

**Twelfth Joint Meeting
for the Seasonal Prediction
of the East Asian Winter Monsoon**

10 – 11 November 2011

Tokyo, Japan

**Tokyo Climate Center
Japan Meteorological Agency**

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Agenda

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Draft Agenda

Thursday, 10 November

10:00 – 10:30 Opening session

10:30 – 11:50 Session 1: Current Status and Future Plan of Seasonal Forecasting Service (including verification of forecast) (Chair: Ms Teruko Manabe, JMA)

- Short-term Climate Prediction in BCC – Current status and future plan – (Dr Han Rongqing, CMA) 20min
- Introduction to the New Seasonal Forecasting System in KMA (Mr Jinho Shin, KMA) 20min
- Operational system and Future plan of JMA's Seasonal Forecast models (Dr Kazutoshi Onogi, JMA) 20min
- Current status of seasonal forecast research (Dr Tamaki Yasuda, MRI-JMA) 20min

11:50 – 13:30 Lunch

13:30 – 15:25 Session 2: Understanding of phenomena related to Seasonal Prediction on the East Asian Winter Monsoon and their predictability

- 2.1 Long-term trend and decadal variability (Chair: Dr Han Rongqing, CMA)
- Decadal climate prediction with initialized climate models (Dr Masayoshi Ishii, MRI-JMA) 25min
- 2.2 ENSO and its influence including interaction from tropics (Chair: Dr Han Rongqing, CMA)
- A review of recent studies on ENSO-related variability in East Asian winter (Dr Tomoaki Ose, MRI-JMA) 25min
 - Influence of MJO on Asian Climate and its Performance of JMA Monthly Forecast Model (Ms Satoko Matsueda, JMA) 20 min
- 2.3 Internal variability in the extratropics (e.g. AO, EU, NAO) (Chair: Mr Baek-Min Kim, Korea Polar Research Institute)
- Climate Abnormity over China in summer 2011 and Possible Attributions (Dr Gong Zhiqiang, CMA) 20min

- Circumglobal Teleconnection (CGT) Relevant to the Seasonal Predictability over East Asia (Dr Masahiro Watanabe, University of Tokyo) 25min

15:45 – 17:45 Session 3: Seasonal outlook of the 2011/2012 winter

- 3.1 Current status and outlook of ENSO and tropical ocean (*Chair: Mr Jinho Shin, KMA*)
- Recent Evolution and Outlook of ENSO Cycle (Dr Han Rongqing, CMA) 20min
 - ENSO Outlook by JMA (Mr Hiroyuki Sugimoto, JMA) 20min
- 3.2 Current status and seasonal outlook of the 2011/2012 winter (*Chair: Mr Baek-Min Kim, Korea Polar Research Institute*)
- An Overview of 2011 summer climate over the Republic of Korea (Mr Jinho Shin, KMA) 20min
 - Climate Characteristics of Summer 2011 in the central interior region of the Korean Peninsula (Ms Young-Ran Yoon, KMA) 20min
 - Climate Characteristics of 2011 Summer in the southwestern region of the Republic of Korea (Ms Gyeong-Suk Choe, KMA) 20min
 - Overview of 2011 summer monsoon and 2011/2012 winter monsoon outlook over East Asia (Dr Si Dong, CMA) 20min

Reception

Friday, 11 November

09:15 – 10:55 Session 3: Seasonal outlook of the 2011/2012 winter (continued)

- 3.2 Current status and seasonal outlook of the 2011/2012 winter (*Chair: Dr Kiyoharu Takano, JMA*)
- Seasonal Outlook of the 2011/2012 winter (Dr Liu Yunyun, CMA) 20min
 - Seasonal outlook of the 2011/2012 winter from Korea Polar Research Institute (Mr Baek-Min Kim, Korea Polar Research Institute) 20min
 - Climate Outlook for 2011/12 Winter over Korea (Mr Jun-Seok Chung, KMA) 20min
 - Overview of 2011 Summer Climate and Seasonal outlook for winter 2011/2012 over Mongolia (Ms Undrakh Tserendeleg) 20min
 - Seasonal Outlook for winter 2011/2012 over Japan (Mr Koji Ishihara, JMA) 20min

11:15 – 12:00 Session 4: Discussion and Conclusion (*Chair: Mr Shuhei Maeda, JMA*)

12:00 – 12:15 Closing session

12:15 – Lunch and Technical tour

Abstracts

Short-term Climate Prediction in BCC

- Current status and future plan –

Rongqing Han
Beijing Climate Center/CMA

Abstract

Short-term (month to annual) climate prediction has a long history of more than 50 years in China, and introduced the dynamical method into the operational forecast in 1995. In addition to these forecasts, BCC (the equal of National Climate Center) currently issues the special climate prediction and El-Nino outlook based on seasonal statistical model forecast, Dynamical Extended model forecast (10-45 days), and coupled GCM seasonal prediction, respectively. For the short-term prediction (beyond 10 days up to one year) , although statistical methods like OCN and CCA are still referred, dynamical model products are used in producing forecasts as main materials.

The current CGCM used for three-month/seasonal forecast, called BCC_CM1.0, is basically the version (T63L16) of the AGCM coupled with Global Oceanic circulation model (T60L30), which had developed by the National Climate Center and Institute of Atmospheric Physics of Chinese Academy of Sciences. The initial atmospheric field is from the NCEP/NCAR Reanalysis Data, and the initial oceanic field is from four-dimensional assimilation of global ocean done by BCC, and the size of the ensemble system consist of 48 members including the control run. The model performance is evaluated with the WMO Standard Verification System for the short-term climate prediction. Towards the more accurate and reliable forecast, we continuously improve and develop the forecast system, and BCC_CM2.0 with many improvements in long-range forecast performance will be finished and work operational before long. In addition, Climate prediction division of BCC is carrying out to establish a Multi-Model Downscaling Prediction System, including the optimal subset regression, BP-CCA, EOF-regression and so on.

Operational system and Future plan of JMA's Seasonal Forecast models

Kazutoshi Onogi
Climate Prediction Division, Japan Meteorological Agency

Abstract

JMA operates two kinds of seasonal forecast model systems. One is an atmospheric global model for one month forecast and early warning for the 2nd week, the other is a atmosphere-ocean coupled model for long-range forecast (more than 3 month or summer/winter seasonal, and ocean (El Nino) forecast). The new reanalysis JRA-55 is also mentioned.

