The bigger picture of the impact of the climate on the blue economy

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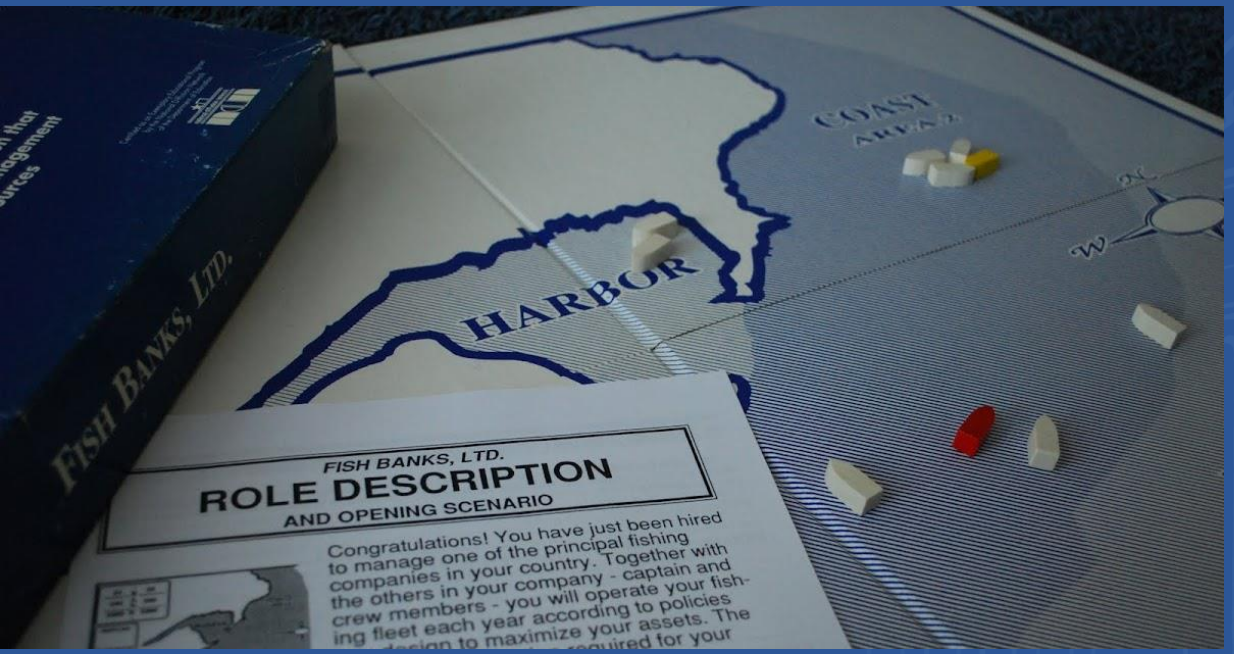
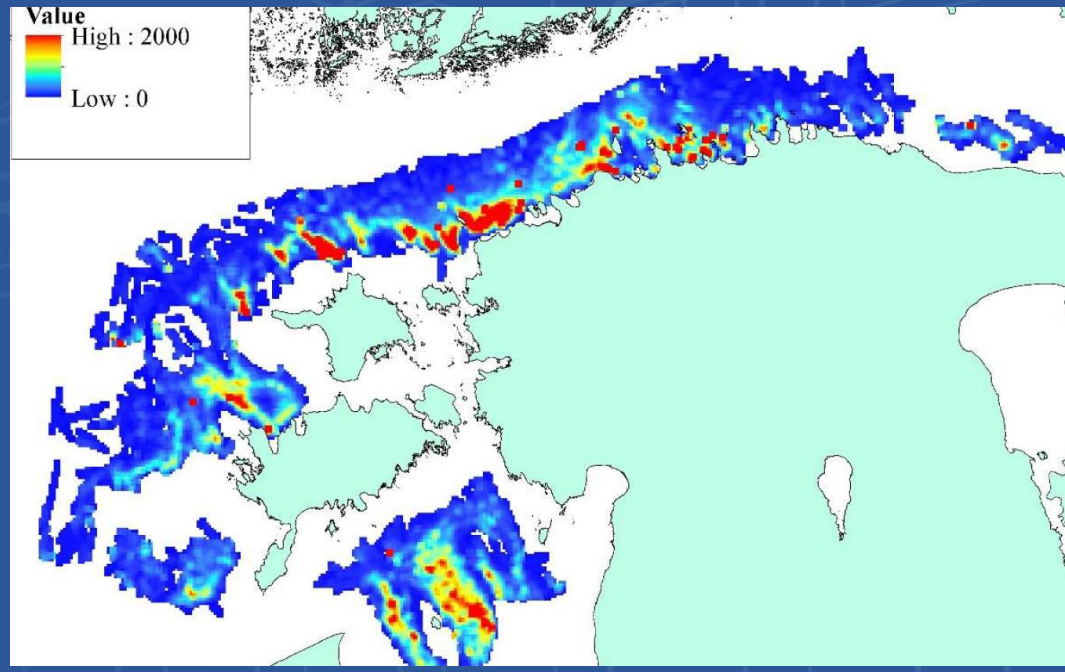
Limits to growth, 1972
Not just overfishing



The Renewable Resource Management Simulation Game developed by Dennis Meadows.
Fish Banks is a role-playing, board game in which teams of players manage and operate their own fishing companies. Based on system dynamics and enhances system thinking.

