

**Minutes of the CHARM Phytoplankton Work Package (2) meeting
September 2-3, 2002,
at the Institute of Environment and Sustainability, JRC, Ispra, Italy.**

Participants (initials / institute):

Peter Henriksen (PH/ NERI), Pirkko Kauppila (PK/ SYKE), Hendrik Schubert (HS/ EMAUG), Norbert Wasmund (NW/ IOW), Ingrida Purina (IP/ IAE), Renata Pilkaityte (RP/ KU-CORPI), Slavomira Gromisz (SG/ MIR), Anna-Stiina Heiskanen (ASH/ JRC), Celine Duhamel (CD/ JRC), Wouter van de Bund (WvdB/ JRC)

Objectives of the meeting:

- 1) to get an overview of the situation with the data quality analysis
- 2) discuss & decide on the further work and analyses
- 3) agree on the need of a possible joint data base
- 4) agree on deliverables & task distribution
- 5) discuss linkages with other CHARM WPs, & other national & EU WFD implementation activities.

Presentations

1. ASH made a presentation of the objectives and tasks of WP phytoplankton (presentation attached).
2. HS made a short presentation on the problems related to ecological quality classification of coastal waters (assessment of 'ecosystem health' requires ultimately integrated indices due to coupling of ecosystem components; e.g. alternative stable states between phytoplankton vs. macrophyte dominated systems; it will be difficult to assess trophic status since productivity data is lacking; sub-sets of existing data should be used to develop hypothesis (bottom-up approach); and other sub- set to test hypothesis, indices developed elsewhere might not be applicable (top-down approach), but some selected could be tested with CHARM phytoplankton data. Data quality problems still persists (e.g. species identification, etc.); common database is needed to develop hypothesis & carry out statistical testing using multivariate analyses).
3. ASH made a summary presentation of metadata analysis (same figs & tables as in the document; available upon request)
4. ASH made presentation of Timetable & Deliverables of WP2 (attached)
5. ASH made presentation of WFD Common Implementation Strategy coordinated by EC DG ENV. (available upon request from ASH, if you wish to have a look)
6. HS explained German administration & research organizations related to WFD implementation.

Overview of the status of phytoplankton datasheet compilation

Partner	Data is already in electronic form?	Coded?	Checked for mistakes etc?	Abiotics included	if not yet, when ready?	Approx. number of datasets	comments
NW (IOW)	Y	Y	Y	N	Oct.	1500	only the German part of the HELCOM-data, some of them sampled also by DK and PL
HS (HRO)	Y	Y	Y	(Y)	Oct	6000	
PH (NERI)	Y	N	N	N	4,5MM needed	3000	only frequent sampled - long term stations - starting with Limfjord/Kattegat
PK (SYKE)	Y	(Y)	(Y)	(Y)	Nov.	2000	same person analyzing since 80's
SG (MIR)	Y	Y	N	Y	Oct	300	
SG (MIR; HELCOM data)	Y	N	N	N	Oct	300	only dominant species are counted; only the subset from 1984 onwards For comparison between dominant and total species counting
IP (IAS)	Y	(Y)	(Y)	N	Nov.	1500	same person analyzing since 70's - still active
RP (KU-CORPI)	Y	N	(Y)	N	Nov	2500	same person analyzing since 81 - still active
AJ (EMI)	?	?	?	?	?	?	Anna-Stiina will contact Andris

Partner	Data is already in electronic form?	Coded?	Checked for mistakes etc?	Abiotics included	if not yet, when ready?	Approx. number of datasets	comments
Sweden? (SEPA, SU)	?	?	?	?	?	?	Anna-Stiina will ask for cooperation in a following small-scale project

Summary of the Discussion of indices

What to select for testing variability of phytoplankton

Across scales of Climate (N-S), Temporal, Salinity, Stratification, Trophic state (eutrophy)

Diversity indices

There are plenty of different diversity indices (e.g. Shannon-Weaver, PIE, Margalef's, etc.). However, Div. Indices may not be applicable to phytoplankton communities, since generation times are very short. Some diversity indices have been found to have a good correlation with climatological variability. It could be considered if it would be possible to pool species in higher taxonomic groups and use diversity indices to check variability of on higher taxonomic (genera or class level).

More discussion with with experts is needed.

WP 2 will start an email discussion of biodiversity indices in November (HS will initiate this).

How to define blooms?

- Frequency of biomasses within different intervals of CHL values (manuscript in prep)
- Anything more than one SD over mean value (of normal distribution) = bloom
- Requires data & knowledge of different area

- Peter prepares instruction/manual how to do this analysis by the end of November
- Also other references should be checked (all partners)

Definition of spring and summer periods

We need to define window where spring and summer blooms occur using data sub-sets for testing hypothesis using existing data.

There are 'expert opinions' of definition of seasons for different areas areas of the Baltic Sea (see below table of the definitions of seasons used by HELCOM experts), which can be used for preliminary definition.

