The Sixth Session of the East Asia winter Climate Outlook Forum

Seoul, Republic of Korea

7-9 November 2018

Contents:

Executive Summary

The Sixth Session of the East Asia winter Climate Outlook Forum (EASCOF-6) was held in Seoul, the Republic of Korea from 7 to 9 November 2018. This Forum was joined by long-range forecasters and climate experts from the China Meteorological Administration (CMA), the Japan Meteorological Agency (JMA), the National Agency for Meteorology and Environment Monitoring of Mongolia (NAMEM), the Korea Meteorological Administration (KMA), the APEC Climate Center (APCC), and WMO LC_LRFMME. Participants shared knowledge about seasonal prediction and discussed seasonal outlook for the winter 2018/2019. It was summarized that the upcoming East Asia Winter Monsoon is likely to be weaker than normal.

1. Introduction

In line with the agreement at the Thirteenth Session of the Joint Meeting for Seasonal Prediction of the East Asian Winter Monsoon (EAWM), the East Asia winter Climate Outlook Forum (EASCOF) was established as a WMO sub-regional COF. The EASCOF has been held since 2013, hosted alternately by NAMEM, JMA and KMA. The EASCOF-6 was held in Seoul, the Republic of Korea from 7 to 9 November 2018, attended by around 60 long-range forecasters, researchers and experts from CMA, JMA, NAMEM, KMA, APCC, and academia. The forum covered main seasonal topics, including the recent climate

phenomena in East Asia, services and assessments of long-range forecasts in East Asia, research and development of climate variability related to the East Asia Winter Monsoon, ENSO activity and outlook, and seasonal climate outlook for the winter 2018/2019, by using statistical and dynamical models. It served as a good opportunity to share understanding of climate events and research results related to seasonal prediction on the EAWM, as well as discussing seasonal climate outlook for the winter 2018/2019.

2. Overview of 2018 Summer Climate

During the 2018 summer, East Asia experienced very hot weather with record-breaking temperatures. The heat wave was attributed to the extension and persistence of North Pacific Subtropical High and Tibetan High farther northward and north & eastward than normal, respectively. The rainfall amount was above normal in most parts of China and Western Japan with extreme heavy rain, but it was below normal in the Korean Peninsula with the earlier retreat of the Changma.

CMA: China experienced the hottest summer since 1961. The summer mean temperature over China was 21.9℃, which was 1.0℃ higher than normal and the highest summer mean temperature since 1961. The 2018 rainy season started later than normal in South China, near-normal in Southwest China. The Meiyu period in 2018, in general, began later than normal with less precipitation. Its duration was shorter than normal, but the precipitation amount in North China was 22% above normal as the rain belt laid more north than normal during the JJA season.

A heat wave affected North China in June, which was earlier than normal. Temperatures in most northern parts of China topped 35℃ from June 20 to 28. Moreover, the heat wave was persistent and widely affected across the country. Many central and southern parts of China had more than 40 hot days. For the first time in the CMA's history, it issued high temperature warnings for 33 consecutive days. In addition, there were 8 typhoons landed on China during the summer, which was above normal of 4.3, causing massive economic damage.

JMA: Japan experienced two record-breaking phenomena in summer 2018, especially in July. In early July, it had an unprecedented heavy rain event since 1982, and after mid-July there were high temperature events across the country.

Heavy rain events were widely observed in Western Japan, and some areas had precipitation two to four times the monthly normal for July. Some observations recorded more than 1,800 mm precipitation during the heavy rain event from 28 June to 8 July 2018. The heavy rain events were attributed to the activation of the stationary state of the Baiu front around Japan,

highly developed Okhotsk High and the North Pacific Subtropical High, upper-level trough over the Korea Peninsula, enhanced convective activity around the East China Sea, and global warning.

