EASCOF 2013

The First Session of East Asian winter Climate Outlook Forum

(The 1st EASCOF)

4-6 November 2013, Ulaanbaatar, Mongolia

Program & Local Information

ABSTRACTS

Sponsors: National Agency of Meteorology and Environment Monitoring (NAMEM)

Institute of Meteorology, Hydrology and Environment (IMHE)

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Contents

Welcoming Address of Mr. ENKHTUVSHIN, Director General of NAMEM, Mongolia

I would like to extend my great pleasure to welcome all the participants from the China Meteorological Administration (CMA), the Japan Meteorological Agency (JMA), and Korea Meteorological Administration (KMA) as well as scholars and climate forecast experts of Mongolia.

As all of you know, this year, we are organizing the 1st Session of East Asian winter Climate Outlook Forum (EASCOF). However, we have more than 10 years' experiences in this cooperation under the title of the "Joint Meeting for the Seasonal Prediction of the East Asian Winter Monsoon".

I deeply appreciate to KMA, JMA, and CMA for their continuous efforts, supports and strong cooperation. Also, I would like to thank the representatives of user groups including decision makers, emergency officers, and experts for participating the forum.

In Mongolia, fortunately, we have experienced very pleasant summer this year. Meanwhile, Japan, Korea and some part of China have experienced unusual heat wave, which cause huge economic pressure. By mid-October, typhoon hit the eastern part of Japan and brought record-breaking heavy rainfall. Precipitation amounts of 600mm in six hours caused severe flush flood and land slide, and more than 16 people were killed.

In Mongolia, drought and Dzud are climate related extreme events that threaten livestock and agricultural sector, which are highly exposed to the climate condition. Therefore, it is crucial to forecast these climate condition as early as possible and as accurate as we could to meet user's request. Predicting climate condition is global challenging issue.

I think that this forum has contributed a lot effort in development of climate condition prediction in our region since its beginning. In this regard, I hope that this forum will produce fruitful outcomes by providing consensus-based winter climate outlook for the four countries with a chance to have in-depth discussions.

I also hope we will continue our friendship to increase the long-range forecasting capability and to continuously exchange information under our partnership in the future.

Finally, I'd like to thank all speakers and participants for being here despite your busy schedule. Have a nice time during your stay in Mongolia.

I wish a great success for the forum.

Thank you very much,

5 November 2013

Mr. S.Enkhtuvshin
Director General
National Agency of Meteorology
And Environmental Monitoring

Program

The First Session of East Asian winter Climate Outlook Forum

(The 1st EASCOF)

4-6 November 2013, Ulaanbaatar, Mongolia

Monday, 4 November 2013

10:00-17:00 **Tour to special site**

Tuesday, 5 November 2013

09:30 - 10:00 **Registration**

Opening Session:

Chair: Dr.G.Sarantuya

10:00-10:10 **Welcome Address**

Mr.Enkhtuvshin, Director-General of National Agency of Meteorology and Environment Monitoring (NAMEM)

10:10-10:20 **Keynote Address**

Dr. Hyun-kyung KIM, Director of Climate Prediction Division, Korea Meteorological Administration (KMA)

Dr. Bing ZHOU, Chief scientist, National Climate Center (NCC), China meteorological Administration(CMA)

Mr. Norihisa FUJIKAWA, Senior forecaster, Climate Prediction Division, Japan Meteorological Agency (JMA)

10:20-10:50 **Group Photo and Tea/Coffee Break**

Section I: Overview of recent climate and climate variability

Chair: Dr. Hyun-kyung KIM

10:50-11:10 Characteristics analysis on the 2013 summer climate in Mongolia, **D.Dulamsuren, IMHE, Mongolia**

11:10-11:30 Characters of temperature and precipitation and main climatic events in China in 2013, **Hongmei XU, CMA, China**

11:30-11:50 Characteristics of 2013 summer over South Korea, **E-Hyung PARK, KMA, Korea**

11:50-12:10 Factors of extreme summer conditions in East Asia in 2013, **Norihisa FUJIKAWA, JMA, Japan**

12:10-13:30 **Lunch Break**

13:30-13:50 Recent variability of East Asian winter monsoon, **Norihisa FUJIKAWA, JMA, Japan**

13:50-14:10 Temperature Variation over East Asia in Connection with Weakening of Stratospheric Polar Vortex, **Sung-Ho WOO, KIOST, Korea**

