



Future Directions for the Digital Ocean and its Digital Twins

Nadia Pinardi, Decade Collaborative Center for Coastal Resilience, Bologna, Italy
Joanna Post, Head, UNESCO-IOC Ocean Observations and Services Office, Paris
Richard Signell, Open Science Computing, LLC, Massachusetts, United States
Giovanni Coppini, Head, Global Coast Division, CMCC, Italy



Outline

- ***What?*** is the Digital Ocean and its Digital Twins?
- ***Why?*** we need Digital Ocean Twins
- ***How?*** future directions



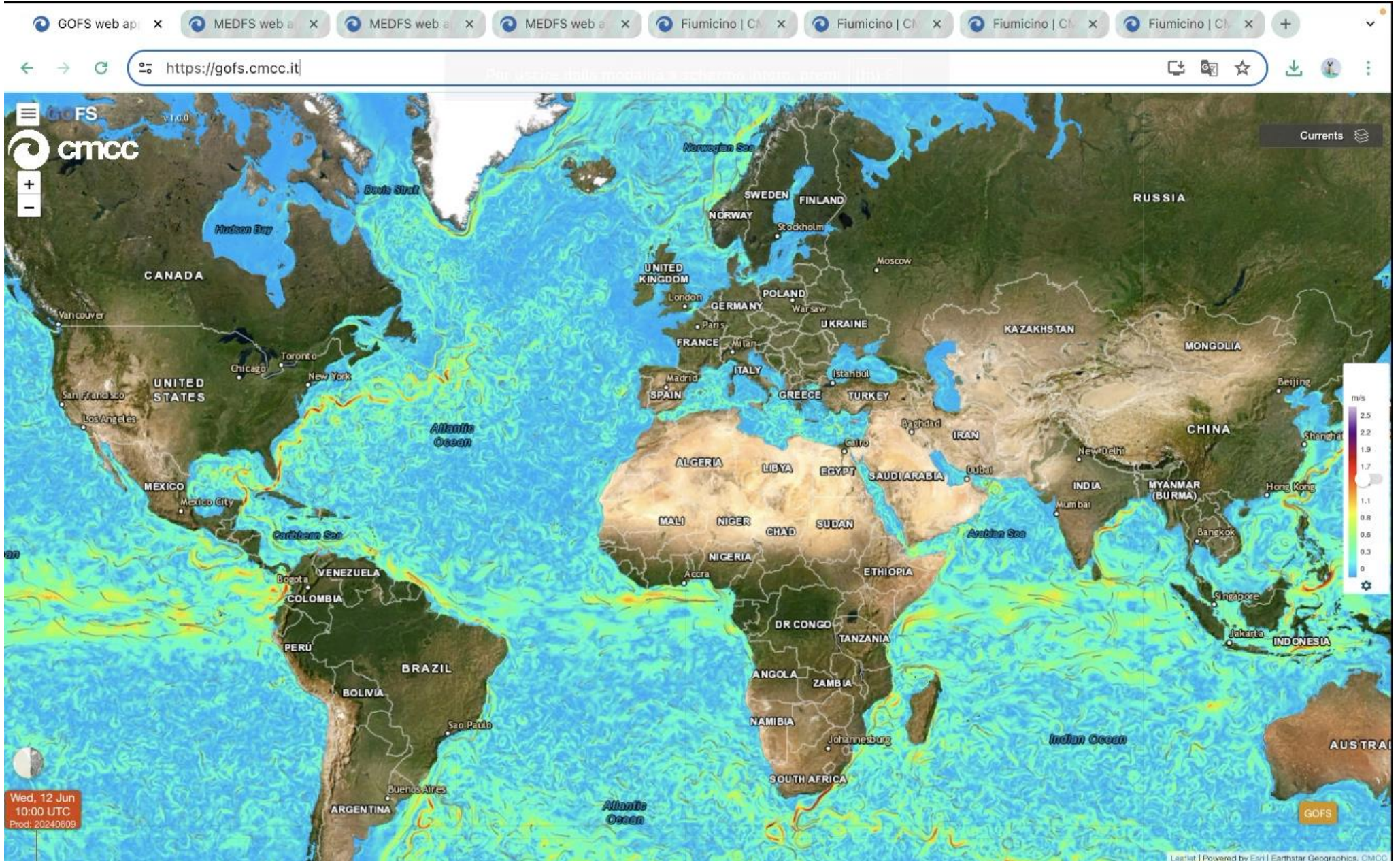
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What is the Digital Ocean



