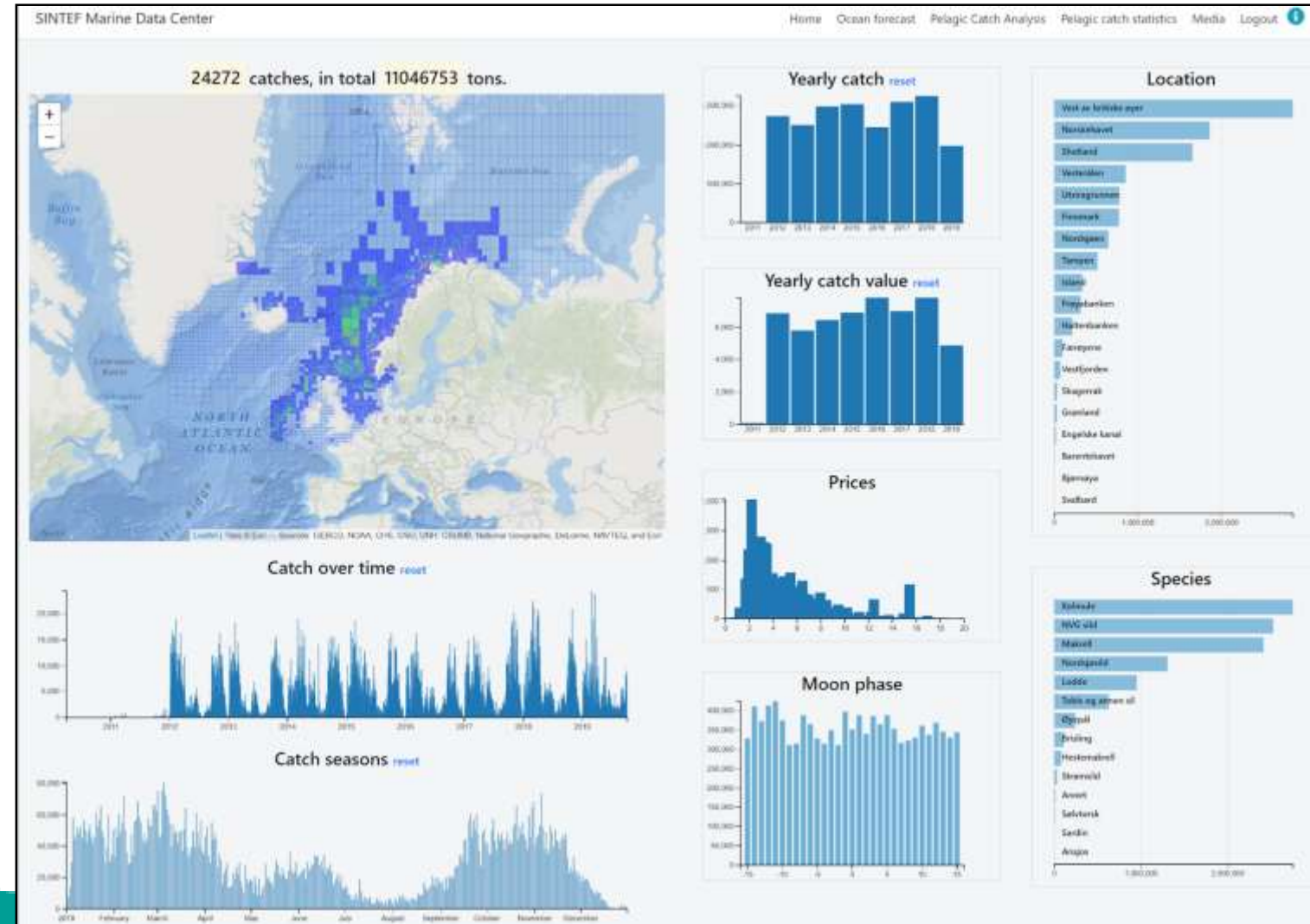


Small pelagic fisheries web portal

Historical catch and market analysis (SINTEF Ocean)



