Delivery date: 30.11.2014

Authors:

Tatiana Tsagaraki
UiB
E-mail :
Tatiana.Tsagaraki@bio.uib.no

Principal investigators:
Frede Thingstad, **UiB** (NO)
Tatiana Tsagaraki, **UiB** (NO)
Name 3, **Shortname partner** (country abbreviation)

Project's coordinator:
Yngvar Olsen, **NTNU** (NO)

1. (Popular) Description of deliverable

In the framework of the project it is essential that partners occasionally meet in person to discuss matters related to the project, exchange information and be updated on ongoing activities. These meetings are organized under WP4. Beyond the gathering of involved partners, these workshops also aim to evaluate the models being used and the scenarios applied, discuss future field and modelling work and present and discuss outcomes from other WPs. It's also crucial to stay up to date with relevant research, therefore, as part of the workshop guest talks and presentation of relevant projects are also organized. This latter part also helps in the dissemination of the project to key stakeholder groups, namely other researchers.

For 2014, the workshop on information exchange took place in the facilities of the University of Bergen (UiB), Norway between the 20th and 21st of June.

2. Summary of contribution of involved partners to deliverable

The workshop was a joint effort coordinated primarily by NTNU and UiB, who worked jointly to set up the meeting agenda, contact invited speakers and address the particulars of the meeting. All partners contributed to the program with interactive talks and initiation of discussion about important project matters.

3. Details part 1

3.1   Meeting agenda

The agenda was structured to include talks by all partners as well as guest talks on other projects and relevant scientific ongoing work.

The guest speakers were Stephanie Dutkiewicz, MIT, who demonstrated "How changes to environmental drivers may alter marine phytoplankton habitats and community structure" using modelling tools. Louis Legendre, Laboratoire d'Oceanographie de Villefranche, gave a very detailed and informative overview of "The Microbial Carbon Pump (MCP), DOC and their relevance to climate change, their interaction with different environmental drivers, such as changing pH, temperature"; Juan Carlos Miguel from the radioecology Laboratory (IAEA), Monaco, talked about "The Biological pump and tracers" and finally Dag Slagstad presented Ocean Certain's sister project ICE-ARC along with their Arctic Ecosystem Model.

After the official end of the meeting a detailed discussion and planning session on the upcoming experiment in Patagonia among all involved partners followed. This was planned in as a critical element of this meeting, since the experiments were to take place in October-November of the same year 2014. Furthermore, it was important for the modelers (WP2) and the developers of the Decision support system (WP5) to take active part in order to learn more about the data that the experimenters were gathering, as well as inform them of what data they would *need* themselves.

The meeting agenda and participant list follows:

DAY 1	Thursday, June 19th, 2014	
9.00	Coffee	
9.15	**Introductions**	PC Yngvar Olsen; WP4 leader Frede Thingstad; SC Murat V. Ardelan; OC Rachel Tiller
10.30-11.00	**How changes to environmental drivers may alter marine phytoplankton habitats and community structure**	Stephanie Dutkiewicz, MIT
9.45-10.15	The Microbial Carbon Pump (MCP), DOC and their relevance to climate change, their interaction with different environmental drivers, such as changing pH, temperature	Louis Legendre, Laboratoire d'Oceanographie de Villefranche
11.15	Coffee	
11.30	**Data Mining briefing**	Juan Carlos Molinero, GEOMAR
12.15	Text Mining & Literature based Knowledge Discovery briefing – What are the needs of the domain experts	Pinar Ozturk & Erwin Marsi NTNU
13.00	**Lunch**	
14.00	The Biological Pump and Tracers	Juan Carlos Miguel, Radioecology Laboratory | IAEA Environment Laboratories, Monaco
14.45	**WP5 – DSS diagram presentation** Also includes a presentation of a "mock-up" interface for the DSS for feedback from the group.	Jean-Luc de Kok; Lieve Decorte
15.30	WP3 presentation	Jennifer Bailey,