14:10-14:30 Advancement of EAMAC/WMO and Assessment of EAWM Indices, **Bing ZHOU, CMA, China**

14:30-14:50 Recent Evolution and Outlook of ENSO Cycle, **Xianjun XIAO, CMA, China**

14:50-15:10 Air temperature distribution over Mongolia using Dynamical downscaling and statistical correction
G.Bayasgalan, Pusan National University (PNU), Korea

15:10-15:30 **Tea/Coffee Break**

15:30-15:50 Review of recent extreme weather and climate events in Mongolia, **M.Doljinsuren, IMHE, Mongolia**

15:50-16:20 **Discussion**

Section II: Seasonal climate prediction of the winter 2013/2014

Chair: Dr. Bing ZHOU

16:20-16:40 Seasonal outlook for winter 2013/2014 over Mongolia, **B.Jargalan, IMHE, Mongolia**

16:40-17:00 Seasonal outlook of the 2013/2014 winter over China, **Wei GU, CMA, China**

Wednesday, 6 November 2013

09:00-09:20 Climate Outlook for Winter 2013/2014 Over Korea**, Jeongsun KIM, KMA, Korea**

09:20-09:40 Seasonal Prediction of East Asian Winter Monsoon in 2013/2014, **Baek-Min KIM, KPRI, Korea**

09:40-10:00 APCC Climate Prediction for winter 2013/14, **Hyun-ju LEE, APCC, Korea**

10:00-10:20 Seasonal outlook of the East Asian Winter Monsoon in 2013/14, **Keiko HARAGUCHI Higaki, JMA, Japan**

10:20-10:50 Tea/Coffee Break

10:50-11:10 Outlook of 2013/2014 East Asian Winter Monsoon using PNU CGCM **G.Bayasgalan, PNU, Korea**

11:10-11:30 Discussion

Section III: Discussion and Summary

Chair: Dr.P.Gomboluudev

11:30-12:10 Discussion on the draft summary on The East Asian Winter Outlook

12:10-12:20 Closing remark

12:20-13:50 Lunch Break

13:50-17:00 Visit in Parliament house, museum, and free time

Abstracts

CHARACTERISTICS ANALYSIS ON THE SUMMER CLIMATE OF 2013 IN MONGOLIA

Dulamsuren Dashkhuu and Batbold Altangerel
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ABSTRACT

The climate of Mongolia is harsh continental with sharply defined seasons, high annual and diurnal temperature fluctuations and low rainfall. Because of high altitude and latitude, it is generally colder than of other countries of the same latitude. About 85% of total precipitation falls from April to September of which about 50-60% falls in June and August. This study, climate characteristics of 2013 summer in Mongolia will be presented and summarized as follows.

During summer of 2013 in Mongolia, mean summer air temperature was 17^0C, which was -0.2^0C lower the climatology of 1981-2010. In case of June and July, the mean temperature in most part of Mongolia was lower than normal. In August, most regions of Mongolian were above the climatology and the eastern part of Mongolia was lower than normal.

From June to August 2013, the precipitation of Mongolia was 52.3 mm which was 6.6 mm above than normal /1981-2010 base average/. The precipitation in June was more- than- normal in all regions of Mongolia. Particularly in July most of parts precipitation was less- than-normal, Southern and eastern part of Mongolia was lower than normal in august.

The heavy rain with hail events occurred on 4 July 2013 in Tushig sum Of Selenge province, the northern Mongolia. During heavy rainfall, 61.3 mm of rain fell in Tushig station for one hour and half. This extreme event *caused loss of life*, disrupt normal human activities, estimated at $250.000.

CHARACTERS OF TEMPERATURE AND PRECIPITATION AND MAIN CLIMATIC EVENTS IN CHINA IN 2013

Hongmei Xu
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ABSTRACT

From January to September 2013, mean temperature averaged over China is 12.2℃, which is 0.6℃ higher than normal and ranks the 3th since 1961. Except the mean temperature in Northeast China and northeastern Inner Mongolia is 0.5~2℃less than normal, temperature in most China is near to or higher than normal, especially in the middle and eastern of Northwest China, eastern of Southwest China, western part to the south of the Yangtze River, and the Yangtze River Delta. During the same period, mean precipitation of China reached 582.5mm, being 4.3% more than normal and the 3rd greatest since 1999. Precipitation is Northern China, northeastern of Southwestern China, and Southern China is generally 10~30% more than normal, precipitation in most China is near to or less than normal.

