EASCOF 2019

The Seventh Session of East Asia Winter Climate Outlook Forum

(The 7th EASCOF)

5–7 November 2019, Ulaanbaatar, Mongolia

Program & Local Information

ABSTRACTS

Sponsored by

National Agency of Meteorology and Environment Monitoring (NAMEM),

Information and Research Institute of Meteorology, Hydrology and Environment (IRIMHE)

Contents

Program

The Seventh Session of the East Asia Winter Climate Outlook Forum (The 7th EASCOF)

5-7 November 2019, Ulaanbaatar, Mongolia

Tuesday, 5 November 2019

13:30 - 14:00 Registration
Location: Grand Hall, 2nd Floor, UB Grand hotel

Opening Session:

(Chair: Purevjav Gomboluudev, IRIMHE)

14:00-14:10 Welcome Address

Ganjuur Sarantuya, Director of Information and Research Institute of Meteorology, Hydrology and Environment (IRIMHE, Mongolia)

14:10-14:40 Group photo and Coffee break

Section I: Research on Large-scale Circulation related to East Asia Winter Monsoon

(Chair: Kim Dong-Joon, KMA)

14:40-15:00 Development and application of BCC high resolution model prediction system (Yan Jinghui, CMA, China)

15:00-15:20 Climate prediction system based on large-scale circulation (G. Bayasgalan, IRIMHE, Mongolia)

15:20-15:40 Relationship between snow and atmospheric circulation (E. Munkhjargal and E. Dorjpurev IRIMHE, Mongolia)

Section II: Overview of Recent Climate and Extremes

(Chair: Gong Zhiqiang, CMA)

15:40-16:00 Review of 2019 summer climate over Mongolia (Kh.Akhmyet-Ali, A. Davaadorj, IRIMHE and Javzmaa, NAMEM, Mongolia)

16:00-16:20 Review of 2019 summer climate over South Korea (Choi Chulwoon, KMA, Korea)

16:20-16:40	Characteristics of 2019 summer monsoon in East Asia (Noriyuki ADACHI, JMA, Japan)
16:40-17:00	Climate Events and Impacts over China in 2019 (Yizhou Yin, CMA, China)
17:00-17:20	Recent extreme events in Mongolia (M. Doljinsuren, NAMEM, Mongolia)
17:30-18:30	Dinner

Wednesday, 6 November 2019

Section III: Application of Climate Information in Socio-Economic sector

(Chair: Lamjav Oyunjargal, NAMEM)

09:00-09:20	KMA Extreme climate services: analysis and forecast (Won Youjin, KMA, Korea)
09:20-09:40	Early warning for Dzud disaster (B. Erdenetsetseg, N. Mungunchimeg and Ts. Bat-Oyun, IRIMHE, Mongolia)
09:40-10:00	Government action and their effect on dzud mitigation and Response in Mongolia (a case study Khuvsgul) (Ch. Ariunaa, NEMA, Mongolia)
10:00-10:20	Coffee Break
10:20-10:40	Winter preparation for livestock husbandry based on winter outlook (Ts. Munkhnasan, MOFALI, Mongolia)
10:40-11:00	Seasonal changes of ice depth and phenomena (Kh. Purevdagva, IRIMHE, Mongolia)
11:00-11:20	Impact of climate change on Environment (D. Dulamsuren, IRIMHE, Mongolia)
11:40-12:40	Lunch

Section IV: Seasonal Climate Outlook for Winter 2019/2020

(Chair: Shoji NOTSUHARA, JMA)

14:00-14:20	ENSO outlook for 2019/20 winter (Tian Ben, CMA, China)
14:20-14:40	JICA project concept on risk reduction associated with dzud disaster in Mongolia (JICA representative)
14:40-15:00	Cold season outlook for winter 2019/20 over Japan (Shoji NOTSUHARA, JMA, Japan)
15:00-15:20	Climate outlook for winter 2019/2020 over Korea (Seo TaeGun, KMA, Korea)
15:20-15:40	Coffee Break
15:40-16:00	Seasonal climate outlook for winter 2019/2020 over China (Zhao Junhu, CMA, China)
16:00-16:20	Seasonal climate outlook for winter 2019/2020 over Mongolia (A. Davaadorj and Kh. Akhmyetali, IRIMHE, Mongolia)
16:20-16:40	Discussion
17:00-19:00	Reception at the UB Grand hotel