1. One-month forecasting and early warning

JMA's one-month forecasting model is an atmospheric general circulation model (AGCM) type with atmospheric initial conditions obtained from the JMA Global Analysis and initial land surface conditions obtained from the JMA Land Surface Analysis System. The EPS for one-month forecasting is run once a week with 50 members, and their initial perturbations are obtained using the Breeding of Growing Modes (BGM) method. The overall 50-member ensemble is then used for a one-month forecast issued every Friday. In future, the weekly forecast model of Numerical Prediction Division (NPD) and the one-month forecast model of CPD will be unified.

2. Long-range and El Nino forecasting

JMA's long-range forecasting model is a coupled ocean-atmosphere general circulation model (CGCM) type with atmospheric and oceanic initial conditions obtained from the JMA Climate Data Assimilation System (JCDAS) and MOVE/MRI.COM-G, respectively. The EPS consists of 51 members for the latest six initial dates. The 51-member ensemble is used for the three-month forecast issued every month and for a warm/cold season forecast issued five times a year (in February, March, April, September and October). The CGCM is being improved in collaboration between CPD and Meteorological Research Institute (MRI). We expect the improved version will be implemented in FY2014.

3. Japanese New Reanalysis: JRA-55

JMA conducts the second Japanese global atmospheric reanalysis project named JRA-55. It covers 55 years, extending back to 1958. JRA-55 system is based on the JMA operational NWP system as of December 2009 (JMA 2007). Details of JRA-55 can be referred from Ebita et al. 2011.

(http://www.jstage.jst.go.jp/article/sola/7/0/7_149/_article)

Introduction to the New Seasonal Forecasting System in KMA

Jinho Shin, Jun-Seok Chung, Hyun-kyung Kim, Yei-sook Lee
Climate Prediction Division, Korea Meteorological Administration

Abstract

According to the current policy of “seamless prediction” from short-range weather forecast to climate projection, KMA is preparing to launch a new seasonal prediction system, called GloSea4, based on the HadGEM3 by collaboration with Met Office, which consists of Met Office “Unified Model (UM)” for atmosphere, MOSES for land surface, NEMO for ocean, and CICE for sea-ice. The UM has been designed to allow different configurations of the same model to be used to produce all our weather forecasts and climate predictions. It is capable of modelling a wide range of time and space scales including kilometer-scale mesoscale nowcasts, limited-area weather forecasts, global weather forecasts (including the stratosphere), seasonal forecasts, global and regional climate predictions as well as being run as part of an ensemble prediction system.

In the operational mode of the GloSea4, both the hindcast and forecast suites are run in parallel in weekly cycle with stochastic physics for ensemble generation. The current operational model of the KMA (GPC-Seoul) for seasonal forecast will be replaced with the GloSea4 in middle of 2013 as the Joint Seasonal Forecasting System between KMA and Met Office.

Current Status of Seasonal Forecast Research

Tamaki Yasuda

Climate Research Department, Meteorological Research Institute, JMA

Abstract

Variability of atmosphere and ocean in the tropics has a great influence on that in the global climate. The SST variability in the tropical Pacific associated with ENSO is well predicted in time scales from six months to one year advance. In addition to the impact of climate variability in the tropics, it has been suggested that sea ice extent could influence the Northern Hemisphere circulation. However, it is still unknown whether the initialization of sea ice leads to a better prediction on seasonal time scale. Treatments of sea ice in the current seasonal forecast systems differ among systems. To understand the potential impact of sea ice initialization on the atmosphere, model comparisons with and without sea ice initialization are needed. There are also a large number of researches on stratosphere-troposphere interactions. It should be assessed the impact of better resolution of the stratosphere in the atmospheric model on the seasonal forecast skill at the surface.

Climate Variability and Predictability (CLIVAR) Working Group on Seasonal to Interannual Prediction (WGSIP) has carried out the Climate-system Historical Forecast Project (CHFP) that is a model comparison on the seasonal hindcast experiments with actual ocean-atmosphere initial conditions and forcings such as GHGs based on the same experimental design. This project provides a baseline assessment of the seasonal prediction capabilities, a framework for assessing of current and planned observing systems. WGSIP also identifies above two areas i.e., sea ice and stratosphere in addition to the soil moisture as likely candidates for increased seasonal forecast skill. Two projects are in progress to evaluate how various components of the climate system interact. A model comparison project called the Ice-HFP is proposed to investigate the effects of sea ice initialization on atmospheric circulation in seasonal forecast systems. The experiments are performed with sea ice initialization of observed state or a simple climatology. The main goal of this project is to demonstrate the influence of proper initialization of sea ice on atmospheric circulation. The Stratospheric HFP (SHFP) is underway to assess the impact on surface forecast skill of raising the atmospheric model lid for a more accurate representation of the stratosphere and its initialization.

Decadal climate prediction with initialized climate models

Masayoshi Ishii
MRI/JMA, JAMSTEC

Abstract

Decadal climate prediction studies have been undertaken in order to provide less uncertain information on future climates until the 2030s under global warming conditions. A key to the success is to find predictability of decadal climate changes dominantly seen in the present and past climates. This is furthermore a challenge to climate predictions beyond the time scale of El Nino and Southern Oscillation.

Slowly-varying ocean dynamics and huge ocean heat contents are essential of long-term climate changes. Therefore, climate models previously used for a global warming projection are initialized by using historical oceanographic observation. With the initial conditions of several ensemble members, 10-year lead prediction experiments for the past period were conducted. The experiments present promising predictability of Pacific Decadal Oscillation, Atlantic Multidecadal Oscillation, and some other climate events.

Present and future studies will also be presented.

A review of recent studies on ENSO-related variability in East Asian winter

Tomoaki Ose

Climate Research Department, Meteorological Research Institute / JMA,

Abstract

Dynamical seasonal predictions are started based on ENSO predictability and its influences on the global climate variability. This is the case for the seasonal prediction for East Asian winter. As compared with other regions in the mid- and high latitudes, East Asia is a relatively lucky region with a clear seasonal predictability mechanism due to ENSO (B. Wang, 2000).

