

THE UN DECADE OF OCEAN SCIENCE FOR SUSTAINABLE DEVELOPMENT – A RESOURCE FOR THE PARIS AGREEMENT AND BEYOND

Margaret Leinen, Co-Chair
UN Ocean Decade Advisory Board



The ocean we
need for the
future we want

2021
2030

United Nations Decade
of Ocean Science
for Sustainable Development

UC San Diego

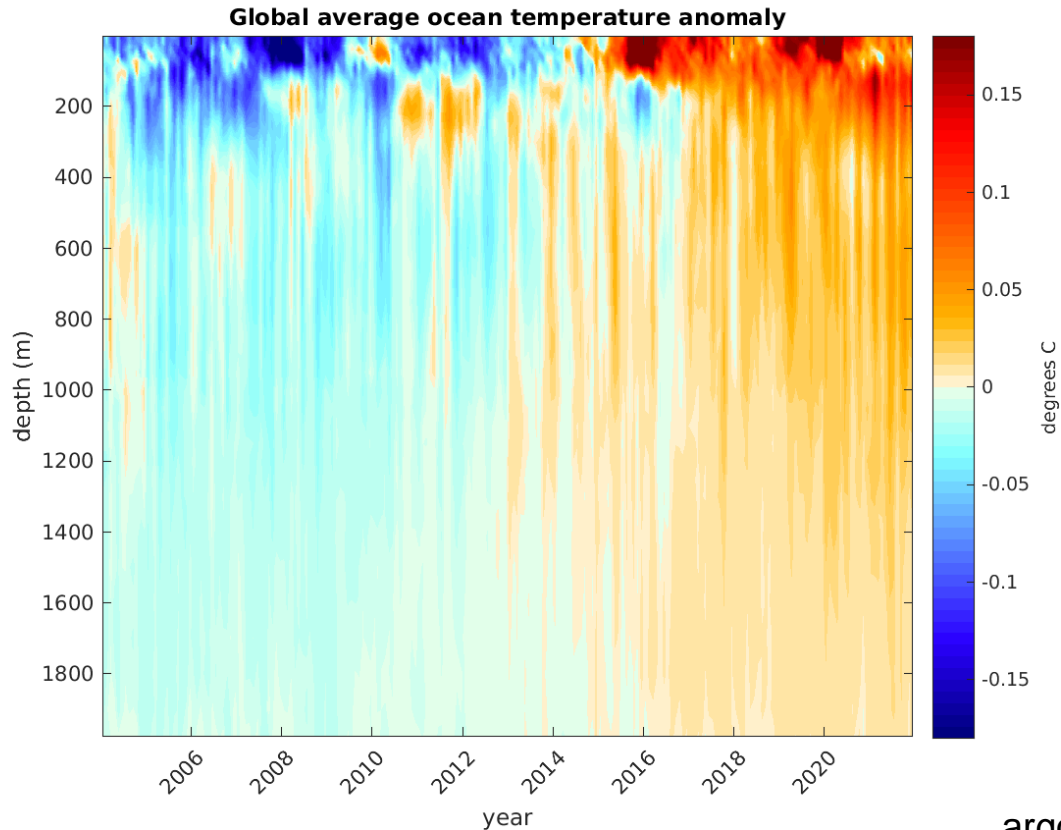


SCRIPPS INSTITUTION OF
OCEANOGRAPHY

IMPORTANT POTENTIALS FOR THE OCEAN DECADE

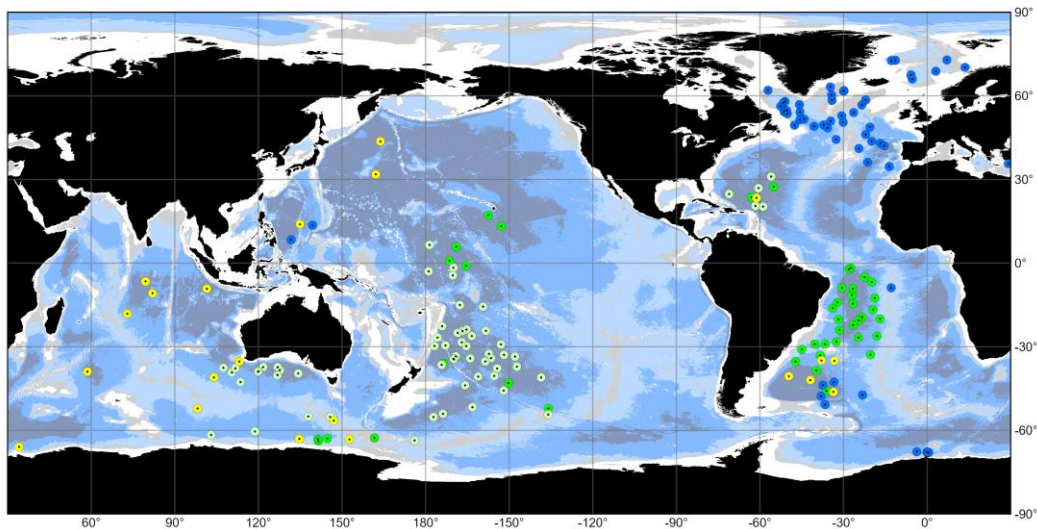
- Variability of the deep ocean