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What are Digital Ocean Twins

**Adaptation solution to be sought:
How do I decrease wave energy at the coasts
and where do I restore seagrass habitat?**

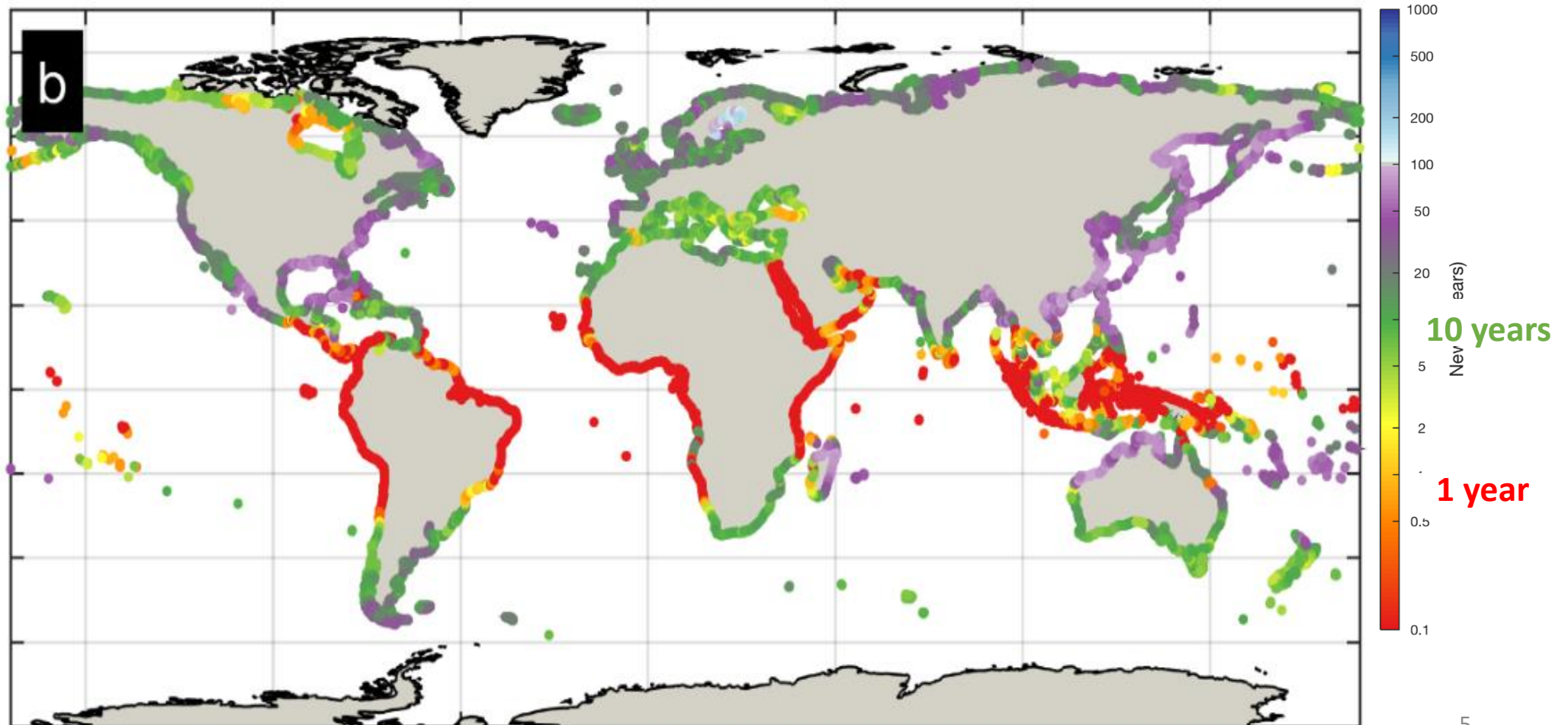
DIGITAL VEGETATION POSITIONS



