OCEANIDS: Utilizing Copernicus Satellite Imagery Open Data Infrastructures for User-driven Applications and Tools for Climate-Informed Maritime Spatial Planning and Integrated Seascape Management, towards a Resilient & Inclusive Blue Economy.

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Horizon project OCEANIDS aims at building user-driven applications and tools, which act as an enabling technological layer for regional authorities & stakeholders in order to achieve a more resilient and inclusive systemic pathway to a Blue Economy in coastal regions. Under a single-access window platform for Climate- Informed Maritime Spatial Planning, the project will allow a more integrated seascape management of coastal regions. The overarching concept is to collect, harmonize and curate existing climate data services, making data accessible, reusable and interoperable for the development of local adaptation strategies. On top of the Euro Data Cube [1] and the Copernicus Coastal Hub [2] the OCEANIDS data cubes will be fused with EO data and further processed and analyzed using advanced deep learning and AI methods and techniques. The purpose of these deep learning and AI methods software tools is to extract meaningful information from the high dimensional datasets and to efficiently structure the collected data into a semantically enriched framework through supervised and unsupervised learning. Generative adversarial neural networks (GANs) are exploited to fill data inconsistencies and incompleteness where existing, so that OCEANIDS are well structured and consistent and therefore optimization of processing, analysis and classification performance is achieved.

A holistic hazard & risk assessment platform will be elaborated, assimilating data from all available sources in OCEANIDS, including asset exposure datasets, population statistics, long-term hazard simulations, short-term hazard forecasting, vulnerability information (both historical and simulation based) as well as impact assessment data from past and forecasted events. The modelling framework for assessing the magnitude of impacts will ensure accurate propagation of aleatory and epistemic uncertainties from all pertinent sources, e.g., data, methods, models, and parameters, all the way to the final quantification of risk. The applied modelling and simulation tools will estimate the state of assets, either single or in portfolios, depending on their currently reported state and/or the states of interconnected assets, where available. The state of an interconnected asset is thus a result of the nature of the hazard pressure affecting the originating asset, the characteristics of the asset under consideration (risk mitigation, means of immediate response, safety equipment) and the type of interconnection between the assets. This approach is the basis for accurately quantifying the risk over a region, allowing the improvement and optimization of the safety of the complex infrastructures related to their operation processes and their inside and outside interactions, while offering actionable metrics for regional planning, insurance, and natural catastrophe prevention/mitigation.

OCEANIDS Decision Support Platform will be implemented to give reliable recommendations to the end-users regarding spatiotemporal changes and the impact of climate change on the environment. The Digital Twin Earth model will be used and be able to monitor Climate Change, perform simulations of Earth's interconnected system and human behavior, and help support environmental policies. This high-level front-end platform will be providing the end-users with an assessment of hazards in their respective region and leading to subsequent multi-scale planning.

[1] **https://eurodatacube.com/**

[2] **https://www.coastal.hub.copernicus.eu/**