If a typical ENSO impact is dominant in East Asian winter variability and fixed for any ENSOs, there is no problem left for East Asian forecasters and modelers. Fortunately, it is reported that a lot of variety and diversity are left to be solved; the Arctic Oscillation is crucial for northern East Asian winter, and the influential Indian Ocean's sea surface temperature (SST) anomaly is more influential than the Pacific one, and the impacts from the global warming, arctic sea ice variability and stratospheric oscillation are not ignored.

Recently, the above other causal factors are studied, not apart from ENSOs but in relation to ENSOs. This fact indicates that the East Asian winter prediction can be qualitatively improved by forecasters who are watching detailed behaviors of the Asian environments, and also that modelers are required to improve seasonal models as to represent those detailed differences among ENSOs.

I would like to review some recent papers on the relationship between ENSOs and the other causal factors for East Asian winter variability.

Influence of MJO on Asian Climate and its Performance of JMA Monthly Forecast Model

Satoko Matsueda, Yuhei Takaya and Kengo Miyaoka
Climate Prediction Division, Japan Meteorological Agency

Abstract

The Madden-Julian oscillation (MJO) is the dominant mode of intraseasonal variability in the tropics and influences not only the tropical weather and climate but also the extratropical circulation. The MJO also influences the weather (e.g., surface temperature and precipitation) in Asia through the changes of circulation (e.g., Jeong et al. 2008; Endo and Harada 2008). The MJO has been thought to have a potential predictability up to one month and to be a forecast signal for this time scale. So, it is important for seasonal forecast models to simulate the MJO more accurately.

In this study, the MJO forecast performance of the JMA operational monthly forecast model is examined by using the hindcast experiment datasets and diagnostic package developed by U.S. Climate Variability and Predictability (CLIVAR) MJO Working Group (CLIVAR Madden-Julian Oscillation Working Group 2009). The results indicate that the MJO forecast performance is well up to a lead time of 2 weeks, but the MJO phase speed predicted by the model is faster than that analyzed and the MJO amplitude predicted by the model is smaller than that analyzed. The model does not well reproduce the northward propagation of the active convection phase in the Indian Ocean, which is the dominant mode of the boreal summer intraseasonal oscillation (Kikuchi and Wang 2010). In the presentation, the forecast performance and the feature of the predicted MJO in the JMA monthly forecast model will be discussed in more detail.

Climate Abnormity over China in summer 2011 and Possible Attributions

Shen Bai-zhu Gong Zhiqiang Zhang Shi-xuan Yang Han-wei Wang Kuo
Feng Guo-Li

Laboratory for Climate Studies
China Meteorological Administration, National Climate Center

Abstract

Using global reanalysis data provided by NCEP/NCAR, precipitation data at 740 observational stations of China provided by the National Climate Center of the China Meteorological Administration, and grid data of precipitation in 2011 provided by National Meteorological Information Center to analyze the phenomenon of a sharp turn from drought to flood in the middle and lower reaches of Yangtze River in early June 2011, and the characteristics of its circulation background briefly, we conclude that: 1) the precipitation in the middle and lower reaches of the Yangtze River was less and its change rate was smaller than corresponding climatological normals from January to May in 2011, both surged suddenly in June leading to the appearance of a sharp turn from drought to flood in June, and the kickpoint was at the 31st pentad (the 1st pentad in June); 2) around the sharp turn, both flood water vapor flux and the space-time evolution characteristics of the first and the second modes of EOF analysis represented the transform of water vapor transport from a weaker state to a stronger one (compared to climatological normals); 3) before and after the turn, atmospheric circulation fields was significantly different. Before the sharp turn, winter monsoon in northern hemisphere was strong, and summer monsoon in southern hemisphere was weak, leading to the delay of monsoon transform, stronger East Asian Trough, which go against warm-moist air blowing to the north. All of that eventually led to less rainfall in south China and occurrence of this sharp turn. In early June, the period of turning, the circulation adjusted quickly, which presented that the western Pacific subtropical high extended to west and jump to north abruptly, East Asian Trough kept strong and maintained in the west, and blocking high located in the Okhotsk Sea weakened. Thus, cold and warm air converged in the middle and lower reaches of the Yangtze River and contributing to the occurrence and continuation of precipitation. It is the main reason of the sharp turn from drought to flood in the middle and lower reaches of the Yangtze River.

Circumglobal Teleconnection (CGT) Relevant to the Seasonal Predictability over East Asia

Masahiro Watanabe

Atmosphere and Ocean Research Institute, the University of Tokyo

Abstract

It is well known that the midlatitude westerly cores, i.e., tropospheric jets, can trap stationary Rossby waves that transfer the wave energy eastward. This trapping often emerges as circumglobal teleconnection (CGT) pattern in the observed atmospheric circulation on monthly and seasonal timescales. In this presentation, I attempt to review, partly based on our works, recent advances in understanding the origin, dynamics, and forcing mechanisms of the Northern Hemisphere CGT in both winter and summer seasons. A comparison of the CGT in idealized atmospheric models and the IPCC-class general circulation models (GCMs) is also performed to demonstrate the intrinsic property of the CGT in the Earth's atmosphere.

Recent Evolution and Outlook of ENSO Cycle

Rongqing Han and Hui Gao
Beijing Climate Center/CMA

Abstract

Following the dissipation of the 2010-11 La Niña event by early May 2011, a few weak remnants of La Niña have persisted, particularly in some atmospheric features, even if the neutral conditions lasted a short period from June to August 2011. Subsequently La Niña conditions came back to the tropical Pacific again in early September 2011, and have gradually enhanced in strength thereafter. Recently, the index of NINO Z (area weight of NINO1+2, NINO3, and NINO4) was -0.5°C and -0.7°C in September and October (12days), respectively. In the subsurface equatorial east-central Pacific, negative temperature anomalies have strengthened and expanded eastward, while the nearly same positive temperature anomalies (100-300m) have been observed in the western Pacific Ocean Since mid August 2011. For atmosphere, the low-level easterly wind anomalies have persisted over the western and central equatorial Pacific Since March 2010, which is consistent with the consecutive positive SOI (Southern Oscillation Index).

Jointly considering most results of ENSO model forecasts, **La Niña is expected to strengthen and continue through the Northern Hemisphere winter 2011-12.**

ENSO outlook by JMA

Hiroyuki Sugimoto

Climate Prediction Division, Japan Meteorological Agency

Abstract

ENSO affects the atmospheric circulation not only in the tropics but also in the East Asia during the winter monsoon season. It sometimes brings anomalous weather. For example, in January 2011 when La Niña events occurred, monthly mean temperatures were below normal all over Japan.