- Analysis of historical catch data
- Dependencies between prices, season, location and species.
- Used for planning when and where to fish for the various species, to optimize value.
- Data (2012 -):
 - Small pelagic catches
 - Trade information

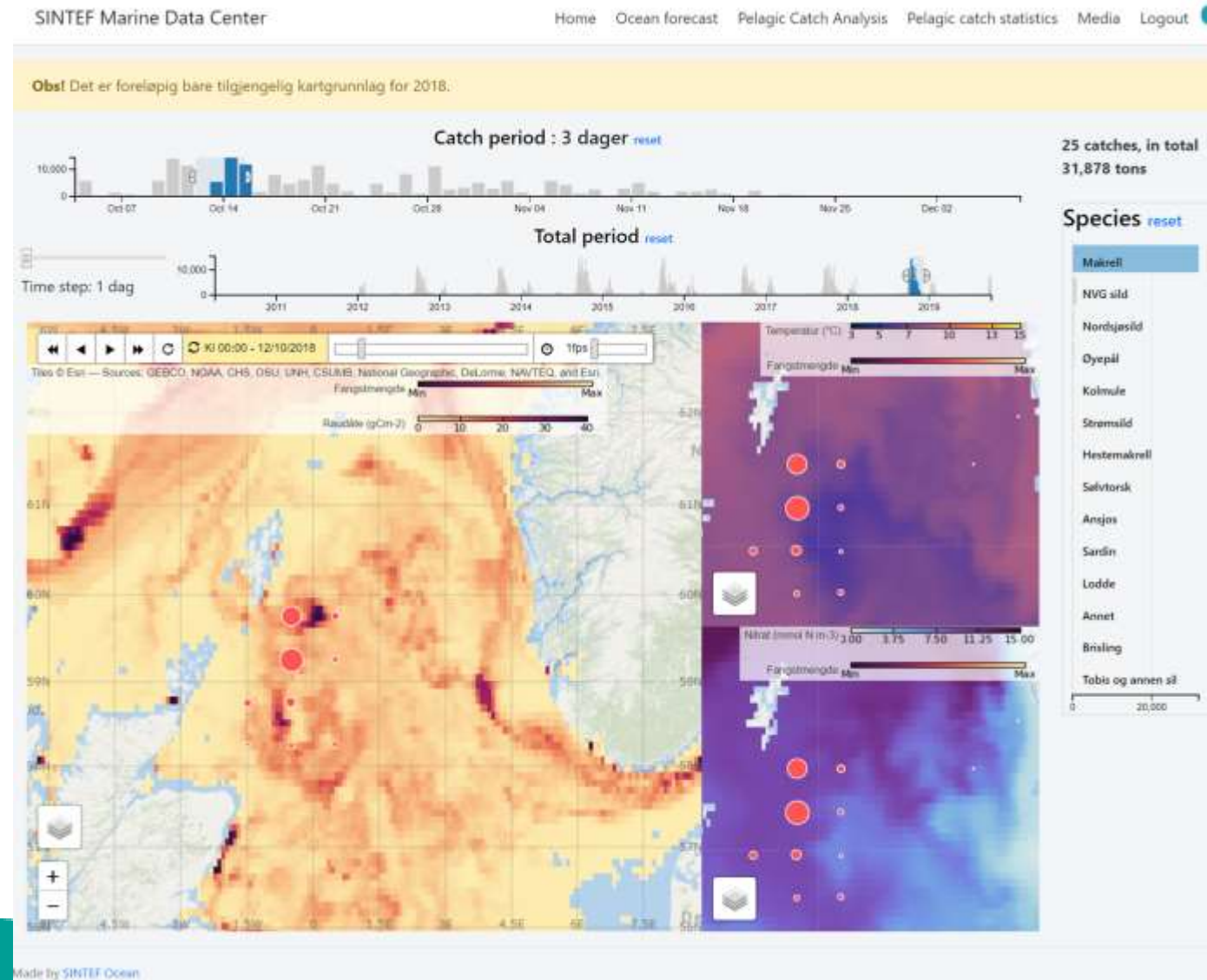


Small pelagic fisheries web portal

Historical catch and environment analysis (SINTEF Ocean)



- Analysis of how historical catches has depended on environmental factors.
- Investigate covariance between catches and e.g. zooplankton concentrations.
- Data (2012 -):
 - Small pelagic catches
 - Earth observations
 - Meteorological simulations
 - Oceanographic and biomarine simulations.

