

Developing Optimal and Open Research Support for the Black Sea



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System of Systems – Opportunities and Next steps

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Image: @ngilfanov



System of Systems

A one-stop-shop for standardised data and model outputs, co-developed with stakeholders, to address environmental challenges and support Blue Growth in the Black Sea

Uses latest technology to bring complex data together

Brings together heterogeneous data streams into analysis (or even interpretation) - ready data cubes using the same (meta)data standard and format

Harmonises data

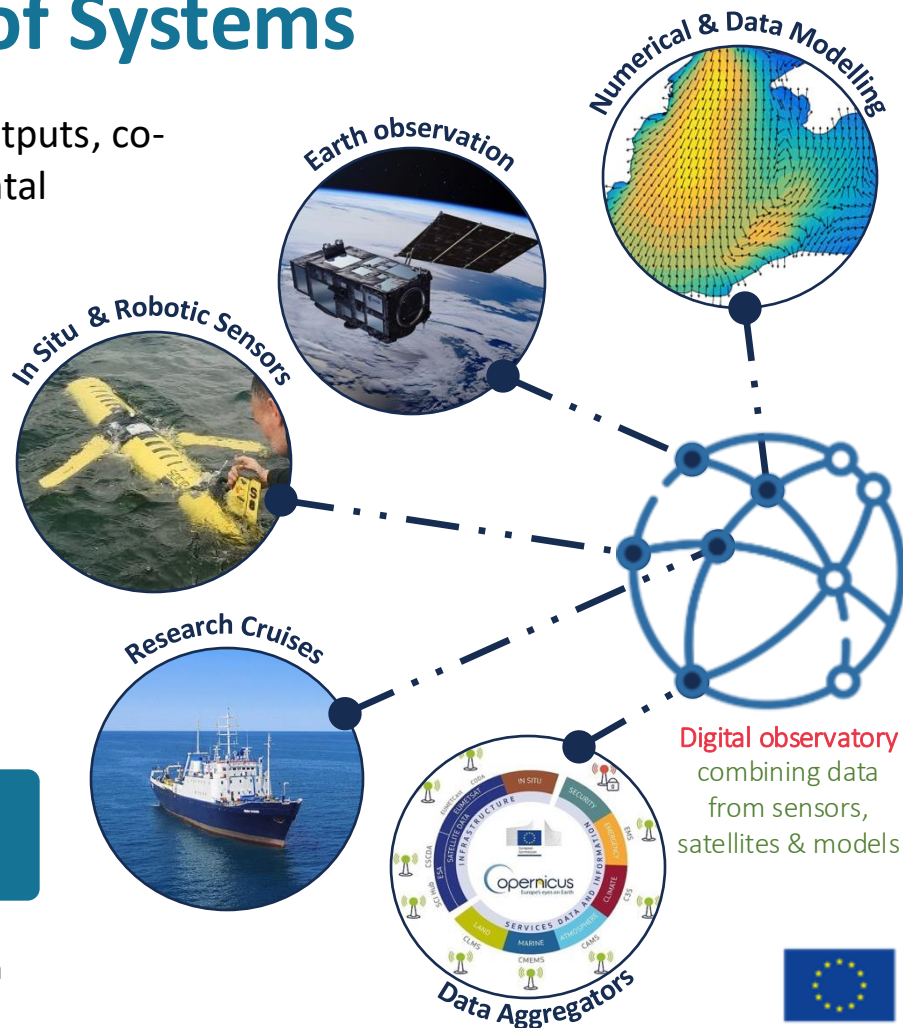
Deliver harmonised spatial and temporal data products (sampling, cruises, fixed & mobile oceanographic platforms, EO observations and models)

