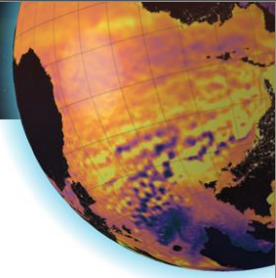## EDITO-Model Lab: towards the next generation of ocean numerical models

The European Commission launched the European Digital Twin of the Ocean (EDITO) at the One Ocean Summit in Brest, France, in February 2022. The EU is building the infrastructure backbone of EDITO through two projects: EDITO-Model Lab and EDITO-Infra. It will further construct and evolve a thriving digital ecosystem through other relevant, complementary actions, aiming for an operational demonstration of EDITO by 2024. EDITO-Model Lab will develop the next generation of ocean models, complementary to Copernicus Marine Service, to be integrated into the EU public infrastructure of the European Digital Twin Ocean. Ensuring access to required input and validation data (from EMODnet, EuroGOOS, ECMWF, Copernicus Services and Sentinels satellite observations), EDITO-Model Lab will also allow access to high-performance and distributed computing facilities (EuroHPC, HPC, other cloud computing resources); to be consolidated under the global European Digital Twin of the Ocean initiative and the digital twin of the Earth programme (DestinE). The objective is to make ocean knowledge available to citizens, entrepreneurs, policymakers, decision-makers and scientific experts alike, thus enabling them to become partners in knowledge generation, explore desirable futures and develop ocean management scenarios (and assemble their own twins), with the overarching goal of ensuring a safe, healthy and productive ocean. EDITO-Model Lab will deliver a Virtual Ocean Model Lab (VOML) including (1) a core model suite including global high-resolution models and coastal configurations, (2) downstream user toolkits and (3) a developer's toolkit for a sustainable ocean. The VOML will be an interactive and co-development environment to operate models. The EDITO core model suite will be based on modelling and simulation software, artificial intelligence, algorithms and specialised tools to form a new service capacity for accessing, manipulating, analysing and understanding marine information. Intermediate and downstream stakeholders will find digital tools, data and information for 'focus applications' that refer to the EU's Mission Ocean Lighthouses and the sustainable Blue economy, including simulations of 'what-if scenarios' to find solutions to natural and man-induced hazards (pollution mitigation, decarbonisation, biodiversity conservation). EDITO-Model Lab will be delivered end of 2025 by a consortium of 13 partners covering ocean knowledge, modelling and technological expertise. https://www.edito.eu/ https://edito-modellab.eu/

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