NEWSLETTER

Commission on Climatology

Nº 18

December 2018

Dear Friends and Colleagues,

The year 2018 is coming to a close. This year's climate was really extreme. For example, during the Baiu-season, we experienced a record breaking heavy rainfall in West Japan in early July and lost more than 200 lives. After that events extremely hot summer arrived, and making a new highest daily maximum temperature records of 41.1°C at Kumagaya, Japan, and 41.0°C at Hongcheon, South Korea. Besides, extreme high temperature was recorded in many other places in the northern hemisphere mid- and high latitude regions. In September, we were attcked by several Typhoons. Typhoon Jebi's strong wind related storm surge on September 4 forced a closure of Kansai Airport, Japan for more than two weeks. Typhoon Mangkhut, the most intense typhoon in this year, hit Hong Kong, China on September 16 with exceeding 100 miles per hour wind gusts, and causing floods, electorisity damages and so on. Actually, I was to visit on Hong Kong on that day, and forced to stay overnight at Haneda Airport. Surprisingly, there were no casualities due to this strong typhoon in Hong Kong. Our role of climatologists has becoming further important.

By the way, this August, a number of CoC sessions were organized at the IGU Regional Conference in Quebec. Please enjoy the session report in P4 to 7. We appreciate the conference organizers for their wonderful management. We learned a lot in that conference, and will prepare for the coming IGC2020 Istanbul, Turkey from the next year (See P9 and 10 for detail). I wish all the best for the New Year, and all of your research efforts will be productive.

Best Regards,

Jun Matsumoto
(Chair of the Commission on Climatology)

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1. Membership of the CoC Steering Committee

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N. Tapper (Austraria: Since August 2018).

2. Meeting Report (2018 IGU Regional Conference, Quebec)

The 2018 IGU Regional Conference was held at in the Quebec City Convention Centre (Photo 1), Quebec, Canada, co-organized by the International Geographical Union (IGU), the National Council for Geographic Education (NCGE), and the Canadian Association of Geographers (CAG) (http://igu2018.ulaval.ca/). The conference was held under the theme ”Appreciating Difference” which is a Quebec expression that invites participants to consider the world as a blank canvas that we must first decide how to depict before putting down images and words. This is a brief report of this meeting, one of the biggest highlights of this year’s CoC activities. All photos were taken by Prof. Jun Matsumoto.

Photo 1. The 2018 IGU Regional Conference venue: The Quebec City Convention Centre

In this conference, the following four CoC organized sessions and one open session were organized in 1.5 days. The The number of participants was 20–40 on 7 August, and 10–20 on 8 August (Photos 2, and 3).

7 August:

C3-SP2. Natural Hazards and Climate (Conveners: Hadas Saaroni, Agnieszka Wypych, Zahide Acar Deniz, Yoshihiro IIjima) 8 Papers

C3-SP1. Climate Change: Recent Trends in the Americas (Conveners: Guillaume Fortin, Francisco Mendonça, Roger S. Pulwarty) 5 Papers

C3-SP6. Weather and Climate Extremes: Increasing (In)security in a Changing World Conveners: (Conveners: Roger S. Pulwarty, Hadas Saaroni, Guillaume Fortin) 2 Papers

8 August:

C3-SP7. Natural Hazards, Extreme Weather and their Impacts: Memorial Session of Late Prof. Masatoshi Yoshino (Jun Matsumoto, Jennifer Salmond): 5 Papers

C3-SP100. Climatology OPEN SESSION: 2 Papers

Poster Session:

Photo 2. During the presentation in one of the CoC organized sessions.

Photo 3. During the discussion time in one of the CoC organized sessions.

The followings are brief summaries of the CoC organized sessions reported by the respective chairperson.

