Summary of the Thirteenth Meeting of Working Group I for Joint Research on Dust and Sand Storms

Online Meeting, Beijing, China 13th October 2020

1. The thirteenth meeting of the Working Group I (WG I) for Joint Research on Dust and Sand Storms (DSS) under the Tripartite Environment Ministers Meeting (TEMM) was hosted by China through an online Webex meeting on 13th October 2020. The representatives from China, Japan, Korea, and Mongolia participated in this meeting (Annex1: List of participants).

2. In Session One, Dr. Jianjun LI, Deputy Chief Engineer of China National Environmental Monitoring Centre of Ministry of Ecology and Environment of China (CNEMC/MEE), delivered the opening remarks and warmly welcomed the participants. Mr. Haohao ZHENG from CNEMC/MEE introduced the agenda of the meeting, which was adopted by all participants, and then introduced the experts and officials from the participating countries.

3. In Session Two on "Taking stock of discussions and activities" chaired by Dr. SUGIMOTO Nobuo from National Institute for Environmental Studies (NIES), two participants made their presentations. Dr. Sang Boom RYOO, the National Institute of Meteorological Sciences of the Korea Meteorological Administration (NIMS/KMA) gave a presentation entitled "Review on the 12th Meeting of Working Group (I)". In his presentation, he summarized the 12th Meeting of the WG I (26-27 September 2019 in Busan, Korea).

4. Dr. Jeong Eun KIM from NIMS/KMA made a presentation on the current status of DSS data sharing. According to her report, air quality data at Ulaanbaataar were newly added from Mongolia. She requested that all participating countries upload data plots to the Webhard as well as data files for their quality check. She also proposed to make a policy for big size files (e.g. satellite data) to secure the enough Webhard storage. She suggested data in the Webhard should be deleted at end of year to store new data of next year, which needs to be further discussed within the four countries. Finally she expressed her thanks to all participating countries for sharing their data.

5. In Session Three on "Progress of the study on DSS monitoring and modeling from each country" chaired by Dr. Chu-Young CHUNG from NIMS/KMA, five participants made their presentations. Mr. MAKI Takashi from Meteorological Research Institute of Japan Meteorological Agency (MRI/JMA) gave a presentation entitled "Recent DSS related activities at the Japan Meteorological Agency and Meteorological Research Institute". He reported MASINGAR-mk2 development and climate model research

activities. The preliminary results showed that DSS occurrence in the 2050s tended to decrease with respect to January through March compared to the recent 30-year average. However, there were also significant differences between ensemble members. He concluded the presentation by emphasizing the importance to enrich data including dust concentrations, meteorological data and land surface related data to improve the dust aerosol model.

6. Dr. Chu-Yong Chung from NIMS/KMA gave a presentation entitled “Introduction on dust sand monitoring capability of GeoKOMPSAT-2 satellite systems (KOREA)". GeoKOMPSAT is the South Korean second geostationary multi-purpose satellite program consisting of two satellite systems, GeoKOMPSAT-2A (GK-2A) and GeoKOMPSAT-2B (GK-2B). In his presentation, the information on the status of GK-2A/2B mission and their geophysical products were provided. In particular, GK-2A dust sand and aerosol monitoring products and the validation results on 2020 Asian dust cases were discussed.

7. Ms. Wenxuan CHAI from CNEMC/MEE gave a presentation entitled “Application of lidar network in sand transportation”. She introduced the application of Lidar network in sand transportation processes, including the establishment of lidar network in Beijing-Tianjin-Hebei and its surrounding areas and intensive monitoring of mobile vehicle-based lidars.

8. Mr. DAVAANYAM Enkhbaatar from Information and Research Institute of Meteorology, Hydrology and Environment (IRIMHE), Mongolia made a presentation entitled “Dust monitoring and dust modelling in Mongolia.” He introduced that Mongolia developed the monitoring systems and modelling with supports from China, Korea and Japan. Then, he presented the Asian dust forecast model in Mongolia which output surface PM10 (μm/m3), accumulated TSP (mg/m2) and aerosol optical depth. He explained that the model needed to be updated, and concluded the presentation by stressing the importance of further cooperation.

9. Dr. Liang LI from CNEMC/MEE made a presentation entitled “Introduction to the occurrence of DSS in China in 2018”. According to his report, there were 18 large-scale dust weather processes across the country in 2018 and the number of days that DSS occurred in China is 50 days. The accumulative number of days that air quality exceeded the standard is 549 days in 2018, an increase of 30.2% over the same period of year 2017. The climate factor is conducive to dust and sand storms in 2018 in China.

10. In Session Four on “Progress of the study on DSS events” chaired by Dr. Chu-Young CHUNG from NIMS/KMA, three participants made their presentations. Dr. SHIMIZU Atsushi from NIES gave a presentation entitled “Detection of Asian dust using the air quality monitoring network in Japan. He proposed a sustainable dust monitoring

method using data from air quality monitoring network in Japan (AEROS) to detect a long-term variation of Asian dust in Japan. Utilizing a combination of SPM and PM2.5 from AEROS enables detection of Asian dust events in winter, spring and autumn. Some results of application on the data during April 2018 were presented.