Extremely high temperatures persisted across Japan starting from mid-July. The monthly mean temperature anomaly for July in Eastern Japan was +2.8℃, the highest on record for July since 1946. A new national maximum temperature of 41.1℃ was recorded on July 23. The heat wave was attributed to the expansion of the persistent North Pacific Subtropical High and Tibetan High to Japan.

KMA: The summer mean temperature over South Korea was 25.4 ℃, which was +1.8℃ above normal and the highest summer mean temperature since 1973 when the nationwide modern observation started in Korea. In particular, the highest minimum temperature reached at 30.3℃ in Seoul. The number of heat wave days and tropical nights was 31.4 days and 17.7 days, respectively, which were both above normal and recorded the highest since 1973.

The summer precipitation was below normal at 585.5mm and the percentile was 17.2%ile. The 2018 Changma period was 14–16 days, the second shortest since 1973. The onset date of the 2018 Changma was within near-normal range, but its retreat was earlier than normal. Due to the early retreat of the Changma, the rainfall amount during the Changma period was below normal at 283.0 mm. But there was heavy rain due to trough in late June and Typhoon Prapiroon in early July. After the Changma, clear sky continued, and sunshine duration was above normal, contributing to above-normal heat waves and tropical nights over South Korea.

NAMEM: Temperature anomalies were above normal in JJA over most of Mongolia except in Southern Mongolia where temperature was near normal over whole territory in July.

The precipitation anomalies were below normal over most of Mongolia in June, nonetheless, dry condition was reversed to wet condition since beginning of July during rest of the season.

Hot and dry summer was dominated during June due to a strong ridge in troposphere was developed over Western Mongolia and Middle Siberia. However, a trough was taken place since beginning of July over Mongolia because Okhotsk high was developed.

3. Current Status and Outlook of ENSO

Current Status

The Nino3.4 SST anomaly is above normal with a deviation of +1.3℃ for the period from 28 October to 3 November. The positive SST anomalies appear around the tropical central-eastern Pacific.

ENSO outlook

Based on the dynamical and statistical methods, there is a possibility that a weak ~ moderate El-Niño could develop in late autumn in 2018. It may continue through the spring of 2019, but uncertainty exists.

4. Outlook for 2018/19 winter

The East Asia Winter Monsoon for the upcoming 2018/19 winter is expected to be weaker than normal.

CMA: Based on the dynamical and statistical model, the East Asia Winter Monsoon (standardized Sea Level Pressure averaged from 40-60N, 80-120E) would be weaker than normal, but intra-seasonal variation is expected to be strong. Air temperatures in winter may be warmer than normal in most parts of China, except Northeastern China and north of Xinjiang province. Precipitation in winter will be above normal in Northern and Southern China, but near or below normal in Central China.

El-Niño event developed in late autumn in 2018 will induce a weak winter monsoon, a shallower East Asian trough, an anomalous low-level anticyclone around the Philippines as well as intensified western Pacific Subtropical High with its high ridge extending farther westward and southward. The North Atlantic Triple SSTA mode is another important factor. Its positive phase in JJA 2018 will favor a weak Siberian High in the coming winter.

JMA: There is a 70% probability that El-Niño condition will develop by the end of this autumn and continue until next spring.

In upper circulation fields, the subtropical jet stream is expected to shift southward over the Eurasian continent and to meander northward around Japan. On the other hand, equatorial symmetric anti-cyclonic anomalies are predicted around the central tropical Pacific as a response from active convection. Furthermore, the PNA (Pacific North American) pattern, which is often observed during El-Niño winters, is expected, but will take a westward shift compared to the typical pattern.

The Aleutian Low is predicted to be moderately strong corresponding to the westward shift of PNA pattern. Then, the extent of winter monsoon is expected to be near normal around Northern Japan. On the other hand, the relatively weak winter monsoon is predicted around Eastern and Western Japan. Furthermore, the mid-latitude tropospheric zonal mean temperature is predicted to be above normal mainly due to the recent warming trend. Considering such predicted and recent climate status, it will be above normal temperature over Western Japan and Okinawa/Amami with a probability of 50%. Temperature and Precipitation outlook over entire regions of Japan are shown at the following figures.

