

The Gulf of Finland – case study

ECOSUPPORT WP4
Marine Systems Institute

Objective:

To provide a detailed assessment of the Gulf of Finland water quality for the coastal zone and open sea during the time periods of marine regime shifts in changing climate conditions

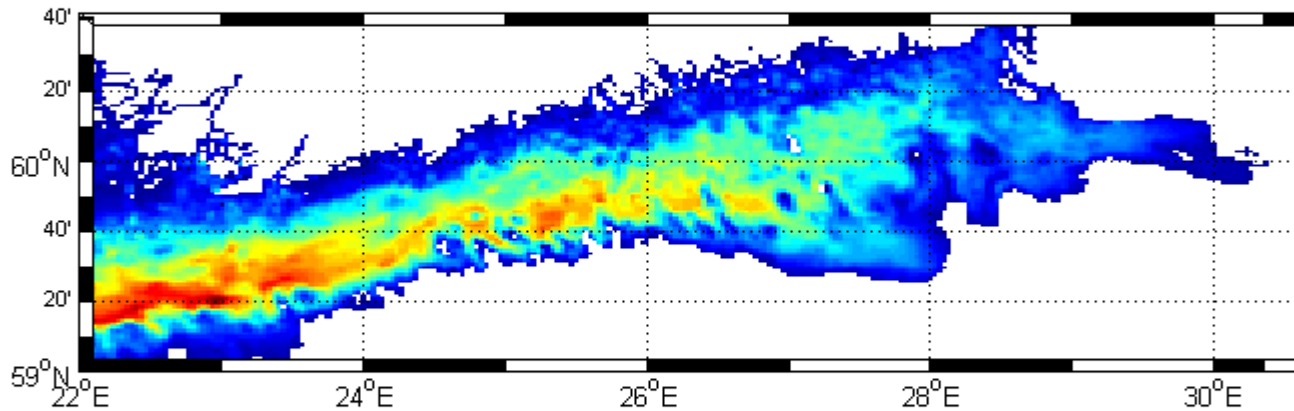
Description of work:

A high spatial resolution coupled physical-biogeochemical model for the Gulf of Finland is forced with lateral boundary data from the basin-wide models. Selected time slices of present and future climates will be calculated. The model results will be analyzed for spatial distribution of temperature, salinity, nutrient and phytoplankton in the Gulf of Finland. The transient character of the fields will be separately analyzed for the coastal zone and offshore area. ...

Deliverables:

Model simulations of present and future climates ...

Modeling approach



- Running circulation model for the whole Baltic Sea and coupled circulation-biogeochemical model for the GoF
- Open boundary conditions for GoF from circulation model and IOW model

Circulation model of the Baltic Sea GETM

1997-2006,

spatial resolution 3 x 3 nm

- Initial
 - T,S
- Rivers
 - Flux
 - T,S
- Open boundary
 - Sea level
 - T,S
- Meteo forcing
 - Wind
 - AirTemp
 - SLP
 - Cloudiness
 - Humidity
 - Precipitation/evaporation

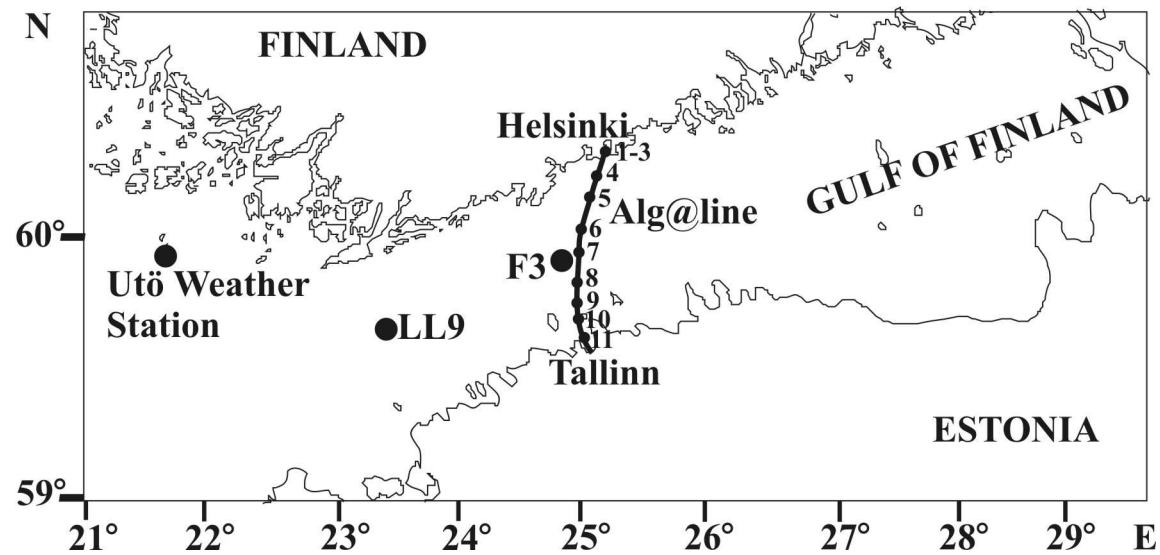
Coupled model GETM-ERGOM of the Gulf of Finland 1997-2006,

