

ECOSUPPORT KICK-OFF MEETING, SMHI Norrköping 26-27 January 2009

Rapporteur: Robinson Hordoir, SMHI (with some modifications by Markus)

The final version of the minutes, WP plans and ppt presentations will be made available on the ECOSUPPORT homepage.

Research plan presented by Markus:

During the first day the meeting will be organised such that 30 min are reserved for each WP comprising 15 min for presentation and 15 min for questions. The aim is that we understand each other for the sake of the project because of the interdisciplinary background of each of the participants.

Objectives of ECOSUPPORT are presented by Markus. 11 partner institutes including 14 groups from 7 countries.

- According to BACC knowledge about the impact of climate change on the marine ecosystem is limited. A downscaling of the climate dynamics will be made (coupled) over the BS. Markus details climate projections over the BS, especially related with salinity shifts. The modelling strategy is also introduced. Modelling strategy includes hydrological models in order to represent river runoff, important for freshwater sources as well as nutrient loads. Three modelling configurations will be used : coupled physical-biogeochemical models forced with (a) RCA (ERA40 at OBCs) 1960-2007, (b) reconstruction data 1850-2007, and (c) RCAO forced by GCMs at OBCs 1960-2100
- Marine biogeochemistry will be represented using multi-model ensembles (BALTSEM, ERGOM, RCO-SCOB), including uncertainty analysis.
- Higher trophic levels (food web modelling), including fish interactions. One question is the link between biology and biodiversity (e.g. valorisation of coastal areas) and future climate projections.
- Socioeconomical aspects.

>>> Output is a decision support system (that will be defined during the project period)

WP1 : Lars Bärring, Available and planned climate scenario simulations at the Rossby Centre

The Baltic Sea is usually poorly described in climate models, not to say not described at all. The Rossby Centre regional climate model has a resolution of 12 to 50 km over the BS region. The ensemble simulations that were done enable to look at different scenarios over the BS area, based on different GCMs at the BC, different emission scenarios, different time periods or domains. None of these models however are coupled to a BS model.

It is necessary to limit the number of possible scenario runs. Otherwise the ensemble would contain an enormous amount of simulations. Another important issue is to have proper

representation of extreme values in climate models that are important for biological modelling. There is some hope to have a better representation of extremes based on parametrisations (e.g. utilizing a gustiness parametrisation to improve wind speed extremes). **It was suggested to produce a list of requested extreme variables that are needed by the food web and other impact models.**

WP2 : Oleg Savchuk, Some basics of biogeochemical modelling

Empirical model formulations show its limits very fast and gives impossible results (negative concentrations for example), and is based on data only, not knowledge nor reflexion.

Main features of a system like BALTSEM or RCO-SCOBI are fluxes between pools, e.g. nitrogen, phosphorus and silicates (the carbon cycle is not part of the deliverables, but some investigations will be done). Such systems can have positive feedbacks, but can also have self-regulation features. Such models prove to give consistent results compared with observations for the BS.

Biogeochemical models used in ECOSUPPORT have different goals. BALTSEM can be used for quick computation (very fast model) whereas RCO-SCOBI will be used for coupling with horizontal transports. **According to Oleg better results from biogeochemical modelling are expected by mainly increasing the precision of the physical coupling and not the complexity of biogeochemistry.**

The question of coupling WP2 with WP3 becomes obvious, and requires better interaction between WPs. Especially the question of feedbacks from WP3 to WP2 arises.

It was suggested to investigate also silicate cycles because silicate might be limiting in future climate.

WP3 Thorsten Blenckner: Food web modelling and regime shifts – what do we know?

Ecosystems respond as a whole but information does not always propagates to the lower trophic levels. Shift from one ecosystem to another is not easy, because states are usually stable. When a system shifts from one state to another a threshold has to be passed. Assessments of regime shifts in the BS have been made for different periods analysing as many data sets as possible. Regime shifts have been observed at the end of the 1980s. Different combinations of drivers can lead to a specific ecosystem state.

Food web modelling attempts have been made using models based on production terms and energy balance. However, the uncertainties are still large. **The non-linear interactions are not well understood yet (e.g. between nutrient loads and climate), although both forcings are well studied.** Management criteria need to be investigated to know if/when a shift will occur. The entire food web can not be represented.

WP3 Anna Gardmark: On the cooperation between ECOSUPPORT and the Swedish Board of Fisheries - Planfish

Within PLANFISH another type of conceptual modelling will be used to have a better representation of species. The impact of climate change on mechanisms is known for some aspects as temperature dependence on the interactions between species, but some other aspects like the influence of salinity is not known. Therefore the overall influence of climate change on fish populations is not well known. **Some interesting hindcasts could be done from a research point**

of view if such a modelling could be coupled to a model like SCOBI (top-down approach).

WP4 Joanna Piwowarczyk and Monika Kedra: Biological Valorisation in Polish Coastal Waters.

See ppt presentation.