Thursday, 7 November 2019

Section V: Discussion and Summary of the Outlook for Winter 2019/2020

(Chair: Gerelchuluun Bayasgalan, IRIMHE)

09:00-11:00	Discussion and Summary
11:00-11:20	Coffee break
11:20-11:30	Discussion about the next meeting
11:30-11:40	Closing remarks Purevjav Gomboluudev, Scientific Secretary of Information and Research Institute of Meteorology Hydrology and Environment
12:00-13:00	Lunch

Local Information

INFORMATION FOR THE PARTICIPANTS

Meeting Location:

The Seventh Session of the East Asia winter Climate Outlook Forum will be held at the UB Grand hotel Conference Hall, 2nd floor, at University street, 20-2, Ulaanbaatar, Mongolia.

Host organization: Information and Research Institute of Meteorology, Hydrology and Environment (IRIMHE) and National Agency for Meteorology and Environmental Monitoring (NAMEM)

Working language:

English

Meals (Lunch and Dinner):

Whole meals and Reception place will be on the 17th floor at the UB Grand hotel.

PPT Copy:

The PPTs will be collected and distributed to all participants by organizer before closing ceremony on 7th November, 2019.

Time zone:

In relation to Greenwich. Ulaanbaatar is +8 hours.

Airport-Hotel-Airport:

We will pick up all participants in Chinggis Khan International Airport and also take to airport from Hotel.

Electricity, internet and e-mail:

The electrical voltage in Mongolia is 220V. Wireless is free in conference hall.

Wi-Fi-username: **UB Grand hotel**

Wi-Fi-Password: **welcometo**

Weather forecast in Ulaanbaatar

5 - 7 November 2019

Mean temperature	-1 – -3°C
Maximum temperature	2 – 7°C
Minimum temperature	-7 – -12°C
Days with precipitation	No precipitation

Identity badge

During the workshop, all participants and their accompanying persons are kindly requested to wear the identity badge. The badge serves as a pass for meetings and meals. If participants have any questions, please contact the staff of organizer who is identified by their red badges.

Currency Exchange

Tugrik (₮) is the official currency of Mongolia. Foreign currency exchange is located at international airport and hotel reception as well. Following table shows exchange rate in Trade and Development Bank, 30 Oct

Currency		Mongol Bank	In non cash		In cash	
			BUY	SELL	BUY	SELL
USD	US Dollar	2,692.43	2,692.00	2,698.00	2,692.00	2,703.00
CNY	Chinese Yuan	381.34	380.50	386.20	380.50	386.50
JPY	Japanese Yen	24.73	24.55	25.33	24.48	25.33
KRW	South Korean Won	2.31	2.27	2.37	2.24	2.37

Following link shows exchange rate in Trade and Development Bank.

https://www.tdbm.mn/en/exchange

Contact person of the meeting

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Abstracts

DEVELOPMENT AND APPLICATION OF BCC HIGH RESOLUTION MODEL PREDICTION SYSTEM

Yan Jinghui

China Meteorological Administration

Abstract

The main advancements in the high resolution version of Beijing Climate Center (BCC) climate system model (BCC-CSM2-HR) are presented, in terms of physical parameterizations and model performance. Historical simulations from BCC-CSM2-HR are used for models assessment. The evaluation matrices include the following: (a) the simulation ability for the temperature and the vertical structure of wind in the stratosphere and the middle atmosphere and their seasonal changes; (b) climate variations at different timescales, such as the stratospheric quasi-biennial oscillation (QBO), the Madden–Julian Oscillation (MJO); (c) improve the simulation of Intertropical Convergence Zone (ITCZ); (d) improve the simulation of surface air temperature, precipitation, and atmospheric circulation for China and East Asia regions.

BCC-CSM2-HR will be applied to construct the next version of the climate prediction operational system in BCC, which will provide the Sub-seasonal to seasonal (S2S) Phase II prediction (0-60 day) and inter-seasonal to annual prediction (0-11 month). Some preliminary experiment results are shown.