The First Session of C3-SP2: Natural Hazards and Climate (Chaired and reported by Prof. Hadas Saaroni)

Natural hazards cover a wide range of topics. Those related to extreme weather conditions and their environmental impacts are being the hot spot of climate research. The first study by Takehiro Naito from Japan, aimed to clarify the latest population on difficult-to-evacuate area of tsunami disaster in a heavy snow and cold region, Kushiro city, Japan, as the research area. First, a geospatial information database of the evacuation area, tsunami refuge site and population was built. Second, they estimated the amount of population in the difficult-to-evacuate area of tsunami disaster by the geospatial analysis and finally, they analyzed the tsunami evacuation plan developed for Kushiro city and discussed the potential effect on tsunami assumed in the future, with regard to estimated changes in population and climate conditions.

The second presentation by Elyse Mathieu from Canada focused on the large wildfire (Kenow fire) of Waterton Lakes National Park, Alberta, in summer 2017. This burning, under extreme weather conditions, consumed two-third of the vegetation of the park and several ecologically

sensitive areas. Surmising that this outcome was a result of a half-century of fire exclusion policy, the study investigated whether the burning of past fires that were extinguished by fire suppression activities before they could fulfill their full potential would have limited the size and severity of the Kenow fire. They hypothesize that a heterogeneous landscape mosaic of varying species and stand ages can exert a greater resistance to fire spread. Using simulation modeling in a retrospective analysis, they created a hypothetical landscapes mosaics by modeling the propagation of historically suppressed fires. Simulating the Kenow fire on these hypothetical landscapes showed only a slight-to-moderate reduction in fire size; the weather conditions were so extreme large-fire spread was inevitable. In contrast, the burn severity and ecological impact of the Kenow fire, had it burned in a naturally regulated mosaic landscape, would have been greatly reduced. Creating a more complex forest mosaic through naturally occurring or prescribed burning will not always prevent very large fire, but may contribute to enhancing ecosystem resilience and providing additional options for fire managers.

The third study by Daniel Celinski-Mystaw from Poland presented an analysis of atmospheric conditions related to convective systems with a bow echo. Kinematic, thermodynamic and synoptic conditions associated with 91 cases of bow echo, which occurred in Poland during the warm season between 2007 and 2014, were analyzed. Seven of them were related to the occurrence of derecho. The environmental conditions were determined based on upper air soundings and ERA-Interim reanalysis. They found that most bow echo cases were affiliated with convective systems which had developed in the convergence zone, or in an articulated atmospheric front with a secondary active low pressure system. The analyses confirmed that the existence of a strong jet streams in the middle and upper troposphere, augmented by high instability of air masses, is conducive to their formation. The presence of strong air flow in the troposphere caused the increase of vertical wind shear values, which provided a good separation between updrafts and downdrafts, thus contributing to the development of a deep convection effect. Environment of bow echo events also showed significantly increased potential for strong downdrafts and damaging outflow winds.

The fourth study by Angelika Palarz from Poland presented a climatological analysis of the inversion layers over Europe - the spatial and temporal variations in their frequency and depth. The study is based on air temperature and specific humidity data at 22 hybrid-sigma derived from ERA-Interim reanalysis for the years 1981-2015, at 6-hour temporal resolution and a spatial resolution of 0.75°×0.75°. Both surface-based and elevated inversions have been analyzed. The results confirmed strong diurnal and seasonal variability of temperature inversions' parameters (frequency and depth), as well as their noticeable spatial heterogeneity. Low-level inversion layers, with base below 1,000 m AGL are mostly an impact of relief and surface type, whereas inversions with a base above 3,000 m AGL, are, in turn, predominantly influenced by large-scale circulation factors.

The Second Session of C3-SP2: Natural Hazards and Climate (Chaired and reported by Prof. Jun Matsumoto):

The first presentation by Adam Kirkwood aims to clarify the greenhouse gas emission changes due to recent degradation of palsa due to rapid warming in the Hudson Bay Lowlands (HBL) in Canada, the largest peat land in this country. Samples are incubated under anaerobic conditions for 100 days. As a result, while intact palsa release more CO2, degraded palsa tend to release more CH4 under warming conditions. The results indicate that the decomposition of organic matter associated with on-going climate induced degradation of palsa field may shift the balance of GHG emissions towards more methane emissions, and suggest the significance of environmental changes in vast carbon rich landscape such as the HBL.

