Challenge'

Quantified Expertise in U.S. Geoengineering Politics

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Structure

1. **Introduction**
2. **The Analytical Framework**
   a) Devising the Science-Politics Interface
   b) The Methodological Approach of “Following a Problem”
3. **Data & Methods**
4. **Findings: Quantified Expertise in U.S. Geoengineering Politics (1990 – 2015)**
   a) The Problem Career
   b) The Relevance of Quantified Expertise
5. **Outlook**

1. Introduction: Climate Engineering?

Climate Engineering is
"deliberate largescale intervention in the working of the Earth's natural climate system"[1]

Solar Radiation Management & Carbon Dioxide Removal

➔ **Technological** approach to addressing climate change

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1 Royal Society 2009, p. 6; see also: Keith, 2000, p. 245; Intergovernmental Panel on Climate Change, 2015, p. 89

1. Introduction: Quantified Expertise?

Climate is
"the state, including a statistical description, of the climate system"[2]

➔ Need of quantified expertise to observe climate change

1. Introduction: Quantified Expertise?

Numerical Climatic Indicators	Climate Models
➢ Climatic Thresholds ➢ Numerical indicators of the climate (temperature, GHG in atmosphere etc.)	➢ Forecasting future states of the climate system

Geoengineering in U.S. Politics

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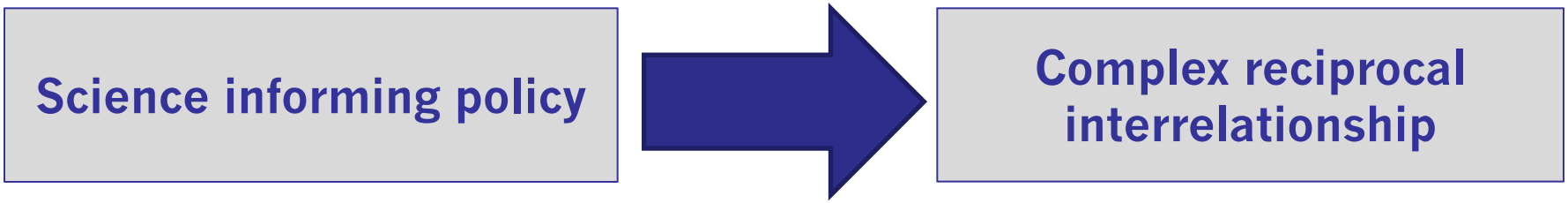
2. The Analytical Framework

a) Devising the Science-Politics Interrelationship

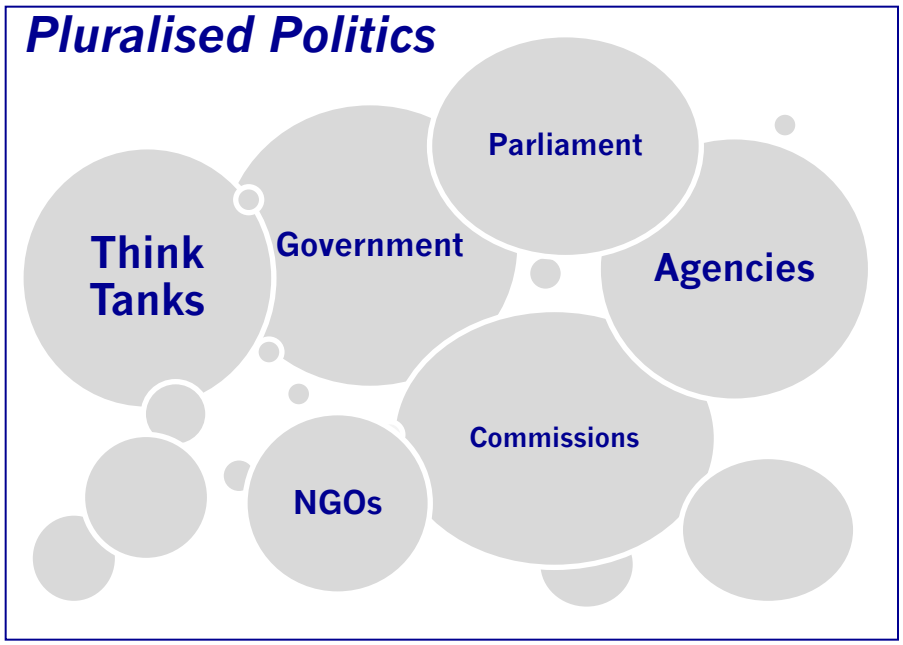
⇒ Sociological conceptions are moving away from the 'linear model':