RELATIONSHIP BETWEEN SNOW AND ATMOSPHERIC CIRCULATION

E. Munkhjargal and E. Dorjpurev

Information and Research Institute of Meteorology,
Hydrology, and Environment, Mongolia

Abstract

Snow is an important component of a climate system, and very sensitive to climate change. and it can be indicator of checking winter climate change. During 2000-2016, snow climate with extreme cold temperature killed approximately *30 million livestock* throughout Mongolia. This study first diagnosed the interdecadal variability of snow depth using ground-based observations from 70 meteorological stations in Mongolia from 1981 to 2016. We used the Mann-Kendall test to evaluate the annual and monthly trends in snowfall. Then, performed principle component analysis to interannual of January snow depth for the 39 stations, which highest snow month. The first mode (PC1) wide spread loading same sign, and the second mode PC2 shows a northeast-southwest dipole pattern. The explained variances of the first (PC1) and second (PC2) mode are 22.93% and 9.41% respectively. The time series of PC2 for January is well correlated with Siberian high (SH) and arctic osculation (AO) for December. The research results help in potential basis for long range forecast in winter.

REVIEW OF 2019 SUMMER CLIMATE OVER MONGOLIA

Kh.Akhmyet-Ali[2], A. Davaadorj[2] and Javzmaa[1]

[1]National Agency for Meteorology and Environmental Monitoring
[2]Information and Research Institute of Meteorology, Hydrology and Environment

Abstract

Mongolia experienced near-normal temperatures and near-normal precipitation in 2019 summer. The summer mean temperature over Mongolia was 17.4^{o}C, which was 0.9^{o}C near-normal (1981-2010 average). The June, July and August temperature anomalies were 1.3^{o}C, 0.7^{o}C, and 0.7^{o}C, respectively.

Furthermore, the summer total precipitation was 91 mm, which was of near normal. The monthly precipitation ratio was 101%, 103%, and 85% for June, July, and August, respectively.

However, this summer temperature and precipitation were near normal, atmospheric circulation was unstable. During this summer heat wave occurred 4 times, cold wave occurred 3 times. Early summer upper-level ridge was located eastern part of Mongolia it made above normal June. Furthermore, the late summer upper-level ridge located western part of Mongolia. Unfortunately, that makes dry periods in the western part of Mongolia.

In this presentation, I will also discuss record-breaking maximum and minimum temperature over Mongolia.

BRIEF POST-ANALYSIS OF THE SOUTH KOREA SUMMER IN 2019

Choi Chulwoon, Choi Jeonghee, Kim Miju and Kim Dong-Joon

Climate Prediction Division, Korea Meteorological Administration

Abstract

In the early June, the surface mean temperature was recorded lower than climate norms. Upper level trough frequently located over the sea of Okhotsk during the early summer, making favorable condition for cold air inflow to the Korean Peninsula, which was comparable to the frequent upper level ridges over Baykal and Bering Sea. As a result, frequent migratory surface high/low pressure systems induced large variability of temperature of the South Korea until mid-July, while the strength of the West North Pacific Subtropical Highs (WNPSH) was within the normal range.

On the other hand, Tibetan High and WNPSH conducted a key role in producing heat waves in the Korea Peninsula from late July to mid-August. As a result, the South Korea has experienced 13.3 days of heat wave and 10.5 days of tropical night phenomenon on average nation wide, which came in 15th and 7th respectively since 1973.

Changma (also known as Meiyu or Baiu) front was located mostly over southern part of the Korean Peninsula during Changma period due to frequent enhancement of upper level trough over the East Asia, making large regional difference of precipitation amount. The area-averaged summer precipitation over the South Korea was 496.8mm, which is less than 70% of the climatological median value.

It is also noticeable that strength of the Tibetan High was maintained through September due to delayed withdrawal of Indian summer monsoon. This induced CGT(Circumglobal Teleconnection) during September and also played important role in maintaining the strength of WNPSH especially in its north-western edge, making favorable condition for typhoons to hit Korean Peninsula.

CHARACTERISTICS OF 2019 SUMMER MONSOON IN EAST ASIA

Noriyuki Adachi

Tokyo Climate Center, Japan Meteorological Agency

Abstract

In East Asia, three-month mean temperatures for the boreal summer (June - August) 2019 were below normal in and around northeastern and western China and were above normal in almost all of the other areas. Precipitation amounts for summer were above normal from Japan to southern China, in and around northeastern and northern China and were below normal in other regions.

