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Coast Clim
Coastal Ecosystem and Climate Research

Newsletter 1/2026

From data to upscaling - one step closer to understanding our complex archipelagos

Shallow Baltic Sea bays are significant but highly variable sources of greenhouse gases. This is shown in new field studies both from Sweden and Finland. The results are the first step and vital for up-scaling and understanding the role of the diverse Baltic Sea coasts in a changing climate.

In the wider Stockholm Archipelago, a group of researchers from CoastClim and the Thriving Bays project measured greenhouse gases in six different

bays.

Against the researchers' expectations they did not observe a clear correlation between greenhouse gas emissions and degradation state of the bays. While the most degraded bay, Högklykeviken, exhibited the highest methane concentrations, high methane concentrations were also observed in less degraded bays.

“The results highlight the complex and highly variable nature of greenhouse gas dynamics in these systems,” says Julika Zinke, first author of the study.

In general, methane concentrations in the water were found to be higher inside the bays than outside, and higher in the more enclosed bays than in the more open ones.

“Both our study and previous ones show that shallow areas accumulating a lot of organic matter tend to become hotspots for methane emissions”, says Sofia Wikström, one of the researchers from the Thriving Bays project.

Want to know more? Read the publication or the Baltic Sea Centre news article!

Results from 21 sites in Finland...

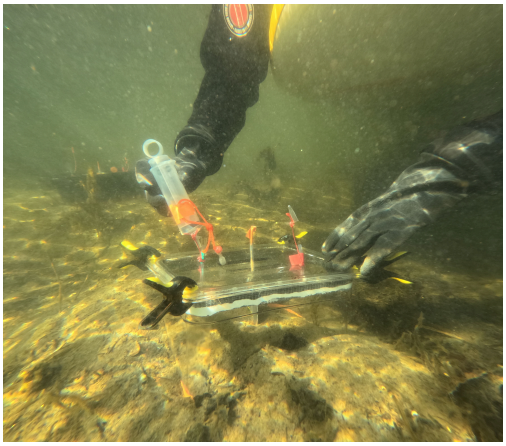
In the Raseborg-Hangö Archipelago, a team of researchers led by Nicolas-Xavier Geilfus measured surface seawater concentrations of the greenhouse gases carbon dioxide, methane and nitrous oxide at 21 shallow

sites in Southwestern Finland. The sites were spanning an estuarine gradient from inner bays to the outer archipelago.

Overall, the results revealed significant spatial variability in greenhouse gas concentrations and air-sea fluxes. While the sampled sites consistently served as a source of methane from the seawater to the atmosphere, the patterns for carbon dioxide and nitrous oxide were different, with the sites shifting between sometimes acting as sources and sometimes as sinks.

Freshwater inputs from the Karjaanjoki River and mixing with seawater were key drivers of large-scale patterns, while local deviations were linked to biological processes. In sheltered areas, elevated carbon dioxide and methane concentrations were associated with enhanced respiration and methanogenesis, whereas more exposed sites were primarily influenced by physical water mixing, resulting in lower concentrations.

For more results read the publication!



A peak into the very shallow systems...

Janina Pykäri and a group of CoastClim researchers have investigated the role of seafloor communities for greenhouse gas emissions in the very shallow areas in the Tvärminne region throughout a year. The sampling was done in water depths less than 0.5 m, and focused on unvegetated areas that are understudied compared to vegetated ecosystems. The preliminary results indicate extremely variable greenhouse gas dynamics in these habitats and between seasons.

For example, the carbon dioxide fluxes varied with seasons, with highest sink of carbon dioxide in August when the microphytobenthic primary production at the seafloor captured lots of carbon dioxide. The highest release of carbon dioxide occurred in May, when microphytobenthic primary production was lower compared to other time points.

The methane fluxes showed large variation even within one season, and there were methane uptake and release occurred at the same time in different parts of the shallow bays. The high heterogeneity could for example be due to patchy oxygen conditions in the sediment, as anoxic conditions were indicated in places by microbial mats on the seafloor.

Stay tuned for the finalised results!