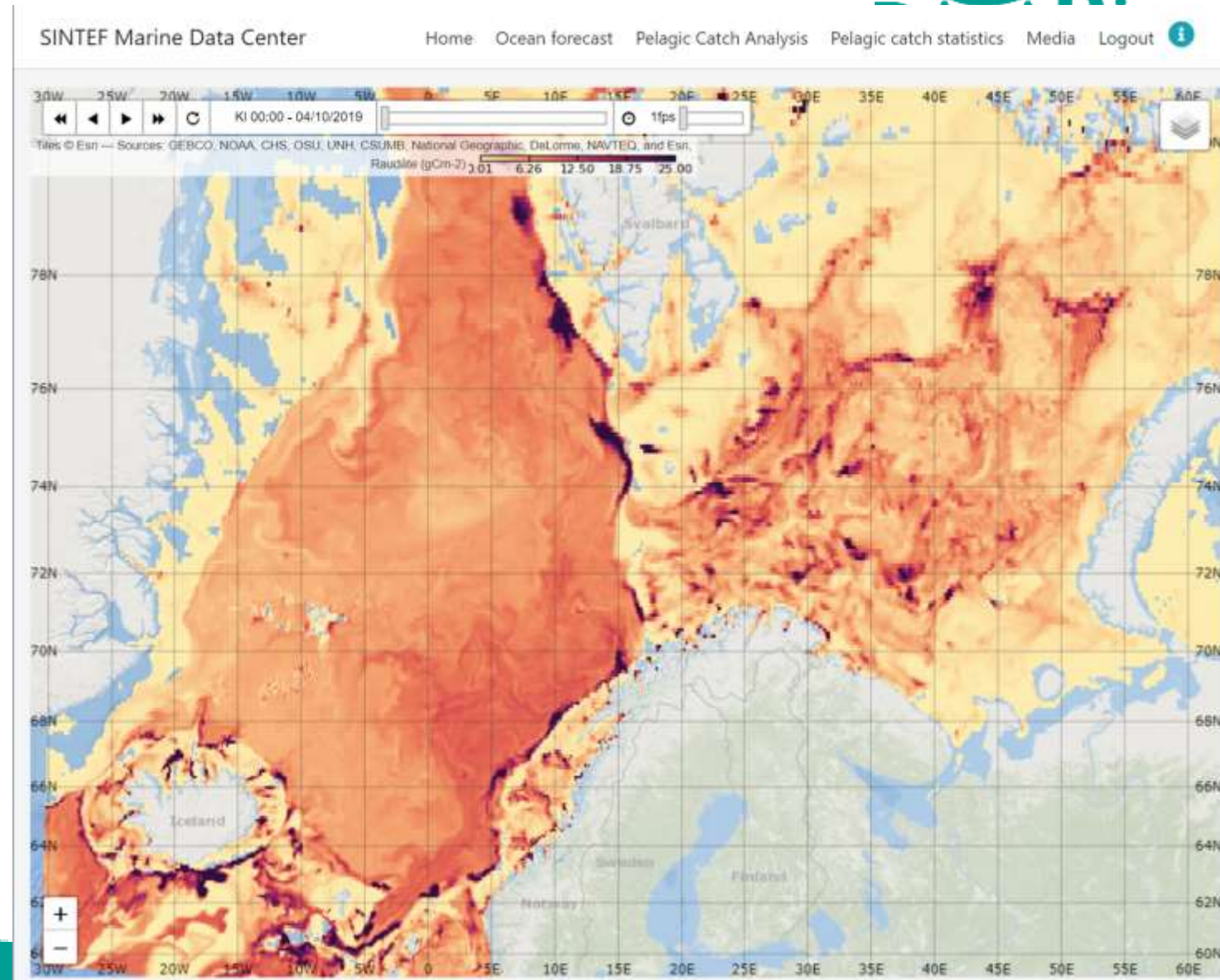


Small pelagic fisheries web portal



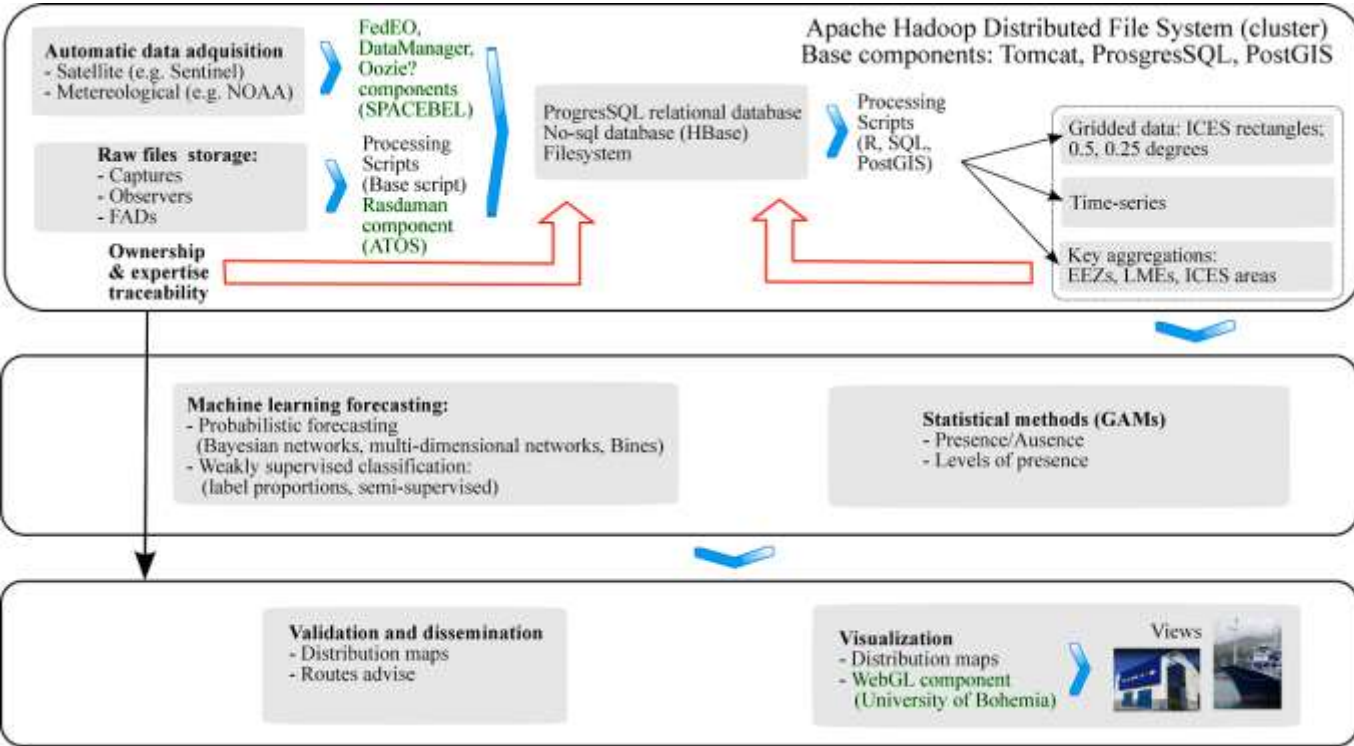
Marine environment forecasts

- Forecasts for the marine environment.
- Supports choice of fishing grounds for the next days.
- Data (the last days):
 - Earth observations
 - Meteorological simulations
 - Oceanographic and biomarine simulations.