Main climatic events during China in 2013 include: (1) In the earlier of this year, Southern China suffered snow and ice storms, part of Northern China suffered snowstorm; (2) Continued low temperature, frequent rain and snow in Northeastern China during the past winter and spring caused a great impact on the spring sowing; (3) Extreme rainfall events in Sichuan, Gansu, Shanxi and Heilongjiang caused floods and mud-rock slides in some area mentioned above; (4) droughts persisted from last winter to this spring in Southwest China and unprecedented droughts persisted in the south of the Yangtze River and Guizhou in summer; (5) Extensive and intensive extreme high temperatures occurred in Southern China in summer; (6) the formation and landfall tropical cyclones are more than normal, with the earlier landfall time and southerly landfall position; (7) Continued , intensive and frequent fog and haze in the middle and east China caused severe negative effects; (8) Convections are less than normal with less impacts; (9) Sand storm processes are less, the intensity is weak, and the starting time is partial late.

CHARACTERISTICS OF 2013 SUMMER OVER SOUTH KOREA

E-hyung Park, Jihye Lee, and Hyun-kyung Kim
Climate Prediction Division, Korea Meteorological Administration

ABSTRACT

South Korea experienced abnormally hot weather and normal precipitation in 2013 summer. The summer mean temperature over South Korea was 25.4℃, 1.8℃above the 1981~2010 average, which ranked highest since 1973. The monthly temperature anomalies over South Korea were +1.4℃, +1.8℃ and +2.2℃ for June, July and August, respectively. The summer mean precipitation was 567.5mm, 78% of normal. The monthly precipitation ratios to normal were 65%, 101% and 60% for the June, July and August, respectively.

The Changma (also known as Bai-Yu in Japan and Mei-Yu in China) in South Korea started on 17 June (18 June) and ended on 4 August (2 August) over central (southern) region. The total number of days over central and southern region was 49 and 46, which ranked highest since 1973.

During Changma, Western North Pacific High (WNPH) has extended northward. As a result, continuously hot and humid southwesterly flow along the edge of the WNPH collided frequently with cold and dry continental upper air over the central region, which induced severe atmospheric instability. The heavy rainfall occurred over central region of South Korea. On the other hand, the tropical nights and heat waves appeared over southern region, which experienced hot conditions and substantial rainfall deficit.

During summer, 13 typhoons developed (normal average: 11.2) and 2 typhoons directly affected (normal average: 2.2) to South Korea, which was normal frequency for 1981~2010.

FACTORS OF EXTREME SUMMER CONDITIONS IN EAST ASIA IN 2013

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ABSTRACT

The atmospheric circulation over East Asia is significantly different from the climatological conditions in summer 2013 and caused some extreme weather/climate events in East Asia. For example, heavy rainfall events in the northern India, the central China, North Korea, the northern Japan, the basin of the Amur River and the Indochina Peninsula and heat wave and draughts in the southern China and the southern Japan.

These events were caused by the anomalous atmospheric circulation such as northward shifted strong jet stream with active high frequency disturbances and the stationary enhanced sub-tropical high pressure system. The background factor of anomalous atmospheric circulation is the active Asian monsoon including Western North Pacific Monsoon.

To estimate factors of anomalous conditions, our group move ahead with an analysis such as a statistical analysis, a budget analysis and an impact experiment using GCM. The results will be discussed in the presentation.

RECENT VARIABILITIES OF EAST ASIAN WINTER MONSOON

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ABSTRACT

Even though the global warming is progressing, most of East Asian countries have experienced severe winters in recent years. Is the main factor La Niña or the rapid decrease of Arctic Sea Ice? Is it concerned with the hiatus of global warming? What is going on in recent winters will be discussed in the presentation.

