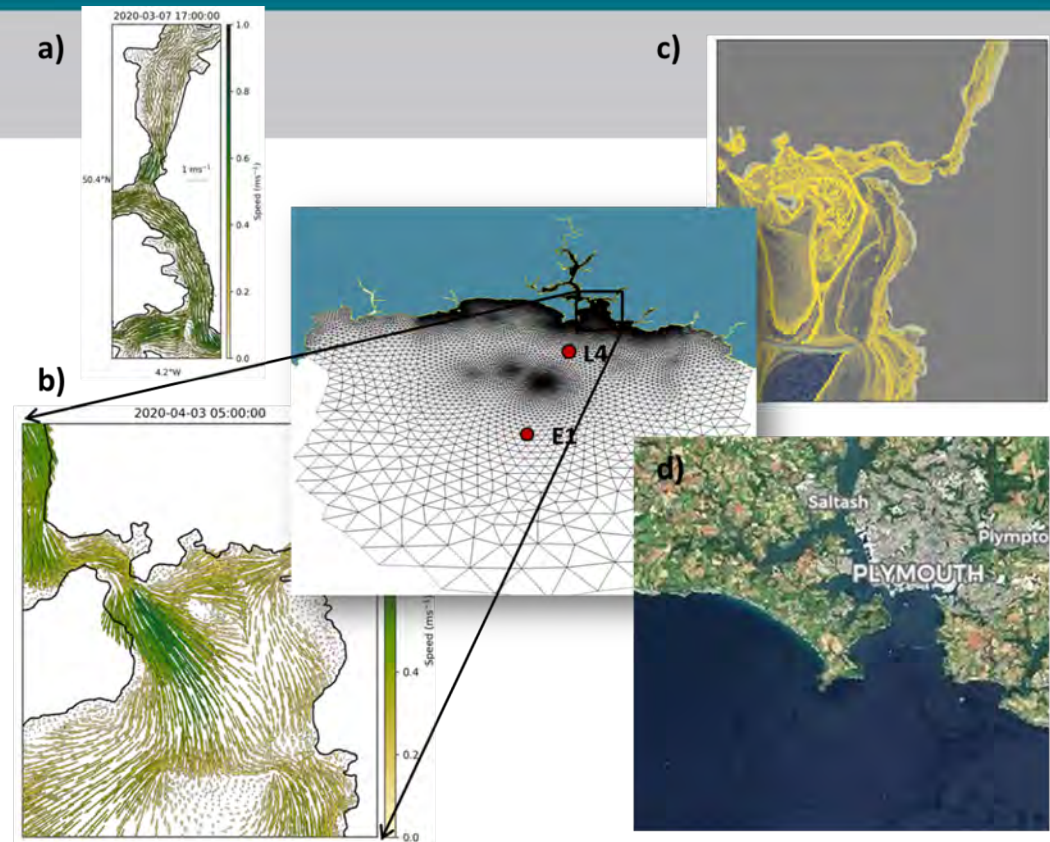


PML

Plymouth Marine
Laboratory

Listen to the ocean

The Western Channel Observatory operational model: monitoring coastal water quality



Ricardo Torres, Michael Bedington, James Clark,
Molly James, Phil Hosegood, Reginald Uncles