A single smart intuitive portal

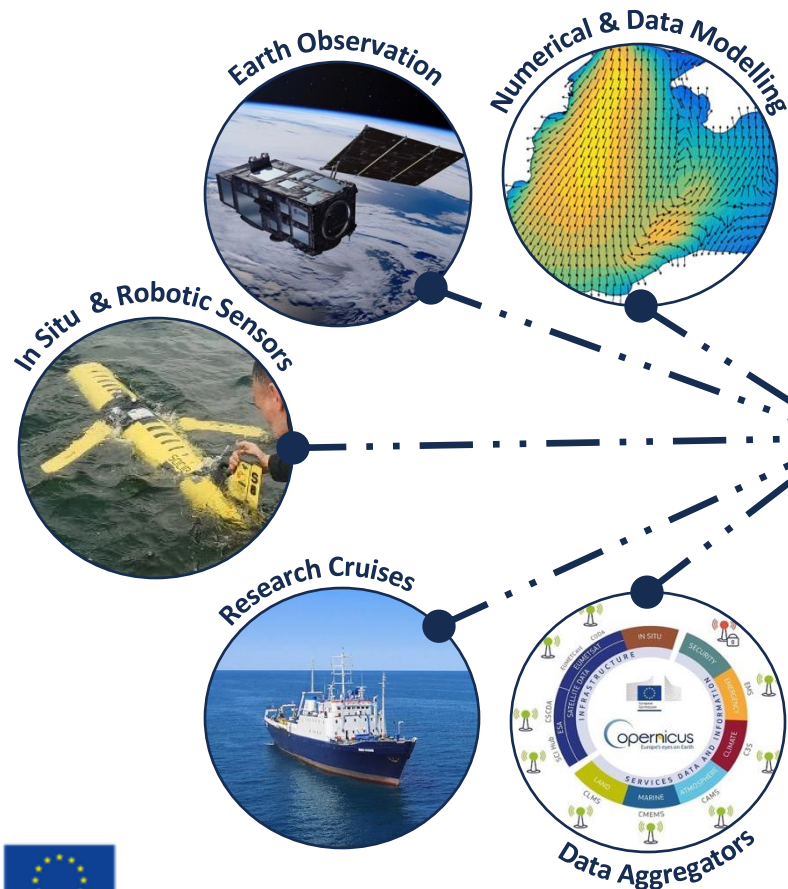
Tailored to the needs of stakeholders, using FAIR principles

Support knowledge transfer

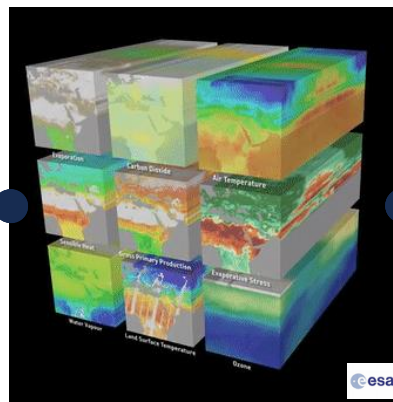
Building a common understanding, opportunities for growth and collaboration for sustainable growth and prosperity