In September 2011, the monthly mean SST anomaly and the deviation from the latest sliding 30-year mean SST in the NINO.3 region were -0.6°C . SSTs in the central-eastern equatorial Pacific were below normal. Positive subsurface temperature anomalies were found in the western equatorial Pacific, while negative subsurface temperature anomalies were found in the central-eastern part. In the atmosphere over the equatorial Pacific, the convective activities were above normal in the western part, and easterly wind anomalies in the lower troposphere were found over the western-central part. The oceanic and atmospheric features mentioned above came close to La Niña conditions.

The JMA's El Niño prediction model predicts that the NINO.3 SST will be near normal through the prediction period. However, the predicted NINO.3 SST deviation for the northern hemisphere autumn and the beginning of the winter is lower than the prediction of the previous month, and the observed value in September (-0.6°C) was near the lower bound of the previous month's prediction. Considering all the above, it is more likely than not that La Niña conditions will develop during the northern hemisphere autumn and winter.

In the presentation, the latest ENSO status and outlook will be presented.

An Overview of 2011 summer climate over the Republic of Korea

Jinho Shin, Jun-Seok Chung, Hyung Byun

Climate Prediction Division, Korea Meteorological Administration

Abstract

Anomalous precipitation in 2011 summer shows a noticeable wet pattern across the Korean Peninsula. Both the onset and offset of the rainy season of 2011 summer were earlier than normal. Even after the summer Changma over the Korean Peninsula was ended, “Changma”, heavy rainfall events at a small area frequently occurred. Because of more rainy days and less sunshine than normal, the occurrences of heat waves were decreased while tropical nights were more often reported. A few typhoons passing over the Yellow Sea also contributed to the increases of rainfall amount in 2011 summer in Korea. Among 10 typhoons in the Pacific, the 5th typhoon, “Meari” and the 9th typhoon, “Muifa” directly affected the Republic of Korea. In 2011 summer, the North Pacific high pressure system extended in the north-south direction compared to the normal patterns. It helped these typhoons head toward the Yellow Sea along the edge of the high pressure, though the number of the typhoon in the Pacific was smaller by 11.2 than the long-term average.

As a result, the summertime precipitation over Republic of Korea has increased up to 142% compared to the normal precipitation. The frequent heavy rainfall events led to catastrophic floods and landslides particularly in the central region of the Korean Peninsula.

The persistent La Nina state since 2010 spring ended in May 2011 and the neutral state continued until 2011 summer. The continuous hot and humid moisture streams from the south-west along the edge of the Northern Pacific High headed toward the Korean Peninsula. They frequently collided with the dry air from the Eurasian continent over the Korean peninsula resulting in the strong atmospheric instability associated with the heavy rainfall events. For instance, mean rainy days (48.3 days), rainy days with precipitation amounts above 30mm/hr (2.8 days), and rainy days with precipitation amounts above 80mm/hr (2.9 days) were above normal by 10.9 days, 1.3 days and 1.1 days, respectively. These are top-ranked seasonal records for the period 1973-the present. Summertime mean temperature over the Republic of Korea in 2011 summer was below normal, while it was above normal by -0.1°C anomaly in June and by -0.5 in August. The neutral state of the SST anomaly over Nino 3.4 region has changed to a negative anomaly state by -0.7°C in September and -0.9°C in early-October, respectively. According to the global SST forecast model outputs of the Korea Meteorological Administration, the La Nina-like neutral state are expected to continue until the end of 2011.

Climate Characteristics of Summer 2011 in the central interior region of the Korean Peninsula

Young-Ran Yoon

Chung-Buk Regional Meteorological Administration, KMA

Abstract

The “Chung-buk” province is located in the central region of the Korean Peninsula, where the interior regional climate in the Republic of Korea is well represented. For example, hot and humid summer in Chung-buk versus cold and dry winter conditions will represent typical characteristics of the East Asian monsoon. Annual average temperatures vary between 10 and 12°C. Annual average precipitation amounts ranges between 1,100mm and 1,300mm. In particular, summer precipitation accounts for 60% of the annual total precipitation.

The climate characteristics for 2011 summer at the Chung-buk province was summarized as the follows. In 2011 summer, the North Pacific high pressure system was shifted more northward than the normal years. The rainy season called summer Changma started earlier than the average years. The “Changma” front was more active due to the inflow of copious moisture along the edge of the North Pacific high pressure system. Even after the rainy season, the unprecedented heavy rain events occurred due to the anomalous atmospheric instability over the Korean Peninsula. As the result, precipitation amounts and frequency increased above normal. This may be associated with the stationary upper pressure system over the Korean peninsula. On August 8th, when the “Changma” front located in the “Gyeonggi” province was shifted slowly toward the south, the strong southwest wind transported massive moisture to the Chung-buk province, resulting in a massive flooding event.

The average temperature in 2011 summer in the Chung-buk province (23.7°C) was similar to the normal (23.2°C) between 1981 and 2010. The amount of precipitation in 2011 summer was 1197.8mm, which amount to 161 % compared to the long-term average. It is ranked as the second largest summer precipitation amount. The number of precipitation days in 2011 summer (52.8 days) is ranked as the highest record. The regional summertime average precipitation in “Chungju” was 1182.8mm this year. Locally, the record increased to”, 1243.8mm in “Boeun”, 1522.7mm in “Jecheon” and 841.9mm in “Chupungryeong”, respectively, which are similar to annual total in normal years. Overall, frequent and intense rainfall events in 2011 summer renewed the maximum of daily precipitation amount in June.

Due to heavy rain in 24th June the official number of casualties was 1 dead and 1 missing. The property damage caused heavy rain was estimated at \$323,800. The damages of heavy rain including loss of road and river flooding are 16 public and 113 private facilities.

