

CLIMATE CONVERSATIONS

Geoengineering and efforts to limit global warming to 1.5°C

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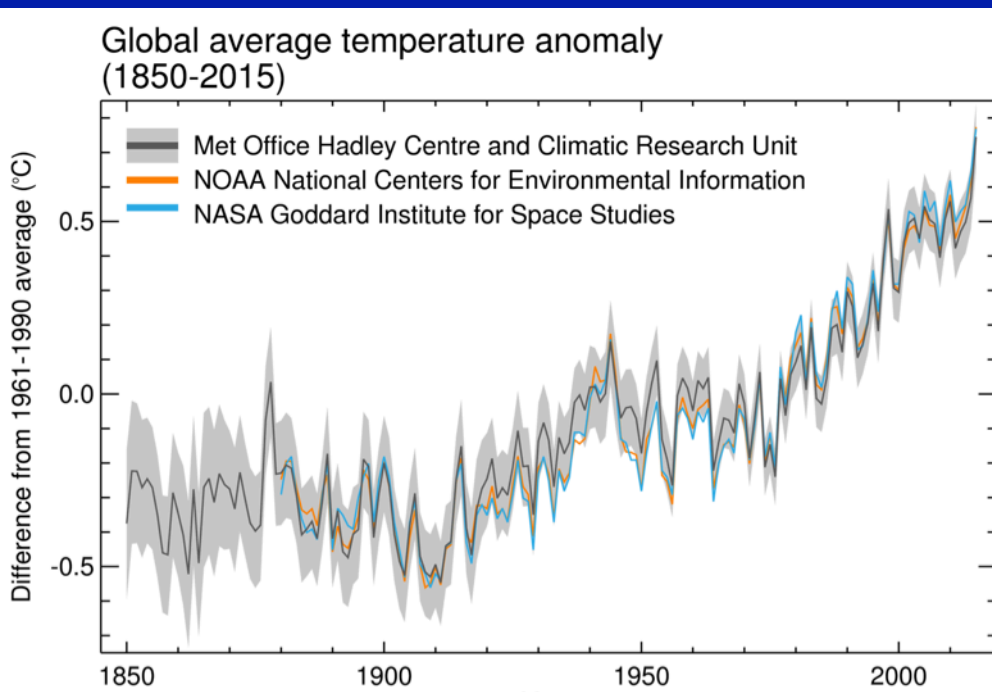
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Geoengineering and efforts to limit global warming to 1.5°C

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Responses to climate change

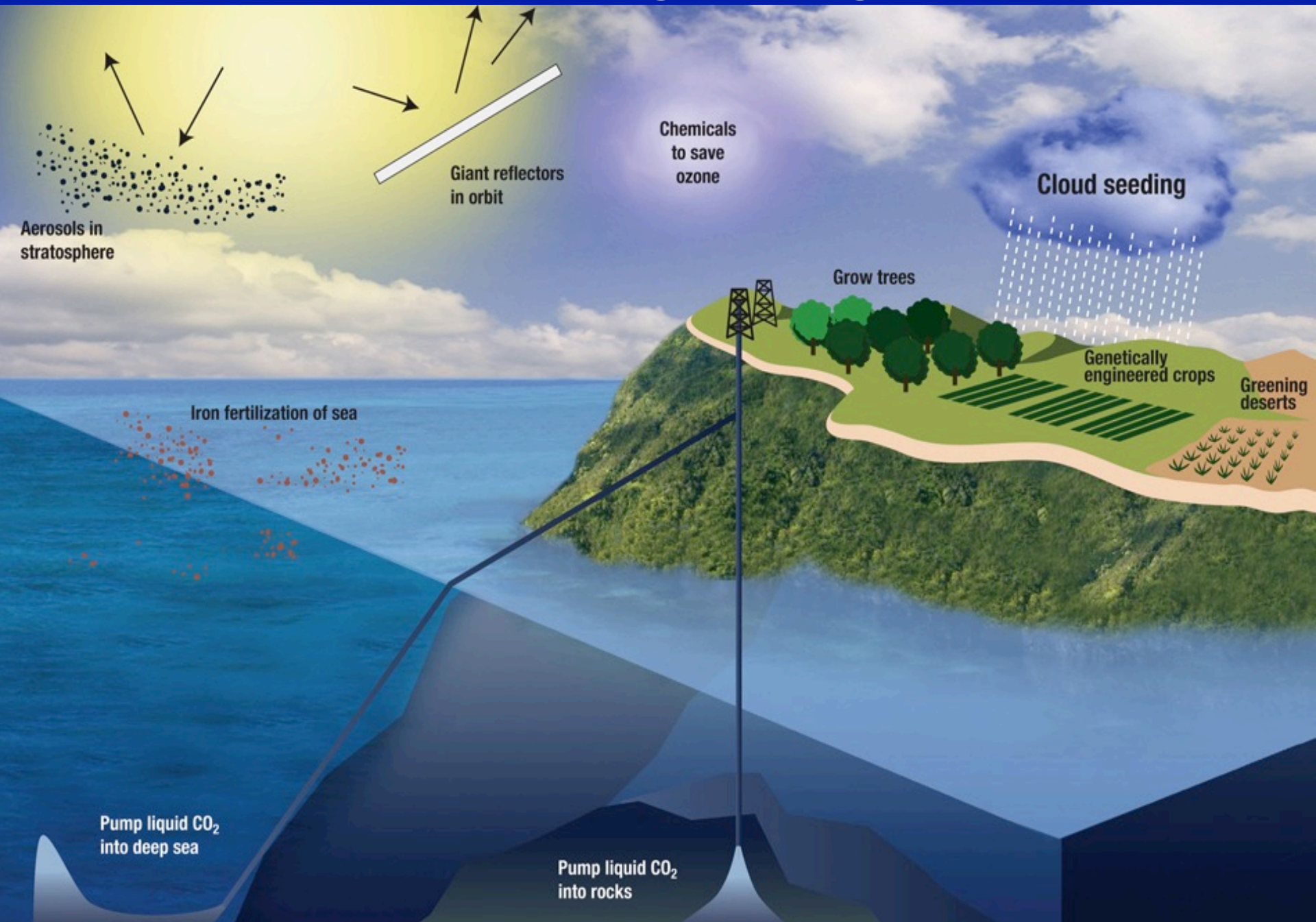
- Mitigation
- Adaptation
- Geoengineering?