Further it was discussed that problems may arise when it comes to deal with specific locations like lagoons where physical, biogeochemical and biological models will not work. All those specific cases should be addressed based on former knowledge linked to the results from the simulations rather than expecting specific results from the simulations. **A solution would be to do statistics based on data from warm years for such areas in order to produce maps for future climates.** Another solution would be to set simplified version of biogeochemical models locally (like SCOBI 1D or 0D). This will very likely not be done within ECOSUPPORT (see below).

From a general point of view, the link between WP1, WP2, WP3 on the one hand and WP4 on the other hand are not well defined and further discussions are necessary how to proceed within the project.

GENERAL MANAGEMENT

1. Information on the BONUS program kick-off meeting (the presentations are available on the BONUS website). **Please check for cooperation possibilities.**
2. A **consortium agreement** will formalize the cooperation within the project (very likely in February).
3. It is possible to apply for **summer school funding** (5 times 10000 EUR) within the BONUS program. Markus will not apply separately for ECOSUPPORT but refers instead to the proposal from Brian MacKenzie (BALTEX).
4. Reporting guide lines within the **EPSS** were summarized. BONUS deliverables include the reporting of radio interviews, TV, stakeholder contacts, etc.
5. **Suggestions for a logo are welcome until 27 February.**
6. Calendar of meetings:
 - **Every 3 months Markus has a telephone meeting with the WP leaders (the first one in April). WP leaders are responsible for the organization of WP meetings between the GAs.**
 - General assemblies (GAs) are planned once every year (excluding the kickoff meeting) in connection with stake-holder seminars/workshops/conferences. **The next GA will be in Norrköping on 15-16 October 2009. The GA 2010 is planned in connection with (before or after) the BALTEX conference in Wolin/Poland (June 2010).** Comment: Changing the country may attract stake-holders from other countries than Sweden.
 - **The next ECOSUPPORT meeting is planned in connection with the Baltic Sea Science Congress in Tallinn, 17-21 August 2009. Note: There is a session on the impact of changing climate on the Baltic Sea ecosystem.**
7. **Input for a joint ECOSUPPORT poster and presentation is requested until 31 March 2009.**
8. **Ideas for the next stakeholder meeting on 15-16 October are welcome** (criteria: more discussions, professional discussion leader, gender aspect, press release, common meeting with hydrological projects, e.g. RECOCA). First announcement will be sent out at the end of February

WEBSITE (Marcus Reckermann, BALTEX)

To our knowledge no specific requirements from BONUS for the ECOSUPPORT website exist. The BALTEX secretariat kindly gives us support and access to an ECOSUPPORT website within the BALTEX website:

<http://www.baltex-research.eu/>

What the BALTEX secretariat will do now: opening the URL and uploading basic information for public communication.

The format will follow the other BALTEX projects. **Pictures of the PIs, brief texts of research interests, contact addresses and member lists of the groups are requested before the end of February.**

The ECOSUPPORT consortium acknowledges the great offer of the BALTEX secretariat.

DATA MANAGEMENT (Anders Höglund)

Physical, biogeochemical & biological models are going to generate a lot of data. Anders asks what kind of data storage are going to be required from each WP. Frequency both from spatial or temporal perspectives changes depending on projects. The ensemble mean being part of the deliverables, it requires special attention. The discussion on how to proceed is not very clear yet and further discussion is required. However, the main conclusion is that there will be storage for all data sets without any specific interaction between datasets required from a data management perspective.

Eutrophication in the BS and shifts in N fixation analyzed with 3D ecosystem model, Thomas Neumann

- MOM3 based model, 3nm resolution. 77 vertical layers (3 to 6m resolution).
- ERA-40 forcing
- Biogeochemical model ERGOM

Model represents oxygen concentration well compared with observations. Model shows increased N fixations during the 90s. Reducing loads cause an increase of N fixation. Excess phosphate can be noticed in the mixed layer in the 1990s due to larger wind stress related to the NAO.

INTERACTION BETWEEN WPs, Brian McKenzie

- Strategy is to try to link existing results for species to present or past climate simulations in order to make projections for future climates. Example given: cod data available since 1966. Based on existing simulations for nowadays period, future projections can be made. Same principle applied to sprat related to T, or to zooplankton.
- Reconstructions can be made regarding biomass.

Fish production models require input from WP1 and WP2: cod recruitment, cod feeding, sprat recruitment, herring recruitment. Data required is salinity, temperature, oxygen, primary production, decomposition. Also own feedback within the food web.

Links to WPs are made through inputs from WP1 & WP2 :

WP1 - Inflow, salinity, temperatures etc....