- Unraveling the ocean-climate-biology nexus
- Understanding precipitation in polar regions
- Extreme events in the ocean
- Ocean carbon dioxide removal
- Understanding the southern ocean

UPPER OCEAN WARMING 2005-2022



argo.ucsd.edu, 2022

UNDERSTANDING THE STABILITY OF THE DEEP OCEAN – DEEP ARGO



Deep Argo

Deep Float Models

May 2022

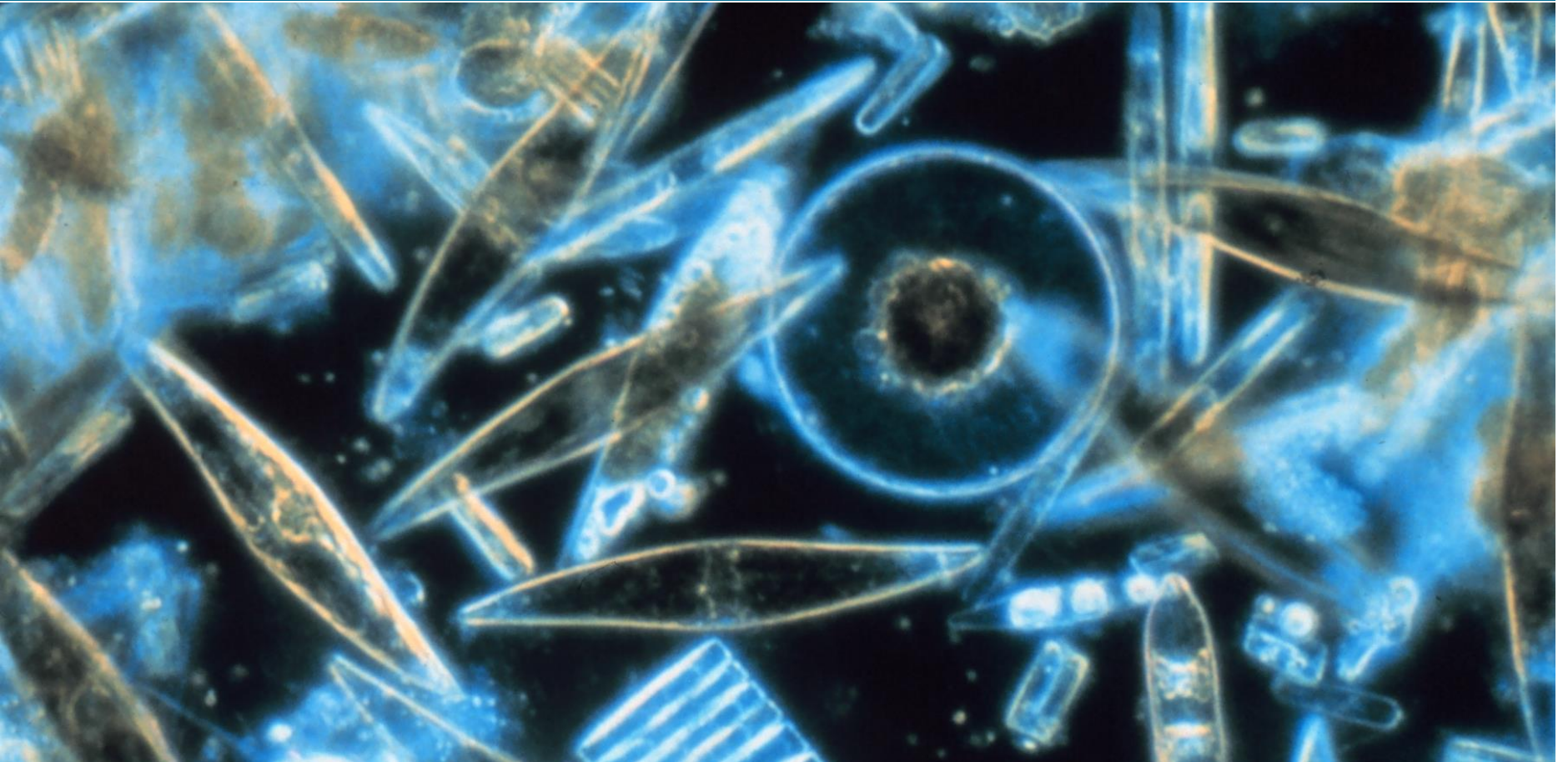
Latest location of operational floats (data distributed within the last 30 days),