		NTNU
16.00	**Consilience session** This session is dedicated to serve wp1. This includes producing variables on FW and BP and deciding what kind of data should be prioritized for data mining. Bayesian Belief Networks – Priority issue: Biological Pump. This session was led by the social scientists from NTNU, and the modellers from CEFAS were instrumental in bringing forth their needs to the other participants.	Frede Thingstad, University of Bergen; Rachel Tiller, NTNU (workshop)
17.30	End of this day's meeting	
19.30	**OCEAN-CERTAIN – Consilience dinner**	Hanne på Høyden

DAY 2	Friday, June 20th, 2014	
9.00	**Coffee**	
9.15	**MOVED FROM DAY 1** **Consilience session** This session is dedicated to serve wp1. This includes producing variables on FW and BP and deciding what kind of data should be prioritized for data mining.	Frede Thingstad, University of Bergen; Rachel Tiller, NTNU (workshop)
10.00	Sister EU project ICE-ARC, and Arctic ecosystem model,	Dag Slagstad Ingrid Ellingsen SINTEF
10:30	**"The role of WP2 ecosystem modeling within the OC project framework"**	Presentations (15 min) from each: Sonja van Leeuwen; Jonathan Beecham; Eva Garnacho and Kieran Hyder. 15 min plenary session at end.
11.15	**Lunch**	
13:00	**Dissemination, WP6**	Can Bizsel, DEU-IMST
14.00	**Summing up**	Murat Van Ardelan
15.00	**Coffee**	
15.30	**Management – Generally Assembly (GA)** a. Identification of representatives in the GA that have voting power b. Approval agenda and minutes of last GA c. Financial project status d. Deliverable and milestone status and expectation for coming period e. Any other business f. Planning of the next meeting	Plenary session
15.45	MESOCOSM!	
17.30	End Consilience meeting 2014	

Meeting participants, including the scientific advisory board and guest speakers, were:

No	First Name	Last Name	Institution	Email Address
1.	Robert	Thorpe	CEFAS	robert.thorpe@cefas.co.uk
2.	Kieran	Hyder	CEFAS	kieran.hyder@cefas.co.uk
3.	Eva	Garnacho	CEFAS	eva.garnacho@cefas.co.uk
4.	Sonja van	Leeuwen	CEFAS	sonja.vanleeuwen@cefas.co.uk
5.	Jonathan	Beecham	CEFAS	jonathan.beecham@cefas.co.uk
6.	Nicola	Walker	CEFAS	nicola.walker@cefas.co.uk
7.	Lucia	Bongiorni	CNR-ISMAR	lucia.bongiorni@ve.ismar.cnr.it
8.	Sükrü	Besiktepe	DEU-IMST	sukru.besiktepe@deu.edu.tr
9.	Nihayet Songul	Biszel	DEU-IMST	nihayetbizsel@gmail.com
10.	Can	Biszel	DEU-IMST	can.bizsel@deu.edu.tr
11.	Juan-Carlos	Molinero	GEOMAR	jmolinero@geomar.de
12.	Linn	Hoffmann	GEOMAR	lhoffmann@geomar.de
13.	Mirja	Dunker	GEOMAR	mdunker@geomar.de
14.	Murat	Ardelan	NTNU	murat.v.ardelan@ntnu.no
15.	Jennifer	Bailey	NTNU	Jennifer.Bailey@svt.ntnu.no
16.	Stefan	Graaf	NTNU	stefan.degraaf@nt.ntnu.no
17.	Erwin	Marsi	NTNU	emarsi@idi.ntnu.no
18.	Yngvar	Olsen	NTNU	yngvar.olsen@ntnu.no
19.	Pinar	Özturk	NTNU	pinar@idi.ntnu.no
20.	Nicolas	Sanches	NTNU	nicolas.sanchez@ntnu.no
21.	Rachel	Tiller	NTNU	rachel.tiller@svt.ntnu.no
22.	Olav	Vadstein	NTNU	olav.vadstein@biotech.ntnu.no

