

# MARINE CDR - THE COMING DECADE IS CRUCIAL



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Marine climate  
interventions

- DEVISE A MULTI-STRANDED TIMELINE – SCIENCE, TECH, LAW, SOCIAL LICENCE
- LEARN FROM THE EXISTING KNOWLEDGE BASE
- UTILISE THE POWER OF LARGE-SCALE PROXIES FOR CDR
- CONCURRENT CAPACITY BUILDING

# PROGRESSING CDR SCIENCE & TECH ALONE IS NOT ENOUGH

## Protesters urge caution over St Ives climate trial amid chemical plans for bay

**Campaigners worry about scheme's impact on marine ecosystem but Planetary Technologies says concerns misplaced**

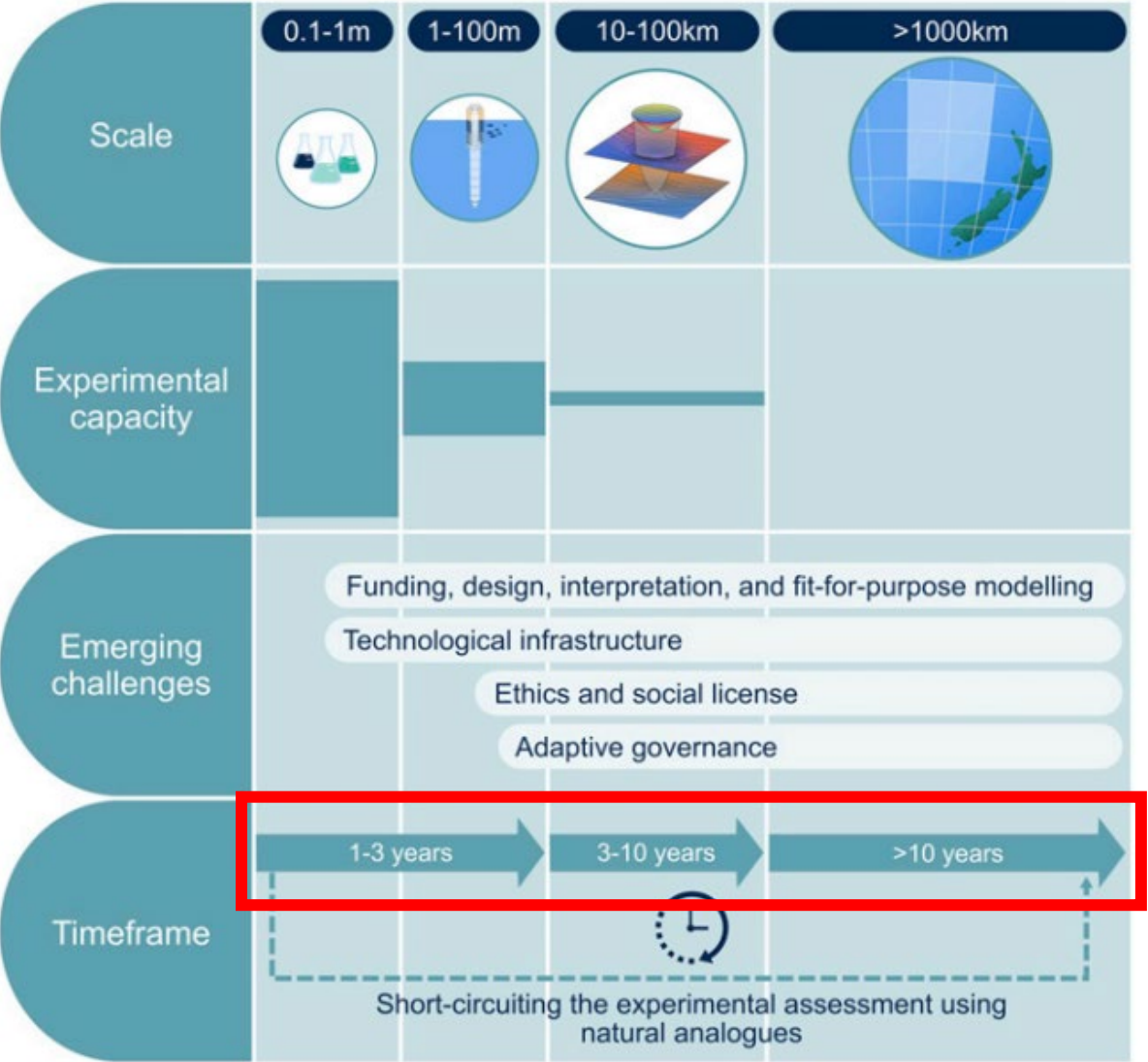
APRIL 23



📷 Hundreds of people gather to voice their concerns over a proposed carbon dioxide removal scheme in the bay of St Ives. Photograph: Jonny Weeks/The Guardian

“We don’t know what the outcome will be if they dump these chemicals into the sea. I’m sure there are more natural ways of solving the climate crisis.”

TIME FOR CAPACITY-BUILDING – ACROSS NATURAL AND SOCIAL SCIENCES - IS SHORT



Mauna Loa CO<sub>2</sub>  
May 2023

	NOAA-GML	SCRIPPS UCSD
May 2023	424.00 ppm	423.78 ppm
May 2022	420.99 ppm	420.77 ppm
May 2021	419.13 ppm	418.95 ppm
Last Update:	June 5, 2023	June 4, 2023
View Data:	NOAA	Scripps

Mauna Loa Observatory (MLO) | Atmospheric CO<sub>2</sub>  
monthly mean concentrations | ppm = parts per million

Fig. 1. Temporal and spatial scales of the experimental mCDR  
Bach & Boyd 2021

# HOWEVER, THERE IS MUCH TO BE LEARNT FROM THE EXISTING LITERATURE

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MARINE ECOLOGY PROGRESS SERIES  
Mar Ecol Prog Ser

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## THEME SECTION

# Implications of large-scale iron fertilization of the oceans

*Idea:* Howard Browman, Philip W. Boyd

*Coordination:* Philip W. Boyd

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WE NEED KNOWLEDGE BROKERS – TO HELP DESIGN INFORMATIVE CDR PILOT STUDIES

2004

**letters to nature**

.....