TEMPERATURE VARIATION OVER EAST ASIA IN CONNECTION WITH STRATOSPHERIC POLAR VORTEX DURING THE BOREAL WINTER SEASON

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[2]Korea Polar Research Institute
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ABSTRACT

In this study, we investigated the sub-seasonal tropospheric circulation and temperature variation related with the weakening of stratospheric polar vortex using the composite analysis. During the stratospheric weak vortex (SWV) period, the cold condition is dominant over East Asia. Interestingly, it is found that the cold signals exhibit strong phase dependency in despite of the slow evolution of stratospheric circulation. The temperature fluctuation in the lower-troposphere over East Asia is mainly forced by the variation of climatological trough located in the upper-troposphere over the East Asian coast during the SWV event. The trough varies in a close connection with the evolution of the SWV. The temperature fluctuation over East Asia is critically influenced by the variation of the East Asian upper-level trough. This variation of the upper-level trough is closely associated with the evolution of SWV. In particular, in the early time of SWV event (Peak period, -5 - +5 days), the upper-level trough over the East Asia take places is anomalously deepened. It leads to extremely cold over East Asia. The deepening of trough seems to be related to the wave forcing from the upstream (Ural Mt.) as well as direct impact of stratospheric negative GPH (geopotential height) anomaly. In the next period (Decay 1 period, +6 - +16 days), the anomalous trough is rapidly weakened in spite of slow evolution of stratospheric circulation, so it is linked to weakening of cold signal over the East Asia. The weakening of the trough in Decay 1 is caused by the westward migration of strong positive Z anomaly from the North Pacific. The westward positive anomaly comes from the clockwise rotation of stratospheric positive Z anomaly. After about two weeks from the occurrence (Decay 2 period, +17 – +27), the cold condition is re-strengthened. This cold is induced by developing of the trough over East Asia related to the hemispheric circulation of negative AO-like type related with the stratospheric downward signal. These results indicate that the large

and local circulations related to the SWV play an influential role in the variation of temperature over East Asia.

ADVANCEMENT OF EAMAC/WMO AND ASSESSMENT OF EAWM INDICES

Bing ZHOU

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ABSTRACT

EAMAC/WMO has made investigation, survey and assessment on about 40 East Asian summer monsoon indices and 15 winter monsoon indices, these indices describe the change of monsoon intensity, and to improve operational capabilities on Asian monsoon monitoring, prediction and service, and set up the EAMAC/WMO website. Results show that East Asian summer monsoon has inter-decadal change, mainly includes two modes.

RECENT EVOLUTION AND OUTLOOK OF ENSO CYCLE

Xianjun Xiao, Lijuan Chen
Beijing Climate Center/CMA

ABSTRACT

Neutral conditions continue in the tropical Pacific since the boreal spring of 2012. During January- February, May-September 2013, equatorial SSTs were below averages in the eastern half of the Pacific, above averages in the far western Pacific and near-average elsewhere. Recently, Equatorial sea surface temperatures (SST) are near average across much of the equatorial Pacific Ocean. Low level winds were near normal across most of the equatorial Pacific. In early October, westerly wind anomalies strengthened over the western Pacific, while easterly anomalies persisted in the eastern Pacific. Negative OLR anomalies were evident over the western Pacific, while weak positive OLR anomalies were observed over the middle and eastern Pacific. The values of upper-ocean heat anomalies and the thermocline slope index are near zero which reflects ENSO-neutral conditions. Most dynamical models surveyed predict ENSO-neutral conditions will continue into the early 2014. According to the climate models and diagnostic analysis, the status of atmosphere and ocean associated with ENSO are expected remain neutral through the winter of 2013-2014.

AIR TEMPERATURE DISTRIBUTION OVER MONGOLIA USING DYNAMICAL DOWNSCALING AND STATISTICAL CORRECTION

Bayasgalan Gerelchuluun and Joong-Bae Ahn
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ABSTRACT

In this study, a dynamical downscaling using the Weather Research and Forecast (WRF) model was performed to attain fine-resolution gridded meteorological information reflecting the complex topographical effect of Mongolia. In fact, sparse station network of average distance 107 km is incapable of representing the spatial distribution of climate variables, such as temperature, over Mongolia's complex topography. In order to reproduce fine-scale air temperature in Mongolia, National Centers for Environmental Prediction / the National Center for Atmospheric Research reanalysis II data with 6-hour intervals from 1981 to 2010 were used as the initial and boundary conditions of the WRF model. One-way nesting system was applied for two nested domains with horizontal grid spaces of 60 km and 20 km, respectively. For correction of the systematic biases induced by dynamical downscaling, a statistical correction method was used for the downscaled results simulated by the WRF. The bias was divided into two parts: the mean and perturbation parts. The former was corrected by using a weighting function and a temperature inversion, while the latter was corrected by the Self-Organizing Maps method. As for the bias for the mean part correction, the temperature inversion, characterized by an inverted lapse rate, in which temperature increases with increasing height in the lower atmosphere, was considered only when the temperature inversion occurred. According to our result, the domain-averaged Root Mean Square Difference of the model-simulated annual mean temperature was decreased from 3.7oC to 2.1oC after the statistical and temperature inversion corrections. Based on our study, we suggest that the area-averaged fine-resolution annual mean temperature of Mongolia was 1.1oC (station mean temperature 0.5oC). These results also revealed the fine and complex distribution of temperature of Mongolia, including the topographical effect, which could not be expressed in the in-situ observational data.