Climate Characteristics of 2011 Summer in the southwestern region of the Republic of Korea

Gyeong-suk Choe

Jeonju weather station, Gwangju Regional Meteorological Administration, KMA

Abstract

In this study, the climate characteristics of 2011 summer in the southwestern regions of the Korean peninsula called the Honam province will be presented. Generally, the warm and humid summer climate in the Honam province is a prototype of the East Asian Summer monsoon climate. Annual average temperature in the Honam province ranges between 12.6°C and 14.3°C. Annual precipitation amount ranges between 1,250mm and 1,530mm. Compared to these normals, the average summertime temperature in 2011 (24.6°C) was higher by 0.5°C. In 2011 summer, the North Pacific high pressure system shifted toward the north compared to the normal year pattern, more positive anomaly pressure over the eastern side of Japan.

The amount of precipitation in 2011 summer (903.1mm) was above normal by 124%. Heavy rainfall events frequently caused severe floodings across the Honam province. Several typhoons which moved northward the Yellow Sea also affected the occurrences of the flooding. The summer rainy season called “Changma” in Republic of Korea on set earlier than normal. Because of the massive moisture inflow along edge of the North Pacific high pressure system toward the Korean peninsula, strongly heavy rainfall events occurred in the Honam province, from July 9 to 10. The precipitation amounts increased up to 305.5mm in “Go-heung” county and 308.5mm in “Gun-san”si, respectively. On August 9, the 9th typhoon, “MUIFA” headed northward the Yellow Sea along the edge of the North Pacific High pressure system affecting the Honam province. The typhoon MUIFA resulted in the highest precipitation record, 420mm/day in “Jeongeup” according to the long-term data sets since 1967. The massive torrential caused the losses of public facility and private property. Especially “Gun-san” and “Jeongeup” was declared a special disaster zone. During this period, one person was killed and property damage was 675,000 dollars at “Jeongeup” and two people killed and property damage 125,000 dollars at “Gun-san”, respectively.

Overview of 2011 summer monsoon and 2011/2012 winter monsoon outlook over East Asia

Si Dong

Beijing Climate Center, China Meteorological Administration

Abstract

In this paper, a preliminary overview of the South China Sea (SCS) summer monsoon in 2011 was presented. The National Climate Center (NCC) monitoring showed that both of two monitoring indices exceeded their thresholds since the 2th pentad of May (May 6st to 10th), namely the mean potential pseudo-equivalent temperature above 340k and the zonal wind changing from easterly to westerly over the monitoring area of 10°-20°N, 110°-120°E. It was two pentads earlier than normal. The recent monitoring showed that the SCS summer monsoon in 2011 ended late, with about three pentads later than normal. It is estimated that the SCS summer monsoon in 2011 was weaker than normal.

Based on the three indices of the East Asian winter monsoon (EAWM), the correlations between the indices and several related factors (such as sea surface temperature (SST), La Nina cold event, the SCS summer monsoon, the Arctic oscillation (AO) and the Arctic sea ice) were examined. It seemed that most of factors would support a stronger EAWM in 2011/2012 winter. Therefore, the temperature in most of China in 2011/2012 winter may be possibly lower than normal.

Seasonal Outlook of China Winter Climate in 2011/2012

Liu Yun-yun

Beijing Climate Center, China Meteorological Administration

Abstract

Based on the decadal characteristics, developing La Niña event and other key atmospheric circulation factors, it is expected that the temperature will be slightly below-normal over most China in the 2010/2011 winter, but above-normal over Tibet of China and middle Northwest China. Precipitation will be near-normal over China.

The La Niña event is developing gradually and its effect is expected to become obvious. When La Niña event occurs in central-eastern Pacific in winter, the temperature is probably lower than normal in some regions over China. It is predicted that the Siberian High and East Asian winter monsoon are stronger than normal based on the Couple General Climate Model (CGCM) from Beijing Climate Center (BCC), which is possible to make the temperature lower than normal in most China. The interannual variation of the above-mentioned key factors will probably make for regional cold temperature in China. However, the temperature has turned into the warm period over China in winter since the end of 1970s. The decadal tendency with opposite effect maybe decreases the interannual cold tendency.

Responding to the developing La Niña event, subtropical high over western Pacific is expected to be slightly weaker, and its location will show more eastern and northern than normal in winter. Under the all-around impacts of the abnormal SST in central-eastern Pacific, the predicted subtropical high over western Pacific and decadal background of precipitation, it is predicted that above-normal precipitation will be found in northern Xinjiang Province, middle and western Inner Mongolia, eastern Northeast China, eastern Northwest China, northern Southwest China and the lower-middle reaches of the Yangtze River, but below-normal precipitation will be over southern North China and the region between Huaihe and Yellow River.

Seasonal outlook of the 2011/12 winter from Korea Polar Research Institute

Baek-Min Kim
Korea Polar Research Institute

Abstract

Dynamic ensemble seasonal prediction of 2011/12 (DJF) winter has been performed using the NCAR (National Center for Atmospheric Research) CAM3 (Community Atmosphere Model, Version 3) with a horizontal resolution of 2 by 2.5 and 40 vertical levels. For the boundary conditions, we used SST and sea-ice concentration in weekly NOAA OISST data. During the prediction, global SST is predicted based on statistical prediction methods consisting of dynamical El-Nino prediction Model, Lagged Linear regression model (LLRM), Coupled Patten Projection Model (CPPM), and persistence. Also, changing sea-ice is considered during the prediction. Initial sea-ice concentration is slowly adjusted toward the recent four years averaged values until the end of May of 2012. Model snow depth is initialized using NOAA CPC (Climate Prediction Center) operational weekly mean snow cover and CMC (Canadian Meteorological Centre) snow depth information (climatology and standard deviation). The ensemble run is made with 8 members by a simple lagged method using initial conditions from 17th to 21th October, four times a day at 00Z, 06Z, 12Z and 18Z. The anomalies are obtained as the difference of the ensemble mean from the model climatology. The results of the dynamic ensemble seasonal prediction for 2011/12 winter will be presented at the meeting. The role of variables in the cryosphere such as sea-ice and snow-cover on east-Asian winter monsoon will be highlighted in this talk.