Catch of Baltic herring, 2017
kg per km²



Offshore trawling, Jonne Kotta, ELME project
Ecosystem service: food production. Linking fish population dynamics to catch statistics. Hence, the relationships between fish reproduction and yield are vague due to several critical factors, incl climate.

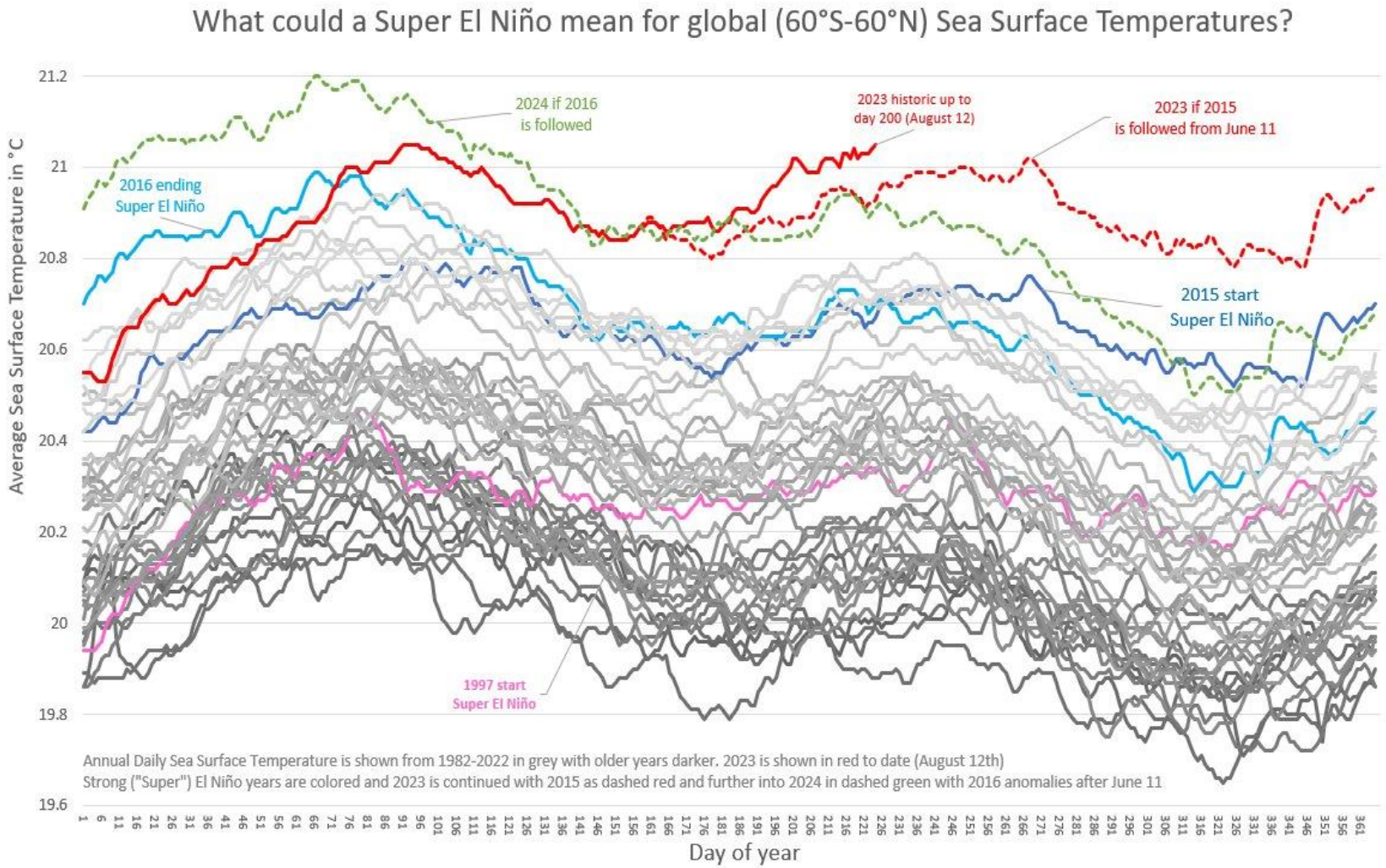
Doomsday prophesy

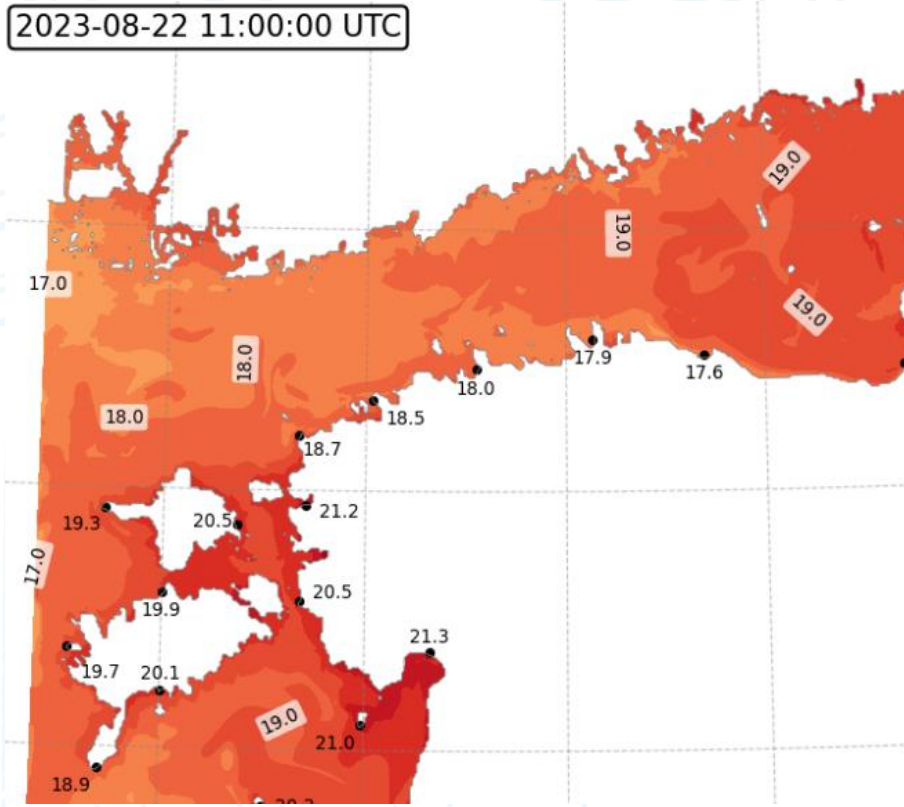
Small talk on weather

Alarmist discourse vs informed pragmatism/intellectual ingenuity

Climate risk in coastal and marine areas

Oceans and sea warming: higher and sharper, superimposed by El Nino





NOAA dataset, Prof E.Jacobsen via https://climatereanalyzer.org

Environmental Agency

CLIMATE CHANGE in the Baltic Sea: present climate

ACCELERATED WARMING (air and water) The sea surface temperature has increased by 0.03-0.06 °C per 10 years in the period 1856-2005 (Kniebusch et al., 2019) and by 0.59 °C per 10 years in the period 1990-2018 (Siegel & Gerth, 2019).

LESS ICE The maximum extent of ice in the Baltic Sea has decreased by an average of 30% during last 100 years (BACC II, 2015).

MORE STRATIFIED In most deep areas, vertical stratification has strengthened in the period 1982-2016 (Liblik & Lips, 2019).

DEAD ZONES. In 2016, the hypoxic area in the Baltic Sea was estimated to be 70,000 km^2, whereas 150 years ago this area was significantly smaller (Carstensen et al., 2014).

