

Black Sea Carbonate System First Results from Sea ReCap Project

11th FerryBox Workshop

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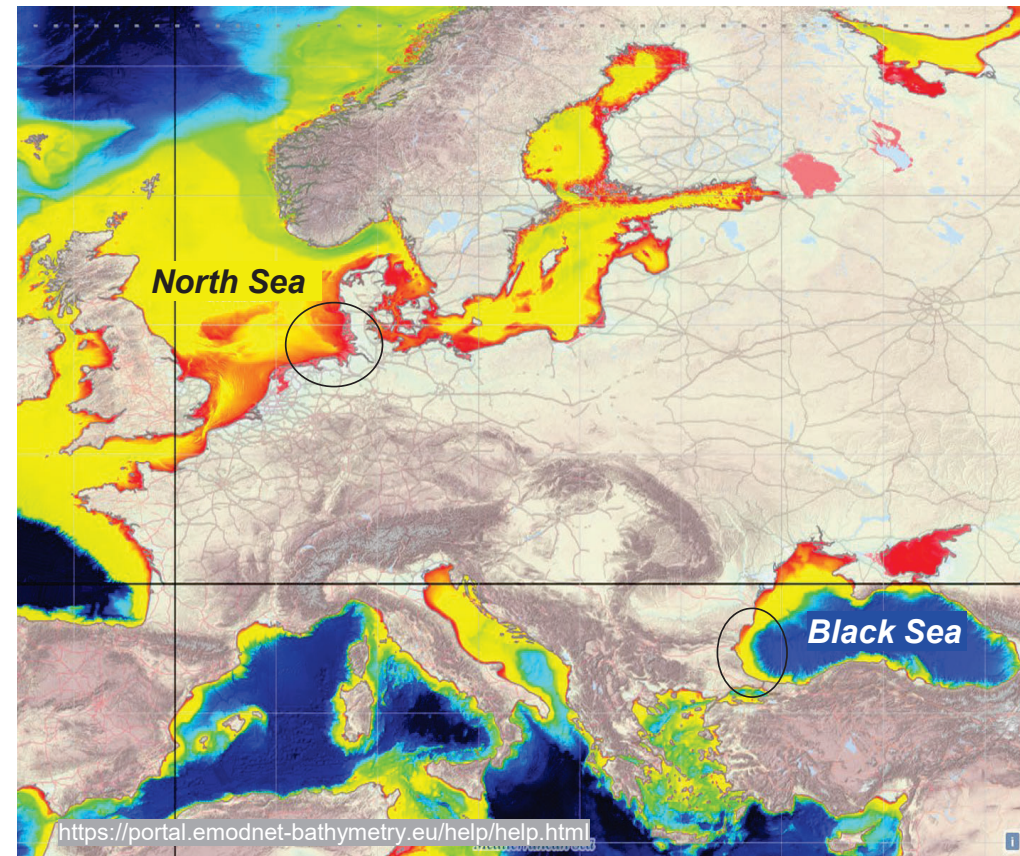
Introduction

Helmholtz EU Partnering Project *SeaReCap* : Research Capacity building for healthy, productive and resilient Seas

- western Black Sea & German Bight (North Sea)
- Black Sea strongly stratified
 - largest anoxic water basin (below ~200 m)
- North Sea well-mixed with strong tidal & wind forcing
- both seas have experienced human-induced & climate change impacts and ecosystem collapses (1980s)

Rationale: Contribute to interdisciplinary knowledge for fundamental improvements in the state of our seas, in line with the urgent transformation towards sustainable blue and circular economy (EU Green Deal*)

*https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en



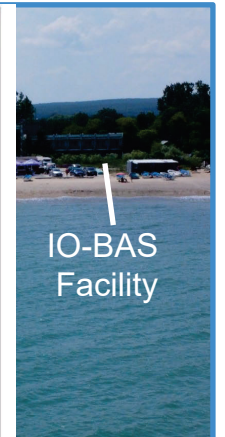
Coastal Black Sea Station Deployment: June 2022