23.	Jose	Iriarte	Univ. Austral de Chile	jiriarte@uach.cl
24.	Antonio	Cuevas	Universidad Austral de Chile	antoncuevas@gmail.com
25.	Humberto	Gonzales	Universidad Austral de Chile	hgonzale@uach.cl
26.	Hugo	Salgado	Universidad de Talca	hsalgadoc@gmail.com
27.	Gunnar	Bratbak	University of Bergen	Gunnar.Bratbak@bio.uib.no
28.	Frede	Thingstad	University of Bergen	Frede.Thingstad@bio.uib.no
29.	Jorun	Egge	University of Bergen	Jorun.Egge@bio.uib.no
30.	Tatiana	Tsagaraki	University of Bergen	Tatiana.Tsagaraki@bio.uib.no
31.	David	Turner	University of Gothenburg	davidt@chem.gu.se
32.	Julian	Gallego	University of Gothenburg	julian.gallego@chem.gu.se
33.	Jean Luc	De Kok	VITO	Jean-luc.deKok@vito.be
34.	Lieve	Decorte	VITO	lieve.decorte@vito.be
35.	***Egil**	**Sakshaug**	**NTNU**	egil.sakshaug@bio.ntnu.no
36.	***Richard**	**Bellerby**	**NIVA**	Richard.Bellerby@niva.no
37.	****Stephanie**	**Dutkiewicz**	**MIT**	stephdut@MIT.EDU
38.	****Louis**	**Legendre**	**Laboratoire d'Oceanographie de Villefranche (LOV)**	legendre@obs-vlfr.fr
39.	****Juan Carlos**	**Miquel**	**IAEA Environment Laboratories, Monaco**	J.C.Miquel@iaea.org
40.	****Dag**	**Slagstad**	**SINTEF Fisheries and Aquaculture**	Dag.Slagstad@sintef.no

* Scientific Advisory Board

** Expert stakeholder; special invitation

Details of workshop (minutes)

On the first day of the meeting, June 19th, the project coordinator, Yngvar Olsen(NTNU), welcomed participants and briefly presented the project and the IPCC. Rachel Tiller(NTNU) gave an overview of the meeting agenda, while Murat Van Ardelan (NTNU) introduced WP4 and the consilience principle. Frede Thingstad (UiB) then introduced the invited guests starting with Stephanie Dutkiewicz. Stephanie introduced MITs Darwin project and its collaborators globally, followed by a talk on the use of 3D models to study plankton biogeography.

The work presented addresses the question of what is going to happen to phytoplankton communities in future oceans and how changes in environmental drivers alter marine phytoplankton habitats.

Different responses in phytoplankton groups according to latitude were demonstrated and, when looking at global data, how challenging it is study impacts of changes in temperature dynamics and pH. The talk concluded with a call for more experimental data on multiple stressors and a long discussion followed based on the information provided during the talk.

Following the lively discussion the 2nd invited speaker, Louis Legendre (LOV) talked about the ocean carbon pump. Louis' talk was very rich in information and synthesis and consisted of an overview of the three vertical oceanic pumps the challenges and uncertainties associated with them and potential responses to environmental forcing. The presentation consisted of six parts:

1. Introduction: the vertical ocean carbon pumps
2. Dissolved organic carbon
3. The microbial carbon pump (MCP)
4. Observed responses of the MCP to environmental forcing
5. Predicted responses of the MCP to global change
6. General conclusions

During the talk the gaps in knowledge to enhance our understanding of the biological pump were highlighted. The importance of the microbial carbon pump was underlined as well as the need for observational experimental and modelling data to understand its functioning.

After the end of the invited talks presentations from the different WPs commenced. First Juan Carlos Molinero (GEOMAR) reported the activities of the data mining group. Data sources were discussed as well as the increase in publications on "pelagic food webs" and "climate" along with an increase in publications on jellyfish. The need to explore the role of gelatinous zooplankton within the carbon pump was discussed, as well as more general data needs that WP2 has and WP1 can provide.

This talk was followed by a briefing on text mining and literature based knowledge discovery LBKD) by Pinar Ozturk and Erwin Marsi (NTNU). In this briefing the tools and methods to collect data were discussed and the participants were asked to explain how they identify important information in a sentence and what kind of knowledge is needed to process this information. The goal LBKD and text mining is to reveal implicit knowledge in literature while

uncovering hidden connections and suggesting new hypotheses. LKBD is at an initial phase, where the team is designing annotation schemes to capture events of change, cause, correlation and feedback my annotating relevant texts. The biggest challenge to this was identified as access to full text scientific publications, since the team has to download large numbers of manuscripts (>100000) there are often user rights problems. Finally a questionnaire to help the text mining team was distributed to participants.