23.5-30.5°E 59.1-60.8°N, spatial resolution 0.5x0.5 nm

- Initial fields
 - Ammonium
 - Nitrate
 - Phosphate
 - Diatoms
 - Flagellates
 - Cyanobacteria
 - Zooplankton
 - Detritus
 - Oxygen
 - Total inorganic carbon?
 - Alkalinity?
- Rivers (Narva, Neva + **local**)
 - Ammonium
 - Nitrate
 - Phosphate
 - etc.
- Boundaries
 - Ammonium
 - Nitrate
 - Phosphate
 - etc.
- Meteo
 - Atmospheric load

Validation data

Alg@line



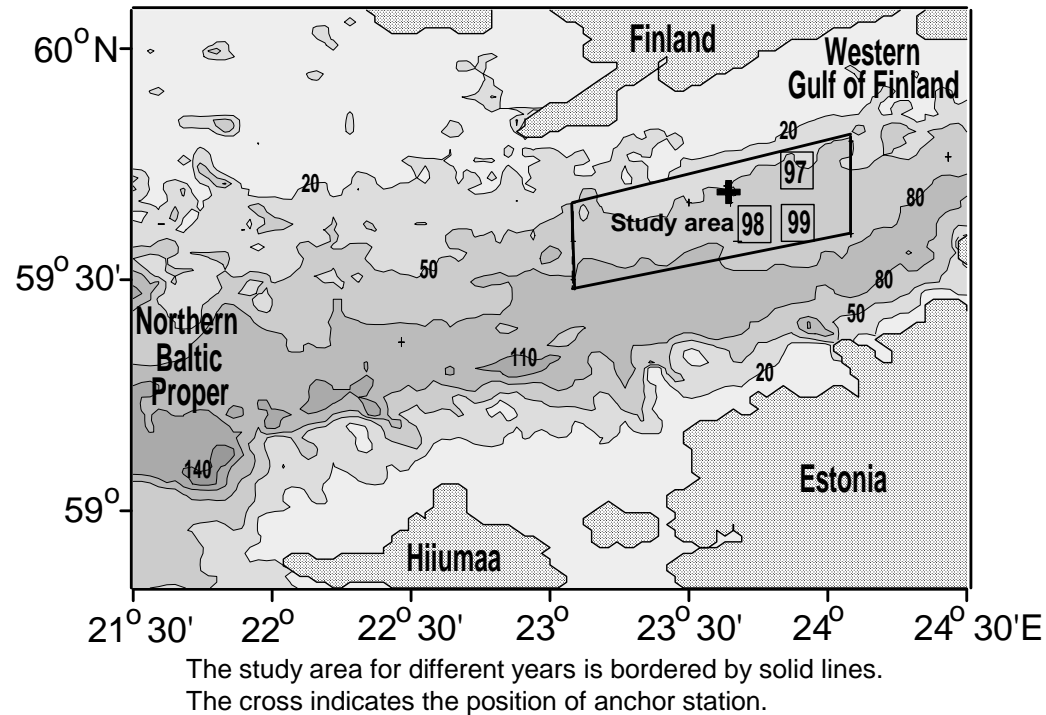
**Tallinn-Helsinki-Tallinn transect
1997-2005 (2006), April-November**

Daily T, S, Chl

Weekly phytoplankton

Validation data

R/V Aranda, 1997-1999



1. Towed undulating system: CTD, fluorometer
2. Anchor station: CTD, fluorometer, phytoplankton, nutrients
3. R/V Aranda flow-through system: T, S, chl-a
+ phytoplankton groups (1997) and cyanobacteria species (1999)

Additional validation data

- International databases (Seadatanet, ...)
- Monitoring data (Estonian Environment Information Centre)
- Project-based data (MSI, Estonian Marine Institute)