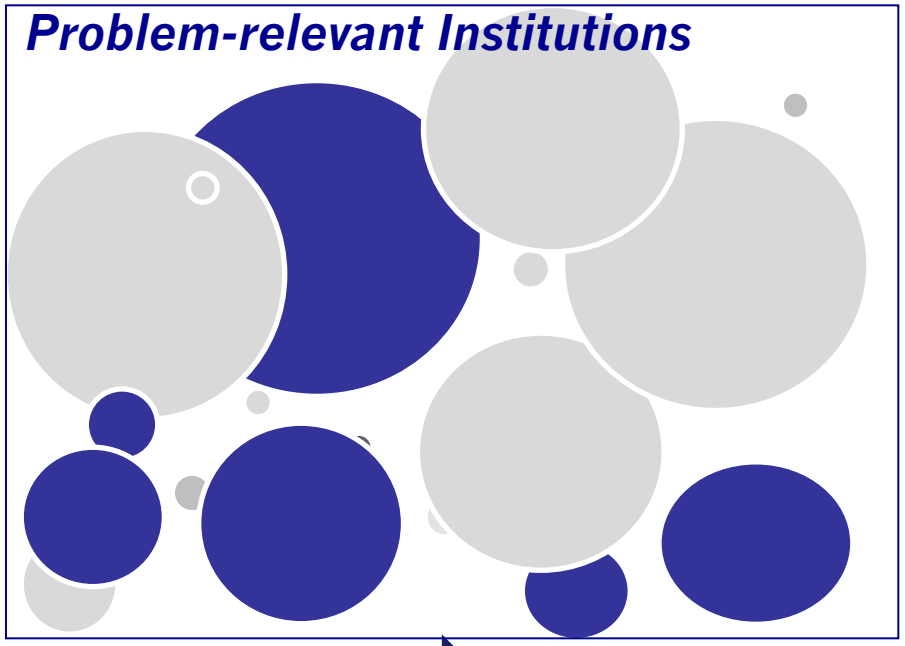


⇒ New focus on social construction and historical contingency of the science-politics interface

2. The Analytical Framework

b) The Approach of 'Following a Problem'





'Following a Problem'

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2. The Analytical Framework

b) The Approach of 'Following a Problem'

A: Retrace Problem Career of Geoengineering in U.S. Politics

→ How is Geoengineering factually addressed as a problem?

→ How is this problem-framing shifting over time?

2. The Analytical Framework

b) The Approach of 'Following a Problem'

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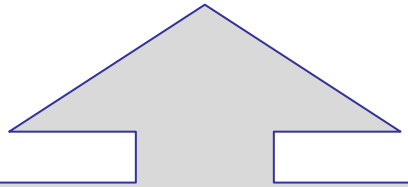


B: Establish Role of Quantified Expertise for Problem Career

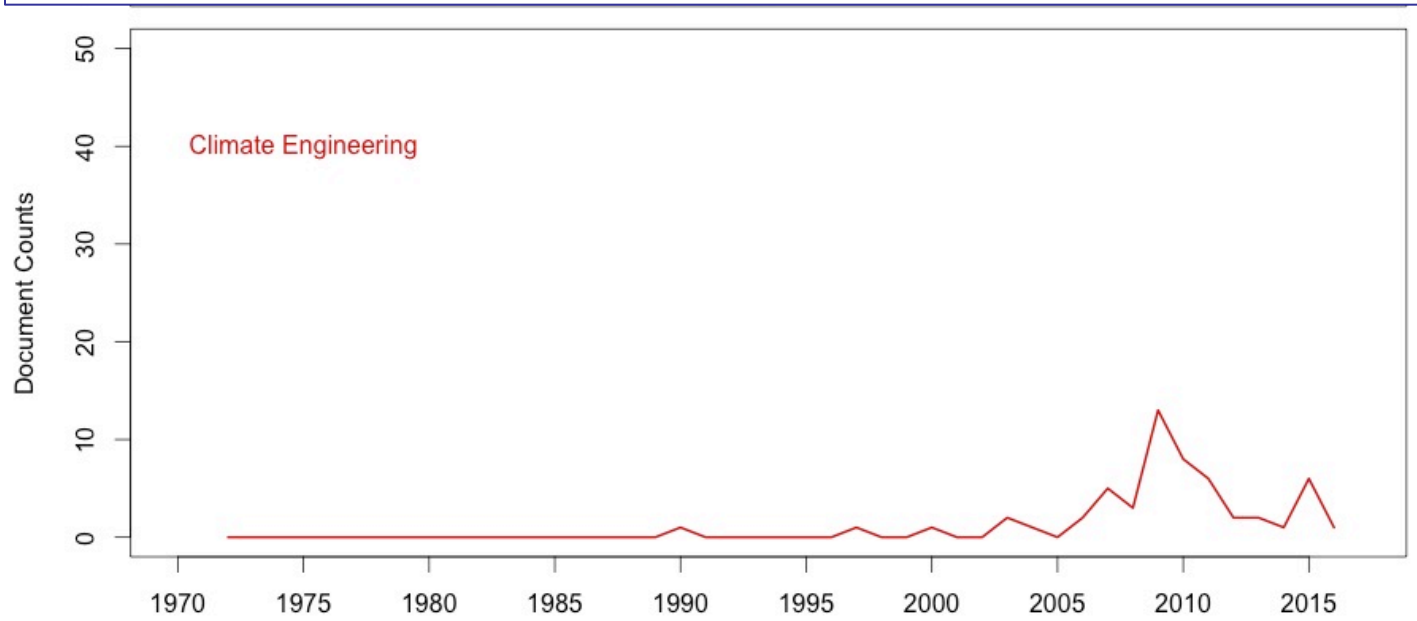
→ How is quantified expertise aiding in shaping and addressing Geoengineering in the distinct frames?