Generated by ocean-ops.org, 2022-06-01
Projection: Plate Carree (-150,0000)



OCEAN-CLIMATE-BIOLOGY NEXUS



eDNA Methods



Single-species PCR (qPCR)

- + Simple, cheap, fast
- Only identifies one species

Invasive or rare species

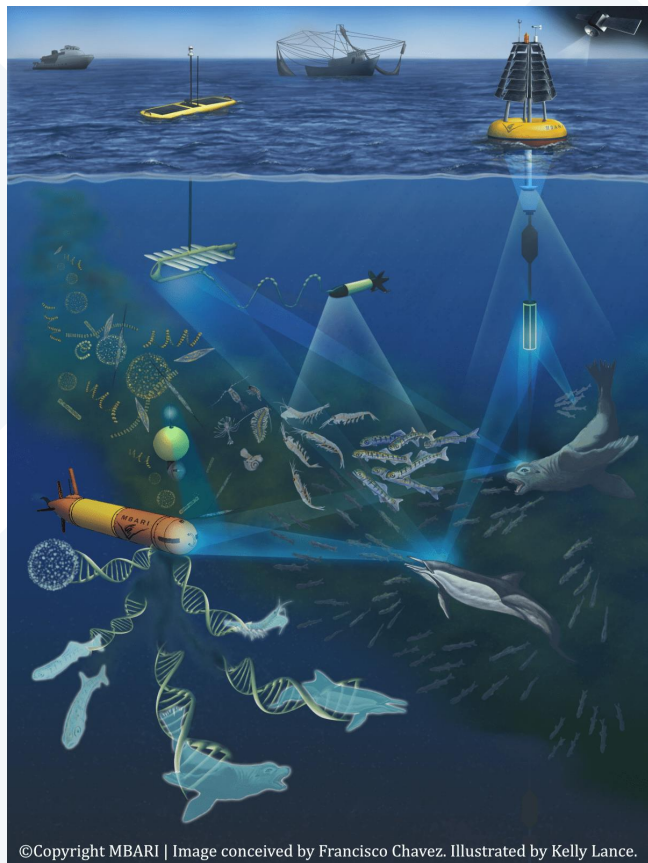


Metabarcoding (amplicon)