What is geoengineering?

- Better to be called “climate engineering”
- Involves manipulation of physical, chemical, or biological aspects of the Earth system to reduce human-caused climate change
- **Carbon dioxide removal:** enhanced removal of carbon dioxide from the atmosphere into vegetation, soils, oceans or by injection underground
- **Solar radiation management:** reducing the amount of sunlight warming the Earth through reflection from the surface, clouds, or particles in the atmosphere

Some climate engineering options



Carbon dioxide removal (CDR)

- Replanting trees and enhancing carbon uptake in soils is already supported under the government's Emissions Reduction Fund
- Research on carbon capture and geological storage is funded by industry and government already
- Ocean fertilisation: Stimulating CO₂ uptake by phytoplankton in the ocean might increase storage in the deep ocean. Uptake is limited by lack of nutrients, such as iron. There are potential adverse impacts on marine ecosystems.

Solar radiation management (SRM)

- Framed as a “quick fix” solution, as an engineered intervention to reduce solar radiation is perceived to be faster than reducing greenhouse gases
- Such an intervention would need to be maintained over time to match the increases in greenhouse gas concentrations, as it just aims to mask the radiative influence of higher ghg concentrations
- Failure of the intervention would lead to an equally rapid reappearance of the full radiative influence of the ghgs in the atmosphere
- The effect of higher CO₂ in the atmosphere on ocean acidification and on photosynthesis would continue

An artist's impression of some SRM options



Solar radiation management

Adverse impacts from different SRM activities include:

- Reducing solar radiation does not exactly cancel greenhouse warming, with different responses in latitude, seasonally and diurnally
- Changes in regional rainfall patterns due to reduction in solar heating and regional cooling patterns
- Increased particles in the atmosphere cause health problems
- Increased particles in the stratosphere enhance ozone depletion, causing increased UV radiation

References

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Governance before research?

....or research before governance?

Anita Talberg

- No purposive 'hard' international law
- No intergovernmental institution or organisation
- But... covered by 'patchwork' of 'hard' & 'soft' law

Principles of international environmental law

Outer space treaties

Civil aviation convention (ICAO)

Ozone treaties

Transboundary air pollution convention (CLRTAP)

Climate change convention (UNFCCC)

Prohibition on hostile environmental modification (ENMOD)

Convention on biological diversity (CBD)

London dumping convention (LC/LP)

Law of the Sea (UNCLOS)

Antarctic treaty system

1. '2C&0GT'

- UNFCCC and Paris Agreement

2. No deployment without governance

- LC/LP amendments
- CBD COP resolutions

3. Freedom of research (...with EIA)

- LC/LP and CBD decisions
- Existing treaties

1. Prioritise certain global average outcomes
2. Many geoengineering schemes are non-excludable
 - Where is the threshold between research and deployment?
 - Problem of detection and attribution
3. Geoengineering creates a knowledge divide
 - More unrestricted research deepens divide

1. Establish enforceable definitions for:
 - ‘legitimate research’
 - ‘adverse impacts’
2. Open dialogue on rules for research **AND** deployment
3. Broaden scope of debate:
 - Purpose of geoengineering?
 - Regional geoengineering?
 - Solar geoengineering as adaptation?



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