The climate in and around the southeastern part of East Asia from early June to late July 2019 was characterized with the large precipitation and late onset/offset of the rainy period. Estimating from SYNOP reports, we found that the precipitation amount for the first half of this summer averaged from the Pacific side of eastern Japan to southern China was the highest since 1996. In Japan, the Baiu (a cloudy and rainy period of early summer in Japan) onsets from western Japan (with the exception of the southern Kyusyu region) to the Okinawa region were later than normal, especially the onsets in western Japan (with the exception of the southern Kyusyu region) were the latest since 1951. The Baiu withdrawals from eastern Japan (with the exception of the Hokuriku region) to the Okinawa region were also later than normal.

One of the main reason for these characteristic conditions is that the subtropical jet stream shifted southward from its normal position (near 40° N in this period) over the eastern part of East Asia, which resulted in the enhancement and substantial delay of northward migration of the stationary front. The primary factors of the shifted subtropical jet stream and other possible reasons will be discussed.

In this presentation, I will also mention the extremely warm event in the eastern part of East Asia from late July to mid-August 2019.

CLIMATE EVENTS AND IMPACTS OVER CHINA IN 2019

Yizhou Yin

National Climate Center, China Meteorological Administration

Abstract

Since the beginning of this year, the average temperature in China has been 12.4℃, 0.8℃ higher than that in the same period of the normal year. From January to September, the national average temperature of each month remained on the high level, among which the average temperature in March and April was higher significantly. The average temperature in April was the second highest in the same period since 1961 (only lower than that in 1998). The average precipitation in China was 610.7 mm, 3.1% more than the annual average (592.1 mm). Except that the national precipitation in May and June was close to the normal level, the precipitation in other months was more, among which the precipitation in February was 31.9% more than that of the normal year, which was the fifth most in the same period since 1961.

There have been 35 times of heavy precipitation in China since the beginning of this year, with great intensity and high overlap. The average number of high temperature days in China was 16.9 days, 6.5 days more than that in the same period of the normal year (10.4 days), which was the third largest number in history since 1961 during the same period. Huanghuai, Jianghuai, the middle and lower reaches of the Yangtze River and other places have staged meteorological drought. Since this year (up to 21st October), 21 typhoons have formed in the northwest Pacific Ocean and the south China sea, which was close to that in the same period of the normal year (21.4). Five typhoons made landfall over China, 1.9 less than the normal (6.9). Super typhoon "Lekima" was the strongest typhoon to made landfall over China since this year, with strong landing intensity, long detention time on land, great intensity of wind and rain, wide range of influence, serious disaster loss characteristics. The severe convection weather process was less, but the influence was wide and extreme.

RECENT EXTREME EVENTS IN MONGOLIA

Myagmar Doljinsuren

National Agency of Meteorology and Environmental Monitoring, Mongolia

Information and Research Institute of Meteorology,
Hydrology, and Environment, Mongolia

Abstract

Due to the recent intense global warming, an increasing trend appeared in atmospheric extreme event frequency, and potentially affect to the national security of Mongolia. The study shows that the correlation coefficient between the frequency of the atmospheric extreme event and annual average temperature during 1989-2018 is around 0.44 in Mongolia. This corresponds to global research results that prove intense global warming lead to increase the atmospheric disaster occurrences. The major atmospheric extreme events can be ranked by social-economic risks as follows - dzud, drought, forest and wild fires, strong wind storms, flush floods, heavy rains, heavy snowfall as well as cold surges. According to latest 30 years' reports, atmospheric extreme events occur 54 times per year on average, and if consider to a period of three decades, the extreme events amounted to around 29 and 53 per year on average in the first and second decade, also the number has increased by 1.5-2.7 times in the last decade, especially convective related extreme events and their negative impacts have risen significantly in the last several years. Convective related events such as flash floods, squall, hail and lightning were accounted for 57% all the extreme events, and flash flood happens about 41% among them, which accounts about 15 times per year. In 2018, 93% of all economic losses from extreme weather were related to flash flood. Likewise, atmospheric front related extreme events, such as strong wind, snow storm, heavy snow and rain, surface frost, cold rain and wet snow cover large area and cause huge damage on agricultural products. Among these types of extreme events, strong wind storms arise more frequently, which occur about 15 times a year. Furthermore, forest and wildfire report 162 times a year, however, they can caused by human activity, although air and ground dryness is the main cause of these fires. 1996, 2002, 2007, 2014 and 2015 were drought and dry years, therefore, fire occurred much more than that in other years. Although the public was pre-informed 93% of the extreme events by NAMEM in the last 20 years, 0.5 thousand people were killed, livestock mortality totaled 29.6 million, and total damage amounted to 773.8 billion Tugrugs. During the 2000, 2001 and 2010, as a percentage of GDP, the total damage caused by atmospheric extreme events was 5.4-11.7%, and it could be explained that, in these years large numbers of livestock were lost due to severe drought and dzud. Nevertheless, in the last 10 years, the number of victims have been decreased by 2.5 times. That could be explained by the forecast quality improvement and application of a wide range of information dissemination methods, especially mass of people started using social media actively. Overall, the study has collected evidence that an increasing trend of extreme events in Mongolia has a certain degree of relation to the global warming. The risks of extreme events, such as flash floods, strong wind storms have been increased, and lead a significant negative impact on the social economy. This proves that the government urgently needs to create weather radar network over the country.