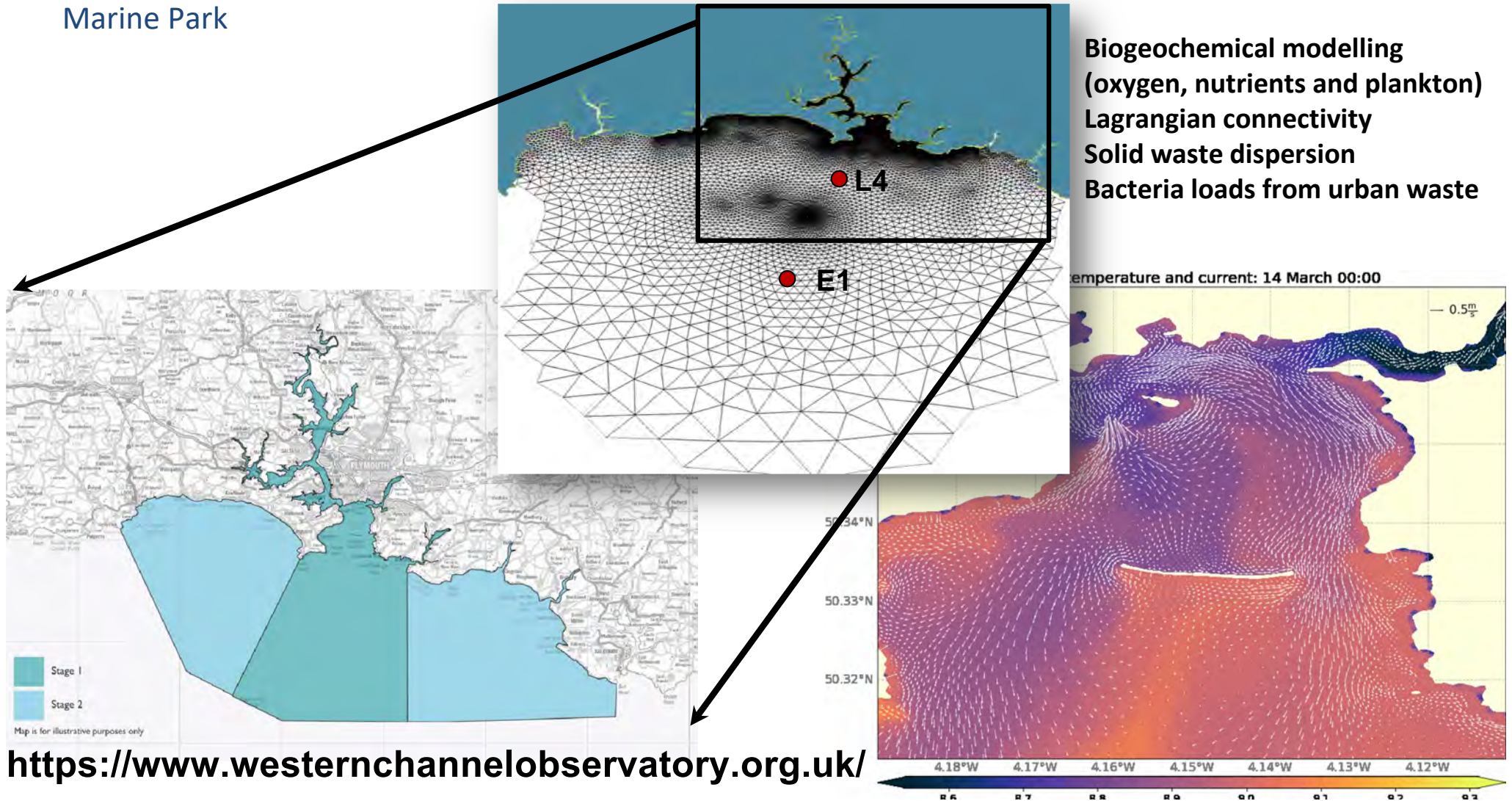
Coordinated Atlantic Coastal Operational Oceanographic Observatory



- ❑ To build a coordinated Atlantic Coastal Operational Observatory.
- ❑ address the **common challenge** of resilience of the coastal to risk.
- ❑ To promote **information sharing** and **interoperability** between the existing systems