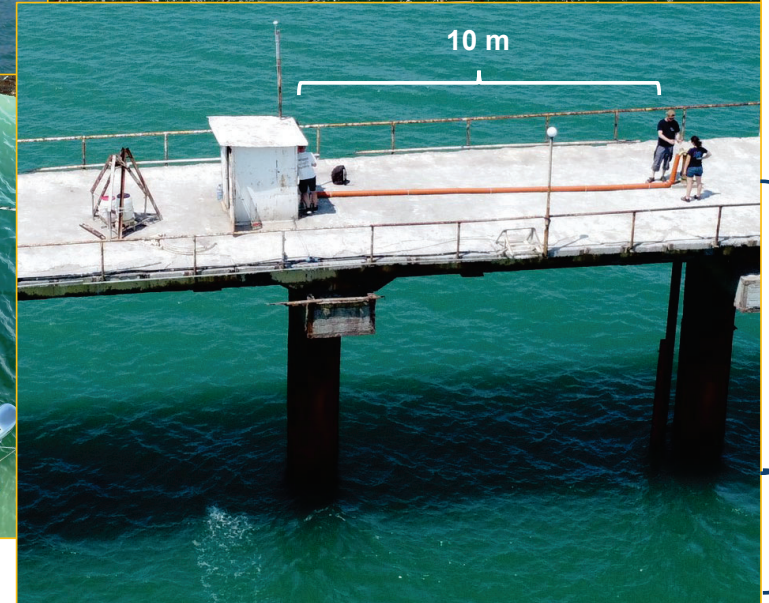
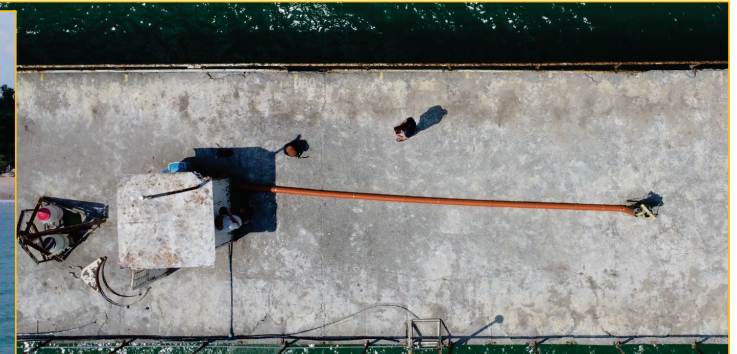
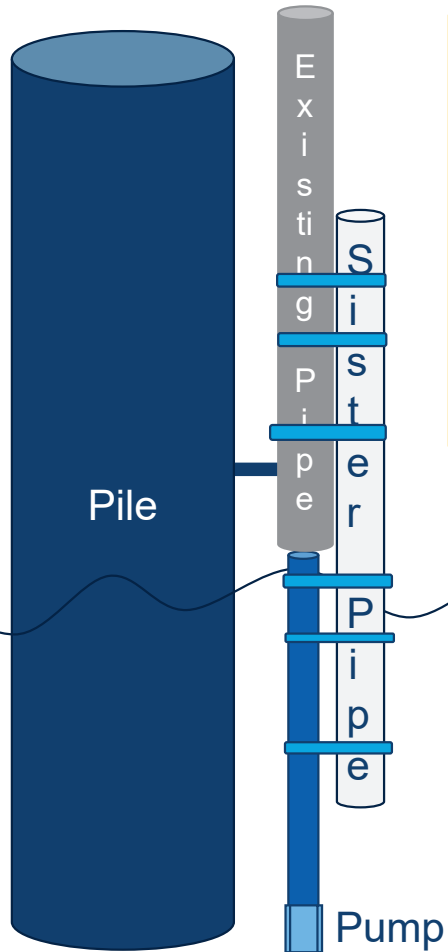
- Shkorpilovtsi Research Station & Pier
- South of Varna Port
- Near marine protected areas