Oceanic tuna fisheries planning

Jose A. Fernandes, Igor Granado, Iñaki Quincoces

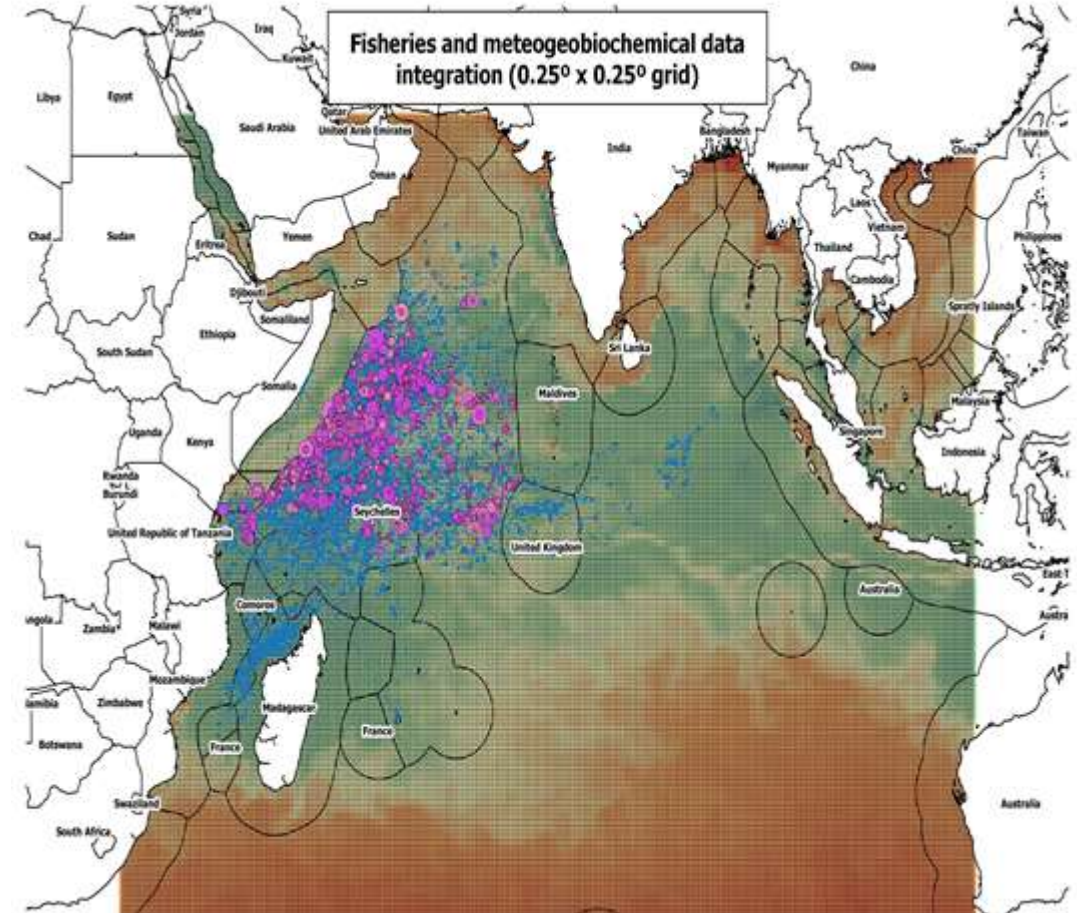


Conceptual diagram of data and components flow

STORAGE

MODELLING

APPLICATION



Tuna fisheries and Copernicus meteogeobiochemical data in the Indian Ocean

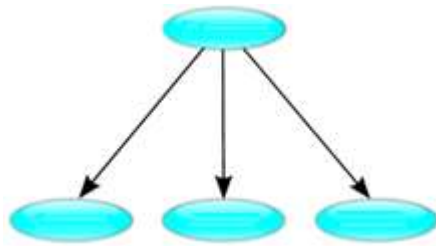
Oceanic tuna fisheries planning

Jose A. Fernandes, Igor Granado, Iñaki Quincoces

Satellite data



Probabilistic
forecasting



Vessel data

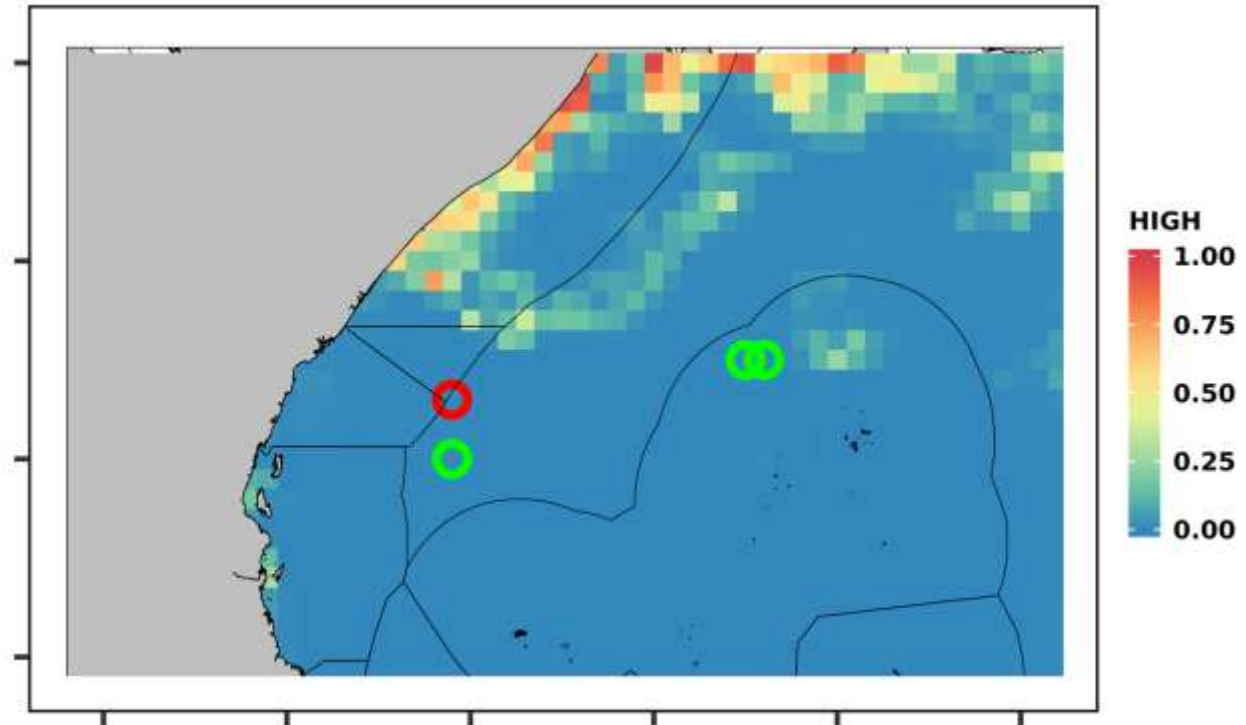


Conceptual diagram of forecasting model based on pipeline of supervised classification methods (Fernandes et al., 2010)

Performance:

- Absence accuracy: ~ 80% (what to avoid)
- High biomass false positive: ~25% (where to go)
- Vessels fuel reduction achieved by a tuna company vessels during DataBio project is between 4% and 30% with a 19% reduction on average

Fernandes J.A., Irigoien X., Goikoetxea N., Lozano J.A., Inza I., Pérez A, Bode A. (2010) Fish recruitment prediction, using robust supervised classification methods. *Ecol. Model.* 221(2): 338-352.



Example of species distribution probabilistic forecast based on Copernicus environmental data and fishing events

Fernandes. J.A., Quincoces, I., Fradua, G, Ruiz, J., Lopez, J., Murua, H., Inza, I., Lozano, J.A., Irigoien, X., Santiago, J. Fishery pilot B1: Planning of oceanic tuna fisheries - Arrantza B1 kasua: Atun tropikalaren arrantza plangintza. DataBio general assembly 02 (Helsinki), 27-29 June, DOI: 10.13140/RG.2.2.22519.32165.