Acknowledgments: This research is funded by "Rural Development Administration Cooperative Research Program for Agriculture Science and Technology Development" under Grant Project No. PJ009353, Republic of Korea.

REVIEW OF RECENT EXTREME WEATHER AND CLIMATE EVENTS IN MONGOLIA

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ABSTRACT

Mongolia has large area of territory, huge number of livestock and locates in the mid-latitude, which is sensitive area to the climate change. Those are the reasons could be even more exposed to the impacts of climate change. The global warming is the main fact to affect extreme weather events. Thus the numbers of disasters, especially convective related extreme events and their negative impacts have risen for last several years in Mongolia.

Therefore, the study was conducted on hydro-meteorological disasters occurring over Mongolia during last 20 years /1993-2012/, their trends as well as their losses. We considered statistical and time series analysis in hydro-meteorological disasters.

First, one type of climatological disasters, forest and wildfire which occurs about 160 times per year is the largest contributor to the economic losses in last year's.

Furthermore, according to latest 20 years' studies convective related disasters such as flash flood, squall, hail, lightning and thunderstorm became more common over the past decade. Convective related disasters counted in last 12 years for 53.3% of all hydro-meteorological disasters and flash flood is about 41.1% of all convective related extreme events, which occurs about 12 times per year.

Even though convective related extreme events are dominating last years, the extreme weather events associated with cold front are still crucial issues. Because cold front related severe weather such as strong wind, snow storm, heavy snow and rain, surface frost, cold rain and wet snow can cover large area and it causes huge damage on agricultural products. Among these types of disasters, severe storms occur more frequently which is about 14 times per year.

In addition, Dzud, extreme condition in winter, is the most disastrous event for the livestock husbandry. For example, the winter of 2009-2010 was harsh for Mongolia, with persistent snowfall blanketing more than 60 percent of total land mass with 20-40 centimeters of snow depth. This winter was extremely cold reaching -40-50 degree of Celsius for consecutive ten and more days, which is the condition to announce Dzud situation. Mongolia regularly faces hard winters, but this year was extreme. More than 9.7 million animals, nearly a sixth of all livestock in Mongolia, have died in a winter of snow, cold and gales.

SEASONAL OUTLOOK FOR WINTER 2013/2014 OVER MONGOLIA

Jargalan Bayaraa, Sarantuya Chuluun
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ABSTRACT

Livestock and agricultural sector that play crucial role in economy and food supply in Mongolia highly depend on weather and climate. Therefore, predicting monthly and seasonal temperature and precipitation is important in our social-economic development.

In Mongolia, monthly and seasonal forecasts have been done mainly by synoptic methods since mid-1960s by firstly Russian meteorological center. Statistic methods for long range weather forecast over Mongolia have been developed and processed since late-1980s. The synoptic, analogy and some statistical methods have been used operational long range weather forecasting. Warm and cold season outlook for monthly mean temperature and precipitation anomalies are been issued twice a year. And monthly forecast for anomaly of temperature and precipitation is given every month.

In long-range weather forecast, several statistical methods and models are used, including Local climate and extreme model, and two more statistical methods based on downscaling. Beside it, prediction maps of Climate center's dynamic models such as of APCC, ECMWF, NCEP, KMA, IRI, NOAA, NECC, BCC and TCC are have been used for monthly and seasonal prediction.

According to the Local Climate Model prediction, temperature would be generally near normal. However, it is predicted to be below normal in the north eastern part in December and some parts of the whole area in January and above normal in the western part of the country in March and April. Precipitation is predicted to be mostly above normal during the whole country.

Extreme Model is predicted that the temperature would be above normal in the whole country in November and February and in the some parts of country in March

and below normal in December and January. Precipitation is predicted to be generally near normal. However, it is predicted to be below normal in December and above normal in January in the whole country.

