

IOC-R: A vision of Coordinated Ocean Carbon Research and Observations for the Next Decade

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There were many contributors to this effort, including participants of an international workshop held last year and other experts in the community who shared their ideas and insights.

Integrated Ocean Carbon Research (IOC-R)

A formal IOC working group sponsored by:



Global Research Programs where ocean carbon is only one part of their mission



GCP is focused on carbon, but not just ocean



IOCCP coordinates ocean carbon observations, but is not a research program

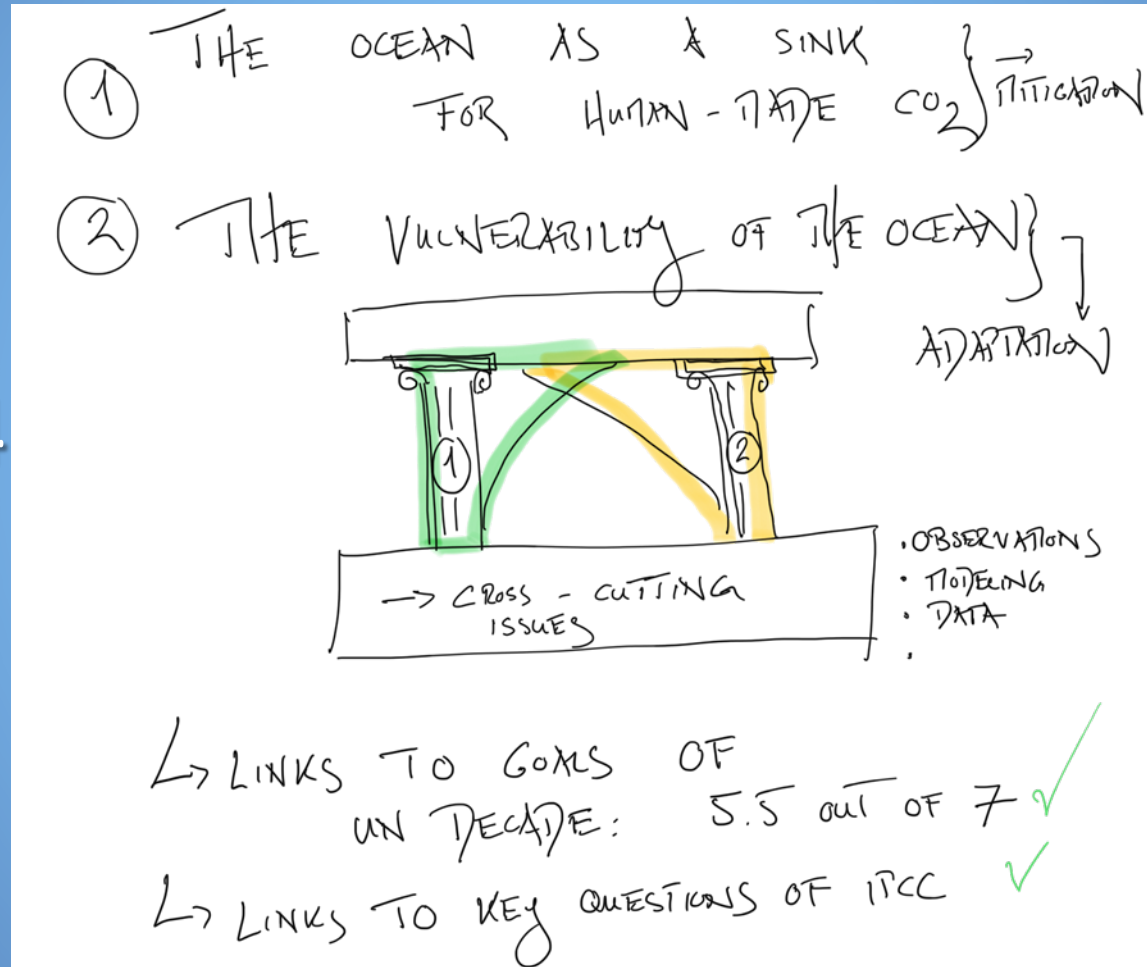


Expert Workshop on Integrated Ocean Carbon Research

IOC-UNESCO Headquarters, Paris, France

Oct. 28-30, 2019

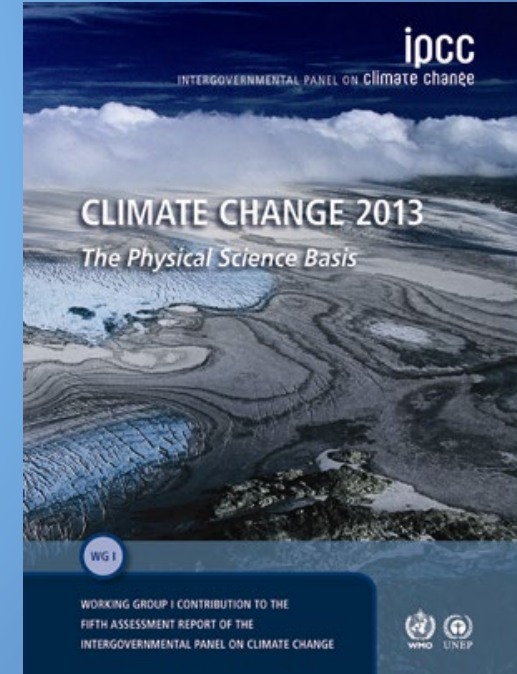
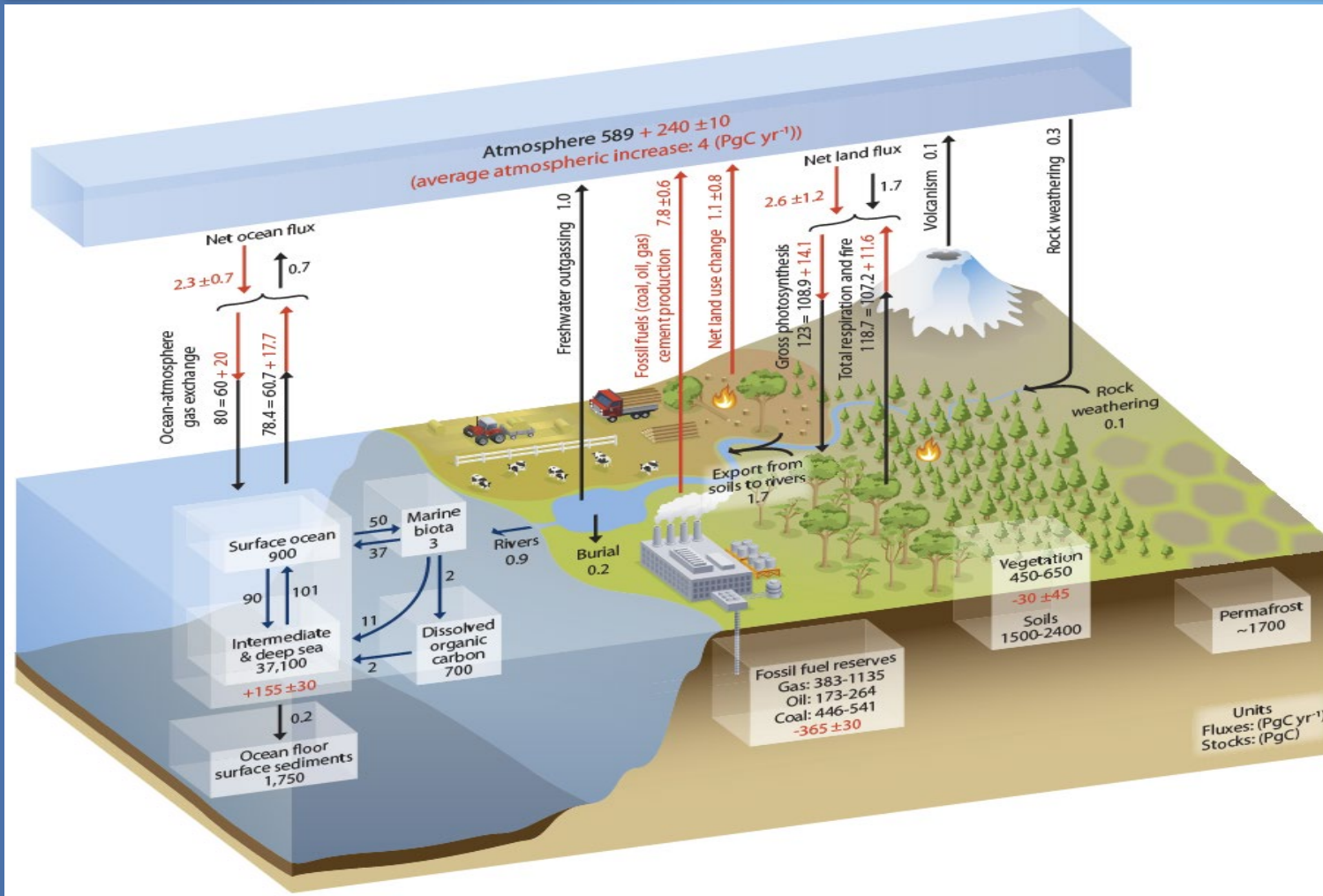
Participants: 34
Countries: 16



Mission: The Integrated Ocean Carbon Research (IOC-R) effort aims to address key issues in ocean carbon research through a strategy of research and observational goals.