The second presentation by Guillaume Fortin from Canada shows the improvement of the floodplain maps accuracy in the Kennebecasis River Watershed, New Brunswick, Canada by the combination of two complementary approaches: the hydrogeomorphological approach, and hydrological and hydraulic modeling. The first approach uses the morphological limits that correspond to the return time of floods, while the second one is based on engineering approach based on meteorological and terrain data to estimate flood zone limits based on different return times. It was shown that the combination of these two different approaches significantly improves the accuracy of the flood zones delineation which will be important for the future flood risk reduction.

The third talk by Shaohong Wu from China introduces the climate change risk assessment in China. This paper standardizes the risk composition of climate change, including the danger of risk causing factor, the exposure and vulnerability of risk bearing body, as well as their interrelations. After that, the logic of the emergence and change of risk were clarified. Based on the coupling analysis of risk causing factor and risk bearing body, it sums up the climate change risk quantitative assessment methods into two aspects of emergency and gradual change, then the theoretical elaboration and case analysis are conducted for the two aspects respectively. Finally, it proposes the future development directions of climate change risk research, including risk assessment under different warming amplitude, vulnerability curve construction and risk adaptation integration.

The fourth paper by Hadas Saaroni from Israel proposes a new synoptic classification, based on the "environment to climate" approach for the national heat-stress (NHS) and the height of the persistent marine inversion base (IB) in Israel. The potential predictors are partly atmospheric variables found correlated with these weather attributes, and partly in the form of indices representing synoptic to large-scale features. The indices are derived from composite maps extracted for days with extreme values of these weather attributes. The prediction equations and the new synoptic classification are applicable for both operative weather prediction and for climate prediction.

C3-SP6 Session: Weather and Climate Extremes: Increasing (In)security in a Changing World (Chaired and reported by Dr. Guillaume Fortin):

Extreme weather could affects all regions around the world and then compromise the human security by the natural hazards caused by these extreme conditions. The first presentation by Tiago Almudi, this presentation shows how individuals and communities living in floodplains in the Amazon floodplain manage to adapt to the impacts of floods. Different qualitative approaches have been used in this research to try to better understand how people affected by floods learn to adapt to the impacts of floods. The results show that social solidarity plays a key role in the ability of individuals and communities to cope with these major floods. In addition, the ability to combine knowledge from past knowledge and new sources in a combined manner is essential for successful adaptation to flooding.

The second presentation by Roger Pulwarty addresses the issue of droughts and the challenges of detecting and managing them. Despite the importance of this natural risk in terms of impacts, the knowledge of this type of extreme event remains relatively limited. Several case studies were presented to highlight new methods for developing, monitoring and managing droughts. In addition, it is important to link risk reduction with climate change adaptation and the establishment of long-term joint networks to ensure sharing of past experiences and focus on acquisition efforts new knowledge.

C3-SP7 Session: Natural Hazards, Extreme Weather and their Impacts: Memorial Session of Late Prof. Masatoshi Yoshino (Chaired by Prof. Francisco Mendonça)

This session was attended by five scientific contributions. The topics covered in the presented papers highlighted the studies related to climatic risks (Mr. Pulwaltry/USA), the urban climate (Mr. Barbaros/Turkey, Mr. Matsumoto/Japan and Mr. Aliakbar/Iran) and agroclimatology (Mr. Matsumoto / Japan). These case studies have exposed the perspective of the interaction between the atmosphere / climate and the surface of the Earth / human activities in different parts of the world. In this section the studies allowed to know particular climate aspects of the United States, Turkia, Japan, Bangladesch and Iran. During the presentations, important debates were held by the assistants. Among the several issues raised by the participants was the concept that climate risks should not be taken only as being linked to extreme weather events, where they are always conceived as a natural risk. Given that the impacts of climate extremes are human/social (especially economic and on human life/health of populations) it becomes important to approach them as highly complex coated phenomena. Understanding the atmospheric/meteorological dimension of climate risks is fundamental, but the approach to impacts requires analyzing their social dimension, where vulnerability and resilience are concerned. On the other hand, the importance of the involvement of qualitative elements in the climatic analysis was also emphasized, because the present context of climatological science in the all around the world tends to hegemony of the approaches based on the mathematical modeling of climatological events.