Climate Outlook for 2011/12 Winter over Korea

Jun-Seok Chung, Jinho Shin, Young-Ho Lee, Ji-Yeon Ye
Climate Prediction Division, Korea Meteorological Administration

Abstract

The Korea Meteorological Administration's seasonal climate predictions for 2011/12 winter over Korea will be presented. Sea surface temperature (SST) over the Nino3.4 region in early-October is about 25.7°C, which is lower –by 0.9°C than normal. Most of dynamical and statistical ENSO models predict that the negative SST departures in the central and eastern equatorial Pacific from normal are likely to persist until the end of 2011. The large-scale circulation patterns over East Asia including winter monsoon are likely to be indirectly affected by the SST evolution over the equatorial Pacific. According to the analog analyses of the past La Nina years, systematic associations between the La Nina episode and the winter climate over Korea are not found, though winter month temperatures in some years were coherently below normal. The size of arctic sea ice during 2011 summer is smaller than normal due to anomalous high temperature in the North Pole area. The polar sea ice cover in 2011 summer is as small as that of 2007. Open seas free from sea ice emit massive heats and moistures to the atmosphere. They generate an upper high pressure system over the polar sea and the energy may transport to a middle latitude zone as a wave-like pattern from fall to winter. As a result, troughs may frequently pass over East Asia, where downstream winds from the back side of troughs make early onset of winter with strong cold surges. Regarding these results, dynamical and statistical modeled data will be discussed focusing on seasonal temperature and precipitation outlook for 2011/12 winter over Korea.

Overview of 2011 Summer Climate and Seasonal outlook for winter 2011/2012 over Mongolia

Undrakh Tserendeleg
Institute of Meteorology and Hydrology, Mongolia

Abstract

Mongolian summer climate change study shows that the annual mean temperature trend was irregular with 0.0-1.0°C below climate norm (1979-2008) during 1979-1999 and it became 1.2°C above norm in last decade. The precipitation amount decreases dramatically in last decade.

In 2011 summer, in June, mean air temperature was +1.0 °C higher, in July it was -0.5 °C lower and in August it was +1.5°C higher than normal. In average, the seasonal mean temperature was near normal.

In 2011 summer, in June, precipitation amount was above normal in almost all of the part of Mongolia. July precipitation was around normal while August precipitation was below normal. Above normal precipitation of June leded favorable condition to grow pasture well. As a result of near normal precipitation combined with less hot days observed in July, pasture production increased dramatically and end of the July, 80 percent of grassland of Mongolia covered by good pasturage. This summer climate condition was favorable for not only agriculture but also for nomadic livestock husbandry which is one of the important economic sectors in Mongolia.

According to 2011/2012 winter climate outlook from October to March, temperature is expected to be slightly above normal such as +1.0 - +1.5 in some part of western part during November-December 2011, and March 2012, and south-eastern part of Mongolia in February. Near normal temperature is expected in rest of the part of Mongolia during winter, except north-east part in December, western part in January where expect -1.0 - -1.5°C below normal temperature. Precipitation is expected to be above normal in Altai and Khentei Mountainous and eastern steppe areas in December, in almost all of the country in January and March, and in northern part of Mongolia in February.

Seasonal Outlook for winter 2011/2012 over Japan

Koji Ishihara

Climate Prediction Division, Japan Meteorological Agency

Abstract

1. Oceanic conditions

In September 2011, the SST deviation from a sliding 30-year mean SST averaged in the NINO.3 region was -0.6°C . The five-month running-mean value of the NINO.3 SST deviations was -0.2°C for July. The Southern Oscillation Index for August was +1.1. The oceanic and atmospheric features mentioned above came close to La Niña conditions.

According to the JMA's El Niño prediction model, the NINO.3 SST will be near normal through the prediction period. However, the predicted NINO.3 SST deviation for the boreal autumn and the beginning of the winter is lower than the prediction of the previous month, and the observed value in September (-0.6°C) is near the lower bound of the previous month's prediction.

Considering all the above, it is more likely than not that La Niña conditions will develop during the northern hemisphere autumn and winter.

2. Numerical prediction

Negative SST anomaly is predicted widely in the tropical and subtropical middle and eastern Pacific. On the other hand, positive anomaly is predicted in the tropical western Pacific and in the tropical Indian Ocean. In relation to this, weak and strong convective activities are predicted in the former area and the latter areas, respectively.

In relation to the feature of the convective activity in the middle and eastern Pacific, it is predicted that the geo-potential height at 500hPa will be significantly higher than normal in the northeastern Pacific and the Aleutian low will be weaker than normal, suggesting northwesterly winter monsoon will be weak over the northern part of Japan.

On the other hand, in association with predicted active convection in the tropical western Pacific and in the tropical Indian Ocean, an anti-cyclonic circulation anomaly in the upper tropospheric (200hPa) is predicted over South Asia and the subtropical jet stream shifts northward over the Asian Continent and southward over Japan, suggesting strong winter monsoon around the southern part of Japan.

The tropospheric thickness temperature averaged over the mid-latitudes of the Northern Hemisphere (30N-50N), which is positively correlated with temperatures over Japan. It is predicted to be above normal in this boreal winter.

In the mid- and high latitudes, the neutral phase of the Arctic Oscillation (AO) is predicted. The positive (negative) phase of AO tends to cause weak (strong) winter monsoon, and above-normal (below-normal) temperature in northern Japan. However, the spread among each ensemble member is large and the hindcast (30 years from 1979 to 2008) suggests that the model does not have enough skill to predict the AO. Therefore, strong or weak winter

monsoon are undecided.