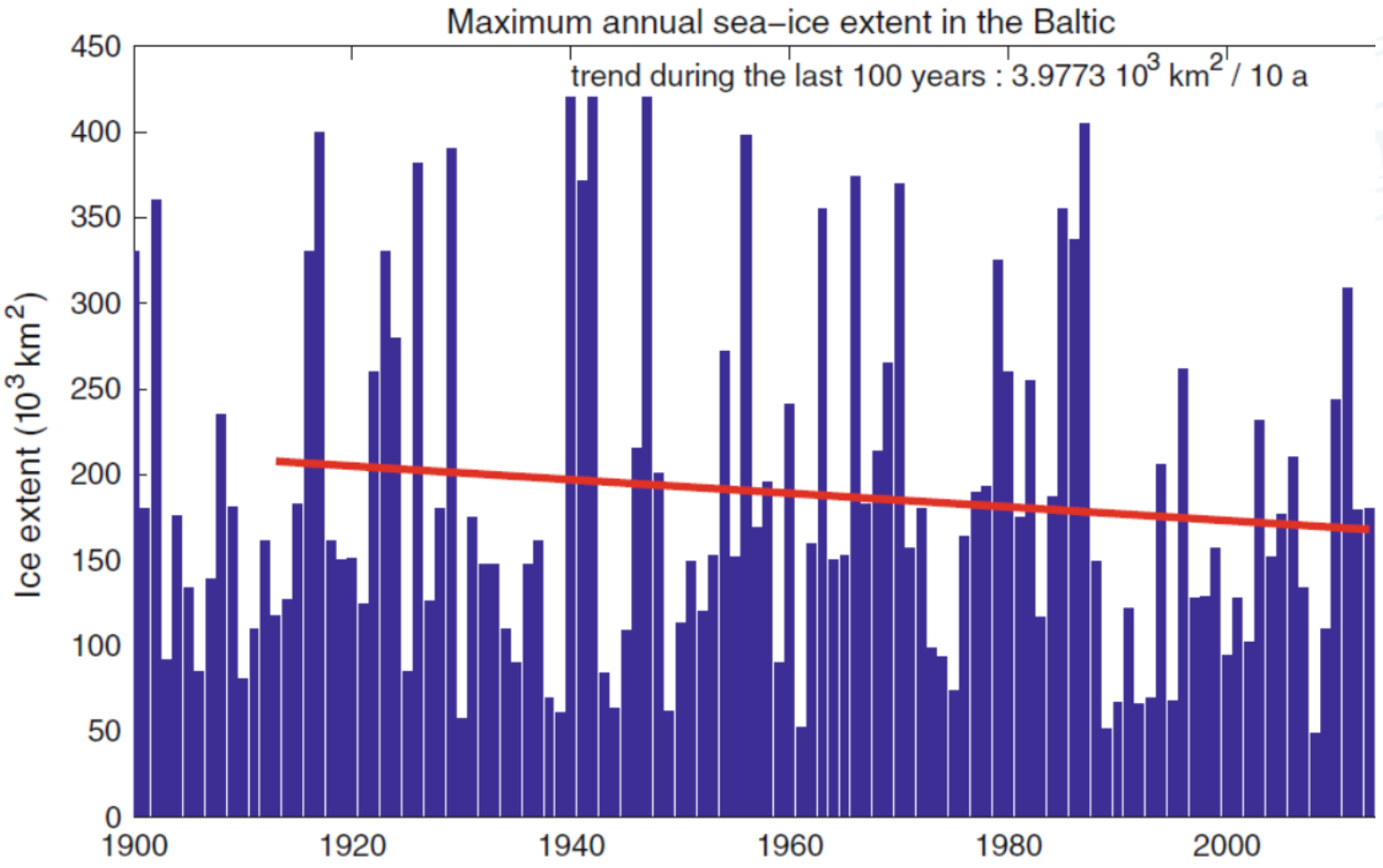
The increase in temperature and strengthening of stratification affects the oxygen conditions, which in turn has an effect to benthic life, fish, etc., thereby to the entire ecosystem.

HELCOM , Env agency, Prof Lips, Krapf et al 2022

CLIMATE RISK MATRIX – marine and coastal impacts

Climate risk – coastal and marine scope	**Risk level** High Average Low	**Intensity in future climate** increases, remains on the same level, decreases	**Frequency in future climate** increases, remains on the same level, decreases
Coastal flooding		High confidence	Medium confidence
Strong wind, heavy storm		Medium confidence	Medium confidence
Heat wave		High confidence	High confidence
Coastal erosion		High confidence	High confidence
Extreme cold		High confidence	Medium confidence
Heavy rainfall		Medium confidence	Medium confidence