■ Regions suitable for designation of MPAs
 NATURA 2000 sites

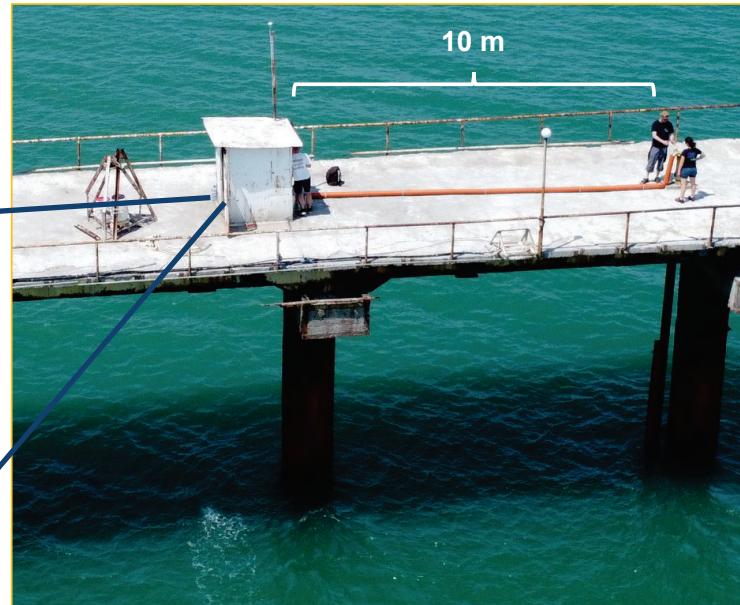


Coastal Black Sea Station Deployment: June 2022



Initial Installation

