

# Coastal Digital Twins: building knowledge through numerical models and IT tools

*Wednesday, October 12, 2022 5:00 PM (30 minutes)*

Digital Twin integrates continuously, in an interactive, two-way data connection, the real and the virtual assets. They provide a virtual representation of a physical asset enabled through data and models and can be used for multiple applications such as real-time forecast, system optimization, monitoring and controlling, and support enhanced decision making. Recent tools take advantage of the huge online volume of data streams provided by satellites, IoT sensing and many real time surveillance platforms, and the availability of powerful computational resources that made process-solving, high resolution models or AI-based models possible, to build high accuracy replicas of the real world.

In this paper, the adaptation of the concept of Digital Twins is extended from the ocean to the coastal zones, handling the high non-linear physics and the complexity of monitoring these regions. The work extends from the on-demand coastal forecast framework OPENCoastS (Oliveira et al., 2020; Oliveira et al., 2021) to build a user-centered platform where multiple services, from early-warning tools to collaboratory platforms, are proposed and customized to meet the users needs. As the computation effort for these services is high, integration of Coastal Digital Twins in federated computational infrastructures, such as European Open Science Cloud (EOSC) or INCD in Portugal, is fundamental to guarantee the capacity to serve multiple users simultaneously.

## References

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