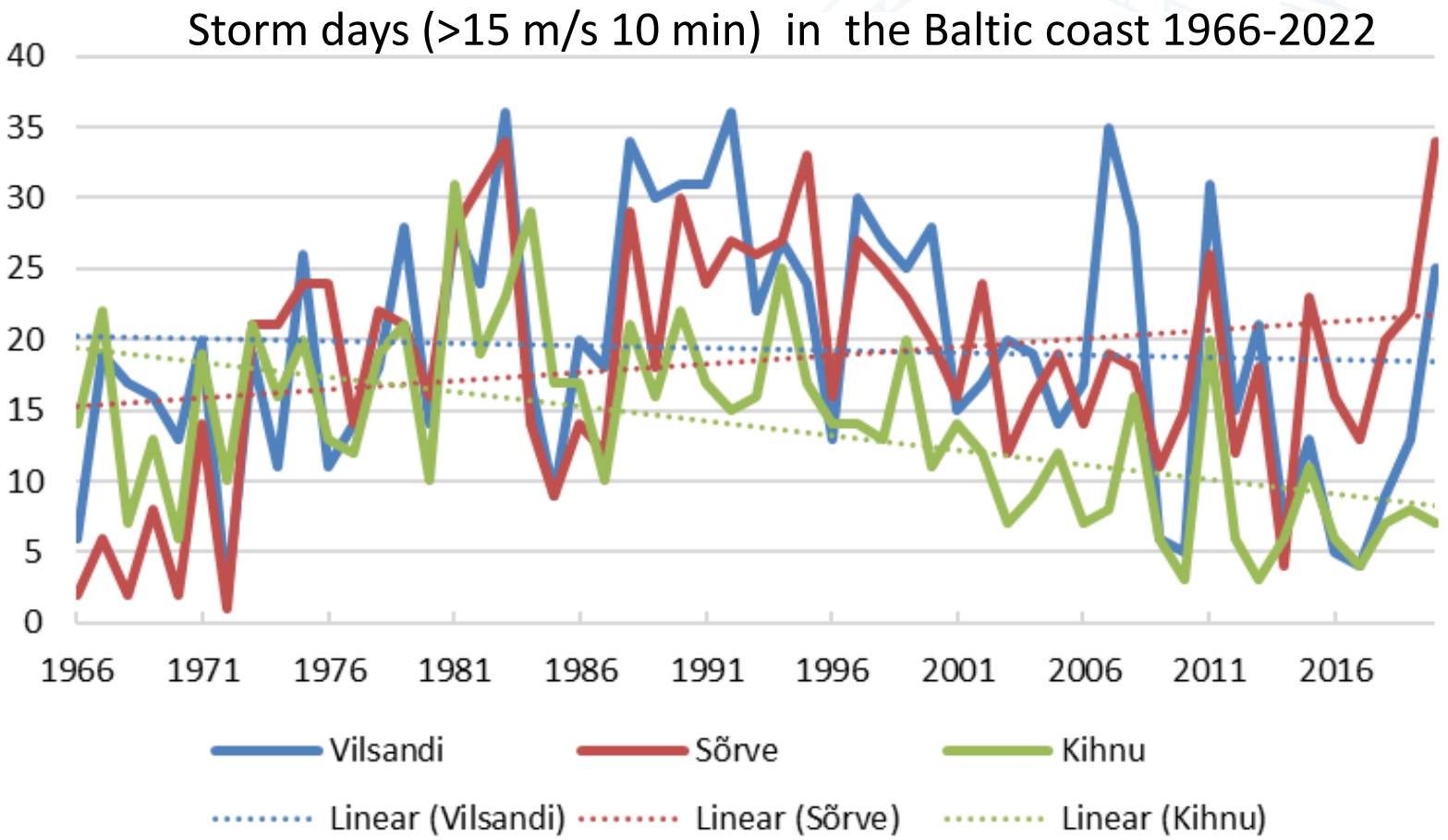
CLIMATE CHANGE in the Baltic Sea: ICE COVER
The maximum extent of ice cover in the Baltic Sea 1900-2012



The red line shows a decreasing ice cover approx. 2% per decade.