4H Jena HydroC pCO₂ Sensor



Pump and temperature measured at intake

7.5 m



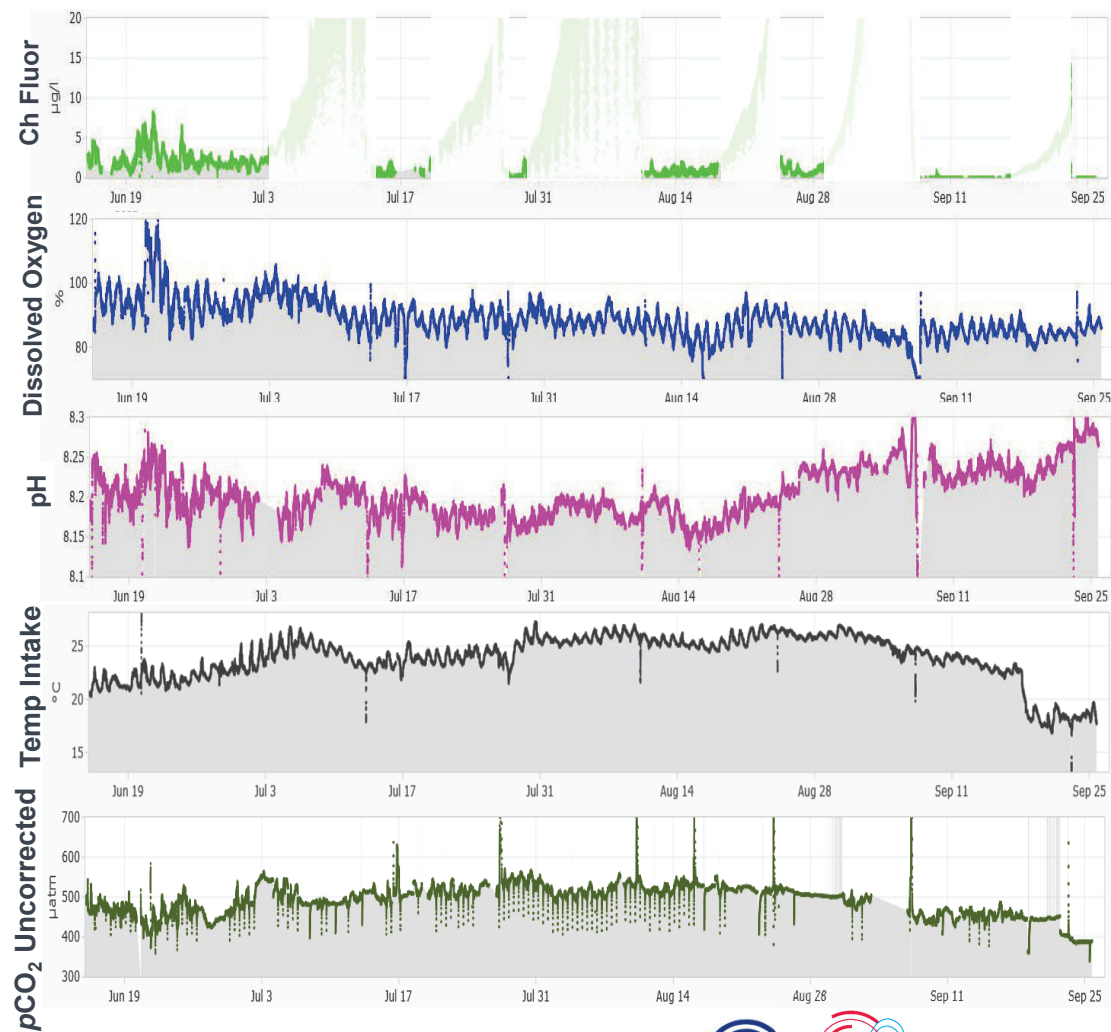
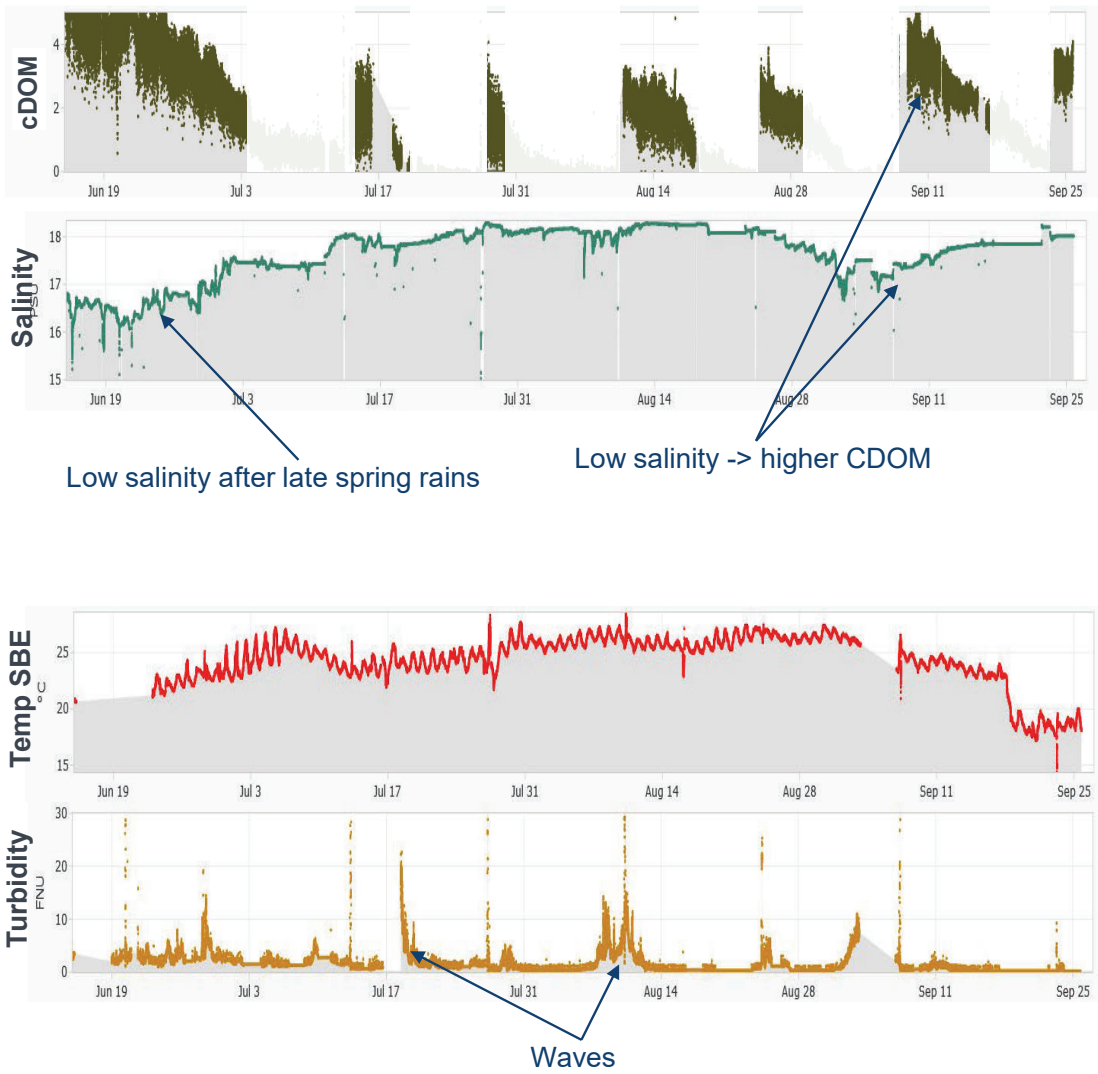
4H Jena Pocket FerryBox