HELCOM seasons

Sea area	Period possible for the spring bloom	Definition of seasons
Kattegat	mid of January – mid of April	Spring: February-April
Sound	mid of February – end of March	Summer: May-August
Belt Sea	end of February – beginning of April	Autumn: Sept-November
Arkona Sea	beginning of March – end of April	Spring: March-May
Bornholm Sea	mid of March – mid of May	Summer: June- September
Eastern Gotland Sea	end of March – end of May	Autumn: October-December
Western Gotland Sea	end of March – end of May	
Northern Baltic proper	mid of March – end of May	
Gulf of Riga	mid of March – mid of May	

Definitions of seasons should be carried out from the combined data set after November by finding the frequency distribution of blooms during each season.

Potential Indices to be tested

a) Key species approach?

- produce a list of most common **10 species** throughout the data sets? (Expert opinion HELCOM list of most important/dominant species already existing (this could be of help))
- produce a list of key-species
- Ratios of commonly occurring species during a bloom events

b) Temporal shifts of blooms

- possible temporal shifts of blooms should be defined using long term data series?

c) Proposals for ratios to be tested

- Ratios of larger taxonomic groups (eg. cyanos, diatoms greens etc....),
- Diatom:Dinoflagellate-ratio (Decrease in spring diatom, increase in dinoflagellates)
- Diatom to total phytoplankton biomass/biovolume-ratio (esp. Kattegat & S-Baltic)
- Ratio of cyanobacteria to total biomass during summer
 - N-fixing species?
- Seasonal bloom-ratio: Cumulative/average Spring bloom dinos & diatom biomass during the spring bloom period (after spring bloom period is defined) vs. cumulative filamentous cyanobacteria (or N-fixing) biomass during summer. Hypothesis behind: in more pristine conditions the spring bloom should exhaust most nutrients (N&P) leaving none for summer blooms to develop, while in eutrophic situation summer blooms develop due to N supply from air (cyanos) and combined N&P supply from upwelling/mixing/sediment release.
- Ratios of functional groups (size classes, filamentous, coccal, colony-forming, flagellates...)
- Coding of size, morphological and functional groups gives a good opportunity to test several potential combinations of those
- Functional groups (codes) for phytoplankton have to be tested during analysis, since they are selected/ determined using expert opinion.

Timetable of WP2 deliveries:

Deliverable	Dead-line	Responsible	Contribution
Draft paper (or <i>Report?</i>) on phytoplankton indices in relation to physico-chemical environment (D 14: <i>Map of distribution??</i>)	July – 2003	JRC, KU-CORPI, EMAUG, SYKE	NERI, SYKE, IOW, IAE, MIR
Report on phytoplankton indices applicable as quality elements for ecological classification (D17: <i>Method / Report??; D17=14??</i>)	November - 2003	JRC, KUCORPI, and MIR	NERI, SYKE, IOW, IAE, EMAUG
Draft paper: Linking phytoplankton indices with typology and macrophytes (D21)	November - 2003	EMAUG	NERI, SYKE, JRC and KUCORPI
Draft paper: Linking phytoplankton indices with typology and benthos (D22)	November - 2003	JRC	IOW, IAE, and MIR
Reference conditions of phytoplankton (Including <i>guidance for methods to select type specific reference conditions for phytoplankton in the Baltic Sea</i>) (D20 & D32; Reports; maps)	November – (draft) 2003 & (final) 2004	NERI, SYKE, KUCORPI, IOW, IAE, MIR, EMAUG (<i>select local type specific RC</i>)	ALL
Recommendations for phytoplankton monitoring strategy (D34; Report)	November - 2004	NERI, JRC, KUCORPI, and MIR	SYKE, IOW, IAE, and EMAUG

Near future task and deadlines (Sept. 2002 - June 2003)