- + Identifies multiple species
- More complex, harder to interpret

Community assemblages, trophic structures

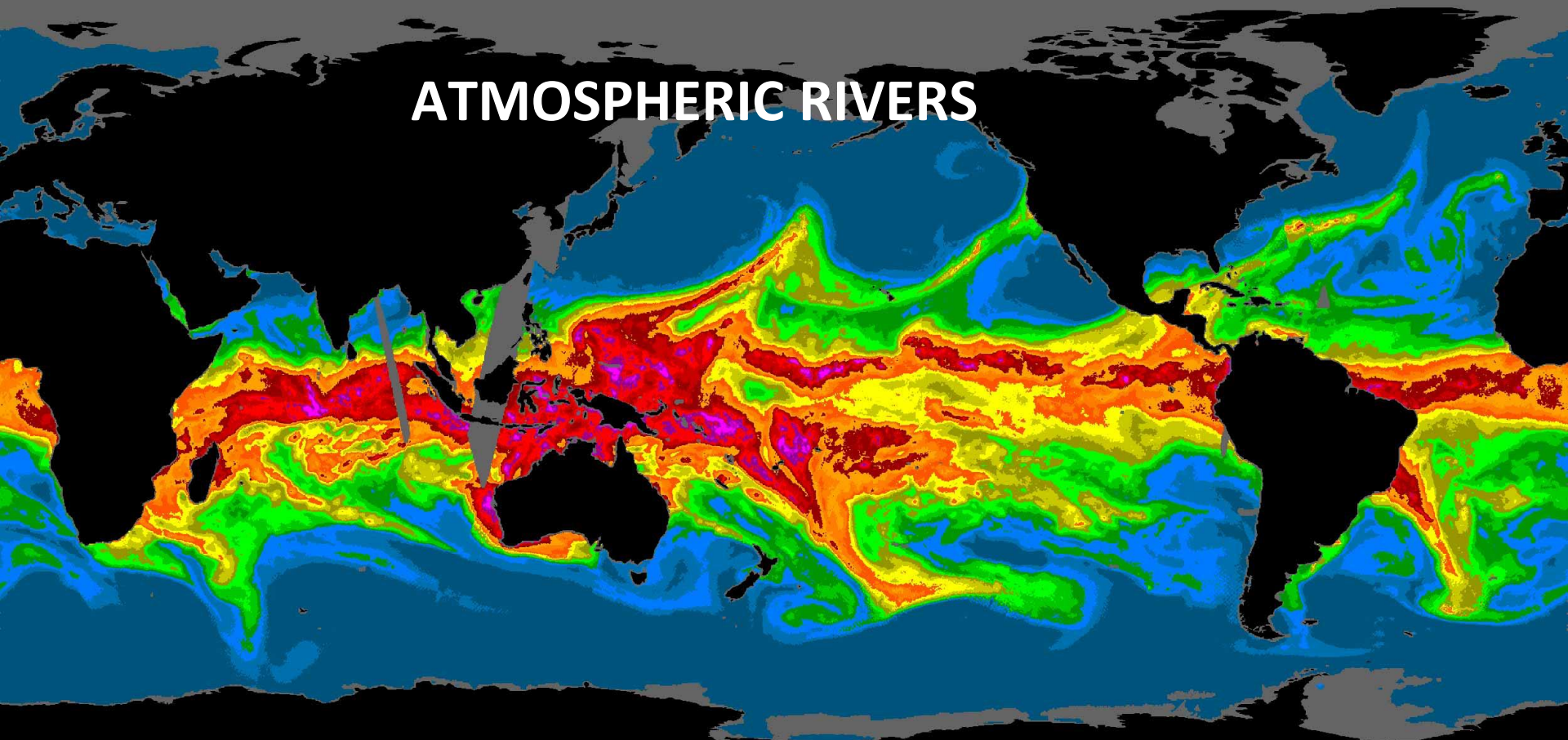
OCEAN-CLIMATE-BIOLOGY NEXUS



UNDERSTANDING PRECIPITATION IN POLAR REGIONS



ATMOSPHERIC RIVERS



Integrated atmospheric water vapor

NASA

Most water vapor transport to the poles occurs over ocean sectors

About 60% of the water vapor transport in those regions is transported by ARs

