

Digital Twins of the Ocean - DITTO



“Digital Twins of the Ocean”
Opportunities to future-proof sustainable development



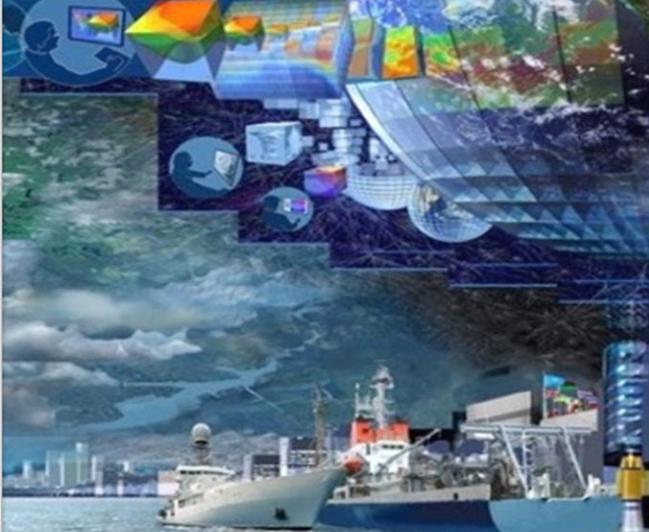
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<https://ditto-oceandecade.org>



Digital Twins of the Ocean

Observations



Data



Knowledge



Digital Twins of the Ocean are a virtual representation of the real ocean and have a two-way connection with it. Observations from the real ocean change and refine the twin; manipulating the twin can highlight regions of the real ocean in need of better or different observations.

Digital Twins will enable users to address **'What if' questions** based on shared data, models and knowledge.

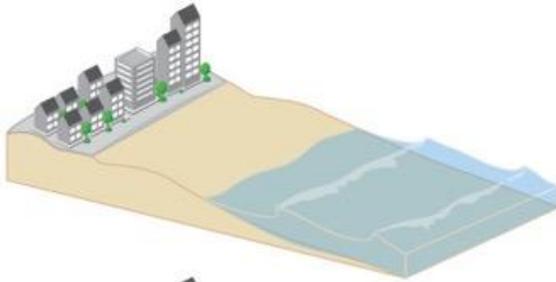


Digital Twin “Prototype”

What is the most cost effective option to mitigate the coastal impact of sea level rise?

Minimal Defense

Many communities have developed right along the ocean with only minimal natural defenses from a small strip of beach between them and the ocean.



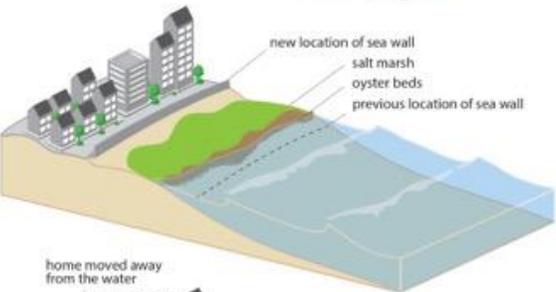
Natural

Natural habitats that can provide storm protection include salt marsh, oyster and coral reefs, mangroves, seagrasses, dunes, and barrier islands. A combination of natural habitats can be used to provide more protection, as seen in this figure. Communities could restore or create a barrier island, followed by oyster reefs and salt marsh. Temporary infrastructure (such as a removable sea wall) can protect natural infrastructure as it gets established.