Task	Deliverable/ Action	Deadline	Who
1. Complete final data sheets	Quality controlled data sheets	30/11/02	ALL
2. Support for DK Data compilation	letter to Rieman	ASAP	ASH
3. Clarify what methods of dissolved silicate analysis are comparable	NW sends info to ASH	ASAP	NW
4. Update missing phytoplankton groups/species to datasheets (all send additions, changes to NW)	Updated phytoplankton datasheets / NW sends updated sheets to ASH	ASAP	NW/ ALL
5. Update data sheet template	Updated data-sheet distributed to everybody through email & web-page	ASAP	ASH
6. Update linkages to other WP's	Letter asking for clarification what they/ we need	ASAP	ASH
7. Send relevant phyto-references to JRC (celine.duhamel@jrc.it)	Reference/ bibliography available in web-page	Sept.-Nov.-02	ALL
8. End-note library of relevant phytoplankton indicator papers	Reference bibliography available in web-page	October-02	CD (JRC)
9. Establishment of data base - meeting in Klaipeda	Agreement of data base location & structure	ASAP or October-02	ASH, HS, RP, AR, ZG
10. Produce plan of procedures	Plan how to deliver data to database & carry out analysis	October -02	ASH, HS, RP, AR, ZG
11. Commenting plan of procedures	plan of procedures	November - 02	ALL
12. Discuss applicability of biodiversity indices	Start an email discussion of the applicability BD indices	November-02	ALL (HS/ EMAUG will initiate this)
13. Develop a method to define 'bloom' using monitoring data	Statistical method for definition what is a bloom	November - 02	PH (NERI) & colleagues
14. Compile a list of easily identified ('no-problem') species	Send a template to everybody, compile & put a list of species in web-page	November-02	ASH/ ALL
15. Collecting notes of possible problem phytoplankton species	Updated list of problem species for analysis	Continuous – January-03	ALL (Sigi/ EMAUG will compile this)
16. First pilot statistical analyses	Results of multivariate analysis	February-03	KU-CORPI, (SYKE, JRC, EMAUG)
17. Commenting results of pilot statistical analyses	Advice & proposals for the next phase	March-03	ALL
18. Revised statistical analysis	Results of multivariate analysis	April-03	KU-CORPI, (SYKE, JRC, EMAUG)
19. Present results in CHARM workshop (8-11/4)	Comments from all partners	April-03	
20. preparing manuscript of variability of Indices	draft paper on natural variability of phytopl. Indices	May-03	KU-CORPI, (SYKE, JRC, EMAUG)
21. comments from others	compilation of commented draft paper	June-03	ALL
22. Revise draft paper	Revised paper = deliverable 14	July-03	KU-CORPI, SYKE, JRC, EMAUG
23. Find local/ national old literature references for definition of phytoplankton reference conditions	Reference conditions. Bibliography, web page	June-03	JRC/ ALL

Comments to tasks-table

1. The present / agreed order & structure of datasheets MUST be kept. Do not delete columns, do not reorganise columns when filling the data sheets. If you have to change order while filling data in, organise those in original order before submitting datasheets to database. Do not use ZERO (0), do not use letters.
3. Silicate Analyses acc. to Koroleff (see Grasshoff et al. 1983) are comparable. Norbert will clarify what is the earlier (blue?) method that may not be comparable with Koroleff's method, and provide further instructions. New column (AB) will be added for Silicate concentration.
4. All proposal for taxonomic additions/ changes to phytoplankton datasheets should be send to Norbert. Only Norbert can add columns to phytoplankton biomass tables. Norbert sends all final changes to ASH who will compile & distribute final datasheets to all partners (& CHARM www-page).
5. Samples where only 10 dominant species have been counted should be marked by setting one (1) to column AC of NEW abiotic data sheet, if all species counted leave empty.
9. A plan of the database structure and for the work to be carried out for statistical analyses will be compiled during visit to Klaipeda in October.
14. ASH send a template with a column for each partners' comments. Everybody send their list & comments to ASH.
15. Sigi collects files & notes where all comments concerning possible problem species are listed. This list can be updated continuously. Sigi will summarize received information in January 2003 to be used for analysis & evaluation of results of statistical analysis. Sigi & Hendrik keep master-file of all problem species. Send all problems with species names & identification to them. Agreed data sheets should not be changed by any partners
- 16-20. It was proposed that first KU-CORPI would be responsible for setting up the database and facilities to carry out statistical analyses of the data. Other partners would assist and supervise KU-CORPI in this task. The analyses should be carried out during small working meetings with 2 – 4 partners, carrying out analyses and testing the data in Klaipeda during December 2002 -February 2003. HS (HRO/EMAUG), PK (SYKE), & ASH (JRC) are willing to participate such meetings. Possibly also other partners. Travel funding may be required to enable some partner to travel to Klaipeda.
19. Date of the CHARM 2. Workshop has been changed. First results should be ready in early April 2003. We should foresee a presentation of the results of statistical analyses and WP2 specific meeting and discussion in connection to CHARM workshop, thus no separate meeting for WP2 partners is needed in 2003.
23. Old literature & references should be collected for evaluation of possibility to identify qualitative data for establishment of REFERENCE CONDITIONS. All partners should carry out this, since much of old references are not available widely (also old literature in Russian should be checked, Renata will do this).

Other issues & comments

- HS (HRO/EMAUG) would appreciate any voluntary to join to be responsible with him to compile Deliverable: **Draft paper**: Linking phytoplankton indices with typology and macrophytes (D21) before November 2003.
- there might be a problem if the heterotrophic *Leucocryptus* spp. is included in the biomass of **Cryptophytes** in earlier data. This should be checked when filling in data. [QUESTION: Should we mark such samples where Leucocryptus is not identified separately?]
- how is the biovolumes of *Ceratium* spp. Generally counted? Norbert will find Ceratium biovolume reference and distribute this reference and include it in the reference database (task: 7)
- information from CHARM WP nutrients could be used to establish nutrient Ref. Conditions. Also at BSSC there was an interesting presentation concerning how to set ref. cond. for coastal waters (HS will send this reference to others).

- Celine is preparing bibliography/ review of phytoplankton indices to her university (ready in October). This will be in French, but can be distributed for those who wish. Also possibility to translate relevant parts to English.
- Reminder of the data sheets completion should be sent to all WP2 partners one month before Nov. 30.