Working Group 29 on *Regional Climate Modeling*

The fourth and final business meeting of working group (WG 29) on *Regional Climate Modeling* (RCM) was held on October 16, 2015 in Qingdao, China. With 11 members and observers in attendance (*WG 29 Endnote 1*), the members focused on discussion on preparation of the group's final report including its contents and schedule, and on next phase of the working group. Finally the members presented a short update for each member's RCM development activity. Below are the agenda items (*WG 29 Endnote 2*) and the corresponding discussions during the meeting.

AGENDA ITEM 1
Welcome

1. Pre-meeting social to allow members to interact.
2. Introduction to WG 29 activities and plans by Drs. Chan Joo Jang and Enrique Curchitser.

AGENDA ITEM 2
WG 29 final report (FR), specific plans and schedule

Dr. Jang presented ideas for a final WG report (structure, specific section assignments) and members agreed upon the content and future schedule, as follows:

- Each member will submit about a 5- to 10-page summary;
- Experts outside of WG 29 can be invited to contribute, if needed;
- Possible topics for the next phase are related to the role of eddies and upwelling, which are associated with biological activity;
- FR schedule:
  - Titles of each member's contribution, RCM info (domain, grid size, purpose, *etc*.), titles of papers and conference presentations (Nov. 1, 2015);
  - Short draft summary (5–10 pages including figures) for each country's RCM development efforts (Jan. 15, 2016);
  - FR Draft (Feb. 2016).

AGENDA ITEM 3
Possible topics for WG 29 next phase

Members discussed possible topics for a next phase of WG 29 and terms of reference for the most likely working group:

- Possible working groups on:
  - High resolution earth system RCM,
  - Sub-mesoscale eddies,
  - Ecosystem in upwelling regions,
  - Ocean–Atmosphere coupled RCM,
  - Local-regional nested RCM,
  - Physical-biological coupled RCM,
  - RCM: decadal hindcast and prediction,
  - COCEAN (ocean version of CORDEX).

- Suggested Working Group on 'Regional Bio-physical Predictions and Projections':
  Terms of reference to include:
  - Seasonal-to-interannual predictability assessment,
  - Downscaling of climate change projections,

- Changes in meso and sub-mesoscale eddies,
- Regional projection intercomparison,
- Trends in upwelling,
- Climate projection from RCMs.

AGENDA ITEM 4
Updates on national RCM activities

1. ***Chan Joo Jang (Korea):*** *Dynamical downscaling of climate change by using RCMs*

Dr. Jang presented results from CMIP5 evaluation analysis and regional climate modeling for the western North Pacific Ocean focusing on the seas around Korea:

- Analyzing all CMIP5 models for certain variables (ex. SST) is too demanding because many model simulations are available: for example, more than 50 different models from 24 institutes of 13 countries contributed to historical run output of SST. This factor, in addition to computing resources, limits the number of CMIP5 model simulation that can be used for dynamical downscaling of climate change projection.
- Most of the CMIP5 models have more than 40 vertical levels, compared with CMIP3 models mostly having less than 40 levels, indicating that CMIP5 models slightly improved their horizontal resolution. This improvement might be more influential on simulations of biogeochemical processes by CMIP5 models.
- CMIP5 models still show significant common SST biases and MLD biases, while their PDO spatial pattern appears to be improved, mainly due to a better simulated atmospheric link between the tropics to extra-tropics.
- Regional climate coupled models (RCCM) projected greater surface warming in summer than in winter in the seas around Korea, possibly due to earlier westward expansion or intensification of the North Pacific High Pressure system.
- Two-way coupling of regional modeling can considerably modify SST projected changes in Korean waters.

2. ***Tiejun Ling (China):*** *Regional coupled climate model application*

Dr. Ling introduced a typhoon (Muifa) simulation using a region coupled model (COAWST) with a 15 km horizontal resolution:

- Results showed that precipitation was better resolved, probably due to improved SST simulation;
- The next step is to integrate the model for 20 years and extend the model domain to the Asian-Australian Monsoon region.