WP4: Team Fish: Machine learning of best catch locations in open and private data



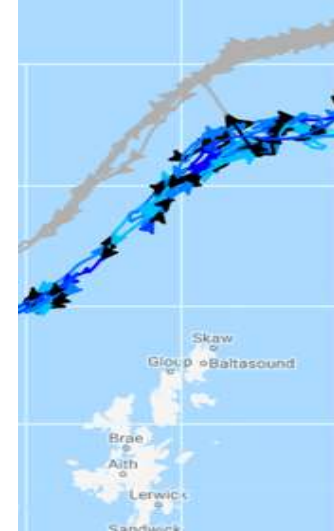
Open catch data:

- All catches last 20 years
- Coarse in location and time (catch zones /landing time)
- No catch value



Private catch data:

- One fishery company
- Precise location and times (catch position and time)
- Catch value



ML Objective: Predict best daily catch location

- Focus on best vessels/captains for a specific fishery
- Model comparison for open vs private data
 - => Same fish species and vessel class (cod & trawlers)
 - => Test same MPC model (LOESS) on both data sets
- Later: Best model per dataset and optimal combination

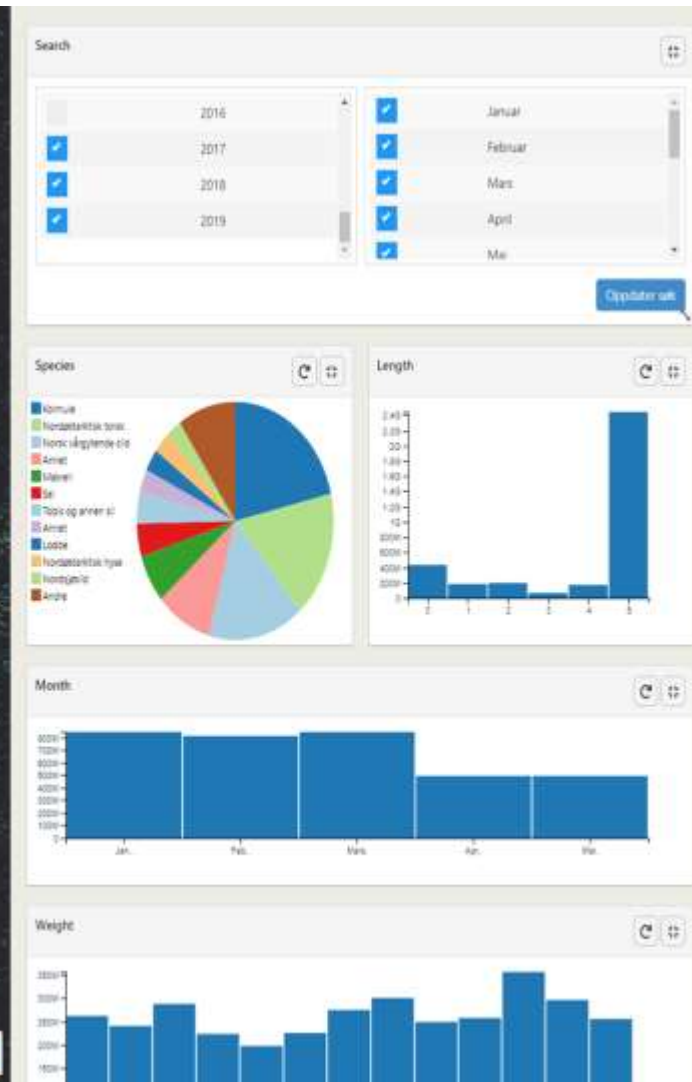
MPC: Multi-Party-Computation using CYBERNETICA Sharemind

Fisheries analytics and prediction models can be trained on the **union of open and sensitive data sets** from multiple users:

- ... without exposing the private data sets to each-other
- ... collation & linking with open data can be done once
- ... less total work resulting in better models for fisheries



WP4: Team CODEFish: Open + Private Catch Data Analytics & SINTIUM Visualisation



- Open Norwegian catch data (20years)
- Catch data drill down
 - Species, tools, time, weight, volume
- Copernicus (CMEMS):
 - Currents (animated)
 - Sea Surface Temperature
- Live AIS
 - Vessel positions
- Machine learning
 - Fishing activity from live AIS by Global Fishing Watch ML model
 - Catch prediction from private data (whitefish data)