KMA: The dynamical model shows that the East Asia Winter Monsoon is likely to be slightly weaker than normal. Temperature and precipitation is likely to be above and near-above normal during coming winter, respectively. However, the tendency of overestimating temperature of the model and anomalous eddies along the mid-latitude at 500hPa indicate the possibility that Siberian High occasionally extends toward the Korean Peninsula and impacts on cold air outbreak during the early winter.

Weak El-Niño is likely to be maintained during the upcoming winter, whereas El-Niño status during the next spring is uncertain. Statistically, Korea has experienced near or above-normal conditions for winter temperature and precipitation. On the other hand, less-than-normal sea ice over the Laptev Sea in October would be accompanied by below-normal temperature during winter, especially in December over South Korea. Overall, temperatures over South Korea are expected to be near-normal, and precipitation near or above-normal for the following winter season with strong intra-seasonal variation.

NAMEM: Based on the CGCM, the Artificial Neural Network (ANN) and statistical downscaling method are used for seasonal prediction. Temperatures would be near normal over most territory of Mongolia, above normal in southern Mongolia. Precipitation would be near normal. On the other hand, strength of the Siberian High is expected to be strong positive in beginning of winter then will become weaker.

Summarized prediction

Temperature
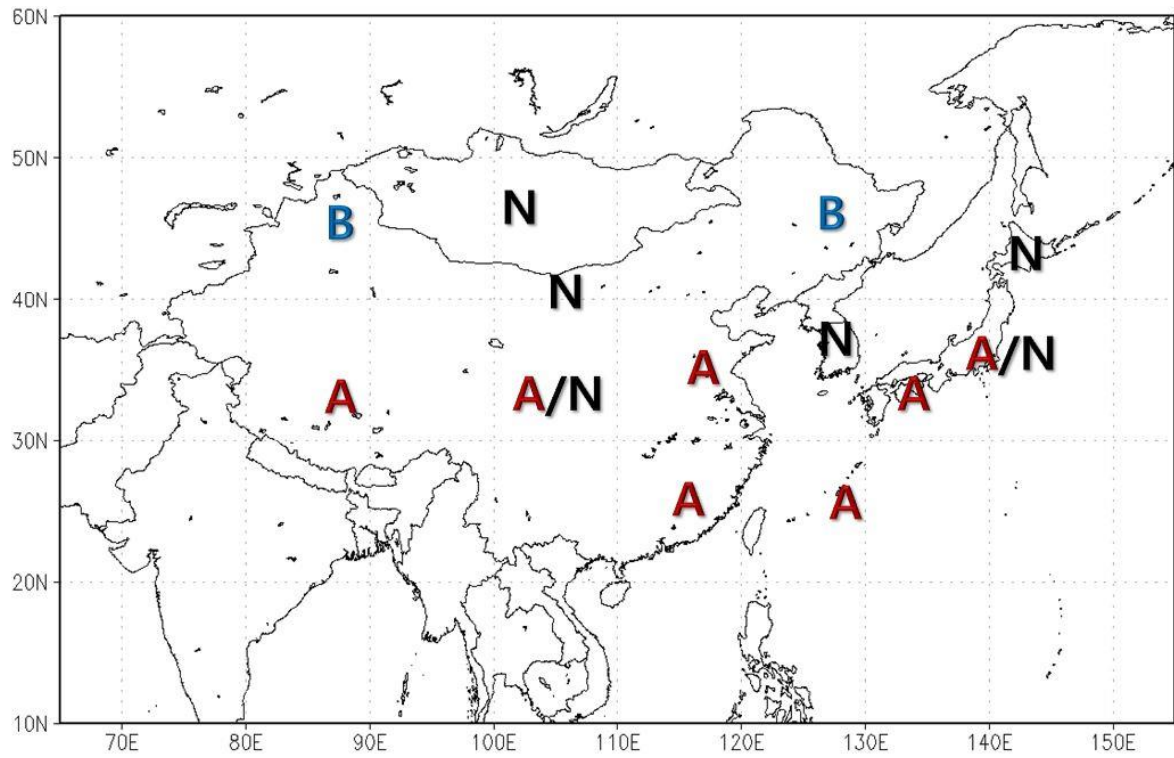
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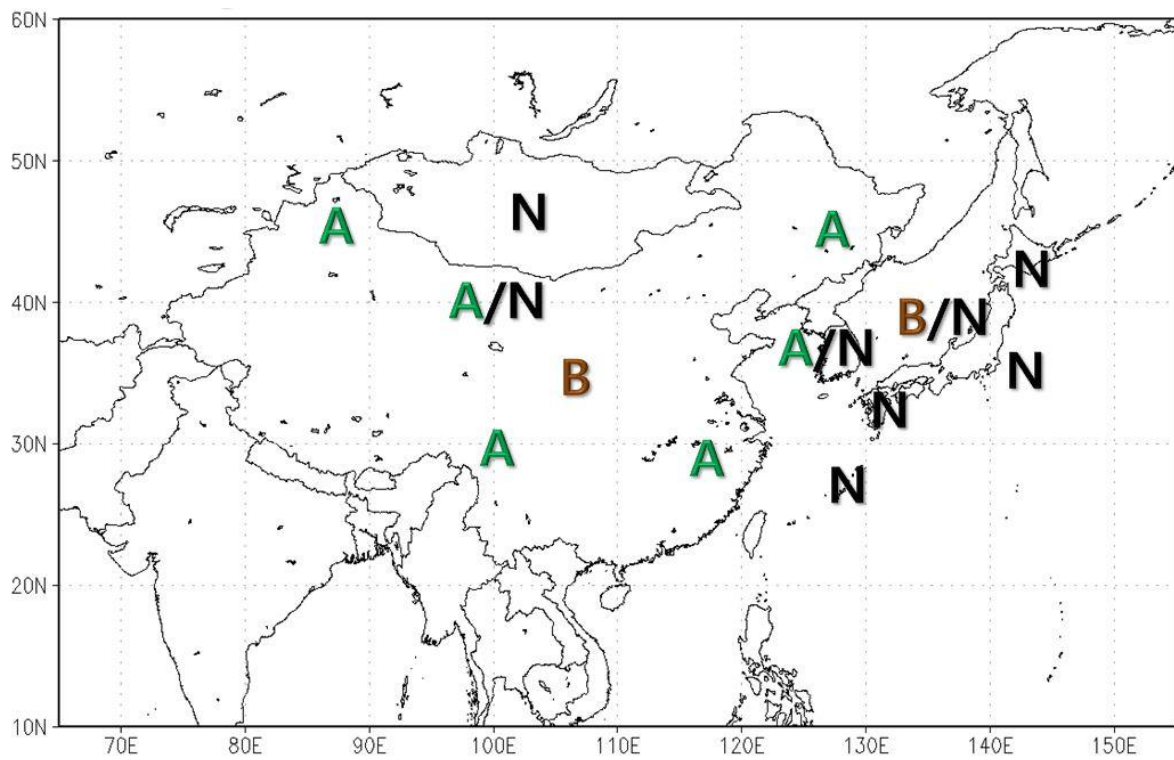
5. Other Issues

5.1. All materials from the EASCOF-6 such as presentations, summary, and a list of participants will be available on the dedicated website.

5.2. As a WMO sub-regional COF, activities of the EASCOF-6 will be reported to the WMO by the KMA as soon as possible after the circulation to all participants.

5.3. The date and place of the EASCOF-7: The session was pleased to note that Mongolia will host the EASCOF-7 in November 2019. The time and venue will be determined later on.