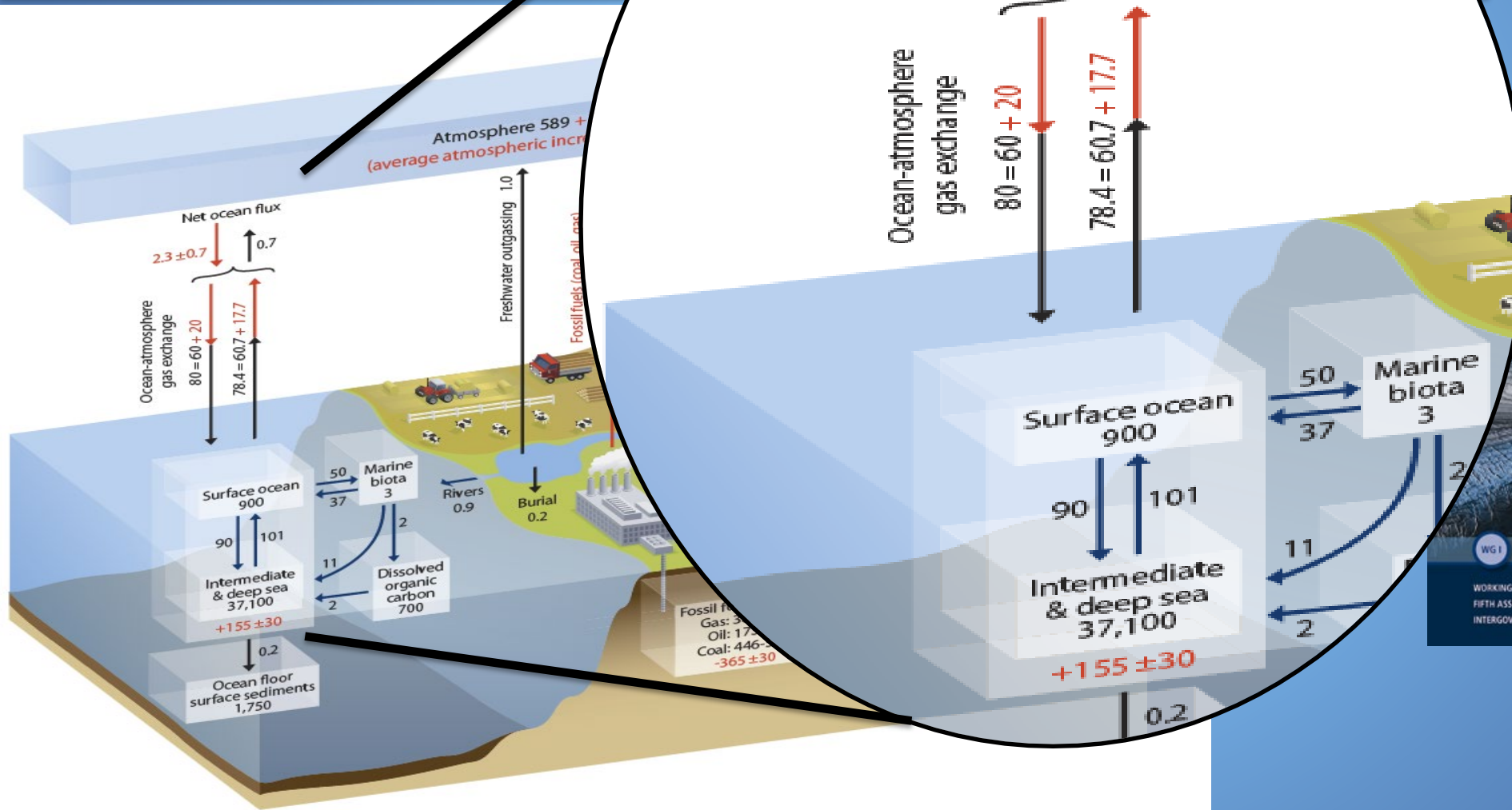
Four Key Questions:

