

ECOSUPPORT workshop on data integration and exchange, WP1-WP3, Sept. 13, 2010, Charlottenlund

Participants:

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 Anna Gårdmark (Swed. Bd. Of Fisheries)
 Bo Gustafsson (BNI, Stockholm University)
 Brian MacKenzie (DTU Aqua) – chair and rapporteur
 Ivan Kuznetsov (IOW)
 Maciej Tomczak (DTU Aqua, BNI)
 Margit Eero (DTU Aqua)
 Markus Meier (SMHI) - coordinator
 Martin Lindegren (DTU Aqua)
 Stefan Neuenfeldt (DTU Aqua)
 Susa Niiranen (BNI, Stockholm University)
 Thorsten Blenckner (BNI, Stockholm University)

Agenda: see Appendix

Workshop background and objectives: The workshop was arranged to further coordinate the data exchange among WPs 1-3 and analyses within especially WP3. Model results from climate and biogeochemical models are becoming available for the hindcasting period ca. 1960-2006 and will soon be available for the forecast period. The data volume and number of analyses and ways to combine model outputs is large.

Main workshop objectives were:

- review overall status of climate, ecosystem and fishery models within the project, especially in relation to data delivery and exchange among WPs 1-3: where are we now, what has been done, what still needs to be done, etc.
- identify what do we have to achieve in remaining time of the project
- decide can we still do what we promised?
- propose a strategy on what datasets, variables and analyses we should focus on in the time left for presentation and discussion at next ECOSUPPORT General Assembly meeting (Oct. 15, 2010 in Norrkøping).

Format of the workshop:

All participants presented status of various climate, biogeochemical, fish population and foodweb models and data analyses. Analyses included preliminary results of some cod projections, and biogeochemical model validations. Related parallel work conducted in the ICES / Helcom WG on Integrated Assessments in the Baltic was presented by a co-chair (Anna Gårdmark). Discussions were held during and immediately after presentations, and a wrap-up discussion was held at end.

Main conclusions and decisions:

Climate models for validation purposes: The project can only use the RCA/ERA-40 climate model (25 km resolution) forcing as a basis for evaluating hindcast quality of biogeochemical and

fish/foodweb models because this model is the only one within the project whose outputs can be compared on an inter-annual and year-specific basis. Other climate models available within the project produce outputs which can only be effectively compared over long (minimum 30-year) time scales. Short-term interannual variability is not an appropriate measure of the variability from some of these models because of the inherent natural variability of the climate system. Long-term averaged outputs from those models can be compared with observations averaged at similar time scales at different depths, areas within the Baltic, and seasons.

Availability of hindcast data:

Hindcast outputs of various hydrographic and biogeochemical variables from the RCO-SCOB1 and ERGOM models are now available. Similar data will soon (end of 2010 to meet deliverable deadline) be available and sent to WP3 colleagues. Some preliminary output data for 2 variables (cod reproductive volume, sea temperature) are available and will be distributed to BNI colleagues.

However a large amount of variables have been requested (e. g., temperature or salinity at various depth intervals) and there may be overlap in the request. WP3 chair will together with WP3 colleagues consolidate the list (make a prioritized list, eliminate duplicates) and send new table to WP1 and WP2 colleagues before the ECOSUPPORT General Assembly in October.

Validation and quality of model hindcast data:

The biogeochemical model outputs available should be used in analyses to investigate quality of fish and foodweb models. Some quality assurance (QA) and validation has been done for key hydrographic and biogeochemical properties (see report by Eilola et al. 2010). Some new analyses specific to WP3 have been conducted using outputs from RCO-SCOB1 and ERGOM, and presented for cod reproductive volume and some temperature data affecting sprat recruitment. Preliminary results showed that model estimates of reproductive volume followed observations closely, but that RCO-SCOB1 outputs were closer to observed data trends and variability than ERGOM outputs. This could be due to some biases in salinity estimated by ERGOM. This issue will be investigated and if necessary a new time series of ERGOM estimates of reproductive volume will be derived and provided by IOW. Expected data delivery is 1 week after the workshop.

Regarding model outputs of *temperature*, both models gave very good correspondence to some observed datasets that have earlier been shown to explain significant amounts of sprat recruitment variability.

These comparisons showed that the two models are very promising with respect to their abilities to produce estimates of key variables affecting cod and sprat recruitment in the Baltic Sea.

New analyses will be conducted for different basins and seasons, and will also include BALTSEM data when available.

Availability of model zooplankton data

No zooplankton outputs from any of the biogeochemical models were presented. Outputs available from RCO-SCOB1 and BALTSEM will be bulk zooplankton estimates unresolved by species, size or stage. Status of species-specific outputs for 1-2 species from ERGOM model was unclear and will be clarified by IOW colleagues.

No quality assurance or validation of zooplankton outputs from RCO-SCOBİ or BALTSEM has been conducted because of lack of availability of appropriate field data for comparison. Fish and foodweb models that use modelled zooplankton as an input may be introducing additional and unquantified uncertainty to their outputs. Some comparison of the zooplankton outputs from RCO-SCOBİ, BALTSEM or ERGOM could be done with Ecopath since the latter is a data-driven and mass-balance model.

Data reconstructions:

Ecopath is being used to develop snapshot estimates of biomasses of various species and trophic functional groups at approximately decadal time scales going back to the 1920s. Longer time series of biomasses for e. g., fish species could be used for other model and data validations and for evaluations of ecosystem and biomass status under combinations of forcings not presently represented by shorter time series confined to the latter half or quarter of the 20th century.