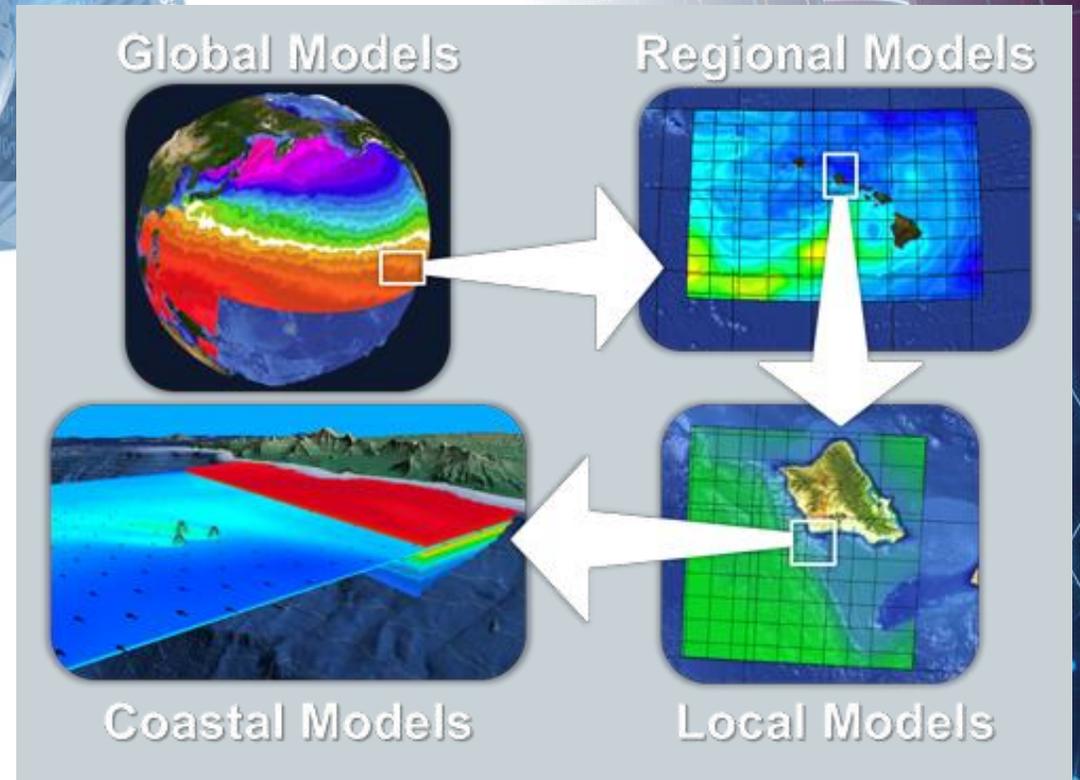
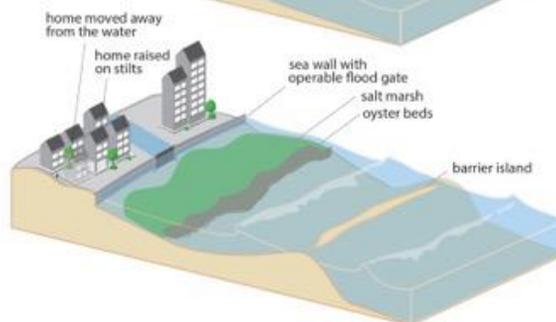
Managed Realignment

Natural infrastructure can be used to protect built infrastructure in order to help the built infrastructure have a longer lifetime and to provide more storm protection benefits. In managed realignment, communities are moving sea walls farther away from the ocean edge, closer to the community and allowing natural infrastructure to recruit between the ocean edge and the sea wall.