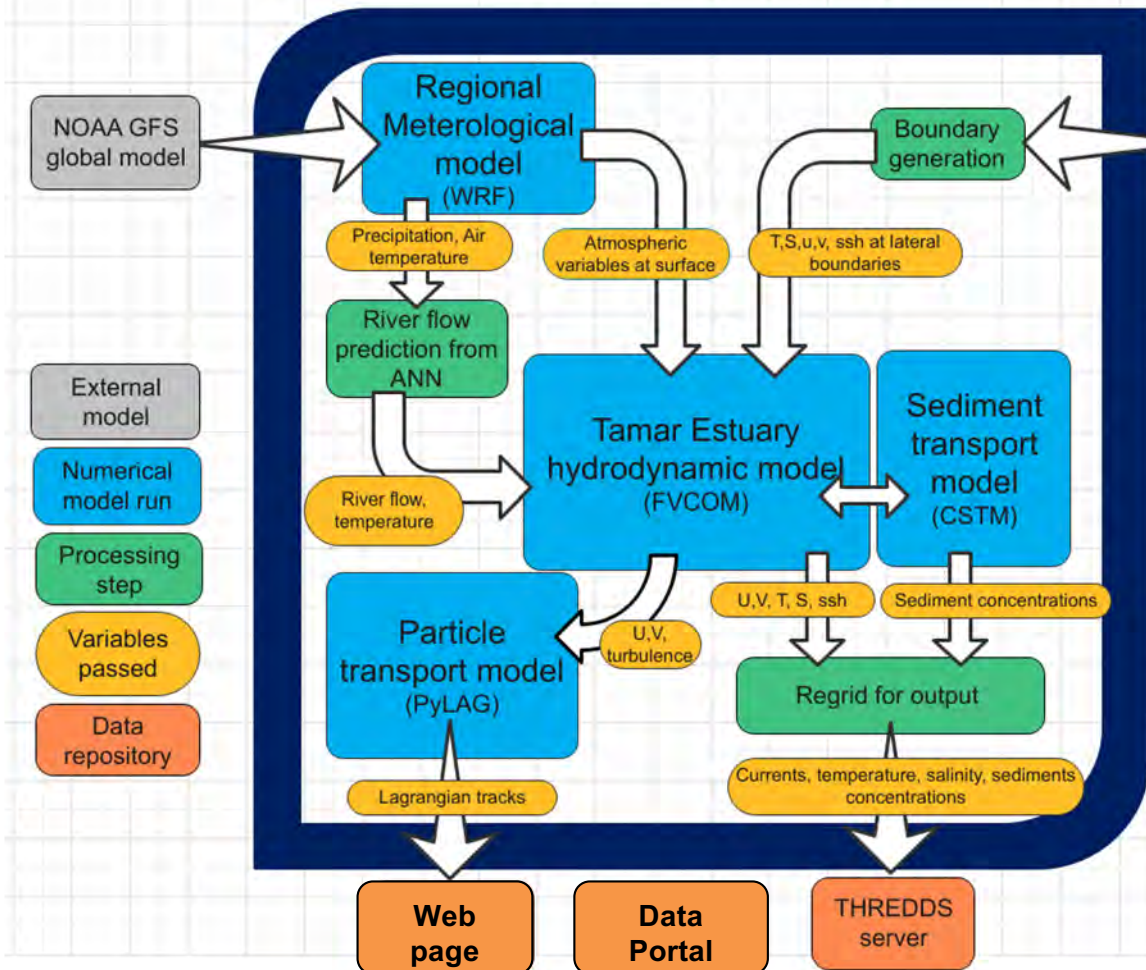
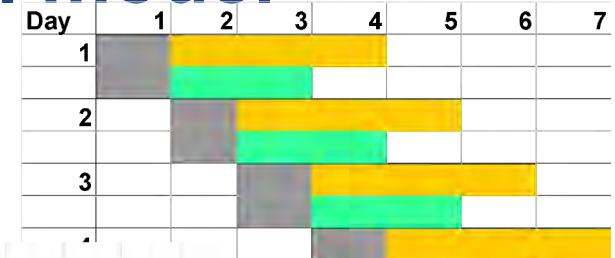
The resulting synergy will allow development and deployment of **standardized tools in the risk management systems** applied mainly to extreme weather events leading to flooding, maritime safety and coastal pollution.

- Mid size (35km²), small river (22m³/s annual average) macro-tidal (5m) with large intertidal areas
- A multi-use Marine space with main environmental pressures related to nutrients and waste water
- Multiple areas of conservation (SAC, SSSI, UNESCO world heritage) and proposed first UK Marine National Park.
- Can contribute to policy, management and industry e.g. managing uses within the proposed National Marine Park



