



INTERNATIONAL DIGITAL TWINS OF
THE OCEAN SUMMIT 2022

Sea Clearly: Winning the Blue-Cloud Hackathon

Keynote speaker: DITTO Summit (London)

Delphine Lobelle: postdoctoral researcher at Utrecht University

Sea Clearly team members:

Cleo Jongedijk, Claudio Pierard, Victor Onink, Darshika Manral, Olmo Zavala-Romero, Joey Richardson,
Laura Gomez Navarro, Mikael Kaandorp

To summarise our idea

What if....

we could develop an **environmental impact assessment** tool to determine locations for **lowest probability** of:

- 1) plastic pollution reaching aquaculture cages
- 2) plastic pollution from cages reaching marine protected areas

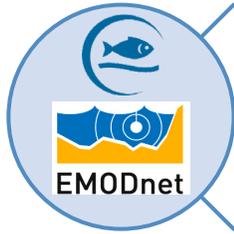
Stakeholders/end-users

- Aquaculture farm project managers: deciding where to place new cages
- Decision-makers: marine spatial planning officers and accreditation bodies
- General public: interested in whether their food could be contaminated

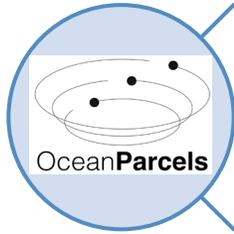
Combining models and platforms



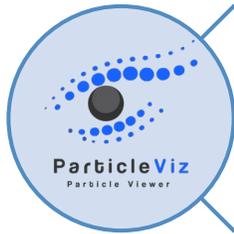
Virtual labs: series of applications to support project activities and/or users with development & demonstrative environments



Copernicus Marine Services: advective fields
EMODnet: aquaculture cage locations



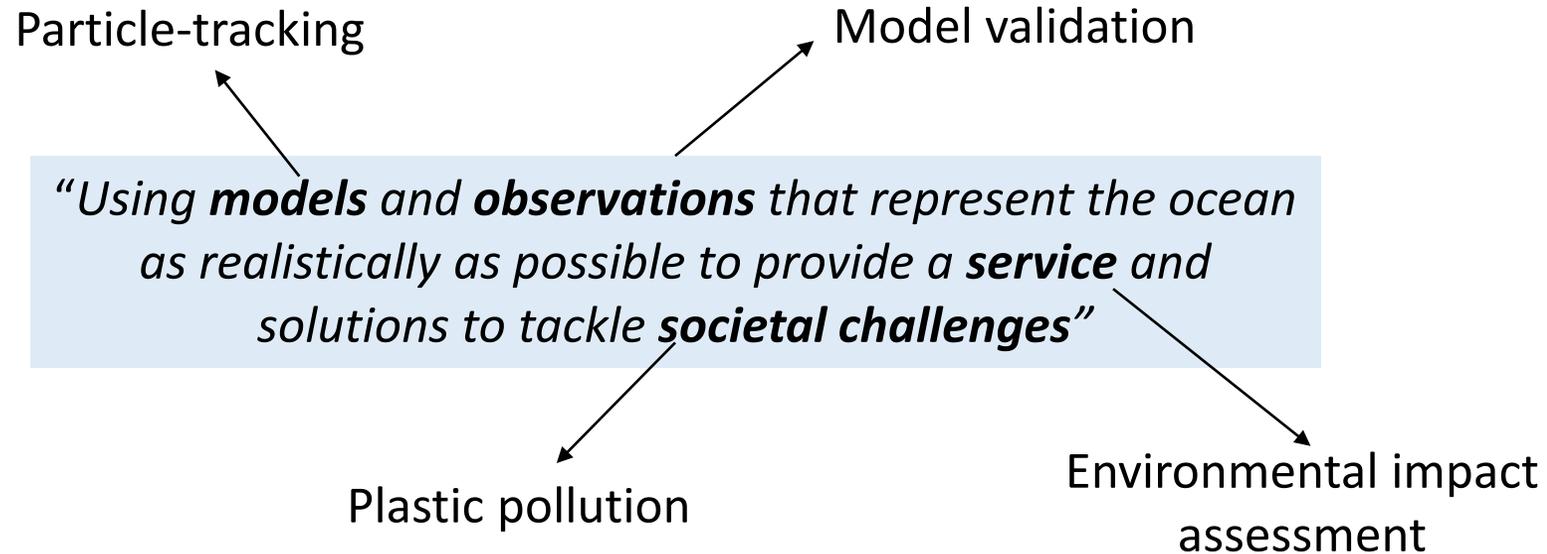
Open-access Lagrangian particle-tracking framework: release virtual microplastic particles and track their pathways, following advective fields



Open Source software for the efficient visualization of Lagrangian scientific data on the web.

How does Sea Clearly tie into 'digital twins'?

How we see digital twins:



All thanks to an incredible team of Early Career Ocean Professionals!



Cleo Jongedijk

PhD researcher

Cleo investigates how plastic litter ends up on beaches.



Darshika Manral

PhD researcher

Darshika investigates how plankton interact with nutrients and plastic in the Atlantic Ocean.



Victor Onink

PhD researcher

Victor investigates the global dispersion patterns of marine plastic pollution.



Claudio Pierard

PhD researcher

Claudio investigates the origin and fate of nanoplastics in our ocean.



Delphine Lobelle

Postdoctoral researcher

Delphine investigates how 3D ocean circulation impacts plastic transport.



Joey Richardson

MSc student

Joey explores how to simulate the transport of oil at the surface of the ocean.



Mikael Kaandorp

PhD researcher

Mikael investigates how to use machine learning to incorporate plastic distribution data into models.



Laura Gomez Navarro

Postdoctoral researcher

Laura investigates how to track floating material in currents from remote sensing.



Olmo Zavala Romero

Assistant Research Scientist

Olmo does Machine Learning and Scientific Visualization for the Earth Sciences at the Center for Ocean-Atmospheric Prediction Studies

For more info on the open-source tools/frameworks used:

<https://github.com/olmozavala/particleviz>

<https://github.com/OceanParcels>

Delphine Lobelle

Also thanks to the Blue-Cloud for the opportunity and Erik van Sebille for his support