Training and survey cruise



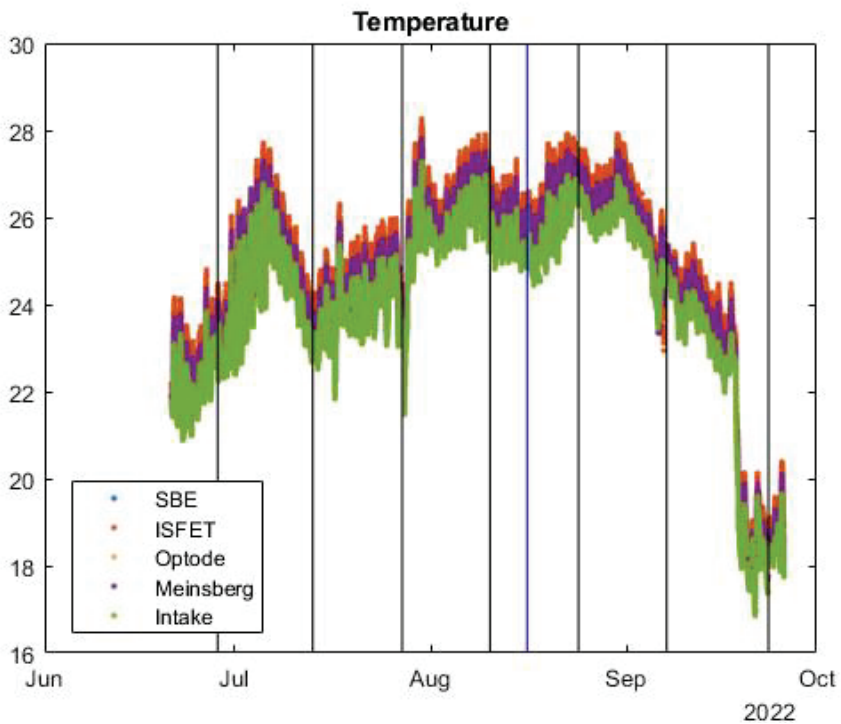
- DIC concentrations are high
 - $3000 \mu\text{mol kg}^{-1}$
- Water column weak stratification
 - No difference at measurement station