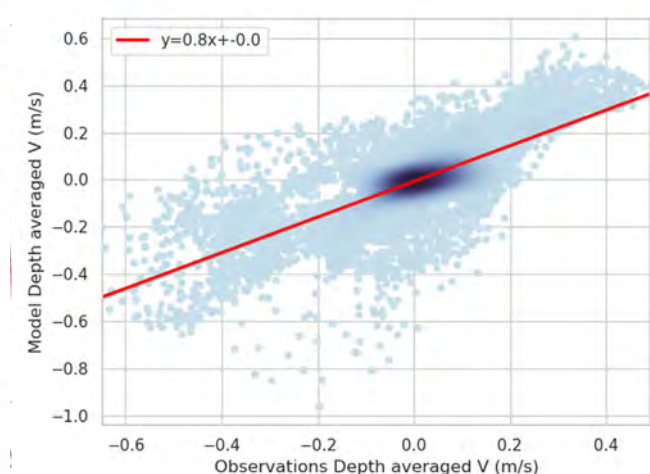
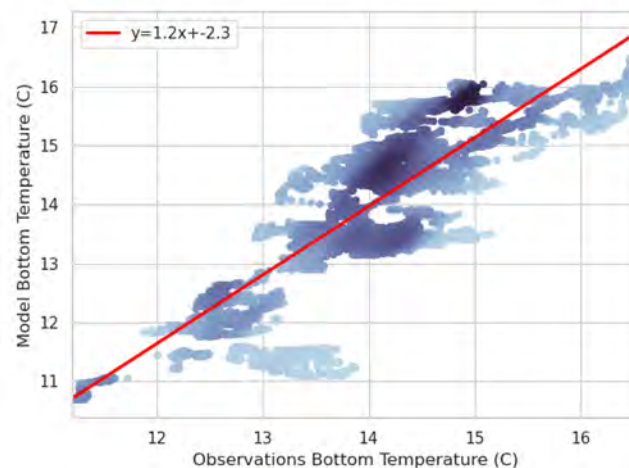
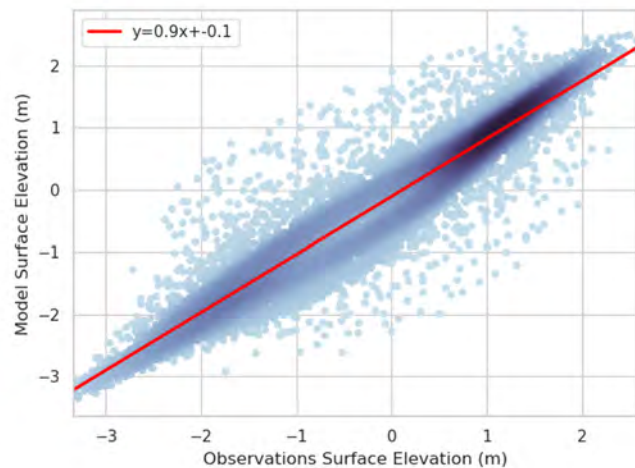
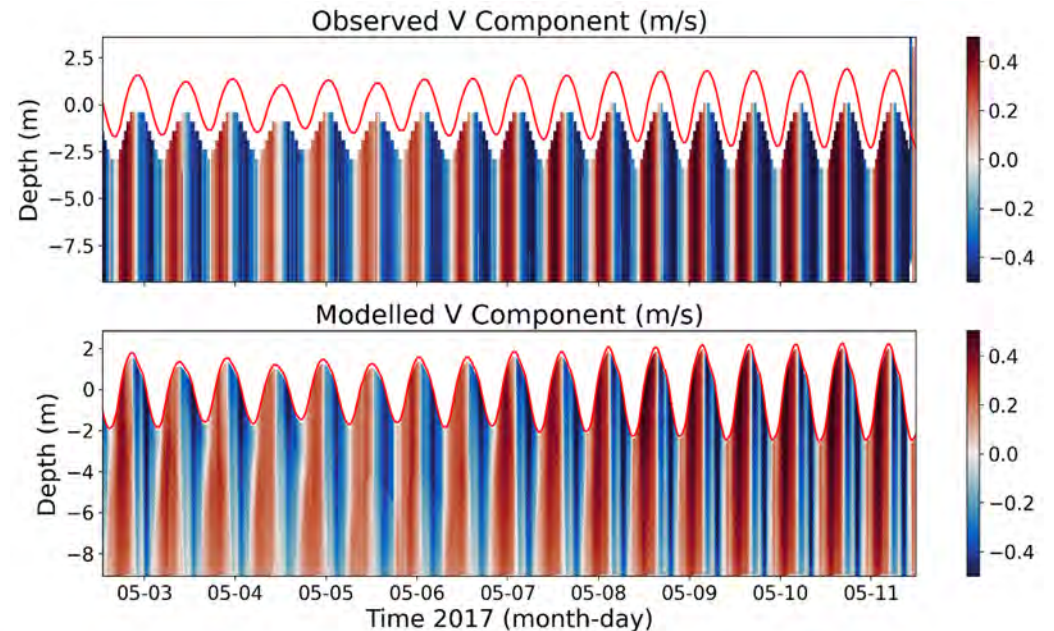
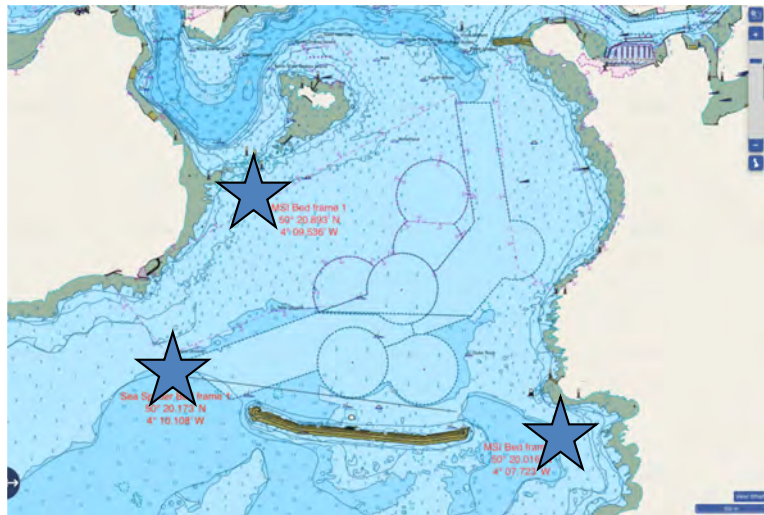
Information flow in the operational model