3. **Data & Methods:** The Corpus of Analysis

→ 50 Documents (*Federal Digital System*)

→ 1990 – 2015

→ 28 Hearings; 9 Reports; 6 Entries to the Federal Register (Rules, Notices); 4 Entries in the Congressional Record; 3 Pieces of Proposed Legislation



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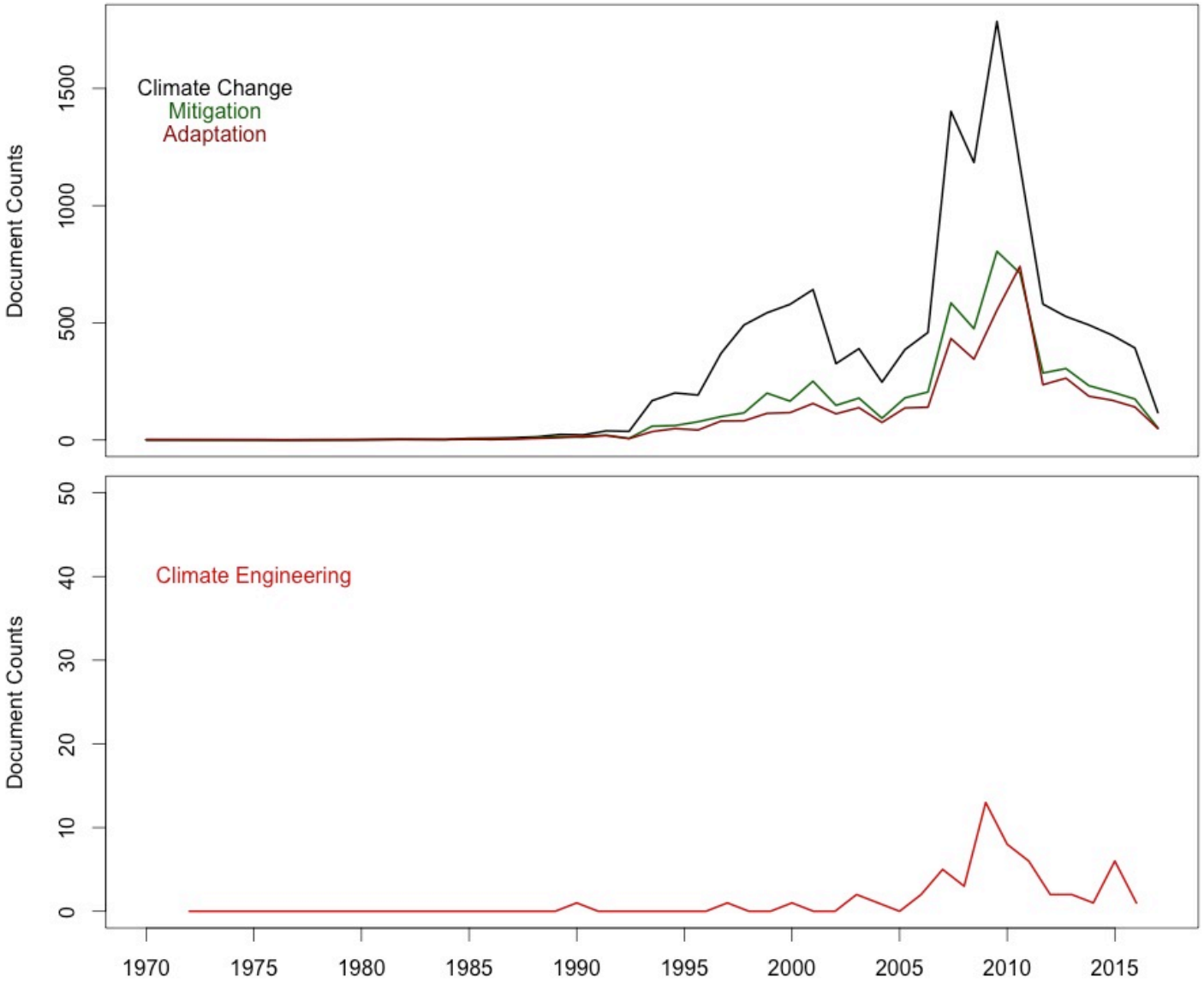
3. **Data & Methods:** The Corpus of Analysis



