Business Meeting Agenda
Shangri-La Hotel, Qingdao, China
October 16 (Friday) (09:00-18:00), 2015

WORKING GROUP ON
Regional Climate Modeling (WG-29)

09:00-09:10 Welcome, self-introduction, and sign-in
09:10-10:00 Introduction to WG-29 activity (Review of WG-29 TOR and accomplishments) (Co-chairs)
10:00-10:20 Group photo &break
10:20-12:00 Short update (<10 min) for each member nation's RCM activity update (WG-29 members)
14:00-15:30 Discussion on WG-29 final report (WG-29 members)
15:30-15:50 break
15:50-18:00 Discussion on preparation and timeline of WG-29 final report (continued), and specific plans and schedule (WG-29 members)
18:00 - Adjourn and WG-29 dinner

Appendix

A. Draft structure and items for WG-29 final report

- RCM activities
  - Each RCM member: RCM development summary
    - Mike: BC RCM
    - Enrique: California coast
    - China: Fangli etc
    - Russia: Olga, Andrei
    - KI,YK Cho, Chan Joo, Young Ho .: RCM for the Korean waters
    - Shin-ichi, Hiroshi, Hasumi, Tsujino : RCM for NP including Seas around Japan
    - Summary and synthesis (web site?): each member
- Ecosystem: Pena (leader authors), Enrique, Chan Joo, Jerome Fiechter, Hiroshi, Shi-ichi
- CMIP5 analysis (web site?)
  - Jim, Chan Joo

- Activity summary (co-chairs, Mike, etc.)
  - Workshop, collaboration with other organizations (PICES WG, CLIVAR etc.)
- Recommendation of next phase of WG-29

B. Report on the third meeting of WG-29 in Yeosu, Korea (October 1, 2014)

Working Group 29 on *Regional Climate Modeling*

The third business meeting of working group (WG 29) on Regional Climate Modeling (RCM) was held in the Conference Hall 1, Yeosu, Korea, on October, 17, 2014. With 10 members and observers in attendance (*WG 29 Endnote 1*), the meeting began with an introduction to working group activities, progress and plans by Co-Chairmen, Drs. Enrique Curchitser and Chan Joo Jang. After short presentations by the RCM working group members, a brief introduction was given by Japanese WG member Shin-ichi Ito, focusing on relevant items to WG 29. Finally the members discussed some emerging RCM issues, plans and schedule of future activity and preparation of the group's final report, and next phase of the working group. Below are the agenda items (*WG 29 Endnote 2*) and the corresponding discussions during the meeting.

AGENDA ITEM 1
Welcome and self-introduction

1. Pre-meeting social to allow members to interact.
2. Introduction to WG-29 activities and plans by Drs. Jang and Curchitser .
3. Members introductions

AGENDA ITEM 2
WG 29 activities

Dr. Jang overviewed WG 29's activities including convening relevant sessions and workshops, including the second meeting in Nanaimo, Canada (2013) and Open Science Meeting in Hawaii(April 15-18, 2014). In addition, Dr. Curchitser introduced the third 3rd PICES/ICES/IOC Symposium on "*Effects of Climate Change on the World's Oceans*" in Brazil, 2015 and the RCM session therein.

WG 29 proposals for 2015 PICES Annual Meeting
WG 29's proposal for a Topic Session on "*Past, present, and future climate in the North Pacific Ocean: Updates of our understanding since IPCC AR5*" (*WG 29 Endnote 3*) to be convened mostly by WG-29 members including Drs. Jang, was accepted and will be held on Day 1 of the 2015 PICES Annual Meeting (October 15–25, 2014, Qingdao, China).

AGENDA ITEM 3

Updates on national RCM activities

1. Chan Joo Jang (Korea): *CMIP5 analysis: preliminary results*

Dr. Jang presented results from CMIP5 analysis focusing upper-ocean processes including sea surface temperature (SST), mixed layer depth (MLD), and Pacific Decadal Oscillation (PDO), as described below:

- Horizontal resolution of most of the CMIP models is about 1 – 1.5 degree for ocean components and 1.5 – 2 for atmosphere components, indicating almost no improvement compared with CMIP3 models. (Angelica Peña suggested investigating changes in vertical levels of CMIP5 models, which might be more influential on simulation of biogeochemical processes by CMIP5 models.)
- Common SST biases: a cold bias in the North Pacific and a warm bias in the Southern Ocean
- MLD biases in CMIP5 show nearly same patterns as in CMIP3, indicating almost no improvement in MLD simulation by CMIP5 models compared with CMIP3 models.
- CMIP5 models seem to improve the PDO spatial pattern mainly due to better simulated the atmospheric link between tropics to extra-tropics.

2. ***Yang-Ki Cho (Korea):*** *Climate change projection in the Northwest Pacific marginal seas through dynamic downscaling*

Dr. Cho showed future climate change for seas around Korea using dynamic downscaling with a ROMS model forced with three different GCM forcing from three CMIP3 global models. Main results are as follows:

- The RCM project a rapid warming in the YS in contrast to a slow warming along the Kuroshio path.
- Future work includes dynamical downscaling forced with CMIP5 models, and inclusion of ecosystem modelling.