BACC II. Haapala et al., 2015

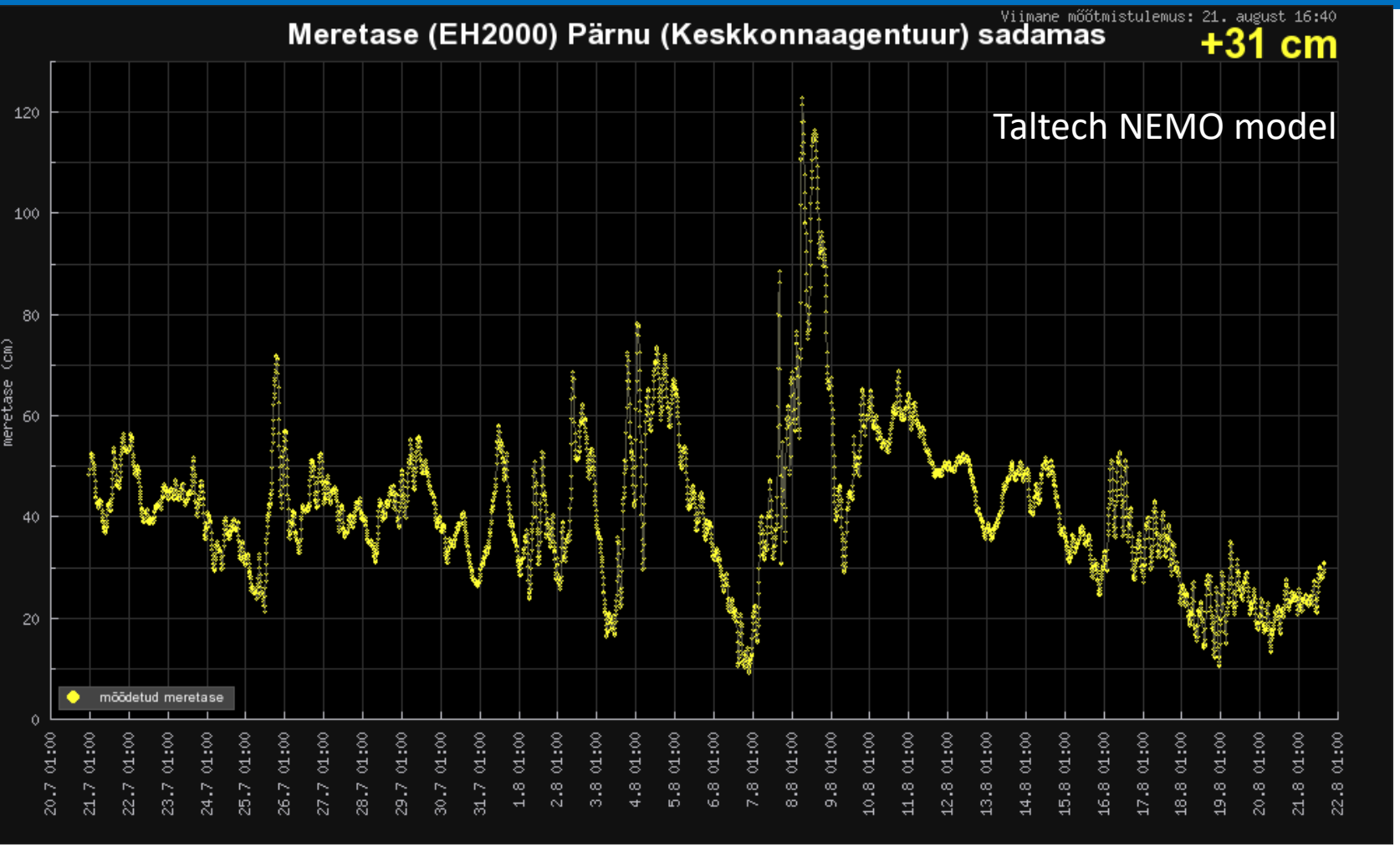
CLIMATE RISK – The storms have not intensified, the period has extended.



- Concerned primarily about melting ice and rising sea levels, the potential risks of changing wind direction are underestimated and ignored, also less modelled (Soomere and Pindsoo 2015, 2020).

Environmental agency data; Jaagus, 2020; Soomere and Pindsoo 2020

CLIMATE RISK – Coastal flooding. Pärnu: the Aug 7-8 cyclone +120 cm



+275 cm BK77 9.1.2005
+253 cm BK77 18.10.1967
+183 cm BK77 17.11.1923

- The average annual sea level rise of the Estonian western coast is up to 2 mm/year.
- Postglacial uplift compensates the sea level rise for next 30 years (Rosentau et al 2018).
- Erosion risk has increased in some coast sections, though the most coast (in populated areas) is relatively high.

Policy making and operationalisation

Reforming of marine protection – sustainable blue economy

EU POLICY – GREEN + BLUE, GROWTH -> SUSTAINABLE

- Strong ‘push’ by The Marine Spatial Planning Directive
- A new approach for a sustainable blue economy, replacing former ‘blue growth’ (2021)

ESTONIAN POLICY DEVELOPMENT:

CLIMATE & MARINE ENVIRONMENT

- Implementing sea protection reform - 30% of sea area protected
- Drafting blue economy action plan to ensure the sustainable use of the marine resources
- Reducing pollution load
- Digitalisation of sea management