Spatial resolution of biogeochemical model outputs:

The RCO-SCOBİ and ERGOM models have a finer spatial resolution than BALTSEM so the spatial scales of model outputs are not directly comparable. It was proposed that some key monitoring station data be used for some data variables. However for reproductive volume data, the same boxes used by Plikshs et al. (1993 ICES CM) will be used by RCO-SCOBİ and ERGOM. The values from the boxes can then be combined to approximate the larger spatial scale of output from BALTSEM.

Forecast data availability for ca. 2006-2100: These data should start to be available shortly after start of 2011. It was proposed that the project start with outputs from the RAO-HADCM3 model for 1 climate emission scenario, and use this to generate outputs from the 3 NPZD models, which could subsequently provide outputs for fish and foodweb models.

Until the forecast data become available, wp3 colleagues should continue and intensify analyses of model validation and especially preparation of new fish and foodweb models so that these will be ready to be forced by new forcing data for the forecast period. Several fish and foodweb models are already developed and can be used to implement forecast data when available (e. g., Ecopath, BALMAR, stochastic multi-species models, single-species fish models).

Forecast scenarios:

The WP, and more generally the project, must identify and prioritize its forecast analyses and strategy because there will be a large number of combinations of CO₂ emission, nutrient loading and fishery exploitation scenarios, and different climate-biogeochemical-fish/foodweb models. The topic was only briefly discussed at the workshop due to time limitations. It is proposed that for cod exploitation, 3 scenarios are considered (status quo or business-as-usual, a recovery level exploitation and no exploitation). However exploitation levels and scenarios for other fish species need to be decided. Further discussion will be held at the ECOSUPPORT GA, and at an extra meeting among wp3 colleagues held in Norrköping before or after the GA. Part of the discussion

Combining forecast model outputs and ensemble averaging:

The large number of models and forcing conditions will yield a potentially vast number of forecasts covering a wide range of forcings. The project will need to consider how to present, visualize and interpret the outputs. Several fish and foodweb models that are under development (BALMAR, Ecopath, SMS) have been used to make preliminary forecasts for different climate and exploitation

scenarios within the ICES/HELCOM WGIAB. The co-chair of this group presented an update of status of their work and the WG has concluded that the outputs will not be combined so no ensemble averaging of the outputs will be done. However participants at the workshop suggested that perhaps some weighting of model outputs could be done to produce an average or synthesis of model results so the topic will be explored further in the remainder of the project.

Overall status of wp3:

Several fish and foodweb models are ready to be “forced” with forecast data, and have already been used for this purpose in other contexts. Some validation of preliminary biogeochemical model outputs that affect key fish lifehistory (e. g., recruitment) for the hindcast period have been conducted and show good correspondence with field data. New analyses with hindcast data will be conducted in remainder of project as data becomes available. Work will begin with forecast data in early 2011 when these data are available. Further discussions about forcing scenarios and an overall strategy will take place at October GA meeting and afterwards.

Upcoming workshop on “Uncertainties of Scenario Simulations”, Norrköping, Oct. 14, 2010:

The coordinator encouraged wp3 participants to submit abstracts about its work. The wp leader will prepare a draft about the model validations in hindcast period, circulate to co-authors and submit it.

Other business and information:

The coordinator encouraged participants to publish their results. He proposed that the project make a special issue of a journal to contain project results. The topic will be discussed further at the GA in October. Journal to be decided later. Preliminary time plan would be for submission in late spring (May-June) 2011.

Appendix: Agenda

ECOSUPPORT WP 1-3 Data Exchange and Integration Workshop



September 13, 2010

DTU Aqua, Charlottenlund

Agenda:

9:00 - 9:20 Welcome, introductions and objectives (Brian)

-deliverables, data table, 3 main topics of this workshop (where are we now, what needs to be done in rest of project, what can we do/what must we do to meet project deliverables)

9:20 - 9:45 Markus: update on status of climate models and WP1

9:45 – 10:05 Bo: update on status of Baltsem model

10:05 – 10:25 Ivan: update on status of NPZD modelling at IOW

10:25 – 10:40 Break

10:40 – 11:00 Thorsten/Susa: update on status of Ecopath modelling, esp. Lower trophic levels

11:00 – 11:20 Maciej/Margit: update on status of fish modelling in Ecopath

11:20 – 11:40 Martin: update on Balmar status

11:40 – 12:00 Anna/Thorsten: update on status of activities in ICES/HELCOM WGIAB relevant to ECOSUPPORT

12:00 – 12:45 Lunch in Castle (Riddersalen)

12:45 – 13:05 Brian: model validations and quality assurance – e. g., reproductive volume

13:05 – 13:25 Brian/Anders: combining model outputs, ensemble averaging

13:25 – 14:15 Brian: Future work in wp3 – getting to where we need to be
-hindcasts, quality assurance: when will data be available?
-forecasts: when will data be available? Which data ready first?

- how many forcing models, scenarios, and combinations?
- which data sets do we need, when will they be available, scheduling the work

14:15 – 15:30 Data exchange among WPs and participants

- formats of data, where available (FTP, website?)

15:30 – 15:45 Links to other ECOSUPPORT meetings

- Uncertainty workshop, Oct. 14, 2010 – submit abstract about our challenges and needs?
- ECOSUPPORT general assembly, Oct. 15, 2010

15:45 – 16:00 Other topics

16:00 End