SoS Architecture

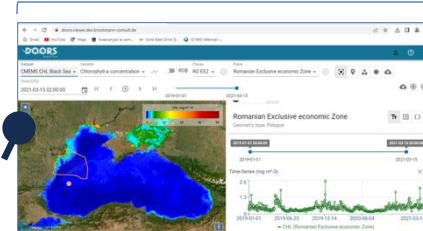


Cloud based data store
Multivariate analysis

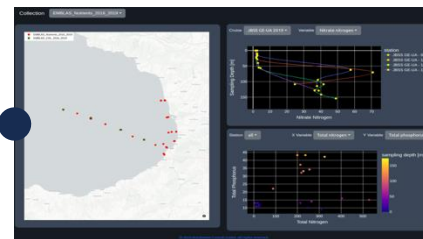


XCubeTechnology & GeoDB

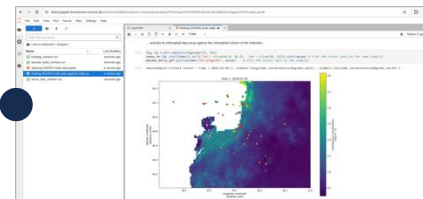
Data Visualisation & Interaction



The Data Viewer



The DOORS Dashboard



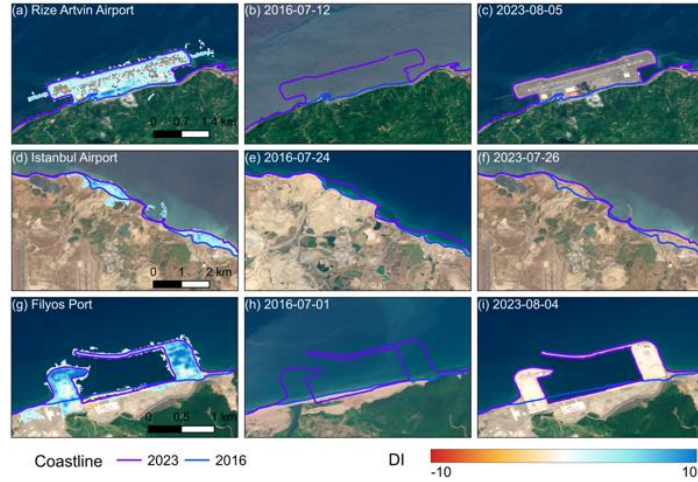
The Jupyter Lab Notebook



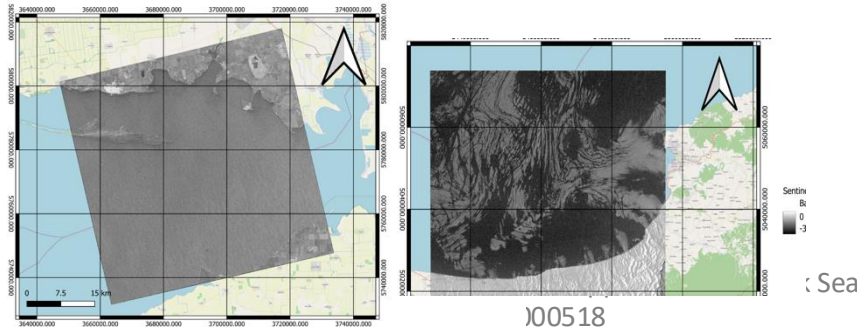
Future: Direct
integration into
existing platforms

New & Improved Data & Model Products

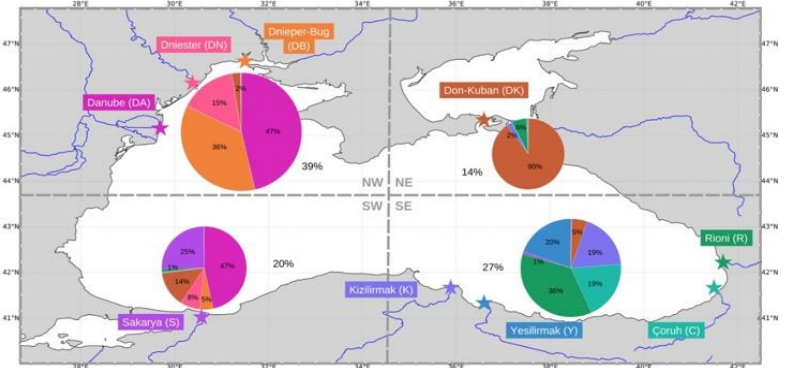
Quantifying natural and anthropogenic coastal change (first time)



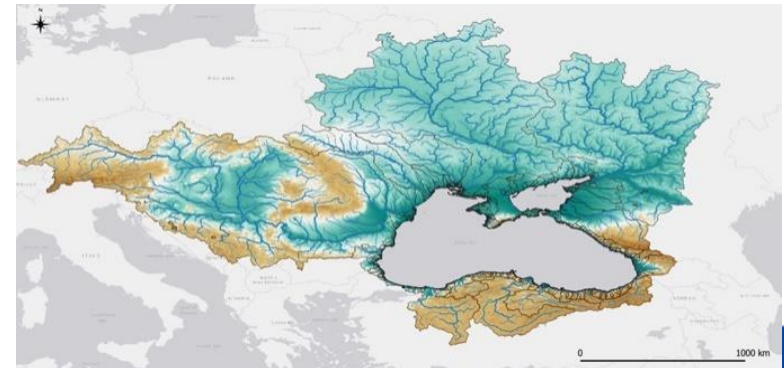
Mapping marine litter – micro plastics (first time ever)



Evaluation of marine litter distribution, origin and area of accumulation



Modelling the catchments feeding the Black Sea (first time)