Baltic Breakfast:

Microbes in the Baltic Sea - more important than we think

What can microbes tell us about the state of the sea, and why should they be considered in environmental monitoring? Watch the CoastClim researchers Emma Bell and Alexis Fonseca Poza talk about this here!

Presenting to the world:

Ocean Science Meeting 2026

A group of 18 CoastClim researchers presented their work to the world, through presentations and posters at the conference in Glasgow. This large international meeting gathered marine scientists from all over the world.

Open now: Transnational access call of IRISCC

The Integrated Research Infrastructure Services for Climate Change Risks (IRISSC) has opened its third transnational access call.

Tvärminne Zoological Station is one of the partners offering access to, for example, the facilities that CoastClim is utilizing. This includes access to coastal ecosystems, several research vessels, sampling equipment, diving facilities, aquarium rooms, laboratories and long-term databases. Check out the RI services offered across Europe and specifically at Tvärminne.

Apply before 26 April 2026.

At the heart of understanding coasts in a changing climate

A large part of all CoastClim members and the scientific advisory board met at Tvärminne Zoological Station, 24-26 March. The meeting included intensive scientific discussions to deepen our understanding of links between coastal biodiversity and climate, and how to translate this knowledge into policy recommendations and management of coastal areas.

Policy update:

OceanEye, Ocean Pact and Ocean Act – can these new initiatives help the marine environment?

During the recently held European Ocean Days in Brussels a new marine initiative was launched. However, it is unclear how the so-called OceanEye will contribute to a better marine environment, says Ellen Bruno, policy analyst at the Baltic Sea Centre, who participated in the conference. The expectations of the upcoming Ocean Act bill are sky-high, but the results remain to be seen.

Read more >>

Short news at a glance

- **Debate article in HBL by Alf Norkko:** Vi får inte glömma havet i klimatpolitiken (in Swedish)
- Alf Norkko and Norman Göbeler talked in the session for **Oceans and Climate Change** during the Atmosphere and Climate Competence Center (ACCC) Impact Week on 14 April in Helsinki.
- **Read more about what the new** Imaging FlowCytobot at the Askö Laboratory can do.

NEW COASTCLIM PUBLICATIONS:

- **Pykäri et al.:** Biotic carbon stocks across trophic levels in the shallow littoral zone – the role of biodiversity and environmental drivers
- **Fonseca et al.:** Evidence for cable bacteria inhabiting deep in anoxic sediment reveals a novel ecological niche
- **Zinke et al.:** Spatial variability of greenhouse gas concentrations and fluxes in shallow coastal bays of the western Baltic Sea
- **Geilfus et al.:** Spatial heterogeneity of GHG dynamics across an estuarine ecosystem

- **Stoffers et al.:** Long-term monitoring reveals biomass loss and concurrent dominance changes in coastal zooplankton community
- **Williamson et al.:** Carbon storage in coastal reed ecosystems
- **Peltola et al.:** Measurement report: New particle formation and aerosol properties at a newly founded atmospheric observatory at the Finnish Baltic Sea coast
- **Rohlfer et al.:** Carbon cycling across coastal soft sediments: the contribution of macrofaunal communities to seafloor respiration

Check out all our publications on the CoastClim webpage >>

Who are we?

Meet a CoastClim researcher:

Who are you?

I am Suanne Kortsch, a marine community and food web ecologist at Tvärminne Zoological Station. Broadly, my work focuses on the relationship between biodiversity and ecosystem functioning and stability, and the role that species interactions - trophic and non-trophic - play in maintaining species co-existence and persistence in complex ecological communities.

What are you doing in CoastClim and why?

In CoastClim, my role is to assess the importance of biodiversity, especially species interactions, for carbon cycling and turnover in coastal Baltic Sea ecosystems. This is important because species interactions shape how energy and carbon move through food webs and influence how stable and resilient ecosystems are to environmental change. Understanding these processes helps us better predict how coastal ecosystems will respond to climate warming - and how their role in carbon storage and cycling may change in the future.

My recommendation to you...

Stay connected with nature. In nature, nothing exists alone - Rachel Carson (1962)

Meet the CoastClim team >>