3. ***Michael Foreman (Canada):*** *Regional ocean climate model projections and their ecosystem implications for British Columbia, Canada*

Dr. Foreman discussed the results from two papers that were published in Atmosphere-Ocean and focus on regional projections for the British Columbia coast. His talk is closely linked to WG 29 TOR #3.

- The RCM project stronger eddy kinetic energy, stronger Vancouver Island coastal current, and little change in upwelling in the coast.
- The Hiada eddies, an important contributor to ecosystem changes, are projected to become stronger.

4. ***Angelica Peña (Canada):*** *A regional ocean climate model with biogeochemistry for the British Columbia continental shelf*

Dr. Peña presented one way downscaling of physics and biogeochemistry in the British Columbia continental shelf for detecting, understanding, and projecting climate change impacts on plankton productivity, nutrient supply, oxygen and carbon content, as well as for evaluating the potential risk (likelihood) for the development of hypoxia events and corrosive conditions. Specifically she described:

- A coupled physical-biogeochemical model has been used in which ROMS was implemented as a circulation model. The biogeochemical model includes NPZD, O2, DIC and Alkalinity
- Future projections experiments are planned by using CRCM or CGCM forcing and increasing atmospheric pCO2 and DIC at the lateral boundaries.

5. ***Hiroshi Kuroda (Japan):*** *Recent update of regional ocean modeling:Lower-trophic ecosystem modeling*

Dr. Kuroda described the modeling activities with the FRA implementation of the ROMS model coupled with eNEMURO or a NPZD model. Specifically he described:

- An operation ocean forecast system (FRA-ROMS) for mesoscale variation over the Kuroshio-Oyashio region

- Importance of nutrient supply by submesoscale eddies for enhanced chlorophyll concentration on the shelf-slope region

6. ***Shin-ichi Ito (Japan):*** *RCM developments in Japan*

Dr. Ito spoke about status of RCM development in Japan including MRI models, AORI model, CHOPE-eNEMURO, eNEMUROMS, and Mutsu Bay modeling. He also mentioned the possibility of providing simulation data from each RCM to PICES.

7. ***Enrique Curchitser (USA):*** *Multi-scale modeling of boundary currents*

Dr. Curchitser extended his RCM implementation to serval boundary current regions including the California coast, Northwest Atlantic and the Benguela region to reduce significant SST biases from GCMs. He discussed the role of wind interpolation and some difficulties with land-sea masks when embedding a high-resolution model within a global framework.

8. ***Young Ho Kim (Korea):*** *Data assimilative modeling system of KIOST*

Dr. Kim introduced the KIOST climate model focusing on ocean data assimilation system (DASK):.

- Ensemble Optimal Interpolation – Cost effective System
- Compared with global SST & SSS climatology and heat content
- Data released through KIOST LAS/OpenDAP server (http://las.kiost.ac)

9. ***Dimitry Stepanov (Russia, Olga presented):*** *Numerical modeling of circulation in the Okhotsk Sea: preliminary results*
    - The ocean model (INMOM) is a 3-dimensional, sigma coordinate model of 1/20 degree horizontal resolution.
    - INMOM was applied to Okhotsk Sea and simulated some prominent features including two branches of Est Sakhalin Current.

AGENDA ITEM 4

Dr. Ito introduced the report of FUTURE evaluation panel focusing on some relevant issues to WG-29:

- The report suggested including ecosystem modelling in climate forecasting to investigate climate change impacts on commercial fisheries.
- Short-term (seasonal to inter-annual) forecast was also suggested.

AGENDA ITEM 5

WG 29 final report, and specific plans and schedule

Dr. Curchitser presented ideas for a final WG report and, along with specific section assignments, will email them to the members. Members also discussed possible topics for a next phase of WG-29.

- Each member needs to submit about 5-10 page long summary.
- Invite experts outside the WG-29 members if needed.
- Possible topics for the next phase are related to the role of eddies and upwelling, which are associated with biological activity.

AGENDA ITEM 6

Adjourn meeting

WG 29 meeting participants (left to right): Shin-ichi Ito, Enrique Curchitser, Young-Ho Kim, Hal Batchelder, Olga Trusenkova, Michael Foreman, James Christian, Angelica Peña, Hiroshi Kuroda, Chan Joo Jang

WG 29 Endnote 1

WG 29 participation list

Members	Observers
Chan Joo Jang (Korea, Co-Chairman)	
Enrique Curchitser (USA, Co-Chairman)	Harold (Hal) Batchelder (USA)
Shin-Ichi Ito (Japan)	
Hiroshi Kuroda (Japan)	
Angelica Peña (Canada)	
James Christian (Canada)	
Michael Foreman (Canada)	
Young Ho Kim (Korea)	
Olga Trusenkova (Russia)	