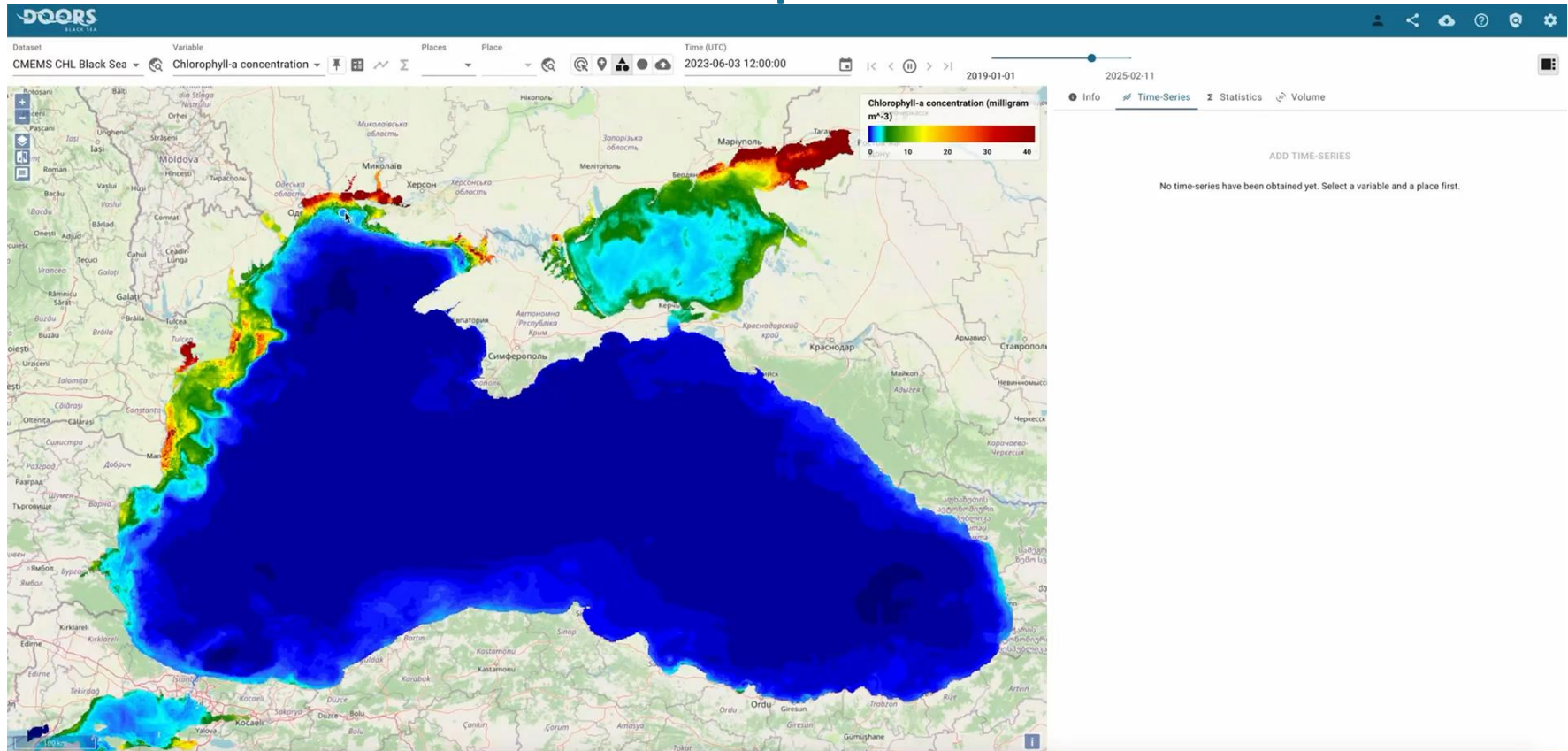


Co-Development: Priority Areas

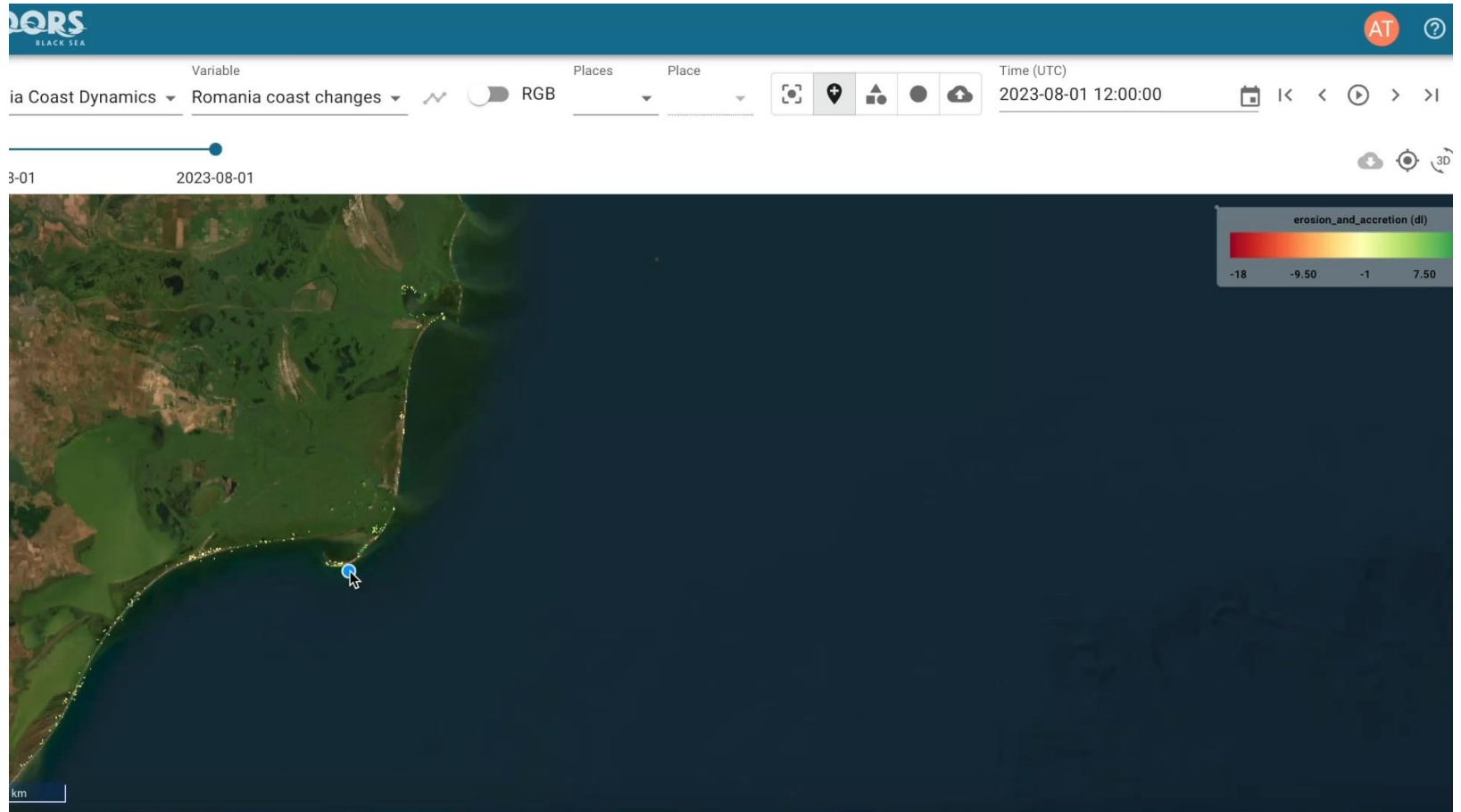
Country	Blue Economy Priorities									Environmental Challenges								
	Aquaculture	Capture Fisheries	Data for Evidence	Renewable Energy	Marine R&D	Oil & Gas	Renewable Energy	Shipping & Ports	Tourism incl. Coastal & Marine	Biodiversity	Climate change Extreme Events	Coastal Erosion	Environmental Shocks	Eutrophication	Marine litter	Over fishing	Pollution, incl. sources	Water level
Ukraine					●								●	●	●		●	
Romania	●	●		●	●		●		●		●	●		●	●		●	
Moldova									●	●								●
Bulgaria		●			●			●	●	●	●	●		●	●		●	
Turkey	●	●			●	●	●	●	●	●	●	●		●	●	●	●	
Georgia	●	●	●		●			●	●		●	●		●	●	●	●	
Basin Wide			●		●				●		●	●	●	●	●		●	