1. Will the ocean uptake of anthropogenic CO_2 continue as primarily an abiotic process?



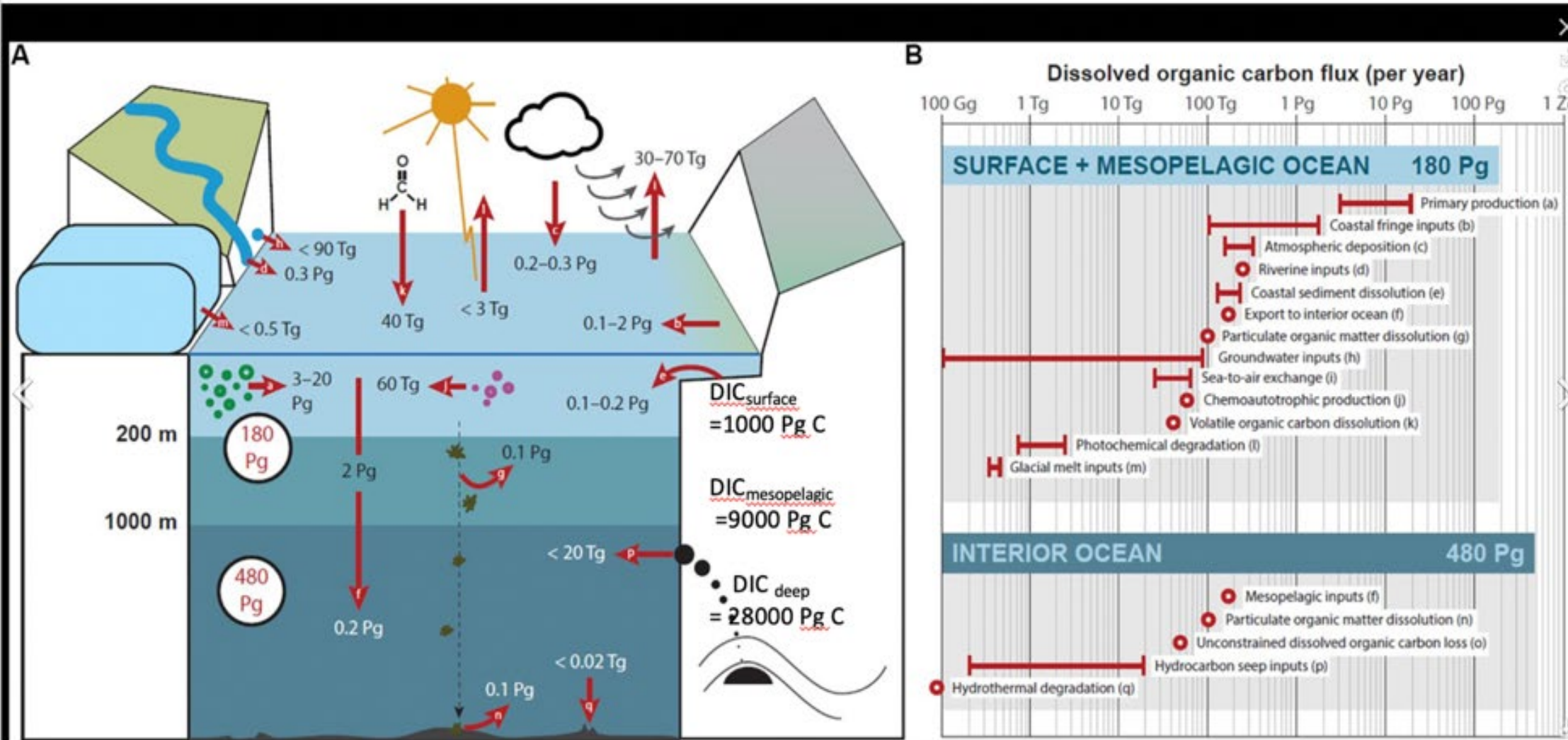
Four

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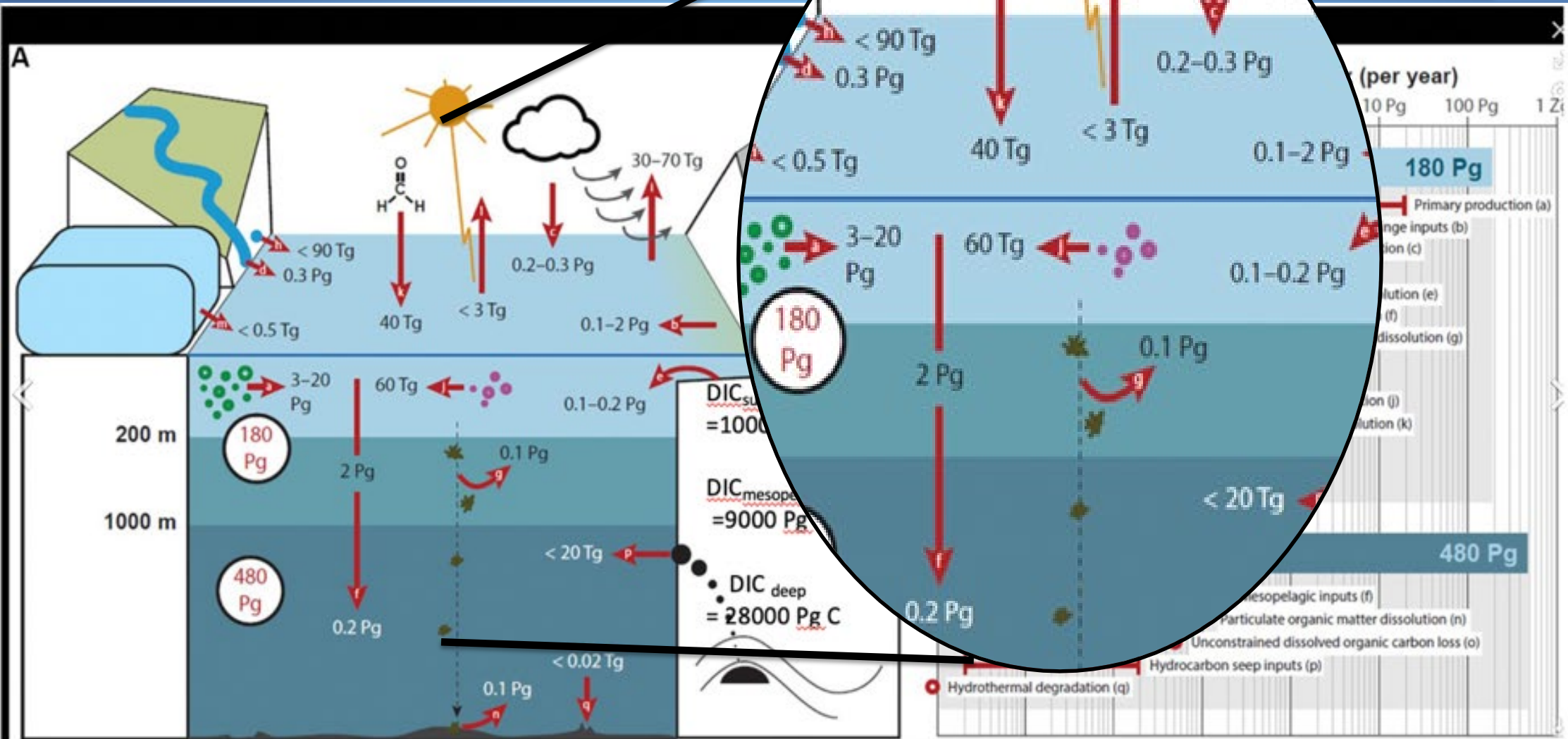