Based on these results and outputs, preliminary winter climate outlook from October 2013 to March 2014 is concluded. According to it, temperature is expected to be above normal by +1~+1.5ºC in the most part of western part during October-November 2013, February-March 2014 and near normal in other parts of Mongolia. The temperature is expected to be -1.0 ~ -2.0ºC below normal in the most area of central and eastern parts in December and in the most area of central, north eastern and south eastern area of western part in January.

Precipitation is expected to be above normal in the northern area of western and southern parts, eastern area of central part and the western area of eastern part in October, in almost all of the country from November to January and March.

SEASONAL OUTLOOK OF THE 2013/2014 WINTER OVER CHINA

Gu Wei and Chen Lijuan
Beijing Climate Center, China Meteorological Administration

ABSTRACT

This presentation presents the seasonal climate outlook for the coming 2013/2014 winter over China, including the prediction of precipitation and temperature. The prediction was made by taking into account the results of both dynamical and statistical approaches. The dynamical model employed is the Coupled General Climate Model (Generation I and II) developed in Beijing Climate Center (BCC), which produces the monthly and seasonal global prediction regularly and updates every month. The statistical model has several potential predictors such as the El Nino/La Nina, the Indian Ocean sea surface temperature anomaly (SSTA), and the Arctic sea ice. All these factors are suggested to be influential on the wintertime climate in China. It is noteworthy that, however, the role and importance of each factor are different from year to year. For the 2013/2014 winter, the SSTA in the mid-latitude North Atlantic, the thermal condition in the tropical western Pacific and the Arctic sea ice extent are thought to be important. The final prediction was made by modifying the result from the dynamical model with that from statistical model.

CLIMATE OUTLOOK FOR WINTER 2013-14 OVER KOREA

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ABSTRACT

Currently, the equatorial SSTs remain slightly below normal but show near normal condition in Nino 3.4 region. ENSO neutral condition is expected to continue into winter 2013-14 and the impact of ENSO can be insignificant during the coming winter in Korea.

A tentative seasonal outlook for winter 2013-14 over Korea based on the comprehensive analysis of climate monitoring, the climate prediction model results of the Korea Meteorological Administration (KMA) and the WMO Lead Centre for Long-Range Forecast Multi-Model Ensemble (WMO LC-LRFMME) will be presented.

SEASONAL OUTLOOK OF 2013/14 WINTER USING KOPRI S2S PREDICTION SYSTEM

Baek-Min Kim, Jee-Hoon Jeong and Tae-Hyun Shim

KPRI, Korea

ABSTRACT

Funded by Korea Meteorological Administration, Korea Polar Research Institute (KOPRI) has devoted large efforts to develop a sub-seasonal to seasonal prediction system for East Asian winter monsoon since 2011. The system emphasizes the importance of statistical prediction of seasonally evolving sea-ice and Arctic sea surface temperature (SST) boundary conditions and proper initialization of early winter (October-November) snow cover over Eurasian continents that initiates the winter monsoon in the AMIP type seasonal prediction system. The major development of the model system has been finished recently and it is ready for actual seasonal prediction. This talk briefly introduces components of the developed system and addresses Pros and Cons of the prediction system compared to typical CMIP type prediction system. Also, we show the test prediction results using snow cover and sea-ice data obtained up until last week of October.

APCC CLIMATE PREDICTION FOR WINTER 2013/14

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ABSTRACT

APCC has provided 3-month climate forecast information produced by its proprietary Multi-Model Ensemble (MME) every month since its establishment in 2005. Since then, as one of the main services produced by APCC, the MME 3-month prediction information has been productively applied by those developing countries in the APEC regions that are unable to produce their own prediction information due to lack of forecasting techniques and/or infrastructure.

However, in order to better adapt to climate-related hazards in a timely manner, developing countries have requested that APCC provides longer lead-time prediction information. Starting on 25 September, 2013, to meet these requests, APCC has launched its 6-month MME prediction service, expanding its services beyond the previous 3-month climate prediction information.

The seasonal outlook for winter 2013/14 has been produced with initial condition of August, 2013. Models participating in the winter forecast are NCEP-CFS V2 from NCEP in USA, NASA in USA, MSC_CANCM3 and MSC_CANCM4 from MSC in Canada, BOM's POAMA in Australia and APCC in Korea.