KMA EXTREME CLIMATE SERVICES: ANALYSIS AND FORECAST

Youjin Won, Bo Young Yim, Sangsoon Park, Seonyeong Bak and Cheol Hong Park

Climate Extremes Analysis and Assessment Team,
Korea Meteorological Administration

Abstract

Some extreme climate events, such as heat waves and heavy rainfall, have become more severe in recent decades. It makes huge social and economic impacts on various sectors, such as energy, agriculture, and human well-being globally. The successive extreme high temperature occurred in summer of 2018 and had a tremendous damage on South Korea. Specifically warm days (TX90p) and warm nights (TN90p) in August were 12.4 and 12.7 respectively, which ranked second since 1973.

Thus KMA has provided extreme climate outlook service based on probabilistic long-range forecast (1-month & 3-month outlook) since November 2018, to minimize the damages caused by extreme climate events. To offer accurate and reliable forecast information on extreme climates, KMA has improved scientific understanding of extreme climates, developed its early detection and prediction technology, such as a statistical model, probability prediction system. KMA is also monitoring global atmospheric and oceanic environments, like ENSO and AO. Detailed information will be presented in the forum.

EARLY WARNING FOR *DZUD* DISASTER

B.Erdenetsetseg, N.Mungunchimeg and Ts.Bat-Oyun

Information and Research Institute of Meteorology,
Hydrology, and Environment, Mongolia

Abstract

Nomadic animal husbandry is a key economic sector in Mongolia, sustained for several thousands of years under the country's arid and cold climate. Ongoing climate change is already evident in Mongolia; increasing frequency of extreme events such as drought and *dzud* (severe winter) during the past decades. Such impacts have led to more threats in the pastoral livestock husbandry, which has been already vulnerable. According to the statistical data, *dzud* is the largest impact on the national socio-economy. For instance, the nationwide worst *dzud* occurred in the winter 2009/2010 which killed 10 million livestock (23.4% of the total livestock). Previous studies noted that lack of the policy towards pastureland management, winter preparedness, less awareness about *dzud* and insufficient forage reserves are the main reason for higher livestock losses during *dzud* disaster events. Therefore, enhancing/strengthening early warning system for early preparedness and early actions are essential to prevent livestock losses. Since 2015, the National Agency for Meteorology and Environmental Monitoring (NAMEM) producing a *dzud* risk map based on summer condition, biomass, pasture carrying capacity, livestock number, anomalies of precipitation and temperature, snow depth, temperature and precipitation forecast, etc. to predict the regions that may experience severe winter condition. The prepared information has disseminated to Government, Ministries, National Emergency Agency and Local administrative offices. Using the information, above governmental organizations taking management actions for early preparation to *dzud*. For example, allocate hay/fodder, coordinate *otor* movement and distribute relief/aid from international organizations (Red cross, FAO, UNDP etc.). Thus, *dzud* risk map is useful science-based information to mitigate and reduce disaster risk.