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4. **Findings:** *Quantified Expertise and the Geoengineering Problem Career*

1) Scientific Challenge (14 Docs)

2) Engineering Challenge (17 Docs)

3) Science and Technology (S&T) Policy Challenge (8 Docs)

4) Environmental Adaption Challenge (4 Docs)

5) Regulatory Challenge (7 Docs)

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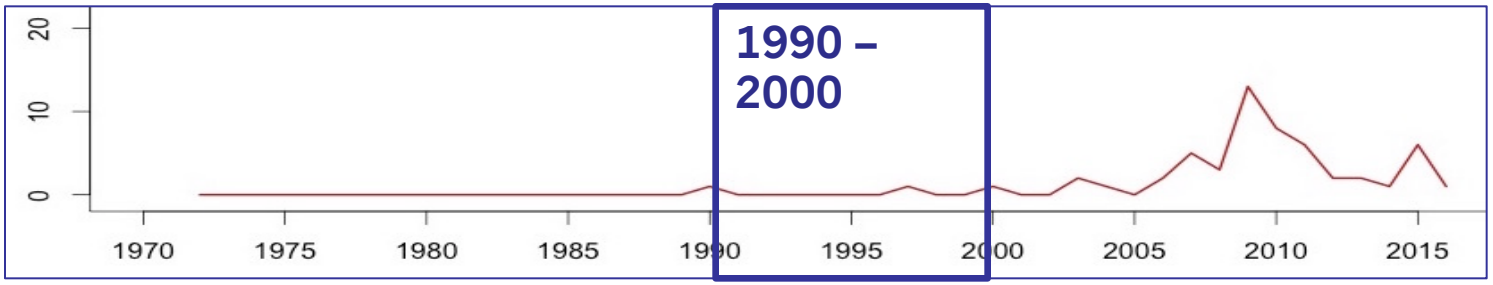
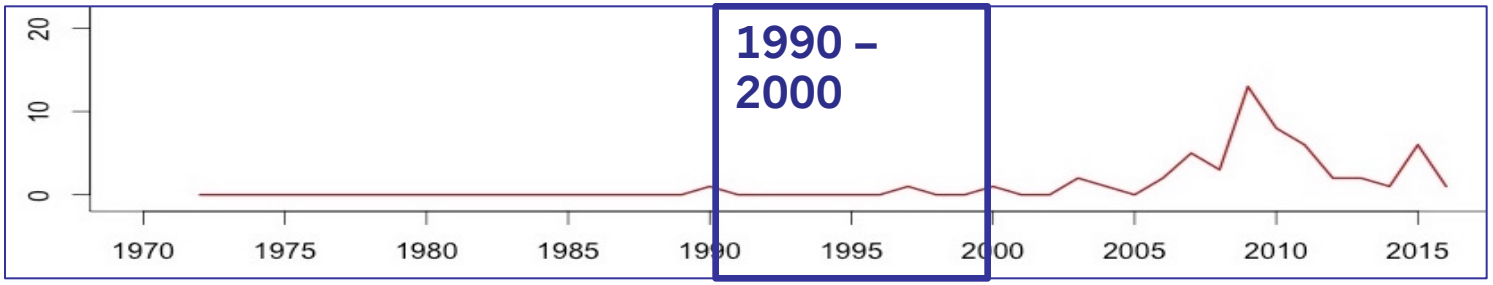


"What's going on here? What are the scientists saying?"

