

BEPSII Update, November 2013

Below is an update of the activities within the three Task Groups of SCOR WG-140 "BEPSII", compiled after a Skype meeting on October 18 attended by: Martin Vancoppenolle, Nadja Steiner, Jacqueline Stefels and inputs from Lisa Miller, Lynn Russell, Klaus Meiners and Christine Michel.

Everybody is asked to acknowledge BEPSII in their publications when they are inspired by the discussions and developments within BEPSII. This is crucial for BEPSII's prolongation! Please also let us know about those publications as well as potential presentations or session proposals, so we can list and advertise them for the group.... Thank you

Task Group 1 (Methods)

Task 1: Methods review paper

- Review is well underway and drafts are sent out for completion.

Task 2: Intercalibration experiments:

In September there was a deadline for submission of potential fieldwork locations. Responses were received from 5 of 8 possible platform locations. Reminders were sent to the remaining 3.

In November the draft for comment will be circulated.

Francois Fripiat has drafted a design for ice camp experiments focused on the comparison of different melting procedures for the analyses of biomass, biota, chlorophyll-a and nutrients.

Task 3: Manual of best practices

No further developments

Task Group 2 (Data)

Circum-polar datasets and analyses of sea ice biogeochemical data are needed to provide input for the development and evaluation of sea ice biogeochemical and primary production models, improving the understanding of coupled physical-biogeochemical and ecosystem processes in polar oceans. A key objective of TG 2 on data is to produce new data inventories and datasets by collation of historic data. The Task Group has initiated collation of Arctic and Antarctic datasets with a special focus on sea ice chlorophyll a from both pack ice and fast ice studies. Several datasets/cruises to the Arctic were identified so collation of data can start. A proposal to collate data from Antarctic fast ice (circum-Antarctic) for Chla will be submitted to the next Australian funding cycle.

We ask the sea ice community to contribute data to these efforts by i) providing data directly (e.g. by using the attached excel spreadsheet) and ii) inform the task group of recently updated data repositories and/or on the availability of unpublished historic datasets.

For Antarctic data please contact: Klaus.Meiners@aad.gov.au and/or martin.vancoppenolle@locean-ipsl.upmc.fr

For Arctic data please contact: Christine.Michel@dfo-mpo.gc.ca

Task Group 3 (Modelling)

We are still encouraging the SCOR-BEPSII members and interest group to participate or in one or more of the tasks described below or even lead a suggested topic which has not yet been taken on. If you are interested please contact the respective contact person or TG leads Nadja Steiner and Clara Deal (nadja.steiner@ec.gc.ca, deal@iarc.uaf.edu).

Task 1. Recommendations from modelers to observationalists:

A ToC for a citable paper has been sent to people who voiced interest in participating. (contact N. Steiner)

Task 2. Review papers on major biogeochemical processes

a) DIC/Alk separation during the freezing process: Lead: Bruno Delille, started on data collection and established contacts, was also contacted by Sebastian Moreau. More details welcome. Also, Grimm&Notz paper with MPI model soon to be submitted. (contact B. Delille)

b) Release and transfer of iron and other minerals: Delphine and Veronique have collected all the Fe data they could get their hands on in Arctic and Antarctic (pack and fast ice), and have started a short draft for a review paper. => would like to get a final draft by the next SCOR meeting in March to discuss/circulate with modelers, for submission in June. (contact D. Lannuzel)

c) Parameterization of light transfer in sea ice – Some progress for an improved parameterisation (Carsten Abraham). The issue was discussed at the recent FAMOS meeting. Some interest came up and a combination with a paper discussion/model intercomparison on under ice PP is planned.(contact N. Steiner)

d) processes of ice algal release into the water – no progress yet. Letizia had been identified as potential lead at the GRC, TBC.

e) link to atmospheric chemistry – Roland pointed out recent publication/special issue. Might not need an update at this point.