WP2 - estimates of reproductive volume

WP DELIVERABLES & DECISIONS (WHO DOES WHAT)

WP1 :

	1960-2007	1850-2007	1860-2100
Atmospheric	SMHI: RCAO/ERA40	GKSS, Stat Modelling	RCAO: ECHAM5, HadCH3 both for A1B or B2 emission scenario
Riverborne	SMHI: Litterature review input to Hype first estimates	IOW: rough reconstruction for coastal sections	SMHI: Hype, present day sources, variable forcing. Need monitored N,P from partners
Airborne	SMHI ~ 1960-2005 Match (obs with Hirlam) Emissions of N, S (not P)	FMI: litterature review scattered data ~ 1850 and after	FMI : litterature survey Nox, Sox,H+,pH, CO2 emissions SMHI : MACTH RCA3/ECHAM4 (A2,B2) 1961-1990 2021-2050 2071-2100

(an updated version from WP 1 is available in a separate attachment)

WP2 :

- Starts as soon as possible.

Forcings :

- Start with downscalled ERA40 (SMHI) that will be distributed.
- Receive nutrient loads from Thomas (ERGOM), atmospheric loads also used.
- River runoff comparison. Bioavailable fraction comparison
- OBC comparison

Initialisation :

- Nutrient pool comparison

Validation part :

- For a number of measurement stations, statistics and time series comparison (plankton data, chlorophyll).
- Comparisons of nutrient pools, cod reproduction volume, alkalinity, pH, zooplankton.
- Carbon modelling

(an updated version from WP2 is available in a separate attachment)

WP3 :

Candidate variables needed for food web and fish population modelling:

- Cod reproductive volume, potentially including effects of pH
- Sprat temperature
- EOFs for herring

Data requirements :

- Nutrients, primary production, phytoplankton for ecopath/ecosim from Scobi and Baltsem. Monthly scale for ICES SD 25-28 area excl. Gulf of Riga, depths specified later.
- Nutrients, primary prod, phytoplankton and zooplankton for ecopath/ecosim from IOW model. Monthly scale for ICES SD 25-28 area excl. Gulf of Riga, depths specified later.

Bioclimatic envelope modelling for selected species, e.g. Coastal and freshwater species like Perch, pike, salmon, pseudocalanus, zooplankton « community ».

Spatial habitat modelling of key zooplankton species using GAMS with 3-4 indept variables, that is t, s, depth, oxygen, pH.

Will prepare data request table (prelimiminary version below) :

Dep. Var.	Forcing var.	depth	area	Temporal resolution (month, season?)	Time period needed
Cod recruitment	Reproductive volume	Defined by vertical profiles of salinity and oxygen (physiological thresholds to be provided)	Bornholm, Gdansk, Gotland Arkona Basins	Monthly;	1900-2100 (1850-2100)
Xxx					

Deliverables

Month 9: Unified validation data sets.

Status: Data available for following variables:

SSB : Spawning Stock Biomass

Fish:

Cod recruitment and SSB: 1947-2008

Cod SSB: 1920s-1947

Sprat recruitment and SSB: 1974-2008

Herring recruitment and SSB: 1974-2008

Salmon smolt survival 1972-1999

Zooplankton monitoring datasets: various durations and areas in Baltic via Helcom, national laboratories

Environmental variables:

Cod reproductive volume: 1950s-present

SST: 1880-present (Christiansø)

SST: late 1800s (most of Baltic; Hadley Centre data)

Temperature: 1955-present (45-65 m; Bornholm Basin)

Month 24: food web model and BEM simulation results 1961-2004

Month 30: detailed assessment of model skills; analysis of regime-shifts in food web

Future plans (next 6-12 months):

-Skype or in-person meeting in spring

-perhaps in connection with ICES Working Group meeting on Integrated Assessment, late March?

-further elaborate variables needed and formats – choice of species or functional groups; means, EOFs, etc.

-consider links and synergies between workpackages – variables needed, deliverable

-consider links between three main foodweb models (Ecopath/ecosim, SMS, Planfish)

-contact IOPAS re. field data (benthos, plankton, hydrography)

WP4 :

Gulf of Finland: 3D HIROMB model (0.5 nm) + SCOBI, HD + phytoplankton. 10 years within 1980 – present time (data available) 2 time slices (10 years) for future time. Forcing including

loading (WP1) and boundary conditions (WP2) – from other WPs. Data for validation – local data

The Vistula Lagoon:

2D MIKE21 (HD+EU, already calibrated, 1km grid) or/and PROBE-SCOBI.

Comparison of local hydrometeo conditions for past and present with pan-Baltic simulations:

WP1 – atmospheric forcing, WP2 – level, salinity, nutrient concentrations, South-East Baltic

Assessment of the river run-off and nutrient loading by existed data and HYPE (SMHI) catchment model. Calibration and validation using periods 1994-95, and 1998-2000 (local data).

Polish waters: Whole Polish economic zone. Mapping with 10 years slices (2 slices: present, past). No modeling (during the Project). Methodology for biological valorization.

Socio-economy (LiU):

- Questionnaire (survey around the Baltic Sea – 1 year):

Russian and Polish sides need date before middle of February to announce it at the local stakeholders. Meetings (Kaliningrad and Poland), discussion with LiU before drafting, later, another version will be issued in summer.

- Story lines about socio-economy (after 1st year) from pilot and others areas