APCC El Niño-Southern Oscillation (ENSO) forecast based on MME prediction for December 2013 to February 2014 suggests a further continuing ENSO-neutral condition through the Northern Hemisphere winter 2013/2014. And the recent cooler-than-normal conditions in the eastern tropical Pacific have weakened, and are expected to become anomalously warm condition over the period from December 2013 to February 2014. According to prediction by Simple Composite Mean (SCM) MME method for winter 2013/2014, it is likely to be slightly warmer-than-normal to near-normal conditions in the Indo-Pacific region and the Atlantic. Most of tropical continents, including the Middle East, Southeast Asia, and South America are likely to experience anomalously warm condition. In contrast, anomalously cold conditions are expected in the most eastern part of Russia and northeast Asia.

SEASONAL OUTLOOK OF THE EAST ASIAN WINTER MONSOON IN 2013/14

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ABSTRACT

1. Oceanic conditions

Tropical oceanic condition is the most important signal for the winter outlook in view of its predictability and effects on variability of jet streams.

In September 2013, conditions in the northern hemisphere summer, which were similar to those observed during the past La Niña events, became unclear, and ENSO neutral conditions continued in the equatorial Pacific. The JMA's CGCM predicts that the NINO.3 SST will be near normal during next winter. It is likely that ENSO neutral conditions will continue in the northern hemisphere autumn and winter. On the other hand, the area-averaged SST in the tropical western Pacific (NINO.WEST) region was above normal in September. The model predicts that this condition will continue until the coming winter. This anomaly is the key point of the coming winter outlook.

2. Outlook for East Asian winter monsoon

In association with the SST anomaly patterns, convective activity is predicted to be stronger than normal in the western tropical Pacific. In the upper troposphere, anti-cyclonic circulation anomalies are predicted from the southeastern part of Asian Continent to the East China Sea, representing that the subtropical jet stream shifts northward there and shifts southward east of Japan. In association with the southward meandering of the jet stream, the Aleutian low is predicted to be stronger and shift more westward than normal, suggesting stronger-than-normal winter monsoon in East Asia. There is almost no signal showing that the Arctic Oscillation (AO) and Eurasian

teleconnection pattern (EU) will prevail, and the model does not have sufficient capability to predict the AO and EU accurately. Thus, the tendency of the AO and EU are not taken into consideration in this forecast. As a result, the East Asian winter monsoon will be normal or stronger than normal in the coming winter

3. Summary of the winter outlook for Japan

JMA issued the winter outlook on 25th September. It says that mean temperatures are expected to be near normal or below normal, both with a 40% probability, in northern, eastern and western Japan. Total precipitation amounts are expected to be near normal or above normal, both with a 40% probability, on the Sea of Japan side in northern and eastern Japan, and to be near normal or below normal, and both with a 40% probability, on the Pacific side in eastern and western Japan. Total snowfall amounts are expected to be near normal or above normal, both with a 40% probability, on the Sea of Japan side in northern, eastern and western Japan.

OUTLOOK OF 2013/2014 EAST ASIA WINTER MONSOON USING PNU CGCM

Bayasgalan Gerelchuluun and Joong-Bae Ahn
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ABSTRACT

A fully coupled PNU (Pusan National University) CGCM is used for the forecast of the global long-term weather prediction. The PNU CGCM prediction system composed of 2 different versions of CGCM. One is version 1.0 and the other is version 1.1. Each version of model produces 5 ensemble for the 12 month-lead hindcast/forecast. The difference between version 1.0 and 1.1 is the inclusion of ocean data assimilation process in the coupled ocean initial field production. The initial conditions for the PNU CGCM v1.1 experiments are provided by the assimilated global ocean data obtained from VAF (Variational Method using Filter). The coupled model is basically consisted of AGCM CCM3, OGCM MOM3 and an elastic-viscous plastic sea-ice model. Any type of flux adjustment is not applied to the experiments to make the coupled state solely initial value problem and thus to determine the state all by itself.

Each of the hindcast/forecast experiment is consisted of 12-month lead integration that starts from 12 different months of a model year. The climate for each experiment is obtained from the monthly norm of 12-month lead hindcast integration starting at a particular data of a model year mentioned prior.

According to the verification of the hindcast experiments for the CGCM, it show a reasonable degree of forecasting skill in predicting East Asia Winter Monsoon with from 3 to 4 months of lead time.

Our CGCM prediction system is applied for the outlook of global climate in winter of 2013/2014 mainly focused on East Asia Monsoon region. The initial condition of the CGCM is obtained from the OGCM and AGCM states of September, 2013, derived respectively from observed atmospheric condition and assimilated OGCM-produced ocean temperature.

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