Raw data

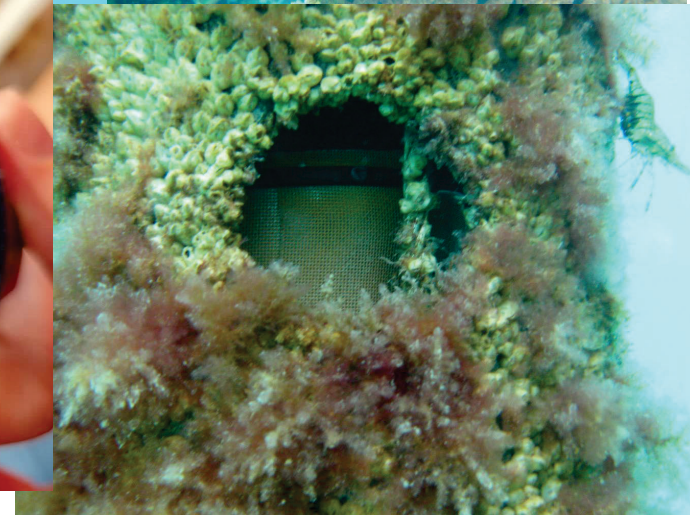
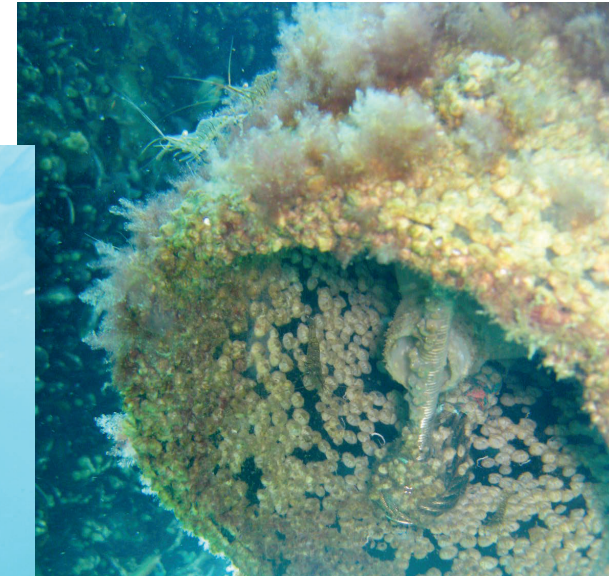


Challenges

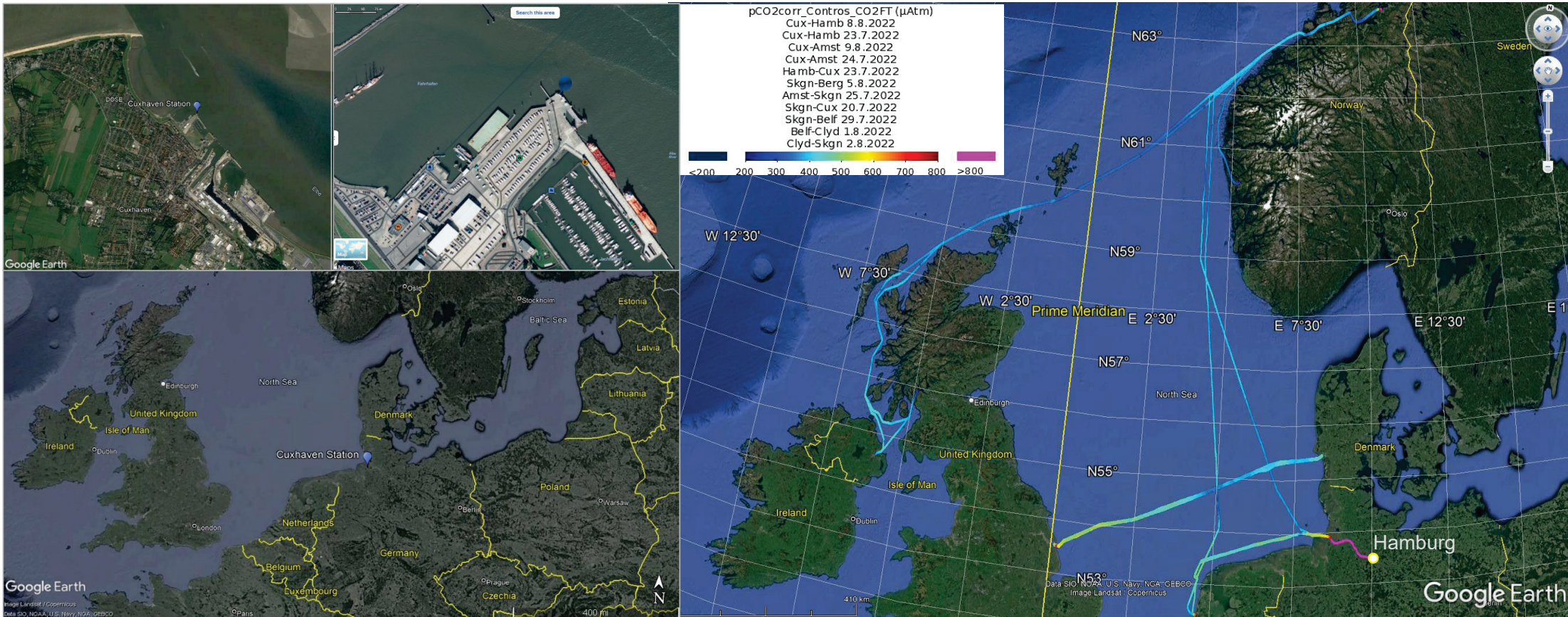
- Biofouling
 - Maintenance every 2 weeks
- High temperatures
 - 0.4-0.5 °C difference from intake temperature
 - Stress on electronics