System produces a 1 day nowcast, 3 day atmospheric forecast and a 2 day hydrodynamic forecast



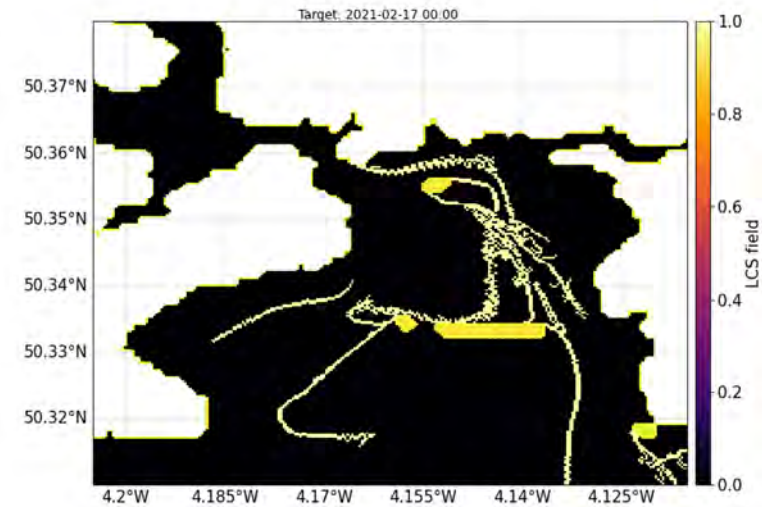
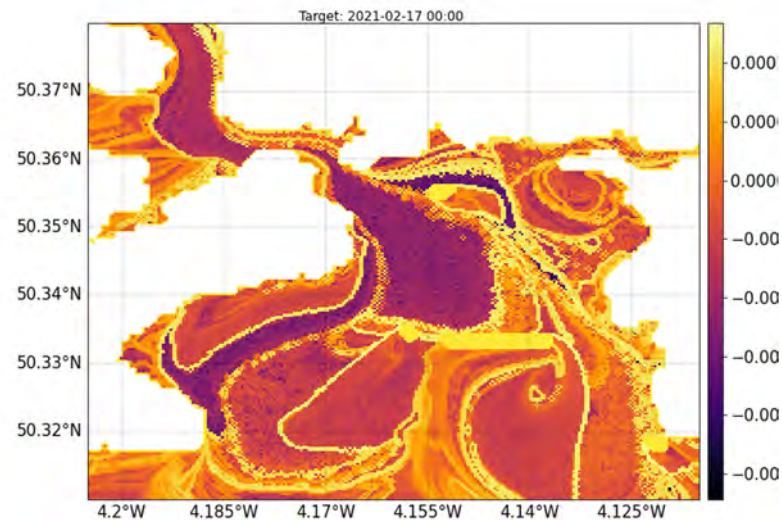
- Data available via thredds in unstructured and regridded format
 - Data standardised to MyCoast recommendations
- Web GIS tool
 - <https://portal.ecosystem-modelling.pml.ac.uk/>
- Summary of conditions for selected areas are shared via a public web page (<https://mycoast.ecosystem-modelling.pml.ac.uk/>, under construction)

