



## **Mid term event, 2025 May 14th, Zandvoort**

### **Postersession:**

Wout van Dijk (Rijkswaterstaat): activities on the Dutch North Sea (today and past)

Pauline Overes: 3D interactions between offshore activities and sand wave recovery.

Leo Heijer (erfgoed Zeeland): Beacharcheologie, looking for artefacts on the beach, a public search for fragments washed on the shore off Walcheren

Lucia Lopez Lopez (ILVO): Marine sand and gravel extraction profoundly impacts the marine environment, altering seabed structure and benthic biodiversity. While the immediate ecological effects of aggregate extraction are well-documented, the recovery dynamics following extraction cessation remain less understood. This study addresses this knowledge gap by examining the recovery of morpho-sedimentary characteristics and macrobenthic communities in two closed extraction zones in the Belgian Part of the North Sea (BPNS): Buiten Ratel (BR) and Thorntonbank (TB), both of which experienced intensive extraction over several years.

Charlotte van Moorlegem, Annelies De Backer (ILVO): The SUSANA project aims to balance trade-offs between offshore sand extraction and its onshore use for coastal protection. We investigated effects of prolonged sand extraction on epibenthos and demersal fish communities by analysing long-term beam trawl data (2004-2023). This data is collected within the framework of the monitoring program for evaluating sand extraction effects within the Belgian part of the North Sea.

Pieter Roos: The Banx project develops computer models and data analysis techniques to understand and detect the impact of large scale sand mining from sand banks in sandscarce environments.

Mohammad Daliri (NIOZ): I study the environmental impacts of large-scale sand extraction in the Dutch North Sea, focusing on how it affects water stability,

turbulence, and turbidity. I use advanced computer models to understand these effects on the marine ecosystem.

Jana Schultz (WUR): Assessing the Ecological Impact of Sand Extraction on Macrobenthos Using Bayesian Species Distribution Models.

This study investigates the ecological effects of sand extraction on macrobenthic species in the Dutch North Sea. Using 34 years of monitoring data, we applied a Bayesian spatiotemporal species distribution model (SDM) to assess species-habitat associations under environmental changes driven by sand extraction. Our findings reveal that species-specific responses were strongly influenced by hydrodynamics, sedimentation, and seabed topography. Notably, while some species, such as *Abra alba*, thrived in extraction sites, others like *Spisula subtruncata* did not, despite similar habitat preferences. This divergence may be partly explained by species-species interactions.

To explore these dynamics, we extended our SDM to a joint species distribution model (JSJM) incorporating correlated random effects and shared spatial latent fields. This approach captures local co-occurrence patterns driven by direct interactions (e.g., competition, facilitation) and accounts for shared spatial patterns that remain unexplained by the included explanatory variables.

Lucas Warmuth (TUD): I study how changes in water depth caused by sand extraction impact the dynamics of the Dutch North Sea.

Stef Gerard (NIOZ): the relation between ingestion and defecation in a turbid environment, making conclusions about carbon export

Martin Baptist (WMR): Operational Recommendations for Ecosystem based Large scale Sand Extraction