2. What is the (changing) role of biology in the ocean carbon cycle?



from Wagner et al., 2020

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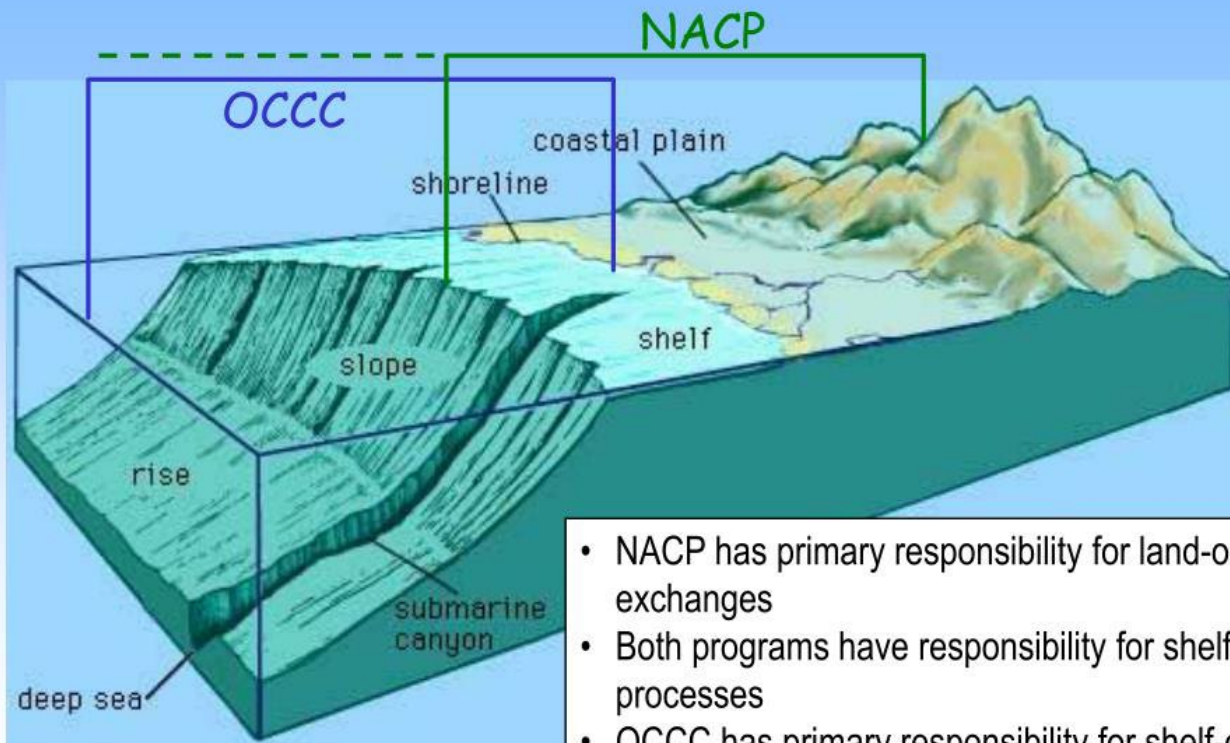