f) review of parameterizations for turbulent mixing in Arctic Ocean models. Elena lead: the issue has been discussed at the FAMOS meeting and will be pursued either with larger FAMOS participation or selection of Russian models (Model comparison testing why models overestimate the MLD in the Beaufort Gyre). A proposal has been declined, but will be resubmitted this year. Current work includes a summary of difficulties with modelling the near surface stratification (contact E. Golubeva)

Task 3. Intercomparison of 1D models and publication of a review

a) biogeochemical: Letizia and Martin are currently deciding on the common data set for the intercomparison. An email with instructions went out to the contacts. The idea is to present results in Hobart at our SCOR meeting for feedback. Contact (L. Tedesco)

L. suggests to publish in the open access Geophysical Model Developments (http://www.geoscientific-model-development.net/submission/manuscript_types.html), and asks if SCOR is able to cover publication costs (~1000k).

b) physical – see 2f

c) DMS: C. Deal is just finishing up a paper on her regional Arctic DMS model. Will look into 1-D models after. A new student at UVIC will work on a 1-D DMS model for the Arctic within the new Canadian NETCARE network (Arctic aerosols). (We should discuss the addition of parameterisations for marine organics. (contact Clara Deal)

d) Atmosphere. At the moment there don't seem to be a useful amount of atmosphere 1-D models for the Arctic. We will revisit next year.

Task 4. Application in regional models with links to global & regional climate modeling. -> link to the Forum for Arctic Modelling and Observational Synthesis (FAMOS).

FAMOS (<http://www.who.edu/projects/famos/>) discussions were positive and included observationalists (P. Matrai, J-E. Trembley). It is planned to do 1d and 3d model intercomparisons for the representation of the deep Chl maximum. Additional plans are hatched to discuss under ice PP in those same models, linking to the issue of light transfer through sea ice. Contact has been made with Sam Laney, who is putting biogeochemical sensors on ITDs (Ice tethered profilers). He was encouraged to check out BEPSII. (contact N. Steiner, K. Popova)

ESM model comparisons for Arctic biogeochemistry have been prepared by Martin and Nadja with limited analysis on causes for model differences including parameterisations. None of these models contains sea-ice algae.

Vancoppenolle, M., L. Bopp, G. Madec, J. Dunne, T. Ilyina, P.R. Halloran, N. Steiner, 2013. Future Arctic Ocean Primary Productivity from CMIP5 Simulations: Uncertain Outcome, but Consistent Mechanisms. *Global Biogeochemical Cycles.*, 27, DOI:10.1002/gbc.20055.

Steiner, N, J. Christian, K. Six, A. Yamamoto, M. Yamamoto-Kawai, 2013. Future ocean acidification in the Canada Basin and surrounding Arctic Ocean from CMIP5 earth system models, *JGR Oceans*, accepted.

Other business

- At FAMOS connected with Arild Sundfjord who's group is currently planning the Norwegian young sea ICE cruise 2015 (objective: to understand effects of new thin, first year, sea ice regime in the Arctic on energy flux, local and global climate, ice dynamics and the ice associated ecosystem). He was

encouraged to join BEPSII and was especially interested in making sure they follow the protocols established within BEPSI. He is interested in receiving a draft of the methods paper.

- Facebook page: No known progress.

- The **next BEPSII meeting** will be in **Hobart**, Australia, after the IGS - Sea Ice meeting (March 10-14, 2014). During the week there will be separate Task Group meetings to discuss group details; the plenary BEPSII meeting will be held on March 16th; options to do a workshop with APECS young scientists on “how to organise an international workshop” will be investigated.

- A **BEPSII-session proposal** has been submitted to the 48th CMOS Congress–Rimouski 2014, 1-5 June (Northern Exposure: The implication of changes in cold environments). Session title: “Biogeochemical Exchange Processes at Sea-ice Interfaces: Measurements and Model Parameterisations”.

- Next skype: January 2014: to be discussed: the program of the Hobart meeting.