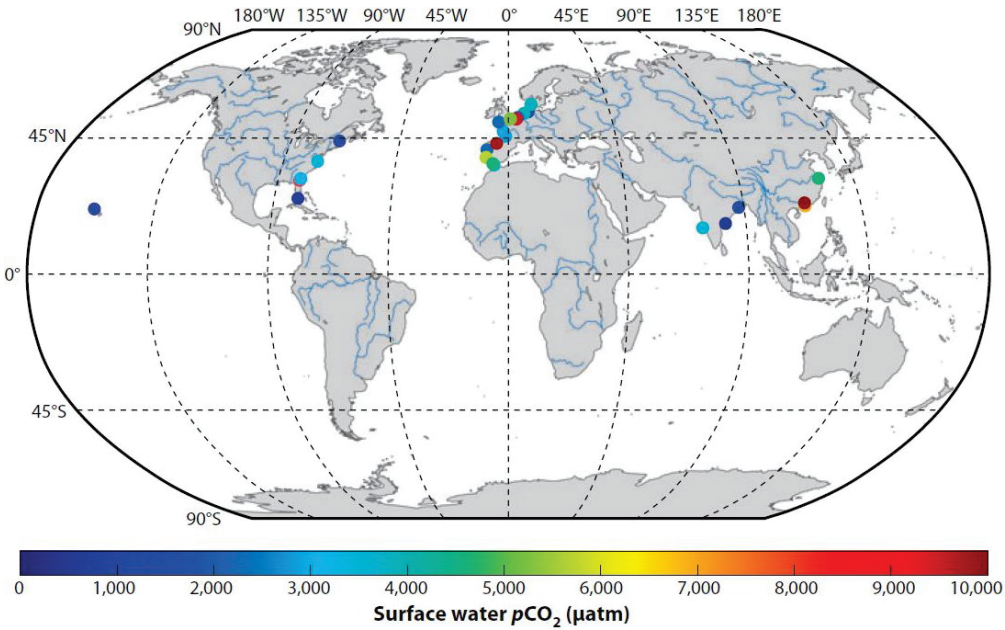
August, 2022



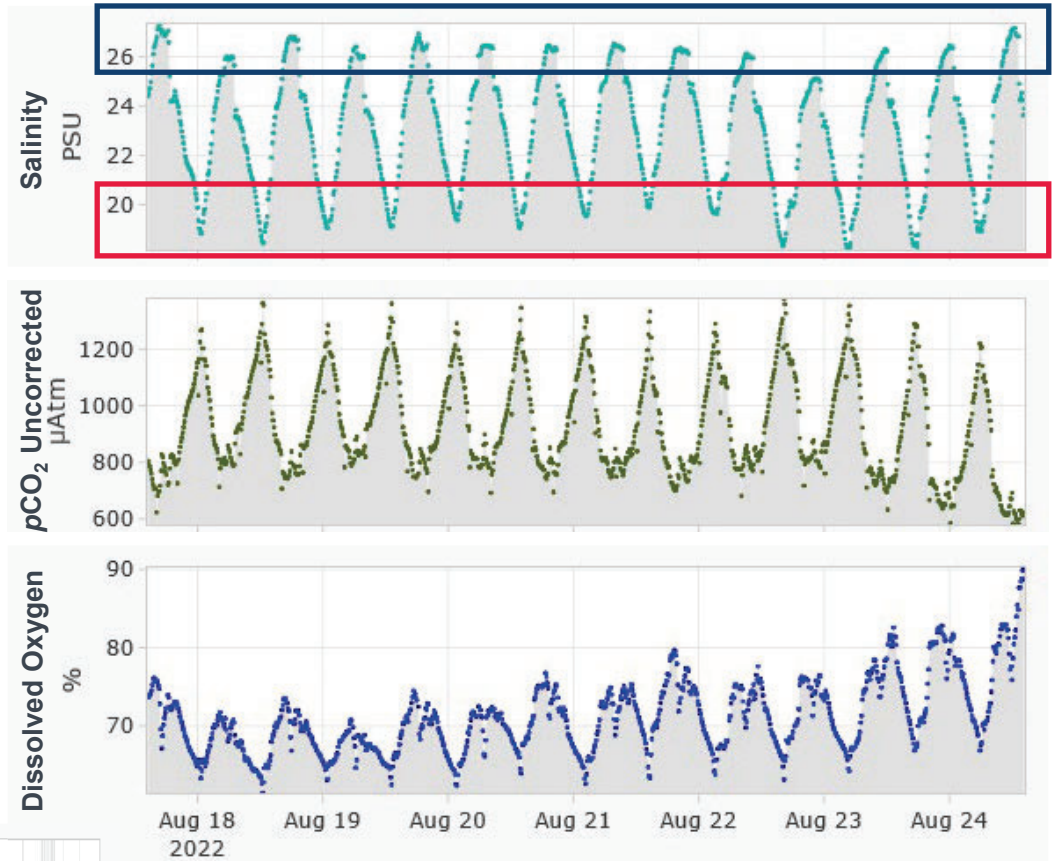
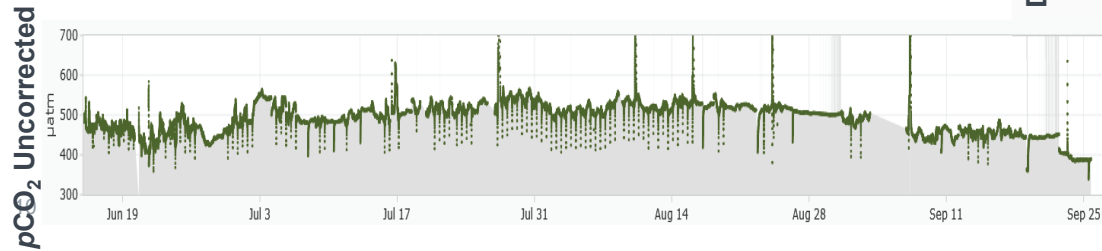
Cuxhaven Station (mouth of the Elbe Estuary) & North Sea FerryBoxes



Cuxhaven Station data



Cai, 2011



Next Steps

- Larger FerryBox at Shkorpilovtsi
 - Cleaning cycle
- Repeat survey cruise
 - Water column characteristics changed?
- Larger Black Sea cruises
- Station near IO-BAS in Varna
 - Larger anthropogenic influence
- Collaboration with modelers



Thanks!