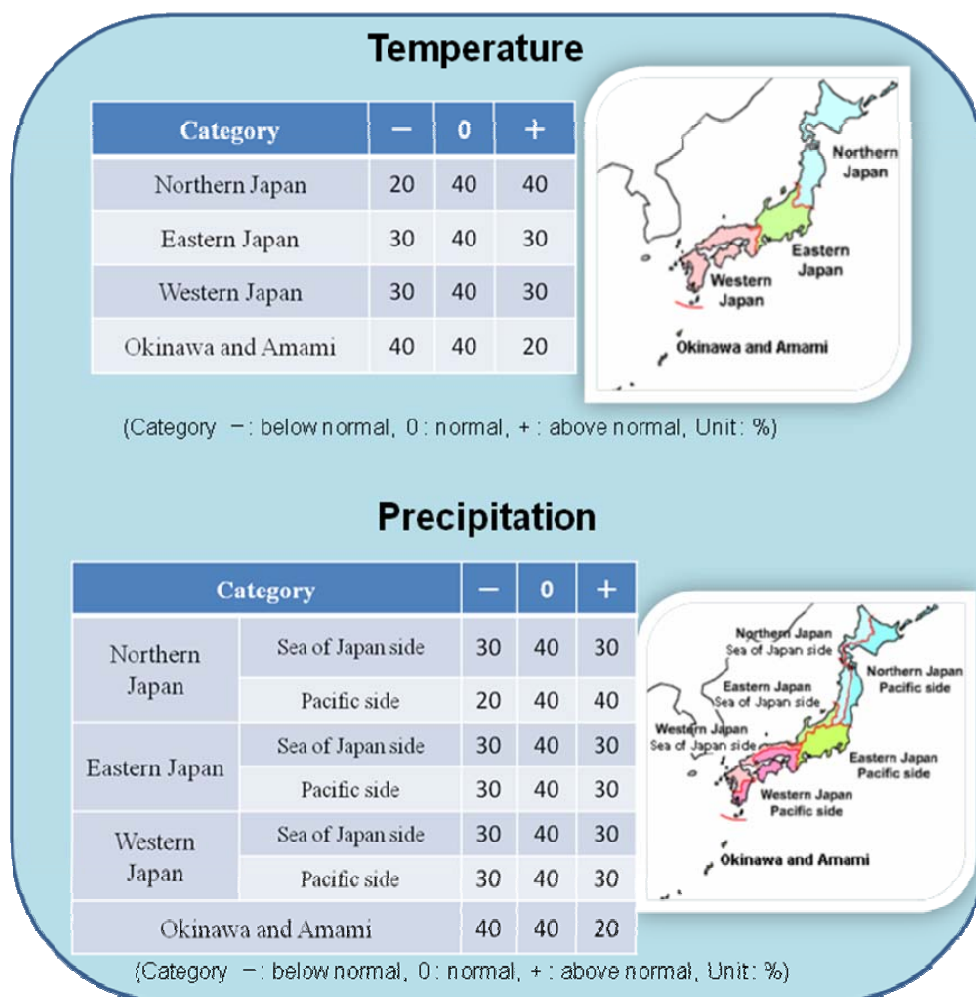
3. Conclusion

From the numerical prediction around Japan, below-normal temperatures are expected in winter in Japan except for the northern part. However, considering the tropospheric thickness temperature, it is likely that temperatures will be warmer than the result of the numerical prediction from eastern to western Japan. In northern Japan, from both the numerical prediction and the tropospheric thickness temperature, it is likely that temperature will be normal or warmer than normal in winter.

4. Summary of the Outlook

Cold season mean temperatures are expected to be both near normal and above normal with 40% probability in northern Japan, and both near normal and below normal with 40% probability in Okinawa/Amami.

Cold season total precipitation is expected to be both near normal and above normal with 40% probability on the Pacific side of northern Japan, and both near normal and below normal with 40% probability in Okinawa/Amami. Cold season snowfall on the Sea of Japan side of Japan shows no significant features.



List of Participants

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Provisional List of Participants

Bangladesh

Mr S. M. Quamrul Hassan
Meteorologist
Storm Warning Centre
Bangladesh Meteorological Department
Meteorological Complex
Agargaon, Dhaka - 1207
Tel: +880 2 9135742
Fax: +880 2 8118230
E-mail: smquamrul77@yahoo.com

Dr Liu Yunyun (Ms)
Engineer
National Climate Center
China Meteorological Administration
46 Zhongguancun Nandajie
Beijing 100081
Tel: +86 10 68408748
Fax: +86 10 68400092
E-mail: liuyuny@cma.gov.cn

Cambodia

Ms Tep Phollarath
Vice Chief, Climate of Office
Department of Meteorology
Ministry of Water Resources and Meteorology
Phnom Penh
Tel: +855 23 72 74 46
Fax: +
E-mail: tepphollarath@gmail.com,
tep_rath@yahoo.com

Dr Gong Zhiqiang
Engineer
National Climate Center
China Meteorological Administration
46 Zhongguancun Nandajie
Beijing 100081
Tel: +86 10 68400089
Fax: +86 10 58993517
E-mail: gzq0929@126.com

China

Dr Han Rongqing
Senior Engineer
National Climate Center
China Meteorological Administration
46 Zhongguancun Nandajie
Beijing 100081
Tel: +86 10 68400090
Fax: +86 10 58993517
E-mail: hrq@cma.gov.cn

Dr Si Dong
Engineer
National Climate Center
China Meteorological Administration
46 Zhongguancun Nandajie
Beijing 100081
Tel: +86 10 68406544
Fax: +86 10 58993517
E-mail: sidong@cma.gov.cn

Indonesia

Mr Nuryadi
Head, Climate Analysis and Information Sub
Division
Meteorological, Climatological and
Geophysical Agency
Jl. Angkasa 1 No.2 Kemayoran
P.O. Box 3540 JKT, Jakarta 10720
Republic of Indonesia
Tel: +62 21 4246321 Ext. 8302
Fax: +62 21 6540214
E-mail: bintaro2001us@yahoo.com

Laos

Mr Vanhdy Douangmala
Deputy Head
Weather Forecast and Aeronautical Division
Department of Meteorology and Hydrology
P.O. Box 2903 Vientiane
Tel: +856 21 215010
Fax: +856 21 223446
E-mail: vanhdy_d@yahoo.com

Malaysia

Ms Nur Syafeenatul Alfda Rosli
Assistant Director
Climatological and Hydrological Section
Malaysian Meteorological Department
Jalan Sultan, 46667 Petaling Jaya, Selangor
Tel: +603 7967 8166
Fax: +603 7955 0964
E-mail: syafeenatul@met.gov.my

Mongolia

Ms Undrakh Tserendeleg
Long Range Forecast Engineer
National Agency for Meteorology and
Environment Monitoring (NAMEM)
Juulchny Gudamj-5, Ulaanbaatar-46
Tel: +976 11326609
Fax: +976 11326614
E-mail: undraa_67@yahoo.com

Myanmar

Mr Chit Kyaw
Assistant Director
Department of Meteorology and Hydrology
Ministry of Transport, Nay Pyi Taw
Tel: +95 67 411446
Fax: +95 67 411449
E-mail: dg.dmh@mptmail.net.mm,
chitkyawdmh@gmail.com

Pakistan

Mr Sohail Babar Cheema
Meteorologist
Research and Development Division
Pakistan Meteorological Department
Sector: H-8/2, Islamabad - 44000
Tel: +92 51 9250334
Fax: +92 51 9250368
E-mail: sbc_met@yahoo.com