WG 29 Endnote 2

WG 29 meeting agenda

- Welcome and self-introduction (Co-chairs)
- Introduction to WG 29 activity (Jang, Curchitser)
- a. Brief introduction of WG activities, progress, and plans (Jang)
  b. Introduction to the third 3rd PICES/ICES/IOC Symposium on "*Effects of Climate Change on the World's Oceans*" in Brazil, 2015 (Curchitser)

1. Short update by each member of their nation RCM activity (WG 29 members)
2. Brief introduction of FUTURE evaluation report (Ito)
3. Discussion on preparation and timeline of WG 29 final report, and specific plans and schedule (Curchitser)

WG 29 Endnote 3

Description for a 1-day Topic Session at PICES-2015

S7 *Past, present, and future climate in the North Pacific Ocean: Updates of our understanding since IPCC AR5*

Sponsoring Committees: POC, BIO, TCODE

Duration: 1 day

Convenors: Chan Joo Jang (Korea), Ho-Jeong Shin (Korea), Zhenya Song (China), Sukgeun Jung (Korea), Anne Hollowed (USA), Kyung-Il Chang (Korea), Angelica Peña (Canada), Shin-ichi Ito (Japan)

Potential (Suggested) Invited speakers: TBD

Climate has been changing and is highly likely to have been influenced by human activities. These changes, which have greatly affected the Earth's environment, have been manifested in oceanic ecosystems. Social demands for information on future projections are increasing the need to adapt to and mitigate climate change. The objective of this session is to update our understanding since IPCC AR5 on the past, present and future climate for the North Pacific Ocean and its marine ecosystems, focusing particularly on climatic change in ecosystem-relevant upper ocean and atmospheric variables. Climate change and its impact have been widely investigated using global climate models, while adaptation and mitigation issues have been studied using mostly regional climate models. While this session invites papers on various topics related to both climate simulations and observations, we also encourage presentations on the development and results of regional climate models (RCMs) and Earth System Models (ESMs), and assessment of hindcast simulations and their application to the projection of future climate or marine ecosystems using coupled general circulation models (CGCMs) in the North Pacific Ocean. Future projections of the North Pacific Ocean and its ecosystems, as obtained from global climate models (including CMIP5 standard experiment data for comparison with RCM results) will also be an important contribution to this session.

WG 29 Endnote 2

WG 29 meeting agenda

4. Welcome and self-introduction including introduction of new WG 29 members (Drs. Panjun Du (China) and Young Ho Kim (Korea)) (Co-chairs)
5. Introduction to WG 29 activity (Jang, Curchitser, Chang)
   a. Brief introduction of WG 29 including Terms of Reference (Jang)
   b. Review of the first meeting of WG-29 in Hiroshima, Japan (Curchitser)
   c. Report on the Regional Climate Modeling 2nd workshop in Busan, Korea (Chang)
   d. Report on WG29 workshop proposals for 2014 Open Science meeting and for 2014 PICESAnnual Meeting (Jang)
6. Short update by each member of their nation RCM activity (WG 29 members)
7. Discussion on preparation and timeline of WG 29 final report, and specific plans and schedule (Co-Chairs)

C. WG2-9 information

PICES webpage: http://www.pices.int/members/working_groups/wg29.aspx

Working Group 29: Regional Climate Modeling

Appoved at PICES-2011 Annual Meeting

Acronym: WG-29

Parent Committees: POC, BIO

Co-Chairman: Chan Joo Jang <cjjang@kiost.ac>

Co-Chairman: Enrique Curchitser <enrique@marine.rutgers.edu>

Mailing List (WG-29 Members only)

Duration: 3 years (Jan. 1, 2012 – Dec. 31, 2014)

Motivation

With the realization that physically-based future climate projections are the starting point for many socio-economic impact and adaptation considerations to future climate change and that global climate models, although they capture large scale climate behaviour, have limitations for regional assessments due to their coarse spatial resolutions, a working group is proposed to assess state-of-the-art regional climate modeling efforts, their implications for regional ecosystem studies and to further their development in the North Pacific Ocean and its marginal seas.

Terms of Reference

- Assemble a comprehensive review of existing regional climate modeling efforts;
- Assess the requirements for regional ecosystem modeling studies (*e.g*., how to downscale the biogeochemistry);
- Continue the development of RCM implementations in the North Pacific and its marginal seas;
- Convene special sessions and inter-sessional workshops dedicated to the RCM topic;
- Publish report and/or review paper on best practices for regional coupled modeling;
- Establish connections between PICES and climate organizations (*e.g*., CLIVAR) and global climate modeling centers (*e.g*., NCAR, JAMSTEC, CCCMA);
- Collaborate with other PICES expert groups such as WG-27, SICCME and the FUTURE Advisory Panels possibly by producing "Outlooks".
- Publish a final report summarizing results.

Linkages to the FUTURE Science Plan:

- What determines an ecosystem's intrinsic resilience and vulnerability to natural and anthropogenic forcing?
- How do ecosystems respond to natural and anthropogenic forcing, and how might they change in the future?
- How do human activities affect coastal ecosystems and how are societies affected by changes in these ecosystems?

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