Let’s talk about sea level rise

11 June 2025 – 10:30 am - 1:30 pm CEST

Inspire Area – European Digital Ocean Pavilion

United Nations Ocean Conference 2025

Abstract

Nature-based Solutions for Enhancing Coastal Resilience under Sea Level Rise

Joanna Staneva – HEREON

Sea level rise is one of the most critical long-term drivers of coastal risk, amplifying erosion, flooding, habitat loss, and socio-economic vulnerability. The complexity and scale of these impacts demand adaptive, multi-functional responses that go beyond conventional engineering. Nature-based Solutions (NbS) are gaining recognition as essential components of coastal adaptation strategies in response to accelerating sea level rise. By restoring or reinforcing natural systems such as salt marshes, seagrass meadows, and mangrove forests, NbS can provide effective risk reduction while enhancing ecosystem services and biodiversity. Their ability to attenuate wave energy, trap sediments, and adapt dynamically to changing water levels makes them particularly relevant under long-term sea level trajectories.

This contribution presents an integrated framework combining high-resolution hydrodynamic and morphodynamic modelling with ecological function analysis to assess the effectiveness of NbS under current and future sea level rise conditions. The approach makes use of Digital Twins of the Ocean (DTO) and What-if Scenarios (WiS) to test restoration strategies, evaluate performance thresholds, and inform adaptive design. The work is developed within the EU projects FOCCUS, SeaClim, and REST-COAST, and contributes to the UN Ocean Decade programmes DITTO and CoastPredict. It supports transdisciplinary, scalable approaches for strengthening coastal resilience through NbS.