from Wagner et al., 2020

Four Key Questions:

3. What are the exchanges of carbon between the land-ocean-ice continuum?

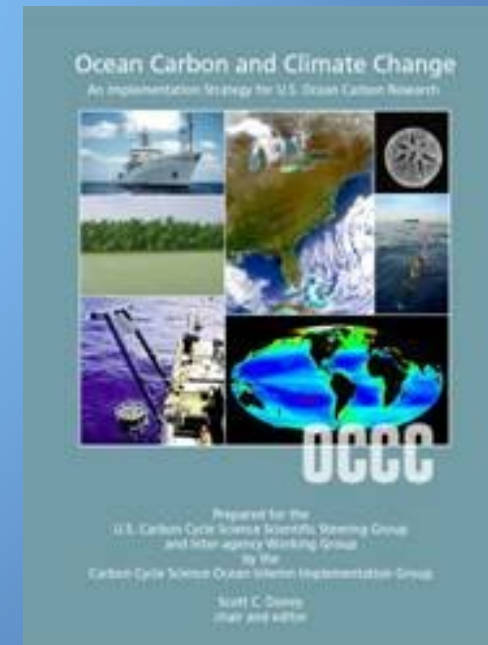
Coordinate NACP and OCCC to give a continuum from dry land to the open ocean



- NACP has primary responsibility for land-ocean exchanges
- Both programs have responsibility for shelf processes
- OCCC has primary responsibility for shelf-open ocean exchanges