KESKKONNAVALDKONNA ARENGUKAVA

KEVAD

Draft National environmental strategy 2023

The Climate Plan of Pärnu County, adopted 2022

ENERGY

INFRASTRUCTURE Build environment

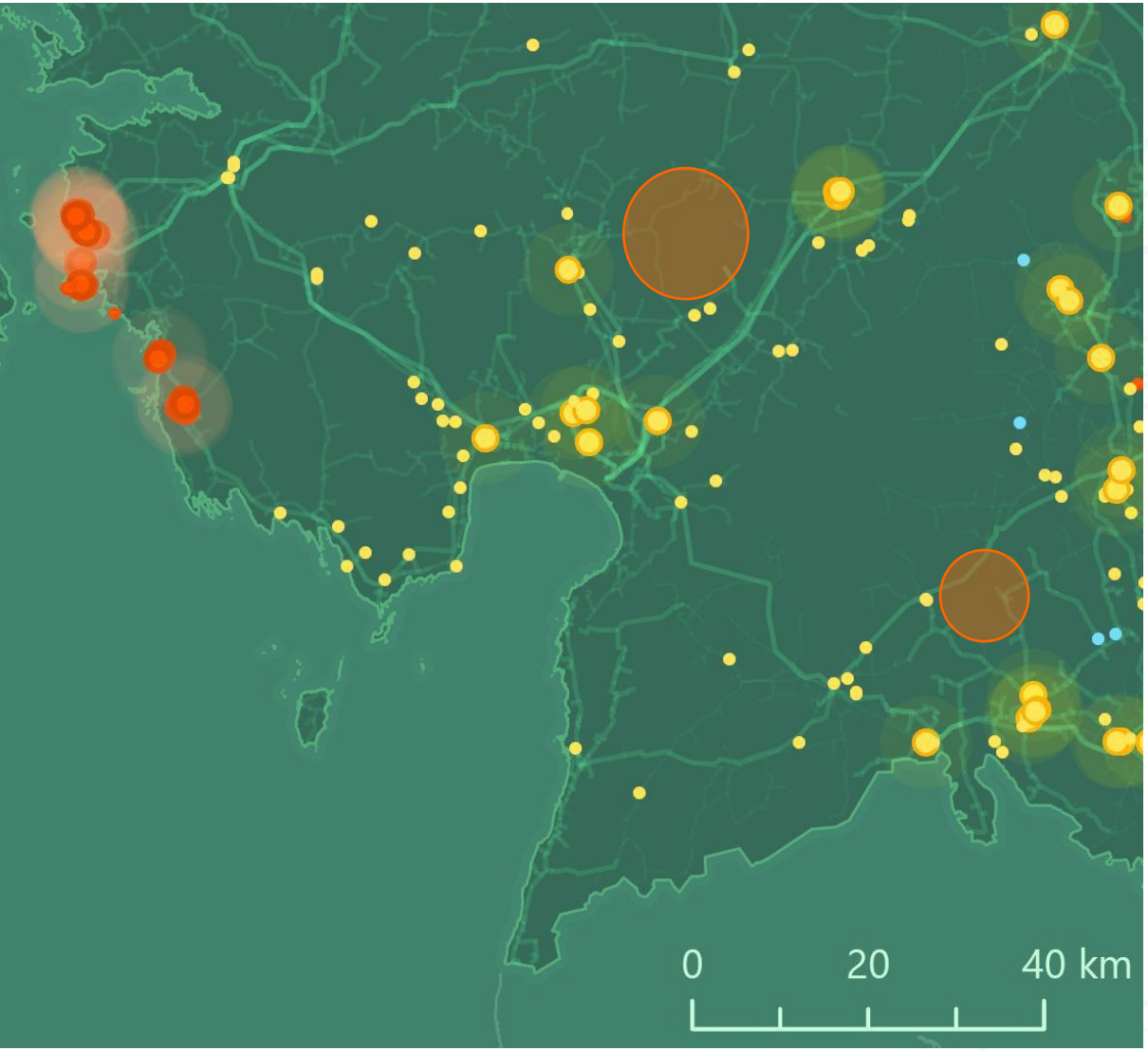
ECONOMY Circular economy and bioeconomy

NATURE Land use and ecosystems

PEOPLE Health and resilience

Blue economy for climate

New energy geography and new roles of ports



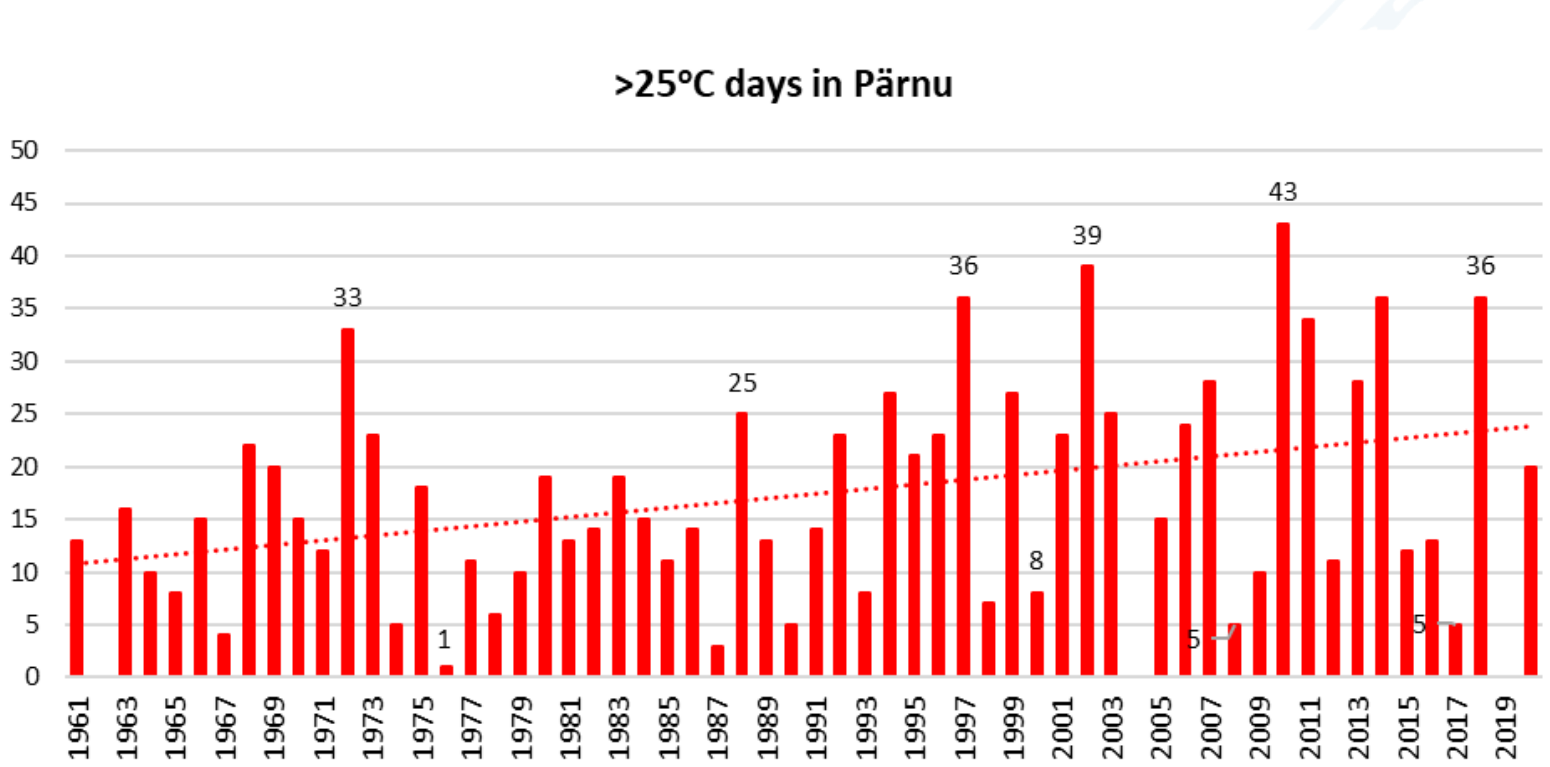
Onshore renewables deployed in the Pärnu county:
Red - wind turbines, yellow – solar parks (2020)

Virtsu port, Estonia

Beyond transhipment and logistics, future lies in developing port' role as energy hubs (for integrated electricity, hydrogen etc), for the circular economy (waste and decommissioning), and for industry (as industrial clusters).

Future ports as energy hubs. Bergen, Norway

New leisure economy preconditioned by summer climate



The kites festival in Pärnu, Sept. 2021.

- Seismic shift in tourism ahead as the new era for the Baltic resorts based profoundly on longer ‘decent’ summers.
- Leisure economy evolves due to the shift in consumption pattern – experiences, not goods.

Green shipping: decarbonise maritime transport

- **18 000 t CO_2 emitted by Estonian island ferries** (2018) = 10% of total emissions of Saare county
- 2024 - Extension of the EU Emissions Trading System to maritime transport (>5000 gross tonnage). Market sentiment has been changing.
- Retrofitting of green technologies on existing vessels: ferries to be converted to hybrid, methanol, electric and hydrogen + good old wind power. Green corridors.
- Phasing out the bunker oil, directly affecting the Estonian oil shale industry

Marine traffic in Suur väin

Keywords on new blue and climate economy

- URGENCY: Targeted research, straightforward evidence-based implementation, ad hoc decision making, acknowledgement of externalities and lock-ins (climate, capital, energy use etc).

- UNCERTAINTY: Negative surprises and bigger losses are more likely. Experts disagree on probabilities and the uncertainty about climate change is too large to apply utility maximisation to guide climate policy.

- AGENCY: Empowering institutions, investors, citizens, communities, bodies, transnational. Most people are risk averse. Pro-active, focused and committed action lines.

MARINE SCOPE: Climate-driven expansion of sustainable blue economy: intensification the use of marine and coastal resources. Trade-offs are unavoidable as every decision creates an opportunity cost.


Pärnu beach
Call for a blue-sky attitude and thinking – visionary, creative, brand new ideas.
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