- Deployment of ADCP's
 - 3 ADCP's deployed in the Tamar in collaboration with University of Plymouth (2017, 2019). 5 Additional deployments at L4 (2010-2021)



Uses lagrangian approaches to identify potential areas of accumulation as driven by patterns of circulation.

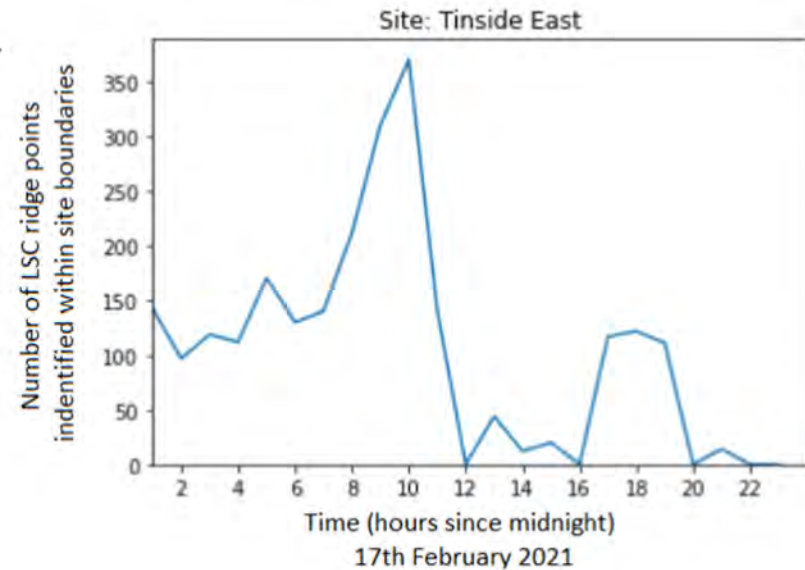
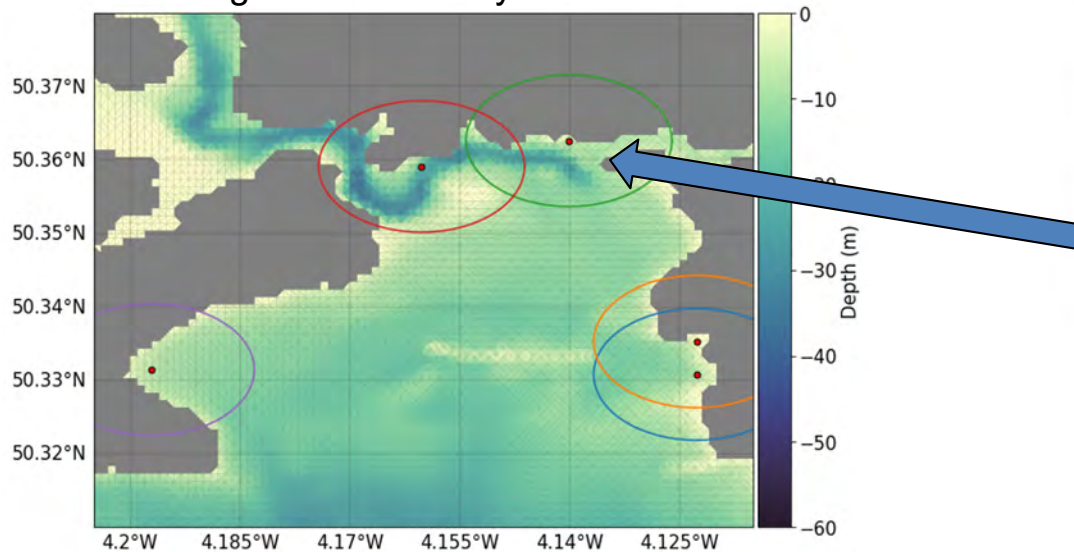
Time evolution of FTLE and LCS fields