(Chairman Chafee in: United States of America, 1997, p. 1f.)

- Climate change as a ***scientific challenge***
- Illustration and contestation of climate change as a physical phenomenon
- Discussion of 'the science' of climate change

4. **Findings:** *Quantified Expertise and the Geoengineering Problem Career*

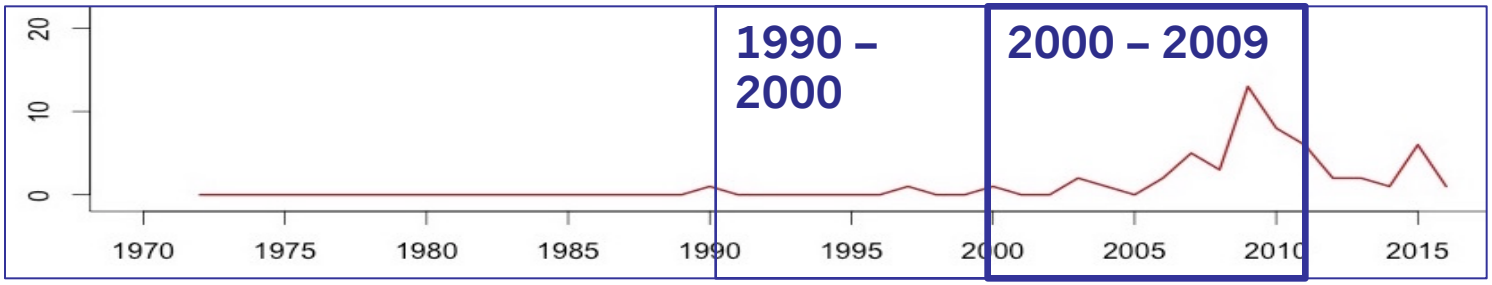


Quantified Expertise?!

→ Quantifying physical parameters of climate change

→ Contesting measurability of climate change

4. **Findings:** *Quantified Expertise and the Geoengineering Problem Career*



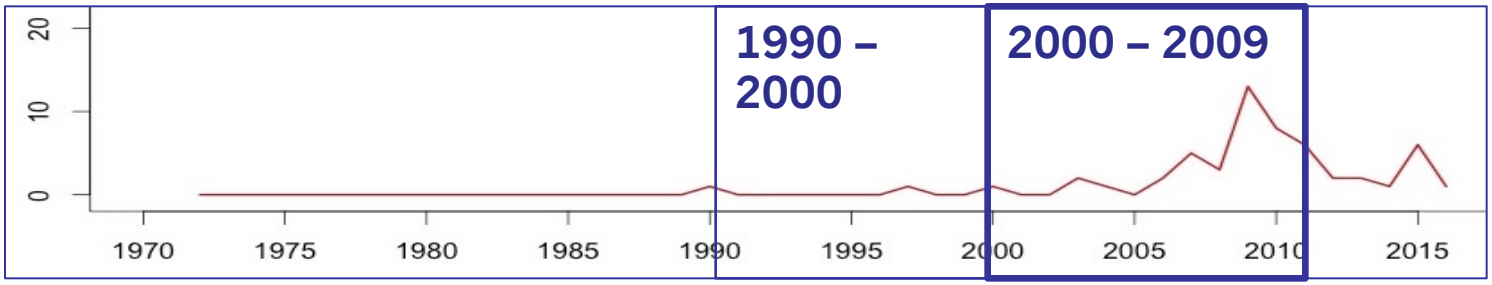
"Do we need a Manhattan Project for the Environment?"

(United States of America, 2006)

Relevance of *Engineering* and *S&T Policy Frame*

- Climate change as a 'daunting technological challenge
- National strategic dimension: Apollo, Manhattan Project
- Environmental frame emerges → communicating urgency

4. **Findings:** *Quantified Expertise and the Geoengineering Problem Career*



Quantified Expertise?!