**Photosynthetic architecture differs  
in coastal and oceanic diatoms**

**Robert F. Strzepek<sup>1\*</sup> & Paul J. Harrison<sup>2\*</sup>**

PHYTOPLANKTON EVOLVED LOW IRON STRATEGIES  
TO COLONISE THE OPEN OCEAN

ARTICLE

<https://doi.org/10.1038/s42003-023-04962-4>

OPEN

2023



ONLY 2 OF >15,000 SEAWEED  
SPECIES LIVE OFFSHORE!!

**Iron limitation of kelp growth may prevent ocean  
afforestation**

Ellie R. Paine <sup>1✉</sup>, Philip W. Boyd <sup>1</sup>, Robert F. Strzepek <sup>2</sup>, Michael Ellwood <sup>3</sup>, Elizabeth A. Brewer<sup>4</sup>,  
Guillermo Diaz-Pulido<sup>5</sup>, Matthias Schmid<sup>1,6,7</sup> & Catriona L. Hurd<sup>1</sup>

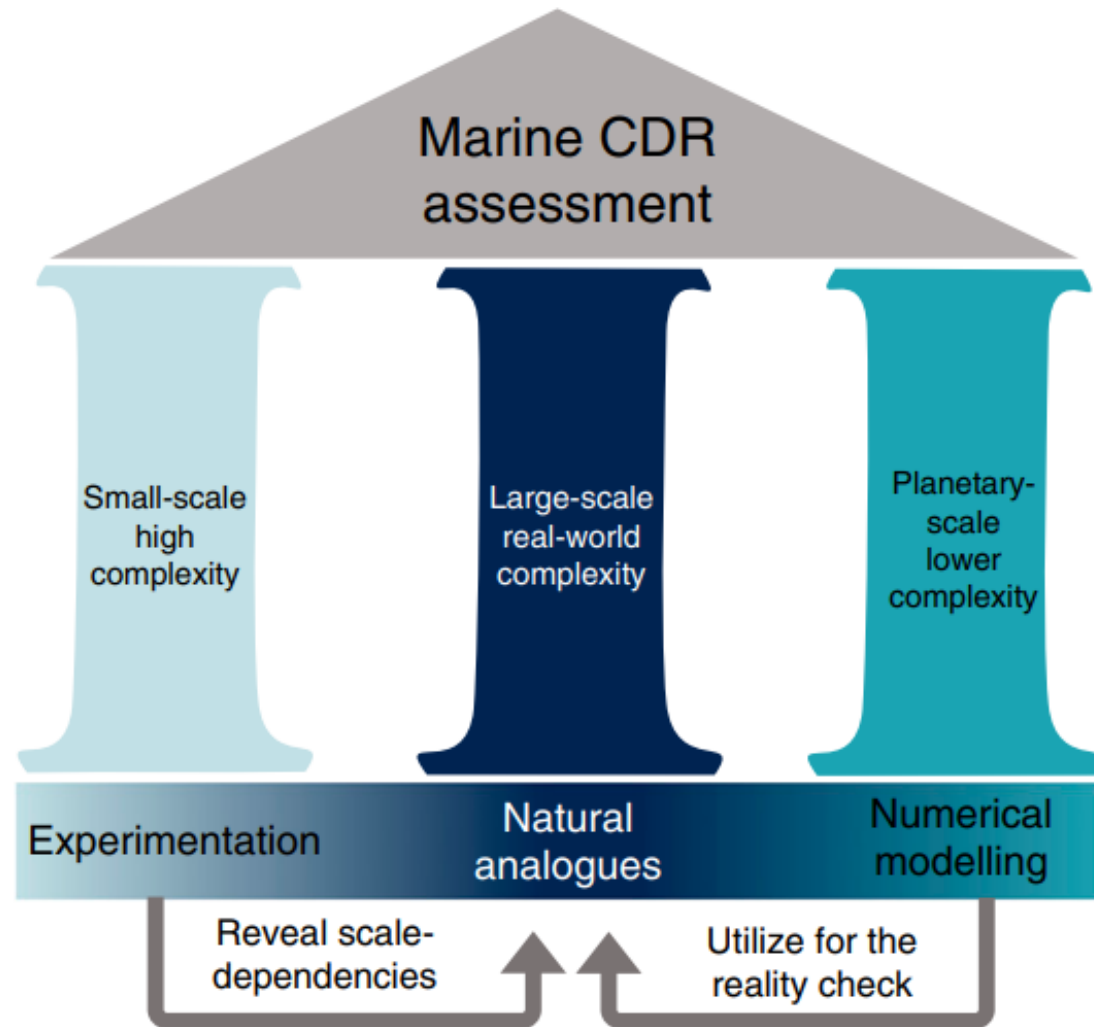
# CHALKEX GULF OF MAINE 2001 – LARGE SCALE RELEASE OF ALKALINE MATERIALS





# Seeking natural analogs to fast-forward the assessment of marine CO<sub>2</sub> removal

Lennart T. Bach<sup>a,1</sup> and Philip W. Boyd<sup>a</sup>



<https://doi.org/10.1073/pnas.2106147118>