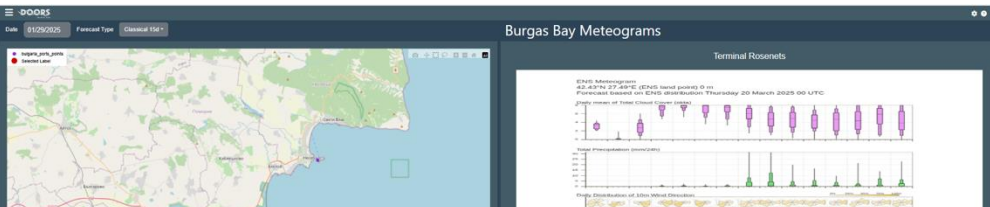
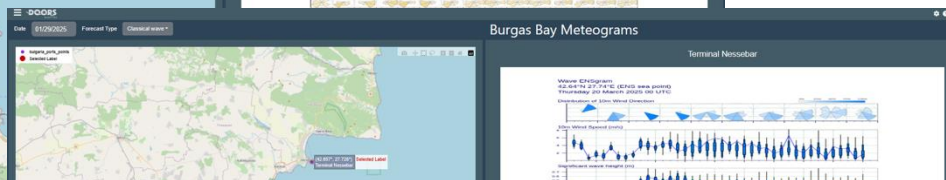
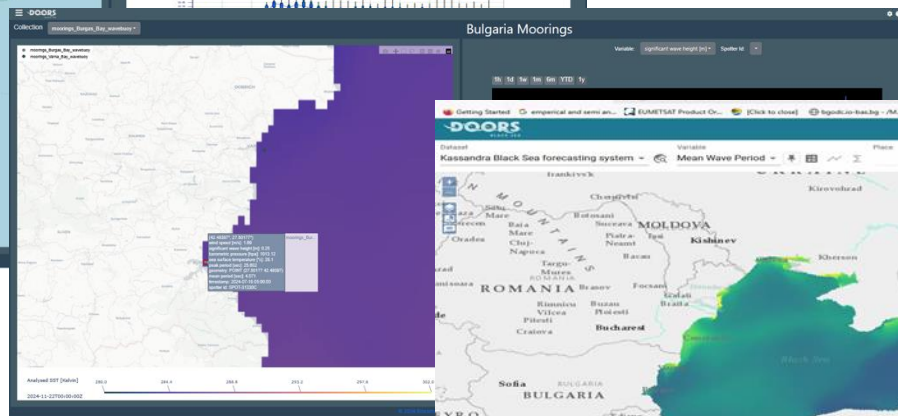
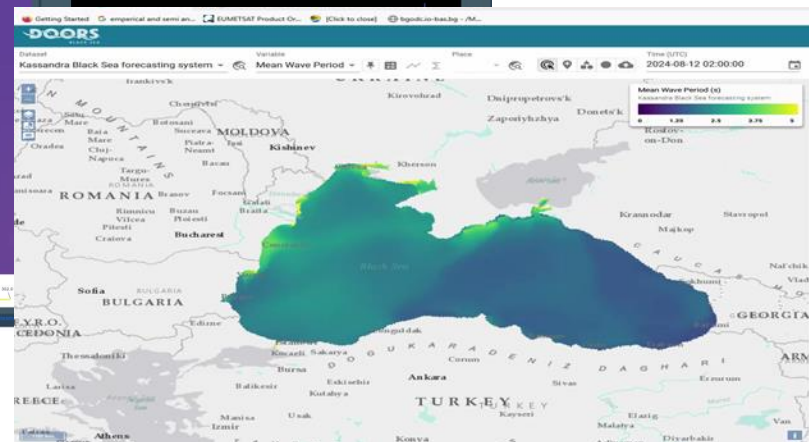