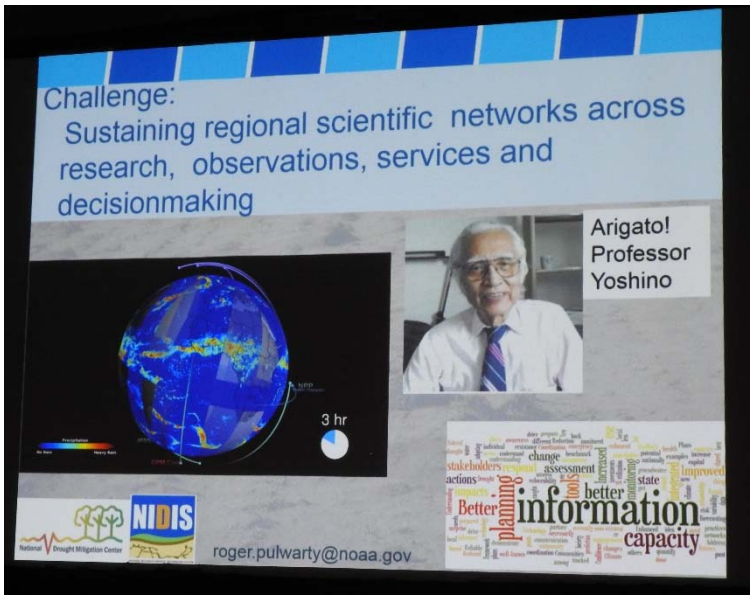

Photo 4. This session was dedicated to Late professor Masatoshi Yoshino, the founder of the CoC. A photo of one of the slides presented by Dr. Roger Pulwaltry

C3-SP100 Session: Climatology Open Session (Chaired and reported by Dr. Guillaume Fortin)

This general session began with Eungul Lee presentation on changes in land use and land cover in East Asia. his work has shown that there is a cooling effect of surfaces that is caused by the expansion of crops for the period 1982 to 2010. The use of different maps of land use and land cover has quantified the changes that have occurred over nearly thirty years, which mainly correspond to an expansion of cultivated areas in northeastern China. These changes affect the heat exchange (latent and sensible) which ultimately results in a decrease in temperatures.

The second and last presentation by Sujeong Im focused on the impact of climate variability on rice production in Korea. Food security is greatly affected by climate change. In this

perspective, the author presents various climatic factors that are likely to affect yields of rice production in Korea over a 44 years period. The results have identified an upward trend in temperature and precipitation for the study area which is expected to affect future rice production. Rising temperatures are expected to increase yields for rice production, while higher rainfall and shorter hours of sunshine should instead result in lower yields in Korea.

CoC Business Meeting

In addition to the organized scientific sessions, the CoC business meeting was held on 8 August 2018, from 3.15 pm to 4.50 pm in the conference venue. Meeting participants are: CoC SC members: Hadas Saaroni, Roger Pulwarty, Guillaume Fortin (from 3.50), Fransisco Mendonça (from 3.50), Agnieszka Wypych (via Skype) , Babatunde Joseph Abiodun (via Skype) , Jun Matsumoto, and Julie Winker as an observer. This was the first business meeting with renewed SC members from 2017.

In the meeting, discussions were made on the organized sessions in this conference. As a whole, the talks in this meeting were interesting covering wide range of climatology in both temporal and spatial scales. In addition, both regional and global climate change impacts were highlighted. They were great outcomes of the climatology under geography. It was planned to organize a special issue related with the sessions organized in this conference. The chair of CoC SC asked the presenters for their possibility to submit his/her paper to the special issue. However, since it was too late to ask them to submit, the number of expected papers was not enough for a special issue. We should have organized such a special issue when we began to organize our sessions. Also it was rather regrettable that there were no plenary sessions related with climate change, although it will be a worldwide important .These points will be a good lesson for the coming Istanbul meeting.