Philippines

Ms Jorybell A. Masallo
Weather Specialist II
Philippine Atmospheric, Geophysical and
Astronomical Services Administration
(PAGASA)
Science Garden Complex, Agham Road,
Diliman
Quezon City 1101
Tel: +632 4342618
Fax: +632 4342618
E-mail: jorybell.masallo@yahoo.com

Republic of Korea

Mr Jun-Seok Chung
Director, Climate Prediction Division
Korea Meteorological Administration
61 Yeouidaebang-ro 16-gil, Dongjak-gu
Seoul 156-720
Tel: +82 2 2181 0472
Fax: +82 2 2181 0489
E-mail: cjs@kma.go.kr

Mr Jinho Shin
Senior Researcher, Climate Prediction Division
Korea Meteorological Administration
61 Yeouidaebang-ro 16-gil, Dongjak-gu
Seoul 156-720
Tel: +82 2 2181 0473
Fax: +82 2 2181 0489
E-mail: jshin0@korea.kr

Mr Hyung Byun
Meteorologist, Climate Prediction Division
Korea Meteorological Administration
61 Yeouidaebang-ro 16-gil, Dongjak-gu
Seoul 156-720
Tel: +82 2 2181 0481
Fax: +82 2 2181 0489
E-mail: bhyung@kma.go.kr

Ms Gyeong-Suk Choe
Meteorologist, Jeonju Weather Station
Gwangju Regional Meteorological
Administration
Korea Meteorological Administration
241, Sene-ro 102-1201, Wansan-gu, Jeonju-si
Jeollabuk-do
Tel: +82 10 2650 8035
Fax: +82 63 284 0365
E-mail: kyung0146@korea.kr

Ms Young-rhan Yoon
Meteorologist, Cheongju Weather Station
Daejeon Regional Meteorological
Administration
Korea Meteorological Administration
265-14, Bokdae-dong, Heungdeok-gu,
Cheongju-si
Chungbuk
Tel: +82 43 265 7504
Fax: +82 43 262 0365
E-mail: dbs406@korea.kr

Mr Baek-Min Kim
Senior Research Scientist
Polar Climate Research Division
Korea Polar Research Institute
406-840 Get-Pearl Ro, Yeon-Su Gu, Incheon
Tel: +82 32 260 6226
Fax: +82 32 260 6235
E-mail: bmkim@kopri.re.kr

Sri Lanka

Mr Kehelella Herath Mudiyansele Sarath Premalal
Meteorologist
Department of Meteorology
383 Bauddhaloka Mawatha, Colombo 7
Tel: +94 11 2682041
Fax: +94 11 2698311
E-mail: spremalal@yahoo.com

Thailand

Ms Chalalai Jamphon
Senior Meteorologist
Meteorological Development Bureau
Thai Meteorological Department
4353 Sukhumvit Road, Bang-Na, Bangkok
10260
Tel: +66 2 399 1423
Fax: +66 2 398 9875
E-mail: chalalaij@yahoo.com
tmd_inter@tmd.go.th

Viet Nam

Ms Le Thi Thu Ha
Forecaster
National Hydro-Meteorological Service
Ministry of Natural Resources and
Environment
No 4 Dang Thai Than Street, Hoan Kiem
District, Ha Noi
Tel: +84 43 8244923
Fax: +84 43 9330731
E-mail: leha246@gmail.com

Japan

Dr Masahiro Watanabe
Associate Professor
Atmos.lphere and Ocean Research Institute
(AORI)
University of Tokyo
5-1-5 Kashiwanoha, Kashiwa, Chiba 277-8568
Tel: +81-4-7136-4387
Fax: +81-4-7136-4375
e-mail: hiro@aori.u-tokyo.ac.jp

Dr Tomoaki Ose
Climate Research Department
Meteorological Research Institute/JMA
1-1 Nagamine, Tsukuba-city, Ibaraki 305-0052
Tel: +81-29-853-8600
Fax: +81-29-855-2552
E-mail: tomoaose@mri-jma.go.jp

Dr Masayoshi Ishii
Climate Research Department
Meteorological Research Institute/JMA
1-1 Nagamine, Tsukuba-city, Ibaraki 305-0052
Tel: +81-29-853-8593
Fax: +81-29-855-2552
E-mail: maish@mri-jma.go.jp
ism@jamstec.go.jp

Dr Tamaki Yasuda
Climate Research Department
Meteorological Research Institute/JMA
1-1 Nagamine, Tsukuba-city, Ibaraki 305-0052
Tel: +81-29-853-8602
Fax: +81-29-855-2552
E-mail: tyasuda@mri-jma.go.jp

Japan Meteorological Agency (JMA)

1-3-4 Otemachi, Chiyoda-ku
Tokyo 100-8122
Tel: +81 3 3211 8406
Fax: +81 3 3211 2032
E-mail: tcc@met.kishou.go.jp

Dr Kiyoharu Takano
Director, Administration Division,
Global Environment and Marine Department,
JMA

Mr Yoshiji Yokote
Director, Climate Prediction Division
Global Environment and Marine Department,
JMA

Mr Norihisa Fujikawa
Deputy Director, Climate Prediction Division
JMA

Mr Hiroshi Ishihara
Senior Scientific Officer,
Climate Prediction Division, JMA

Mr Shuhei Maeda
Senior Forecaster, Forecast Unit,
Climate Prediction Division, JMA

Mr Koji Ishihara
Forecaster, Forecast Unit,
Climate Prediction Division, JMA

Dr Kazutoshi Onogi
Senior Coordinator for Climate Modeling,
Climate Prediction Division, JMA

Ms Satoko Matsueda
Scientific Officer, Numerical Prediction Unit,
Climate Prediction Division, JMA

Mr Tetsuya Mikawa
Senior Coordinator for El Niño Prediction,
Climate Prediction Division, JMA

Mr Hiroyuki Sugimoto
Scientific Officer, El Niño Unit,
Climate Prediction Division, JMA

Tokyo Climate Center, JMA

Ms Teruko Manabe
Head, Tokyo Climate Center, JMA

Mr Ryuji Yamada
Scientific Officer,
Tokyo Climate Center, JMA

Mr Kenji Yoshida
Scientific Officer
Tokyo Climate Center, JMA