Assessing impact of unforeseen events: Kakhovka Dam explosion- 6 June'23

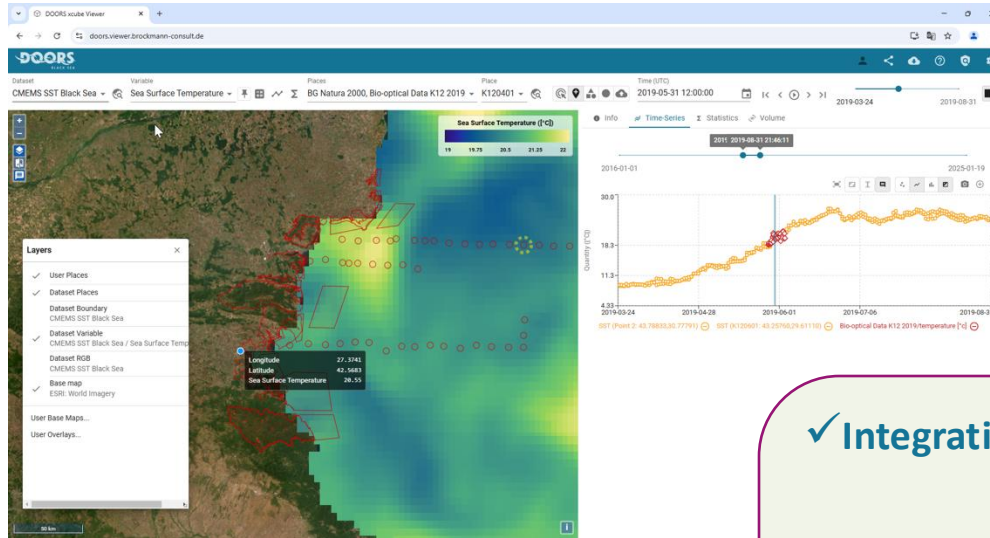
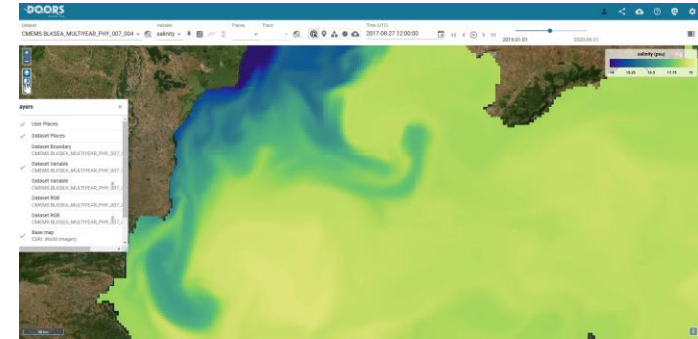




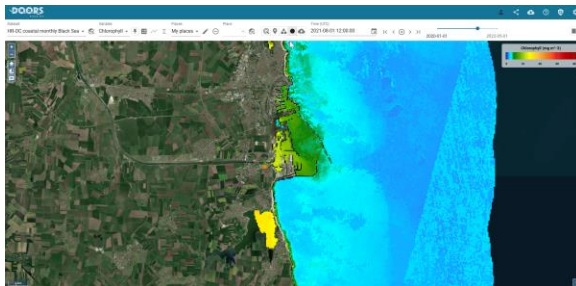


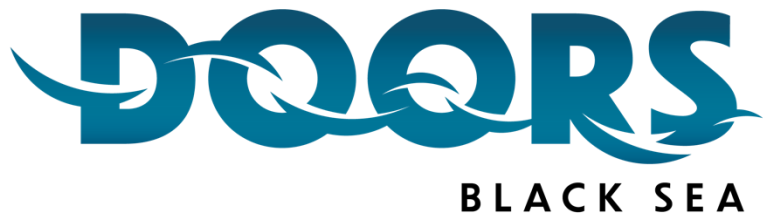


SoS summary



- ✓ Integrating heterogeneous data from multiple sources for the Black Sea region
- ✓ Feature-rich, open-source web application for geographic data
- ✓ Extensible and tailorable for specific applications
- ✓ Cloud-based, scalable for big data and many users
- ✓ Operationally proven with user access management





Thank you!

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Image : Mike Rea