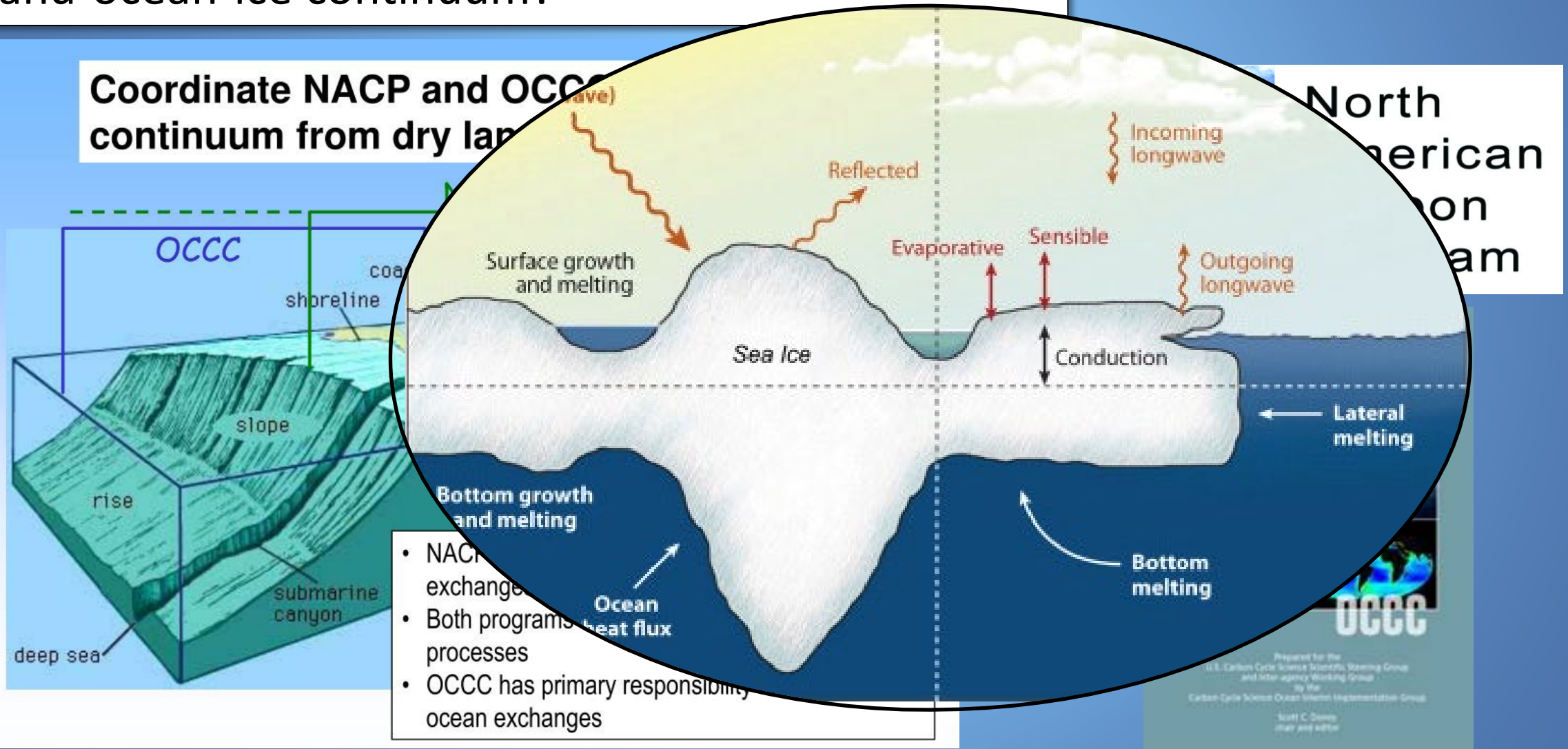


**North
American
Carbon
Program**



Four Key Questions:

3. What are the exchanges of carbon between the land-ocean-ice continuum?



Four Key Questions:

4. How are humans altering the ocean carbon cycle and resulting feedbacks?



#PR4Education. This Project Addresses 12 SDGs

Four Key Questions:

4. How are humans altering the ocean carbon cycle and resulting feedbacks?





GENERAL ASSEMBLY OF THE UNITED NATIONS

Omnibus Resolution for Oceans and the law of the sea (A/RES/72/73) of 6 December 2017

- Proclaimed the UN Decade of Ocean Science for Sustainable Development 2021-2030 and called upon the IOC to prepare an implementation plan for the Decade in consultation with [multiple stakeholders]
- Invited the UN SG to inform the UNGA about the implementation of the Decade through his report on oceans and the law of the sea based on information provided by IOC



Ocean Decade: Societal outcomes and Science challenges

Ocean Decade Challenges



Understand and map land and sea-based sources of pollutants and contaminants and their potential impacts on human health and ocean ecosystems, and develop solutions to remove or mitigate them.



Understand the effects of multiple stressors on ocean ecosystems, and develop solutions to monitor, protect, manage and restore ecosystems and their biodiversity under changing environmental, social and climate conditions.



Generate knowledge, support innovation, and develop solutions to optimise the role of the ocean in sustainably feeding the world's population under changing environmental, social and climate conditions.



Generate knowledge, support innovation, and develop solutions for equitable and sustainable development of the ocean economy under changing environmental, social and climate conditions.



Enhance understanding of the ocean-climate nexus and generate knowledge and solutions to mitigate, adapt and build resilience to the effects of climate change across all geographies and at all scales, and to improve services including predictions for the ocean, climate and weather.



Enhance multi-hazard early warning services for all geophysical, ecological, biological, weather, climate and anthropogenic related ocean and coastal hazards, and mainstream community preparedness and resilience.



Ensure a sustainable ocean observing system across all ocean basins that delivers accessible, timely, and actionable data and information to all users.



Through multi-stakeholder collaboration, develop a comprehensive digital representation of the ocean, including a dynamic ocean map, which provides free and open access for exploring, discovering, and visualizing past, current, and future ocean conditions in a manner relevant to diverse stakeholders.



Ensure comprehensive capacity development and equitable access to data, information, knowledge and technology across all aspects of ocean science and for all stakeholders.



Ensure that the multiple values and services of the ocean for human wellbeing, culture, and sustainable development are widely understood, and identify and overcome barriers to behaviour change required for a step change in humanity's relationship with the ocean.