11. Dr. Yun-Kyu LIM from NIMS/KMA gave a presentation entitled “Analysis of Model (ADAM3) and Observation Data in DSS 2018 Case.” In his presentation, DSS 2018-1 case event was analyzed with observation data and numerical model results (ADAM3). In particular, in the western coast of the Korean peninsula (Anmyeondo), the effects of anthropogenic pollutants were more pronounced along with Asian dust, while the east coast (Ulsan) had a remarkable characteristic of Asian dust.

12. Dr. Siyuan LIANG from CNEMC/MEE made a presentation entitled “Characteristics of the Chemical Compositions in Particulate Matters during Three Sand-Dust Events in Beijing in 2020”. She introduced the characteristics and variations of PM2.5/PM10, ion, OC, EC and heavy metals in PM2.5 during some DSS events in Beijing.

13. In Session Five on “Discussion on the detailed milestones for mid-term action plan (MTAP 2020-2024)” chaired by Mr. OHMURA Takashi from the Overseas Environmental Cooperation Center, Japan (OECC), four participants made their presentations. On behalf of Japan, Ms. WATARAI Hiroka from OECC presented the cooperation proposal for constructing an online portal which is stated in the Activity 2 of the MTAP 2020-2024. According to her presentation, Japan proposed to lead constructing the online portal and to have it pre-launched in 2021 with minimum information and among the WG I experts. After her presentation, the participating countries proposed that Japan could start the preparation for the online portal, but the detailed designs of the online portal including data sharing need to be further discussed.

14. In Session Five on “Discussion on the milestones for research on sub-seasonal to seasonal (S2S) forecasts and long-term variations of DSS”, Dr. Yun-Kyu LIM from NIMS/KMA gave a presentation entitled “Seasonal Asian Dust Forecasting Using GloSea5-ADAM”. He introduced dust prediction for S2S in KMA and suggested that each country’s dust forecast result for S2S be shared in order to improve the accuracy of spring prediction. In addition to Dr. Lim’s presentation, Dr. Sang-Boom Ryoo of NIMS pointed out the item 1) in the Activity 6 of the MTAP 2020-2024 is a mixture of climate variation and climate change and there are some misunderstandings among the three countries. Thus, Dr. Ryoo proposed to establish three research fields under the Activity 6, 1) *"inter comparisons of forecast and hindcast modeling results reported by participating countries in order to assess the DSS variation by 2050 and perturbations"* in order to conduct the Activity 6 successfully. The proposed research fields were (1) sub-seasonal to seasonal scales of DSS forecast, (2) long-term variations of DSS occurrence and intensity, and (3) scenario or future climatic projection on DSS activities. These need to be further discussed by the meeting participants.

15. Ms. WATARAI Hiroka from OECC gave a presentation to discuss the proposal of Japan for the research on DSS and Sub-seasonal to Seasonal forecast and long-term variations of DSS. Ms. WATARAI, on behalf of Japan, proposed two ideas regarding the Activity 6 of the MTAP 2020-2024. One is to establish a new session entitled “DSS and S2S forecast and long-term variations of DSS” from 2021 onward. Another is to hold a special session on “DSS and S2S forecast and long-term variations of DSS” in the 14th WG I meeting in Japan in 2021. The special session would accommodate researchers from other research institutions. Also, Japan proposed to seek the possibility of holding a joint workshop with the WG II in the 14th WG I meeting and seeks the collaboration with them. The two ideas proposed by Japan need to be further discussed within the four countries.

16. Dr. SHIMIZU Atsushi from NIES gave a presentation to discuss the proposal for collaboration with the WGII. He introduced his and his colleagues’ study funded by ERTDF5-2001 which consists of three sub-themes including monitoring, modeling and surface experiment. He stressed that interactions among these sub-themes were good practices of collaboration between the DSS WGI and WGII in Japan, and the outcome from this study is expected to be utilized by policy-makers, TEMM DSS WGs, and related international collaborative activities.

17. The period of DSS observation data for joint research was discussed in this section. Two DSS events were detected in 2019. The four countries agreed on sharing he observation data during the period from 20 April 2019 to 10 May 2019 [DSS2019-01], from 13 November to 24 November 2019 [DSS2019-02].

18. In Session Six on “Closing” chaired by Dr. Liang LI from CNEMC/MEE, a brief summary was made by the four countries. Dr. LI made an acknowledgement for the efforts and contributions of all the participant countries and a special thanks to Japan side for their help for using the online meeting software Webex.

Before closing, it was suggested that the 14th meeting of the WG I will be held in Autumn 2021 in near Tokyo, Japan. As the host country of the next WG I meeting, Japan will propose the detailed date, venue, and timeline for preparing agenda and meeting materials more than three months ahead of the meeting.