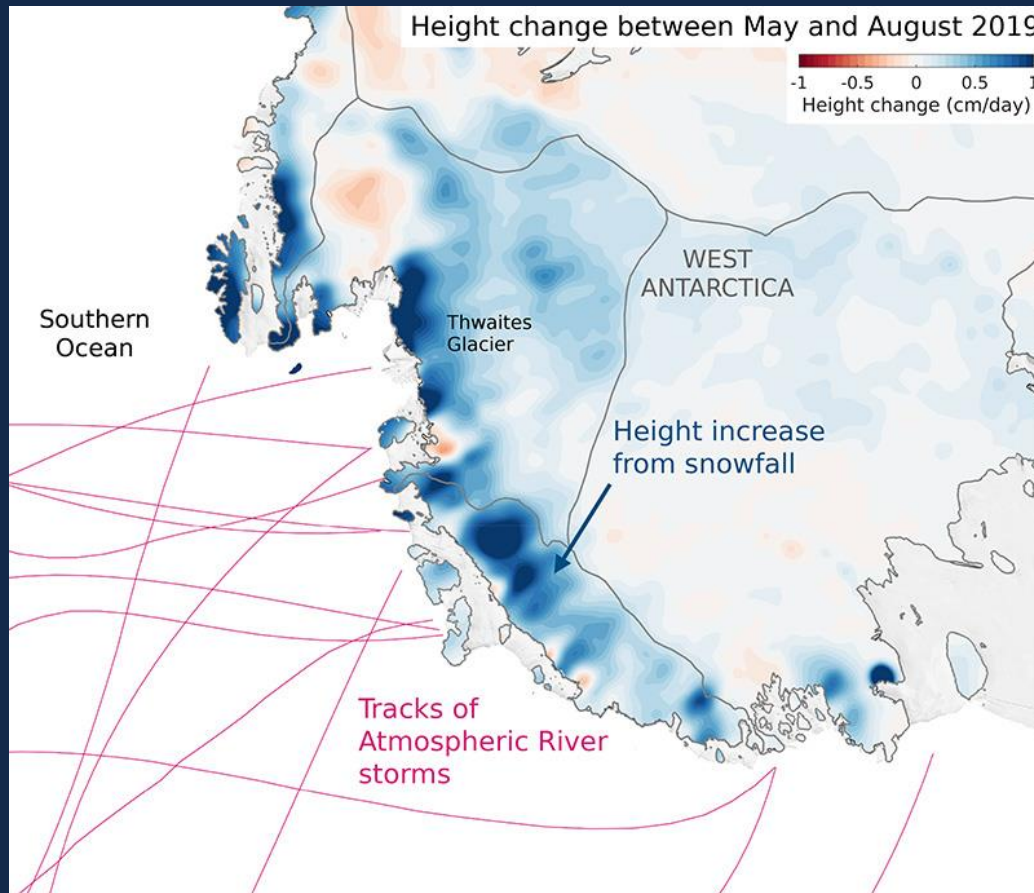
ARs control >70% of the variance above 70° latitude

Nash, Waliser, Guan, Ye and Ralph, 2018

Coupled ocean-atmosphere models suggest that under warmer conditions ARs will:

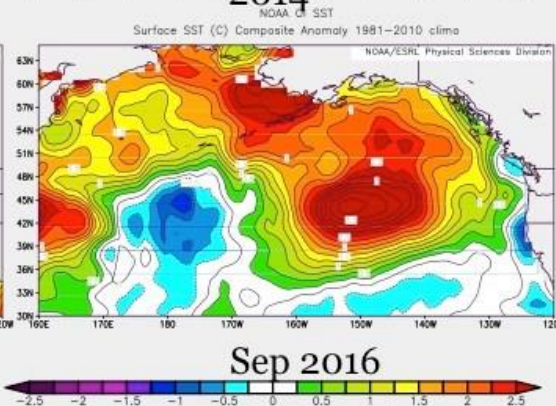
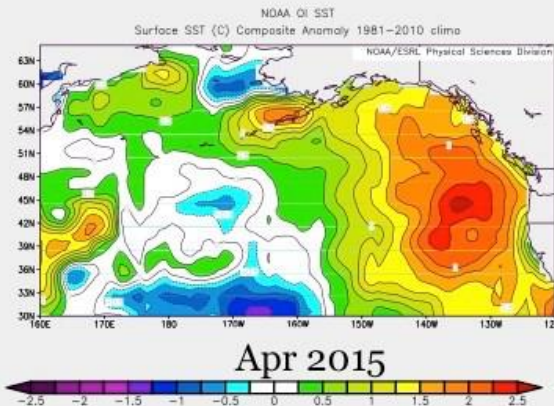
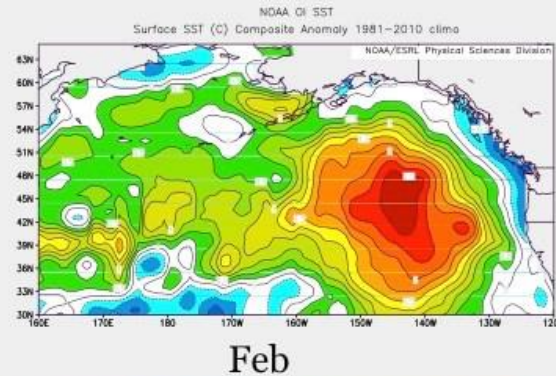
- be fewer in number, but
- be longer, wider
- carry more water
- and produce more rainfall