The next and final guest speaker of the day was Juan Carlos Miguel (IAEA), who talked about processes that may affect the ocean in the context of temperature, atmospheric CO2, decrease in pH and increase in pCO2 as well as decrease of the mixed layer depth.

Jean-Luc de KOK and Lieve Decorte (VITO) gave an overview of different network models including original neural network, concept networks, fuzzy cognitive maps (FCM) and system dynamics. FCMs were explained in more detailed since this type of model will be used in the framework of the project, in support and collaboration with WP3.

For this model to be applied it is critical to have stakeholder input, primarily to know what problems the stakeholders feel they are facing with changes in the environments, policy etc. It is also important to know what stakeholders consider as important indicators and what they think about the terminology "short term" & "long term". The decision support system (DSS) constructed will be used by two different groups, namely stakeholders/ decision makers and scientists. It is expected the two groups will have different requirements from the DSS, stakeholders will be asking questions along the lines of: what are the long term impacts of climate change of fish landings; while experts will want to know what changes we can expect in the functioning of the biological pump.

A mock-up of the DSS was presented along with a brief demonstration of how it works, VITO are awaiting feedback from all partners to improve the DSS.

The first day of the meeting concluded with a presentation of WP3 by Jennifer Bailey (NTNU), who talked about how stressors will affect stakeholders, what their reaction might be and how we can improve management of socio-ecological systems. Vulnerability was used as a key concept during Jennifer's talk and suggestions were made on how to define and address vulnerability.
Meeting day two started with the WP4 consilience session, Frede Thingstad (UiB) presented an introduction to one of the biological pump main drivers, marine plankton food webs, and presented the main experimental and modelling challenges to understanding the system. Frede demonstrated what kind of responses are expected with different drivers to the system and how modelling and field results can confirm these hypothesis or take a turn for the unexpected to create new questions and pathways to understanding.

Following this overview, Muran van Ardelan (NTNU) continued by explaining the type of information needed to create a Bayesian Belief Network (BBN), setting the stage for Rachel to construct the BBN. The main components of the BBN appear to be biomass quantity, physiological characteristics and Environmental variables with lots of data being the positive state and absence of data the negative state.

Can Bizsel (DEU_IMST) then talked about dissemination as a performance indicator and a discussion about stakeholders, who they are and what their need are commenced.

Dag Slagstad (SINTEF) then presented Ocean Certain sister project ICE-ARC (Ice Climate & Economics, Arctic Ecosystem Model). A general introduction to the project was given. Project workpackages were described along with the structure of the ecological model. After the presentation of ICE-ARC, the CEFAS modelling team, Sonja van Leeuwen, Jonathan Beecham and Kieran Hyder presented a summary of the ecosystem model and the options available. The modelling team also presented some of the requirements for the model to run in terms of field data needs from the different study areas.

A plenary session for the Literature Based Knowledge Discovery followed where meeting participants were asked to contribute by recording scientific questions most important to their research and what kind of search terms they would use to answer those questions. This was done presupposing that the search engines used would have the capability to handle the queries and were therefore not constrained by system capacity.

Murat Van Ardelan then summed up and closed the meeting. A short General Assembly (GA): a) identified the members of that have voting power, b) approved the agenda and the minutes of the previous GA, c) discussed the financial status of the project, d) discussed the deliverable and milestone status and expectations for the coming period e) discussed other business and e) planned for the next meeting.

The meeting ended after this and participants at the mesocosm experiment in Patagonia were invited to discuss the particulars of the experiment. During this discussion the experimental design and measured parameters were discussed and decided upon while general information on the set up and running of the experiment was disseminated.

3.3 Results

After a successful meeting and interaction between the participants Stephanie Dutkiewicz and Louis Legendre agreed to participate in the project Scientific Advisory Board. The meeting provided a constructive platform to discuss project related matters and contribute to the different work packages.