Ocean Decade: Societal outcomes and Science challenges



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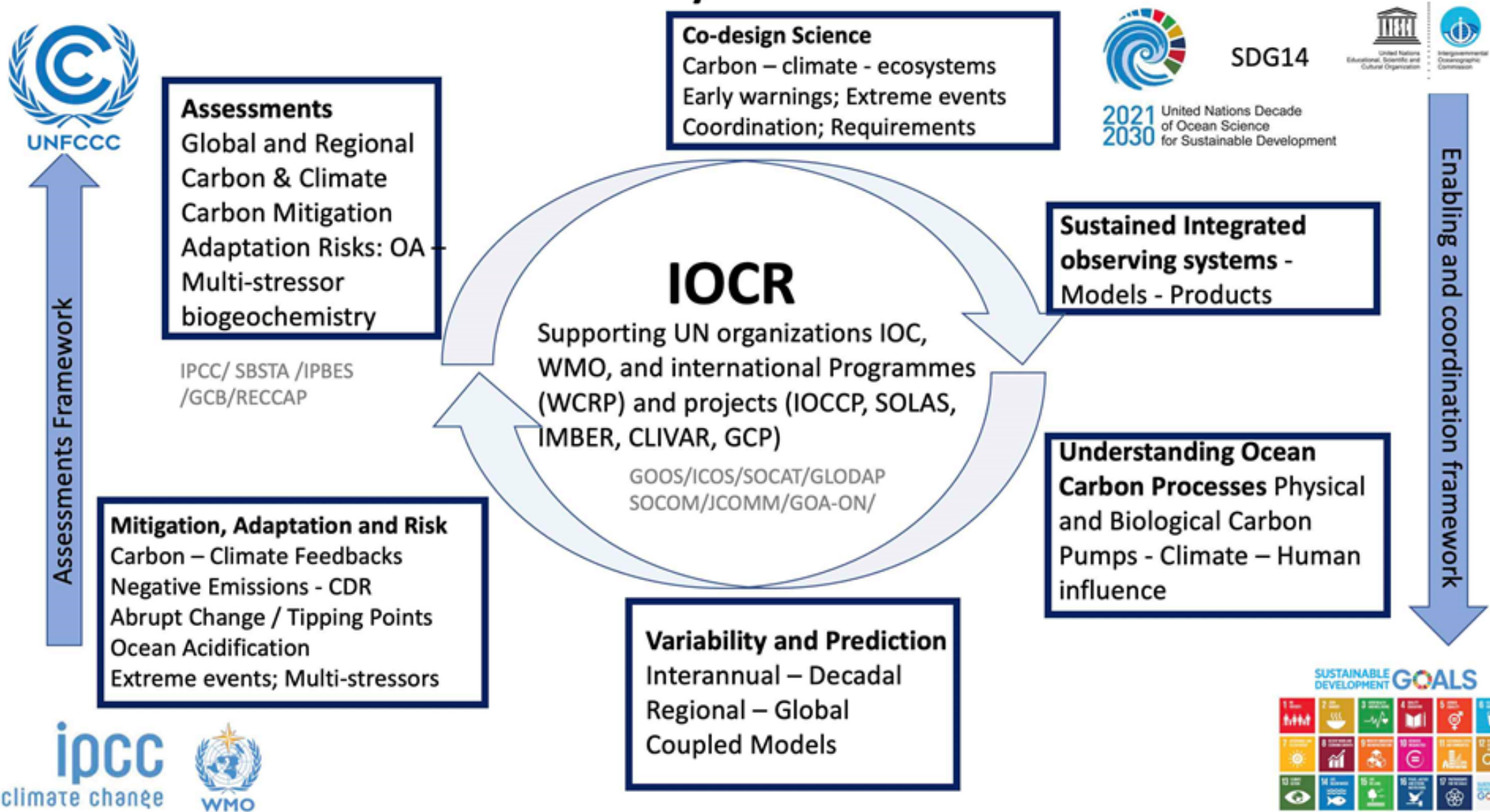


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Science - Society Framework for IOCR



Approaches

- Strengthen sustained financial support for observing networks
- Enhance and coordinate the existing suite of carbon observing and synthesis projects
- Develop regional priorities
- Consider what new process studies and experiments are needed
- Identify new technologies to enhance autonomous observations and analyses
- Emphasize the integration of models and observations
- Consider the ocean's role in climate solutions- mitigation approaches
- Propose governance for the Integrated Carbon Research (IOC-R) program

Thank You
For
Your Time



United Nations
Educational, Scientific and
Cultural Organization



Intergovernmental
Oceanographic
Commission



2021
2030 United Nations Decade
of Ocean Science
for Sustainable Development

One Planet, One Ocean