1， Organizer

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2. Title

Japan's Research and Observation for IPCC WGI AR5

3. Theme

This event consists of a series of presentations and a panel discussion on Japan's cutting-edge research and earth observation. It is about Japan's contribution to IPCC AR5 WG1 as well as the latest scientific knowledge, generated by the supercomputer, Earth Simulator, and Greenhouse gases Observation Satellite, for instance. Speakers include a Japanese Lead Author of AR5 WGI on near-term Climate Change Projections and Predictability.

4. Agenda and speakers

1) Introduction: R. Kotani (MEXT)
2) Greenhouse gases observation from space by GOSAT & Ocean and Antarctic observation researches: K. Shiomi (JAXA)
3) International Contributions of JMA for Climate Issue: D. Kuboike (JMA)
4) Recent Progress and Outcomes of the Earth Simulator based Climate Change Projection Research: H. Kondo (RESTEC)
5) Decadal Prediction: A First-Round Report: M. Kimoto (U. of Tokyo/AORI)

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Footnote) MEXT: Ministry of Education, Culture, Sports, Science and Technology, JAXA: Japan Aerospace Exploration Agency, JMA: Japan Meteorological Agency, AORI: Atmosphere, and Ocean Research Institute.

5. Outline of presentations and discussions

1) R. Kotani, as the facilitator, expressed the audience the overall objective of this event and introduced each panelist.
2) K. Shiomi first mentioned the important role of the GOSAT for climate change research and policy issues in a series of satellites in the JAXA exploration history. He showed recent observed outcomes on horizontal distribution of the concentration and flux of such GHG as CO2 with their contribution to the AR5. He then showed main observation activities of Japan Agency for Marine-Earth Science and Technology (JAMSTEC), such as ocean observation findings on bottom ocean water warming and also outcomes from an antarctic research expedition.

3) D. Kuboike talked on JMA's operational observation efforts contributing to the long-tem continuing atmospheric and oceanic monitoring through the framework of WMO/Global Atmospheric Watch (GAW) and GCOS. JAM publishes periodically outcomes from these observation data as well as its projection outcomes. He also showed ongoing new re-analysis initiative of JRA-55, which follow up and develop from the existing JRA-25 already accomplished earlier. JRA-55 will apply 4D-Var analysis of the last half century. He also mentioned JMA's another important role as the World Data Center for Green House Gases (WDCGG) under the WMO.

4) H. Kondo talked recent progress and outcomes of climate change projection research based upon the supercomputer, Earth Simulator, under a series of projects of the MEXT. The second of the series, KAKUSHIN Program has particularly contributed to the IPCC AR5 through its new findings. He showed its three foci as the projection targets: long-term, near-term and extreme event changes. He showed examples of such new findings particularly how a dynamic vegetation model under which species compete each other under a given climate condition to attain a balance and how a 20 km super high resolution global atmospheric model simulate tropical cyclones, both by video animation.

5) M. Kimoto, the research leader in Japan for near-term prediction and a LA of the IPCC WG1 AR5 Chapter 11, reported the very challenging research efforts on decadal prediction now at its first-round stage. The difficult challenge of the near-term decadal prediction, according to his talk, comes from its duel characteristics from the prediction stand point. Near-term prediction consists of initial value problem as a longer extension of NWP and also climate change problem as an external force (natural and anthropogenic) response problem. He stressed the important aspects of atmosphere and ocean data assimilation for initialization. He also showed new findings on predictability at certain time frames. He then showed other research outcomes including those related to the hiatus issue and remaining challenges being addressed under the ongoing MEXT initiative of SOUSEI Program.

6) Responding to comments and questions from the floor, the panelists expressed their views. The details are as follows.

<Floor> How do you assess the increase of CO2 in the central region of Africa in the model simulation that reflect observation data?

<Ans.> *We guess it is the impact of biomass burning. By reflecting observations,*

we expect improvement in the inventory information, contributing to better simulation results.

<Floor> How do you discern data to identify CO2?

<Ans.> *GOSAT cannot discern anything under cloud cover. We discard data by identifying clouds. We only deduce CO2 under clear sky.*

<Floor> To what extent of depth is the ocean warming?

<Ans.> *According to the observation in Indian Ocean by the JAMSTEC, warming at the depth of 3000 m has been confirmed.*

<Floor> The video animation of the 20 km global model simulation was impressive, particularly for tropical cyclones. How do you make use of the model outcome for your projection?

<Ans.> *Under Kakushin Program, present and future climates have been simulated and projected by providing sea surface temperature at present and at the future respectively and the outcome shows regionally detain presentation of the present and projected climate. The model is capable to simulate, for example a tropical cyclone with eye, eye wall and spiral bands to a considerable extent. Our projection is the difference of these two outcomes. According to the model experiments, future tropical cyclones will globally increase in strength and decrease in frequency. The findings on the frequency is remains low in confidence by AR5. We think one of the reason of this assessment would be because we do not find any similar modelling results to compare each other.*

<Floor> Are the outcome of such high resolution model available?

<Ans.> *Outcomes from the 20 km global model have been already made available. Further high resolution of 14 km global model data from the "Key" super computer in Japan with 10 petaflops ability are not yet available until completion of ongoing experiments and analysis.*

<Floor> According to your outcomes from your Earth System Model, the future boreal-deciduous forest in the northern part of Siberia are projected to be replaced by the boreal-evergreen forest. Then why the tropical forest are projected to remain in the similar regions?

<Ans.> *In the dynamic vegetation model integrated into the Earth System Model, vegetation spices compete each other under a given climate conditions to attain a certain balance. Concerning your question, we think that the higher latitude regions outside tropical rain forest regions are projected to remain dry and tropical rain forest would be limited to move outside to higher latitude.*

<Floor> This is my comment. Thanks to the description of hiatus in the AR5, questions by skeptic people (such as whether the global warming has stopped) has not been brought in since the publication of the WG1/AR5/SPM on 27 September 2013.

<Floor> Global warming is now under hiatus. How is your prospect of global warming from now on?

<Ans.> *We project that the hiatus will be unnoticeable in several to 10 years and the warming tendency will again come back. So existing findings on global warming, adaptation and mitigation are not to be affected.*

<Floor> What has been found from geoengineering experiments?

<Ans.> *From a stratospheric aerosol dissemination experiment, first of all, it was found that drastic warming occurred just after the termination of such dissemination. Since I am not an expert in this subject, I am not quite sure but I think that even if we stop global warming by blocking solar beam through stratospheric aerosol dissemination, greenhouse gas concentration is increasing and water cycle is argued to change (though I am not sure if these are reflected in AR5). I thing disseminating aerosols will not completely stop global warming.*

6. Photograph