→ Emergence of distinct ‘numbers’ (2 & 450): Threshold values signifying policy targets

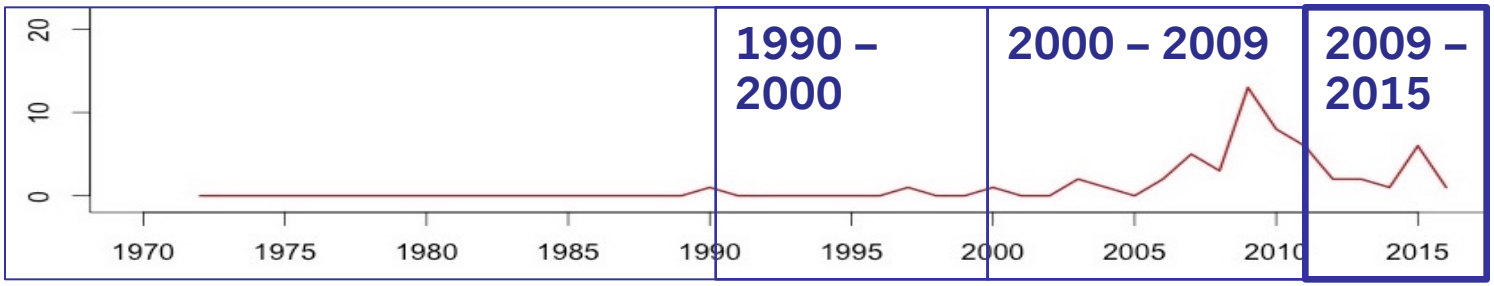
→ Emergence of ecological “tipping points”

→ Quantifying ”the size of the job”

→ From diffuse phenomenon to clear-cut challenge

4. Findings

a) The Geoengineering Problem Career in U.S. Politics



"Geoengineering Parts I, II, and III"

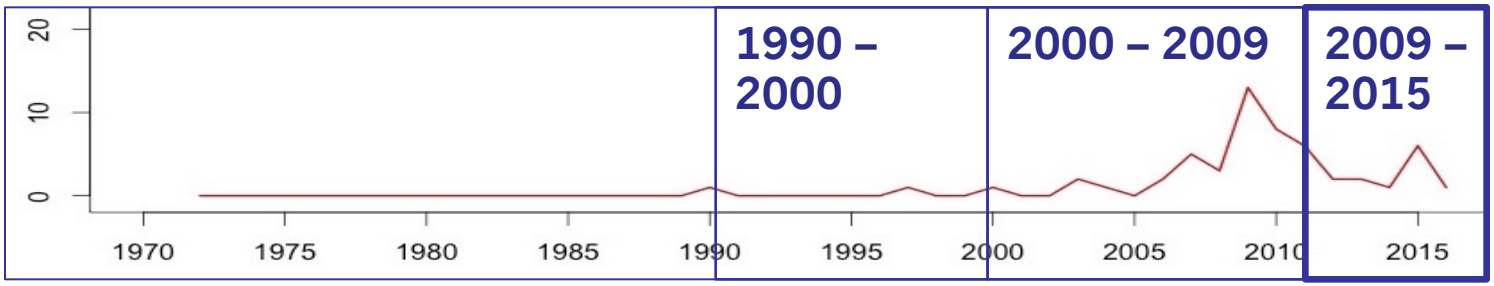
(United States of America 2009)

Relevance of *Engineering*, *Environmental*, & *Regulatory Frame*

- Geoengineering as ***engineering*** (& scientific) challenge in its own right
- Geoengineering as necessary for ***environmental*** adaptation ("Last Resort" argument)
- Geoengineering ***regulated*** as "Non-Option"

4. Findings

a) The Geoengineering Problem Career in U.S. Politics



Quantified Expertise?!

- Quantifying and modeling the efficiency of potential Geoengineering strategies
- Quantifying urgent need for environmental resilience → Need for Geoengineering as 'Last Resort'
- Quantifying 'science-based' policy targets

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5. Discussion of Results & Outlook

Quantified Expertise is substantially shaping Geoengineering problem career

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5. Outlook

Quantified expertise is substantially shaping Geoengineering problem career

Numeric Indicators

- ✓ Illustrating & disputing physical reality of climate change
- ✓ Policy targets specify distinct challenge

Climate Models

- ✓ Organizing discussion of scientific understanding of climate change and Geoengineering
- ✓ Climate change and Geoengineering as primarily scientific challenge

Literature

Keith, D. W. (2000). Geoengineering the Climate: History and Prospect. *Annual Review of Energy and the Environment*, *25*(1), 245–284.

Pachauri, R. K., **Mayer**, L., & **Intergovernmental Panel on Climate Change** (Eds.). (2015). *Climate Change 2014: Synthesis Report*. Geneva, Switzerland: Intergovernmental Panel on Climate Change.

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