Identifying the time evolution of Lagrangian Coherent Structures in designated areas

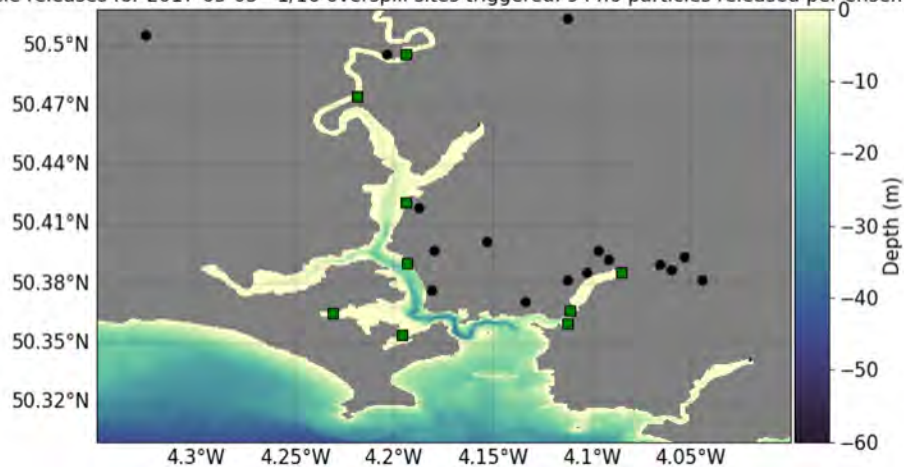
Tinside east is a popular swimming area within Plymouth Sound. It is also the site where water quality monitoring has shown instances of faecal coliform contamination

