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CARBON DIOXIDE REMOVAL: IS EFFECTIVE AND ADAPTIVE REGULATION OF EARTH SCALE CLIMATE MANIPULATION CONCIVABLE?

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Ensure, …, in the absence of **science based, global, transparent and effective control and regulatory mechanisms** for **geo-engineering**, and in accordance with the precautionary approach …, that no climate-related geo-engineering activities that may affect biodiversity take place, until there is an adequate scientific basis on which to justify such activities and appropriate consideration of the **associated risks for the environment and biodiversity and associated social, economic and cultural impacts**, with the exception of small scale scientific research studies…

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Geoengineering?

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- **Carbon dioxide removal, CDR**

  - "CO_2 scrubbers" (air capture) with storage/sequestration

  - Bioenergy with CO_2 capture and stor./seq. (BECS)

  - Ocean fertilization

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- **Solar radiation management (SRM)**
  - Space-based Reflectors
  - Stratospheric Aerosols
  - Increased Urban Albedo

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Assessing from a resilience perspective?

- Should (at least) include consideration of
  - Temporal and spatial aspects of risks & benefits
  - Reversibility of measures and effects
  - Redundancy (feasible)
  - Level of containment/dispersal (of substances/effects)

”Margin of failure”

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- Does the measure/technique allow for
  - “bad” decisions
  - technical failure
  - lack of financial resources
  - loss of knowledge
  - failing (short term) incentives

  without severe consequences?

- Will any serious consequences be reversible?

Attendant risks

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- Physical risks:
  - direct harm to humans, ecosystems
  - negative effects on the climate system

- Political risks:
  - diversion of fund from more effective/viable action
  - prompting complacency (moral hazard)
  - power accumulation
  - lack of legitimacy/acceptance (how deal with over time?)

Significant characteristics

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- how many actors required, what kind?
- what need for coordination (mechanisms)?
- what knowledge and technology required?
  (ability to acquire, retain, develop over time)
- reversibility of action/process?
- adaptability of management system(s) over time

Air capture + storage / BECS

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- Physical risks for humans are very local
  - benefits global (problem of weighing up)
- Climate risks (direct) only if large scale leakage
  - ”political risk” – diversion of large resources to costly, unproven technology
  - “moral hazard” – may prompt complacency
- Low reversibility of phys. risk/ medium rev. of effect
- Many actors/projects needed (for significant effect)
- Low need for coordination
- Knowledge intensive – needs to be retained over time
- Robust legal/financial incentives needed
- Safety dependent on “storage sites being well selected, well designed and operated, and appropriately monitored”

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Conclusion

- A “resilience-inspired perspective” may enhance our understanding of the problems associated with regulating large-scale and complex climate intervention projects

- It does not solve the problem of weighing up different (kinds of) benefits and risks

Principal references

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- Folke, C., J. Colding, and F. Berkes, Synthesis: building resilience and adaptive capacity in social-ecological systems. In F. Berkes, J. Colding, and C. Folke, (eds). Navigating Social-ecological…, Cambridge University Press 2002, pp. 352-387.
- Geoengineering the climate: science, governance and uncertainty, The Royal Society, Sept 2009
- Langlet, D. “Safe Return to the Underground? The Role of International Law in Subsurface Storage of Carbon Dioxide”, 18 (3) *RECIEL* (2009), pp. 286-303
- Underdal, A., Complexity and challenges of long-term environmental governance, 20:3 *Global Environmental Change* (2010) pp. 386-393.
- Virgoe, J., International governance of a possible geo-engineering intervention to combat climate change, 95: 1 *Climatic Change* (2009) pp. 103-119
- Zedalis, R. J., Climate Change and the National Academy of Science’s Idea of Geoengineering…, *EEELR*, (2010) 18-32