**Percentage
wave height
reduction**

Why we need the Digital Ocean and its Digital Twins

Frequency of the 100 year storm surge event in 2100

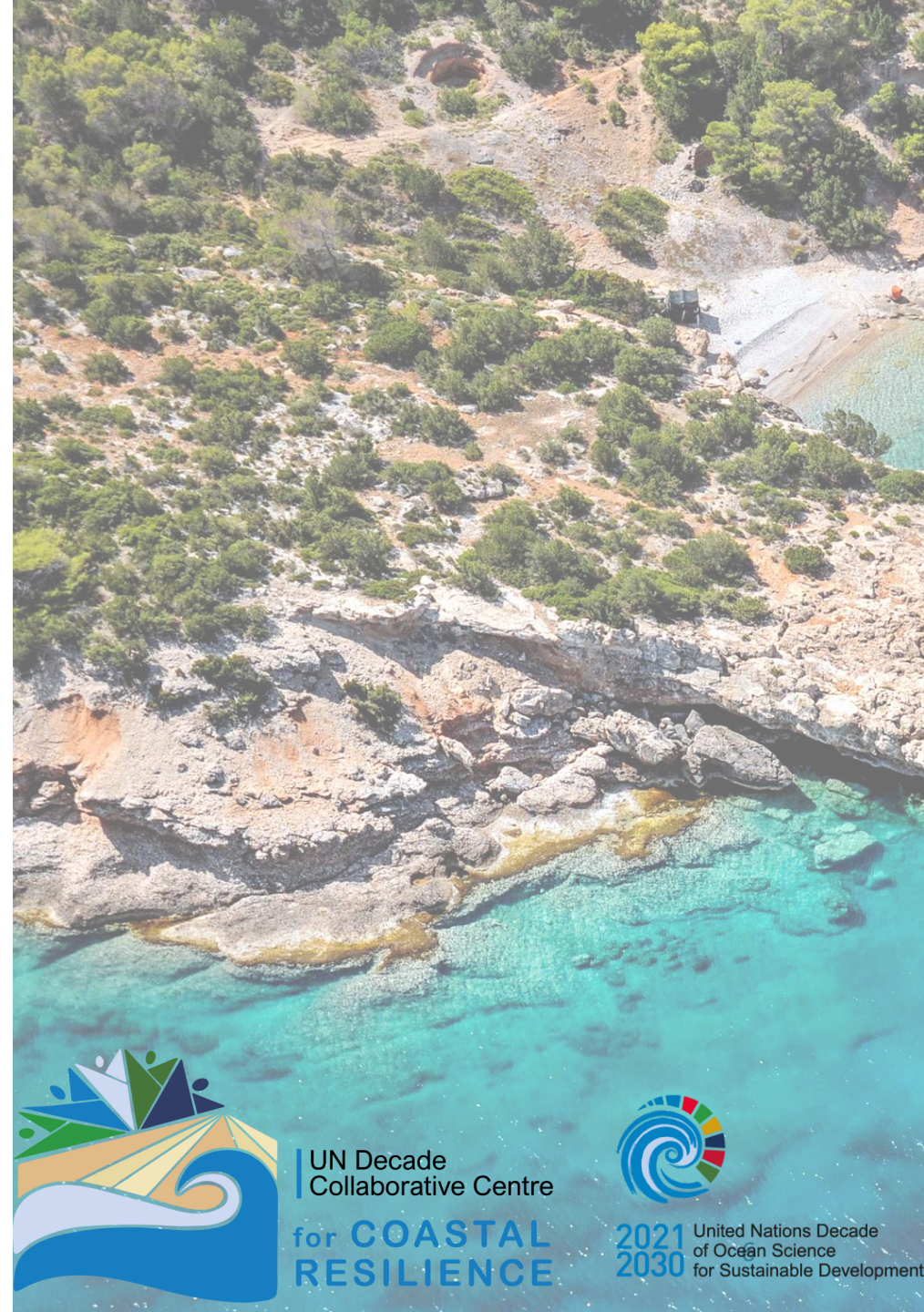


From: Vousdoukas et al., Nature communication, 2018



How we develop the Digital Ocean and Twins?