GOVERNMENT ACTIONS AND THEIR EFFECT ON DZUD MITIGATION AND RESPONSE IN MONGOLIA: A Case Study of Khuvsgul

Ariunaa Chadraabal

National Emergency Manegement Agency
Mongolia

Abstract

Statistical data shows that the increase in disasters due to natural hazards over the last two decades has been caused mainly by meteorological and hydrological events namely from dzud. Dzud is a Mongolian term for harsh winter condition. Extended cold winters, minimal annual precipitation, and severe summer droughts result in harsh climate conditions. Poorly developed infrastructure, increasing poverty, limited institutional capacity, and nomadic lifestyle of herder families are increasing the risks of life and livelihood losses in communities in both rural and urban areas due to natural and anthropogenic causes.

Regarding the statistics, the last biggest dzud happened in the winter of 2009-2010 caused about 10 million heads of livestock or nearly 25 percent of the total livestock.

Moreover, the risks of climate change and hydro-meteorological events such as drought and dzud have dramatic impacts on Mongolian economy and natural systems. The most vulnerable systems are agriculture, livestock, grassland ecosystem, and water resources.

Lessons learned from previous dzuds and disasters, the Government of Mongolia has carried out disaster mitigation and prevention measures in last several years both at national and local level. Yet, the herders still have been experiencing the harsh winter. In order to identify the cause of the dzud and its factors, as well as, the effectiveness of the government actions, the research survey conducted in two neighboring soums of Khuvsgul aimag (administrative units of Mongolia) in which had different livestock mortality rate in the winter of 2016-2017. The research findings show that local government actions are vital for mitigating the dzud and reducing the livestock losses.

WINTER PREPARATION FOR LIVESTOCK HUSBANDRY BASED ON WINTER WEATHER OUTLOOK

Munkhnasan Tsevegmed and Batmunkh Damdindorj

Livestock development policy and coordination department,
The ministry of Food, Agriculture and Light Industry of Mongolia

Abstract

Mongolia is a landlocked country in Central Asia covering 150 million hectares of area and hosting over 3 million people; 75.0% of the country's total territory is used for pasture with a carrying capacity of approximately 75 million sheep units of livestock per year (FAOSTAT, 2014). Consequently, the livestock husbandry is the most significant subsector that produces 88% of total agricultural products (20% of GDP), 6.6% of the country's export income, directly employs 35% of total work force and contributes to alternative income generation of half of the country's population (NSOM, 2018).

Governmental measures for the livestock winter preparation

Each year Mongolian Government approves cabinet resolution on livestock winter preparation plan and orders every province to prepare sufficient hay-grass and feed for grazing animals during the winter season. In order to make above mentioned plan our ministry receives following weather information from respective state organizations.

- Summer and autumn pasture carrying capacity mapping
- Winter and spring pasture carrying capacity mapping
- Air temperature and snow coverage
- Predictive evaluation of drought and Dzud /disaster/
- Dzud risk evaluation map
- If dzud occurs, list of soums where dzud occurs heavily, moderately and lightly by every ten days
- Agro-recommendation for spring cultivation

Future collaboration

Firstly, we as responsible ministry for livestock welfare, we need more detailed long term data on pasture yields by at least provinces. These long term data will help us to monitor pasture condition shortly.

Secondly all data and information needs to be compared with previous year and long term of period. They will bring some more opportunities to work on them and our own analysis.

Lastly, if technically possible pasture yield and carrying capacity data needs to be detailed in bag level. This has advantage to make annual pasture utilization management plan at soum level and monitor this at ministerial level.

IMPACT OF CLIMATE CHANGE ON ENVIRONMENT

D. Dulamsuren

Information and Research Institute of Meteorology,
Hydrology, and Environment, Mongolia

Abstract

We are aiming to study climate change, dryness, surface water scarcity, pasture condition, and changes in important ecosystem components in Mongolia. The results show that the annual average air temperature of Mongolia is warming by 2.25 ° C / 79 years, and the intensity of the warming was high during 1998-2011 when the precipitation was lower than the long-term average, evaporation and rainwater levels in Hentii, Khangai, Khovsgol's forests are 20-35 mm in mountainous areas, and have decreased by about 5 mm to 20 mm in all other areas, which was decreased by approximately 15 mm. As a result, the average run-off of Selenge River is about 130 m3 / sec in the Selenga-Hutag area, but in 2002 it was only 47.1 m3 / sec which was 3 times less than the long term average and the lowest for the last 67 years. The flow of large rivers decreased and many small rivers dried up.