Espinoza, et al., GRL 2018

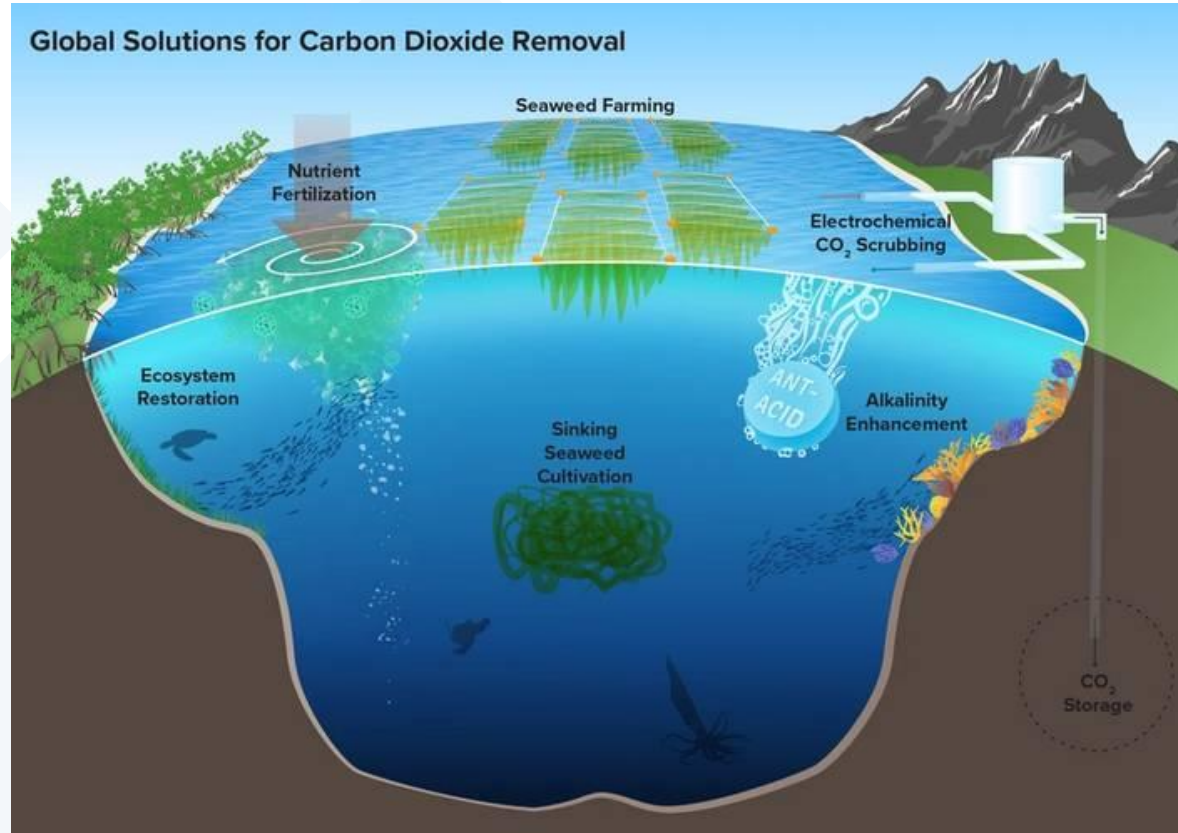


OCEAN HEAT WAVES AND THEIR IMPACT

Sea Surface Temperature (SST) Anomalies in the NE Pacific



OCEAN CARBON DIOXIDE REMOVAL



ACCESSING AND UNDERSTANDING THE SOUTHERN OCEAN