5 Bathing sites within Plymouth Sound

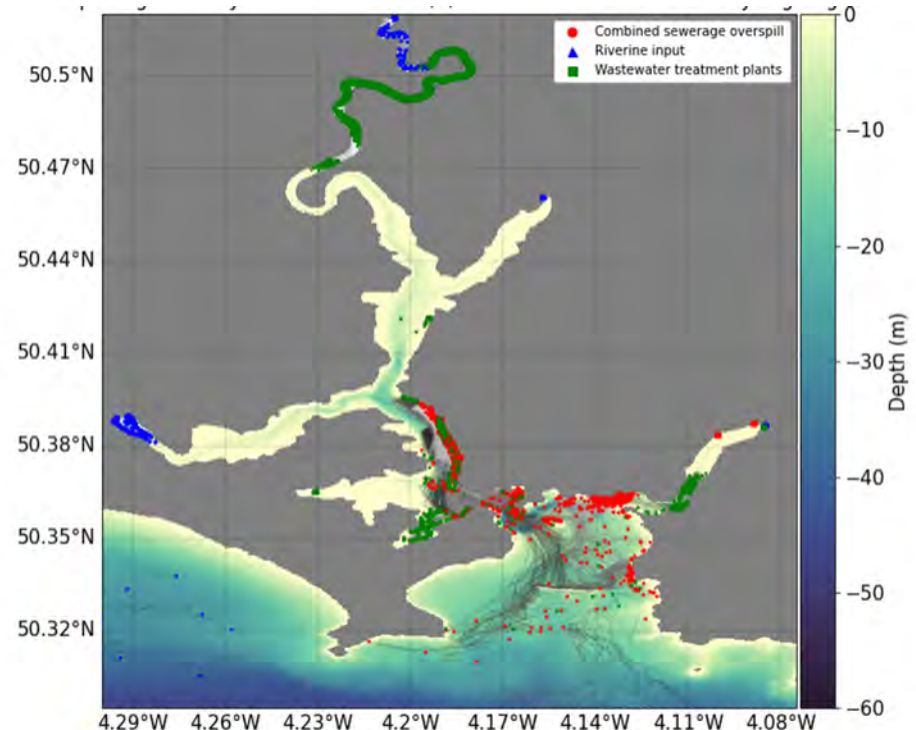
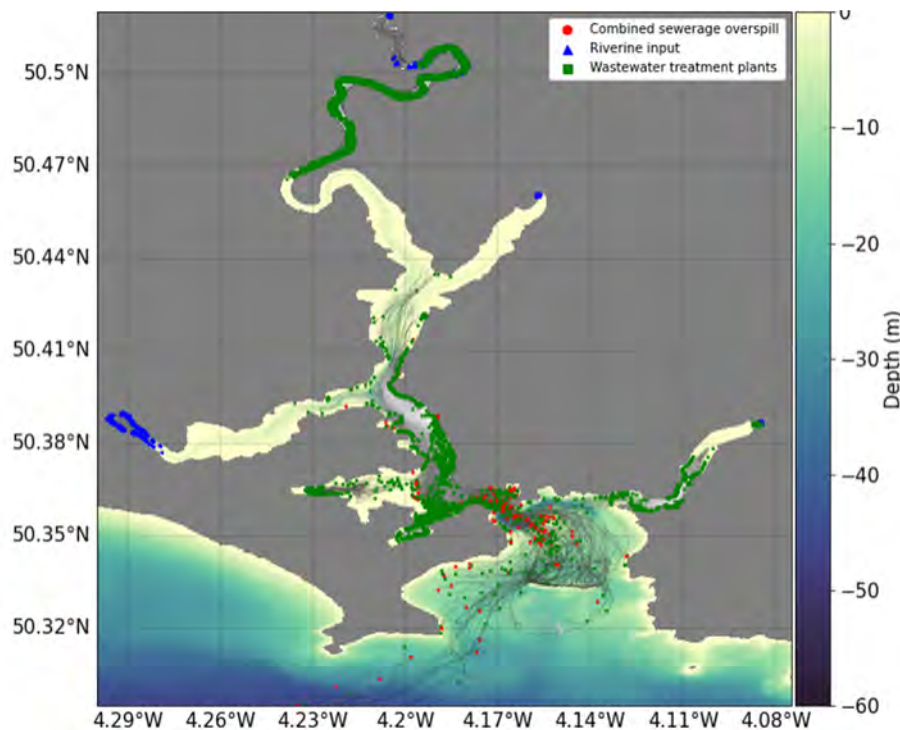
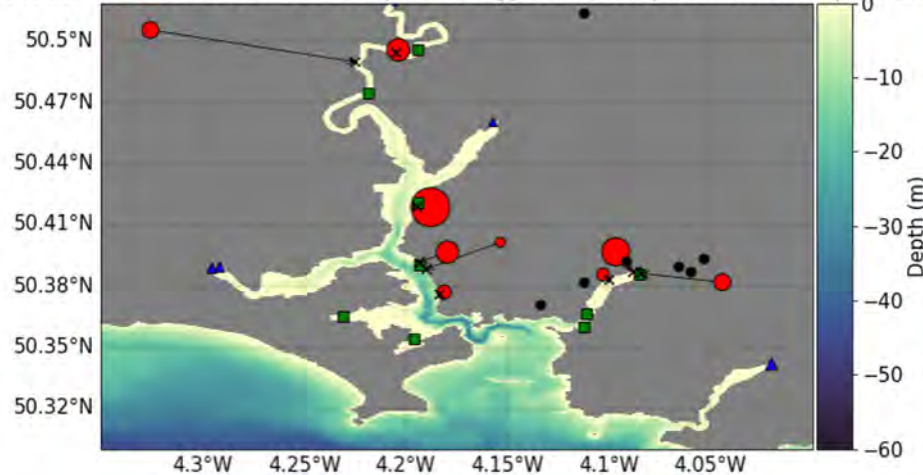


MyCoast water quality tool

Particle releases for 2017-05-05 - 1/16 overspill sites triggered. 944.0 particles released per ensemble



Particle releases for 2017-05-15 - 9/16 overspill sites triggered. 7212.0 particles released per ensemble



Future work

1. Marine pollution:

- Revise CSO/River concentration models
- Include Suspended Sediment model
- Biogeochemical model

1. Operational model

- Education
 - Secondary schools
 - University students
- Academia
 - Postgraduates
 - Research
- Marine Traffic
- Search and rescue
- Recreational use of marine environment