That the impact of climate change was relatively weak in 1961-1990 and impact was high from 1991 to 2017 (Fig 1). In the years with intensive climate change in 1991-2017, the area of degraded steppes with the value of HTI 0.5-1.0 and dry Gobi areas with the value of HTI less than 0.5 have increased. In other words, the land area of dry Gobi has increased by 4% expanded to the north, whereas the relatively humid forest steppe area has also been reduced by 3% moving to the north. That is to say the overall condition of the agro-ecosystem of the forest steppe has begun to contain the characteristics of the steppe landscape as a result of climate change.

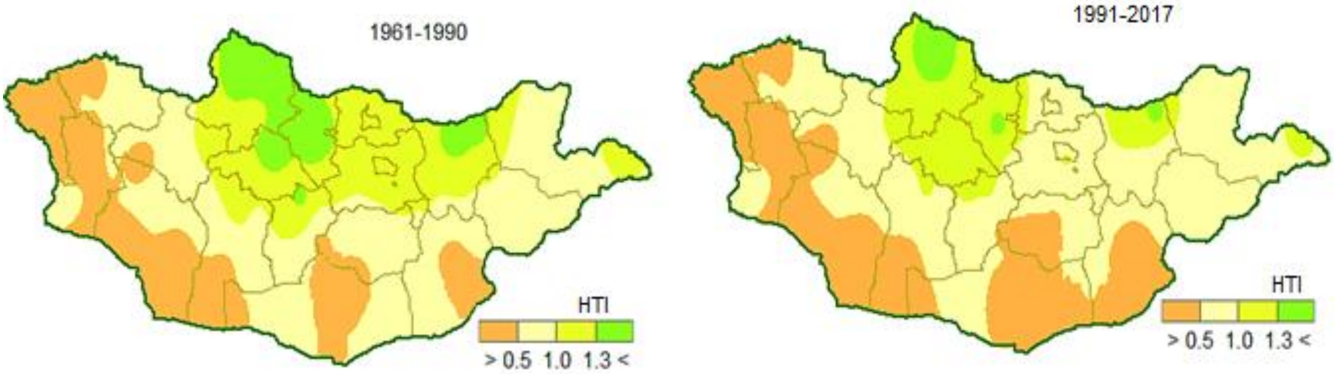

Figure 1. Geographical distribution of the average value of the HTI

During the dry years with less rainfall from 1997-2011, where the influence of global warming was increasing, the pasture and agriculture ecosystems of Mongolia were degraded and about 90 percent of the total area had drought.

ENSO OUTLOOK FOR 2019/2020 WINTER

Ben Tian, Hongli Ren, Jinqing Zuo, Ying Liu and Bo Lu

Beijing Climate Center, China Meteorological Administration, China

Abstract

Based on the System of ENSO Monitoring, Analysis and Prediction (SEMAP2.1), the study first reviewed our predictions made in spring this year, and then outlook what could be happening in tropical Pacific this following winter. SEMAP2.1, developed in Beijing Climate Center, has started running as an operational system and issued a bunch of operational products on the website ever since 2016. The system consists of three methods for ENSO seasonal predictions, and generally, multi-method ensemble mean tends to show the highest prediction skill. According to our predictions that started in September and October, it is likely that the warm sea surface temperature (SST) in tropical eastern Pacific are gradually turning into a neutral state, thus no ENSO events occurring during the following winter. Meanwhile, continuous positive SST anomalies in tropical central Pacific are detected in following winter, needing us to further note ENSO-related climatic influence over China.

COLD SEASON OUTLOOK FOR WINTER 2019/2020 OVER JAPAN

Shoji NOTSUHARA

Tokyo Climate Center, Japan Meteorological Agency

notsuhara@met.kishou.go.jp

Abstract

The Japan Meteorological Agency (JMA) issued its outlook for the coming winter (December 2019 – February 2020) over Japan in September 2019 and updated it in this October. In this talk, the latest outlook will be presented.

According to the JMA El Niño outlook, it is likely that ENSO-neutral conditions will continue until the boreal winter. Whereas the Sea surface temperature (SST) are expected to be above-normal in the western part of the Indian Ocean and the equatorial Pacific. Corresponding to the expected SST anomalies in the tropics, the convection will be enhanced over the western part of the Indian Ocean and the equatorial Pacific and suppressed around the southeastern part of the Indian Ocean.