3. ***Hiroshi Kuroda (Japan):*** *The current status of an operation ocean forecast system "FRA-ROMS" and its community models in FRA*

Dr. Kuroda detailed on-going efforts for developing the Fisheries Research Agency (FRA) forecast system with data assimilation and community models:

- The operation ocean forecast system (FRA-ROMS) produces a nowcast and 2-month forecast with a 1-week update, which are publically available through the website (http://fm.dc.affrc.go.jp/fra-roms/index.html)
- The FRA-ROMS system is evolving into a community model including a lower-tropic ecosystem model, a sea-ice model, and an individual based model.

4. ***Dmirty V. Stepanov (Russia):*** *Modelling the circulation and its variability in the Japan/East Sea*

Dr. Stepanov reported on modelling studies with the INMOM model for the Japan/East Sea and the Okhotsk Sea. The main results are as follows:

- A simulated cyclonic gyre in the northern Japan/East Sea shows predominant 4-year variability.
- Tidal effects can contribute to sea ice concentration in the Okhotsk Sea

AGENDA ITEM 5
Adjourn meeting

WG 29 Endnote 1

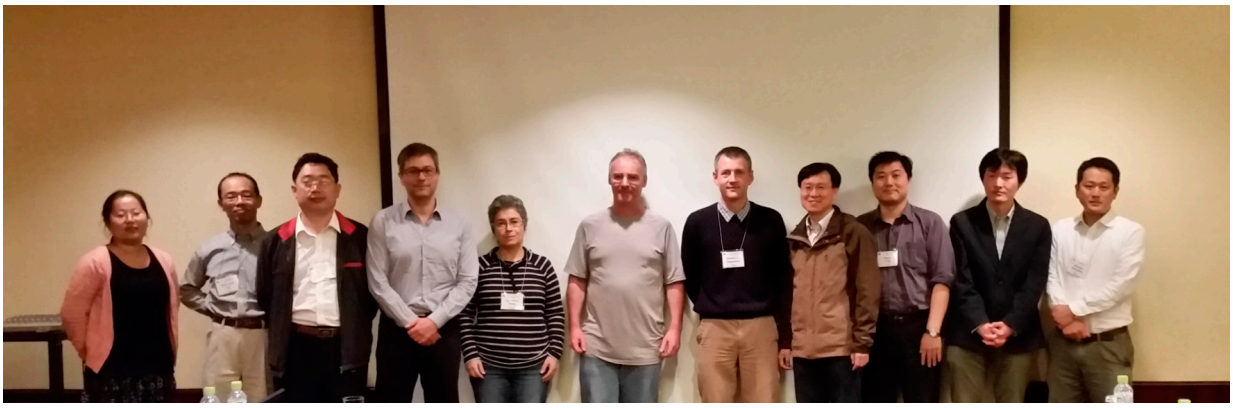
WG 29 participation list

Members

James Christian (Canada)
Enrique Curchitser (USA, Co-Chairman)
Shin-Ichi Ito (Japan)
Chan Joo Jang (Korea, Co-Chairman)
Hiroshi Kuroda (Japan)
Tiejun Ling (China)
Angelica Peña (Canada)
Fangli Qiao (China)
Dmitry V. Stepanov (Russia)

Observers

Ying Bao (China)
Daisuke Hasegawa (Japan)



WG 29 meeting participants (left to right): Ying Bao, Shin-ichi Ito, Fangli Qiao, Enrique Curchitser, Angelica Peña , James Christian, Dmitry V. Stepanov, Chan Joo Jang, Tiejun Ling, Hiroshi Kuroda, Daisuke Hasegawa

WG 29 Endnote 2

WG 29 meeting agenda

1. Welcome and self-introduction (Co-Chairs)
2. Discussion on timeline and contents of WG 29 final report (Jang and WG 29 members)
3. Possible following working groups (Jang and WG 29 members)
4. Short update by each member of their national RCM activity (WG 29 members)