Hybrid

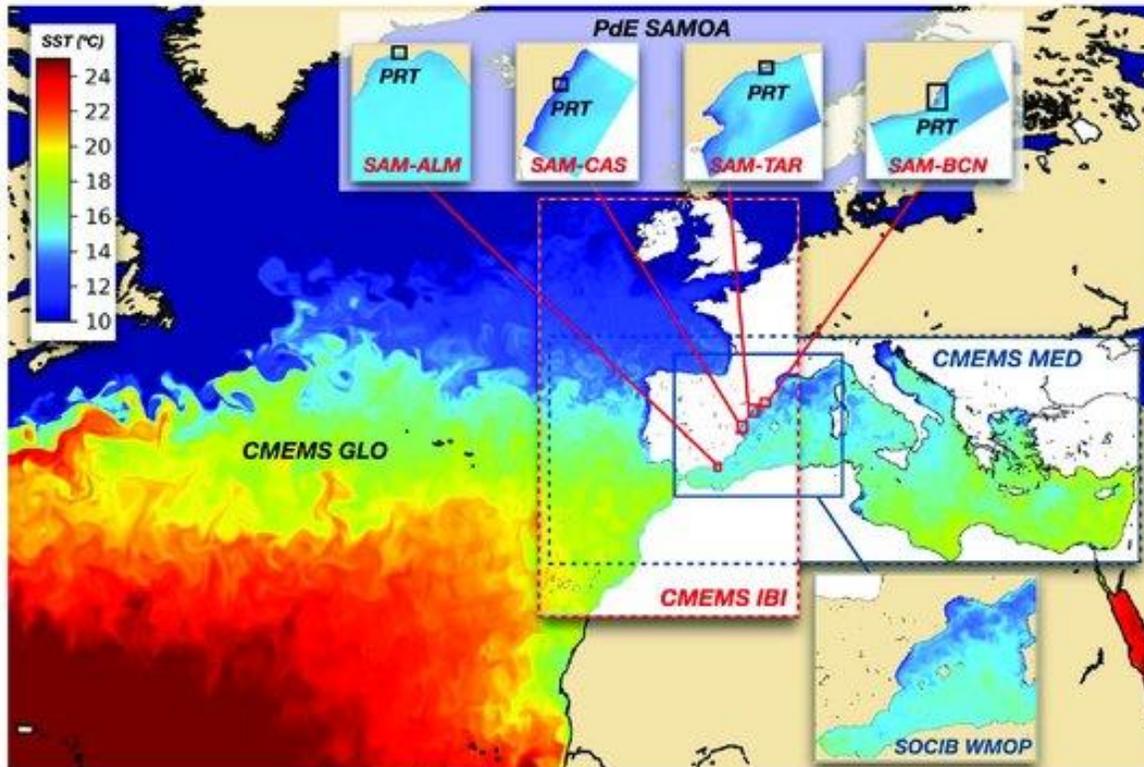
In the hybrid approach, specific built infrastructure, such as removable sea walls or openable flood gates (as shown here) are installed simultaneously with restored or created natural infrastructure, such as salt marsh and oyster reefs. Other options include moving houses away from the water and raising them on stilts. The natural infrastructure provides key storm protection benefits for small to medium storms and then when a large storm is expected, the built infrastructure is used for additional protection.



Digital Ocean - Ocean Prediction



The Decade Collaborative Centre for Ocean Prediction



- Ocean predictive multi scale modelling frameworks.
- Artificial intelligence / machine learning to create, manipulate and analyse marine information.
- The ability to simulate change to the system by human intervention and to explore their consequences.

International Digital Twins of the Ocean Summit



4 to 5 May 2022

High-level in-person event in Central London, UK, with live stream



www.g7fsoi.org/digital-twin-ocean-summit

Digital Twins of the Ocean – DITTO Working groups

DITTO establishes and advances a digital framework to explore ocean related development scenarios and develop a comprehensive digital representation of the ocean.

WG1. Supportive ocean observations and data systems

WG2. Data analytics and prediction engines

WG3. Data lakes and interoperability

WG4. Interactive layers and visualizations

WG5. Framework - architecture, design and implementation (TURTLE)

WG6. Education, training and capacity development

WG7. Outreach and communication

Become a Partner of the Digital Twins of the Ocean (DITTO) Programme



Partner Application

The objective of the partnership is to support each other through a network of DITTO partners.

- Once you have submitted the application the DITTO team will review the information and
- send you a **memorandum of understanding (MOU)** to be mutually agreed on.

Interested to join the DITTO community?

[ditto-oceandecade.org](https://ditto-oceandecade.org/join-the-ditto-community)
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