- **1. Enhance and expand *risk science research* to bolster coastal resilience and adaptive capacity**
- **2. Enhance observation collection with a focus on coastal areas, leveraging Digital Twins and AI-based solutions**
- **3. Expand cloud-based computing and infrastructure to enhance accessibility**



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Enhance and expand *risk science research* to bolster coastal resilience and adaptive capacity

Dr. Joanna Post, Head of the Ocean Observations and Services Section at the Intergovernmental Oceanographic Commission (IOC) of UNESCO, Paris

GOOS
The Global Ocean Observing System

unesco
Intergovernmental Oceanographic Commission

WORLD METEOROLOGICAL ORGANIZATION

UN environment
United Nations Environment Programme

International Science Council

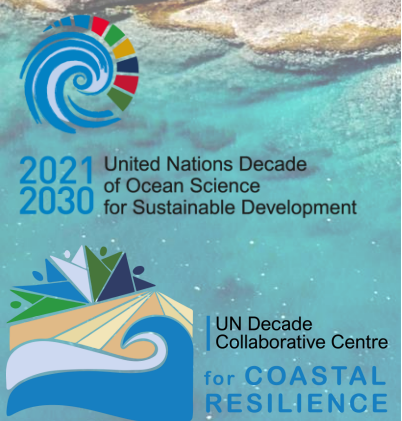
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Joanna Post

Enhance observation collection with a focus on coastal areas, leveraging Digital Twins and AI-based solutions

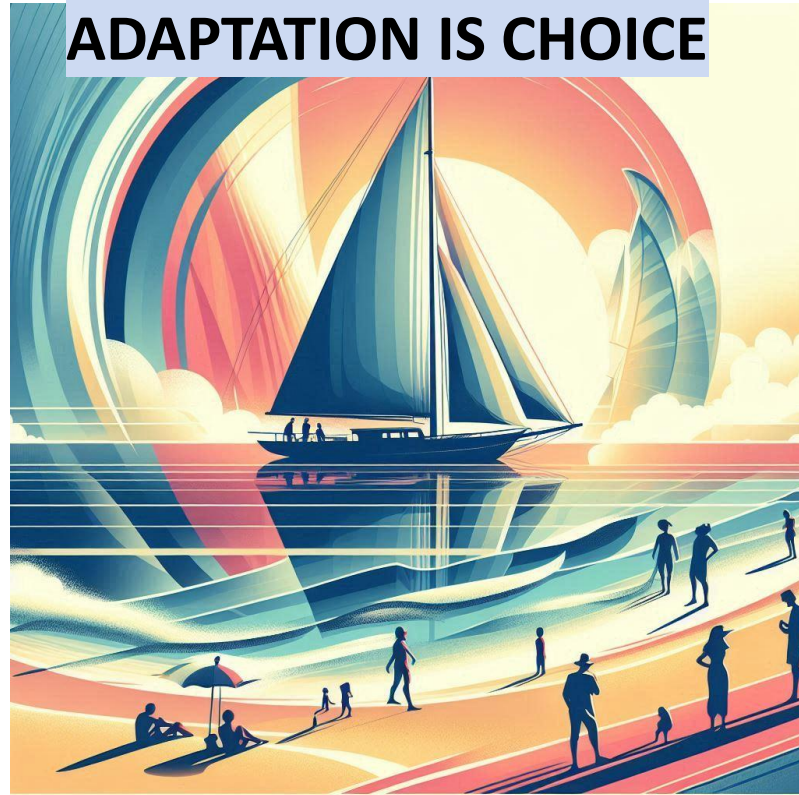
Dr. Giovanni Coppini, Director of the Global Coast Division,
Centro EuroMediterraneo sui Cambiamenti Climatici, Lecce, Italy



Expand cloud-based computing and infrastructure to enhance accessibility

Dr. Richard Signell, Open Science Computing, LLC, Massachusetts, United States





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How do we get to the ocean we want?

From Prof. Syders AR, Delaware University, June 2024