In upper circulation fields, wave trains are expected from the mid-latitude of the Eurasia continent to around Japan with anticyclonic anomalies over the Arabian Peninsula and in and around Japan, in association with the active convections over the western part of the Indian Ocean. Therefore the subtropical jet stream is expected to shift northward around Japan, suggesting the weaker-than-normal winter monsoon around Japan.

Furthermore, the tropospheric temperature is predicted to be above normal mainly due to the recent warming trend, which is likely to decrease probabilities of below normal temperatures.

As a result, seasonal mean temperatures are expected to be above-normal tendencies in any regions of Japan. Seasonal snowfall amounts for the Sea of Japan side are expected to be below-normal tendencies.

CLIMATE OUTLOOK FOR WINTER 2019 OVER KOREA

Seo Taegun, Kim Samyoung, Kim Hyeonjeong,
Yang Jayoung and Kim Dong-Joon

Climate Prediction Division, Korea Meteorological Administration

Abstract

Korea Meteorological Administration (KMA) officially releases seasonal outlook for the coming winter season on 22nd November. The seasonal outlook for winter 2019 over Korea will be presented based on the KMA's operational climate prediction system, GloSea5 (Global Seasonal Forecasting System ver.5) and MME results from the WMO Lead Centre for Long-Range Forecast Multi-Model Ensemble (WMO LC-LRFMME), as well as impacts of essential climate elements/indices. The preliminary results of GloSea5 using October initial condition show above-normal temperature and precipitation over Korea for the coming winter season. Also, influence of the Siberian-high over Korea is predicted to be weaker than normal.

The SST anomaly in Niño3.4 region was 0.3℃ higher than normal during September, and is expected to be neutral during the coming winter season. The Arctic sea ice extent over Barents-Kara Sea, Laptev Sea and Bering Sea is smaller than normal, which is similar to the lowest-ever year of 2012. Therefore, there is a possibility of large temperature variability over Korea during the coming winter season.

Possible impact of various climate variables such as SST, continental snow cover, and Arctic sea ice on the winter climate of Korean peninsula will be considered along with statistical analysis results to produce final seasonal outlook for the winter. Overall, detailed analysis results of numerical and statistical models will be presented.

SEASONAL CLIMATE OUTLOOK FOR WINTER 2019/2020 OVER CHINA

Zhao Junhu and Song Wenling

Beijing Climate Center, China Meteorological Administration

Abstract

Dynamical models and statistical analyses will be discussed focusing on East Asian Winter Monsoon (EAWM), seasonal temperature and precipitation outlook for 2019/2020 winter over China.

Based on dynamical models and statistical analyses, we predict a weak-normal EAWM in the coming winter. Air temperatures will be warmer than normal in most China. More precipitation tends to occur over most China, especially the northwest China and the middle and lower reaches of the Yangtze River valley. However, less precipitation tends to occur over northeast China.

Sea surface temperature anomaly over the tropical eastern Pacific is one of the most important external-forcing factors for the climate prediction in this winter. Most of dynamical and statistical models predict there’s about an 85% chance the tropical Pacific will remain ENSO-neutral through the fall, and warm SST maintained in central Pacific. It will induce a normal-weak winter monsoon, a shallower East Asian trough. Another important factor is the Sea Ice concentration (SIC) in the Barents-Kara Seas in September. After removing the linear trend of the SIC, the normal SIC over the Arctic will not result in a strong Siberia High in winter.

SEASONAL CLIMATE OUTLOOK FOR WINTER 2019/2020 OVER MONGOLIA

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Abstract

National Agency for Meteorology and Environmental Monitoring (NAMEM) issued its outlook for coming winter over Mongolia in August 2019 and updated it in every month. The seasonal outlook for winter 2019 over Mongolia will be presented based on the various atmospheric general circulation model results such as Pusan National University (PNU), Tokyo Climate Center (TCC), MME results from the WMO Lead Centre for Long-Range Forecast Multi-Model Ensemble (WMO LC-LRFMME).

The preliminary results of PNU using September initial condition show above-normal temperature over Mongolia coming winter season.

Based on dynamical model and statistical analyses, we predict a weak EAWM in the coming winter. Most model predictions clearly demonstrated that the WNPSH will be strengthen in winter due to East Asian trough is weak than normal.

The seasonal air temperature will be expected warmer than normal in most Mongolia. Precipitation will be expected above normal over south and western south over Mongolia.

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