Photo 5. A group photo at one of the brewery restaurant near the venue after the conference.

Summary of this meeting

Throughout these sessions, the interdiciplinary approaches for the climate related environmental changes have been widely applied, and they are very effective for the increasing climate related hazards and risks in all over the world. The role of climatology has become more and more important under the current fast changing world both from the natural and human influences. Special thanks are given to all the session organizers, chairs, and wonderful presenters.

3. Upcoming Conference: The 34th IGC in Istanbul, Turkey

34th International GEOGRAPHICAL Congress
Istanbul 2020, 17-21 August
"Geography: bridging the continents"

The 34th IGC will be held in Istanbul, Turkey

By Prof. Dr. Barbaros Gönençgil,
Chair of the Organizing Committee, the 34th International Geographical Congress;
Vice President of the International Geographical Union;
Vice President of Turkish Geographical Society

The 34th International Geographical Congress which will be held in for the first time in Istanbul, where the continents meets, between 17th – 21st August 2020.
(http://www.igc2020.org/en/default.asp)
As widely known, Istanbul is the only city in the world which is bridging two continents, Asia with Europe.

İstanbul also represents the unique feature of Turkey for serving as a bridge between different cultures. No doubt that this meeting will be valuable opportunity to be a part of scientifically enriched environment as well as perfect harmony with all historical beauties of magnificent Istanbul and Turkish hospitality and guaranteed to leave you with unforgettable memories. İstanbul will mobilize the necessary experience, expertise and support for one of the most successful events in the history of the IGU.

Main Theme of the congress is "**Geography: Bridging the Continents**"

Geography is the science of relationship between the earth and human. This is the basic definition of Geography. But Geography is not only a science of relationship. Geography also has meaning of evaluation, interpretation, awareness and analysis. With all this meaning Geography is the "Queen of the all sciences".

The fact that Istanbul is located at the junction of the continents constitutes the most important point of this great meaning. The 34th International Geographical Congress, will host the most accurate way of realizing this historical meaning of the Geography. Thus, all colleagues in all continents will meet in Istanbul.

Other key topics of the congress are;

- **Globalization vs Localization**
- **Climate Change**
- **Migration and Conflicts**
- **Earth and Disasters**
- **Eurasia and Middle East Studies**
- **Anthropocene**

(Istanbul from the conference web-page: http://www.igc2020.org/en/default.asp)

Istanbul, the hosting city, is the commercial and financial center of modern Turkey, the former capital of the Byzantine and Ottoman Empires and has been the European Capital of Culture in 2010. Istanbul, herself provides enchanting historical sites, and modern attractions and sceneries to the visitors. You will also spare some time to discover the City and replenish your souls within the mysterious silhouettes of the old Genoese Tower, churches, palaces, minarets, and ancient city walls. You will feel like at home, enjoying the world-famous Turkish hospitality (and cuisine!) and discovering the special magic of this magnificent city.

On behalf of the Organizing Committee and the Turkish Geographical Society, we look forward to have the pleasure and excitement of welcoming you to Istanbul.
Let's meet in İstanbul in between 17th – 21st August 2020!

4. Others

Corresponding Members

We kindly remind and ask every Commission on Climatology Full Member to prepare the potential list of Corresponding Members: people who are interested in cooperating in the frame of CoC, who find the CoC activities important and have the possibility and – what's more important – desire to sustain the international research cooperation and studies on the field of climatology, encourage the exchange of relevant documents and information and organize conferences or meetings. We would try to involve all the people to meet together in Quebec to discuss further perspectives and plans for CoC activities.

CoC website

http://www.klimat.geo.uj.edu.pl/CoC.htm

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