

# **Summary of the Twelfth Meeting of Working Group I for Joint Research on Dust and Sand Storms Busan, 26<sup>th</sup> - 27<sup>th</sup> September 2019**

1. The twelfth 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 held at RAMADA Encore, Busan, Korea from 26<sup>th</sup> - 27<sup>th</sup> September 2019. Representatives from China, Japan, Korea, and Mongolia participated in this meeting (Annex1: List of participants).
2. In Session One, Dr. Sang Boom RYOO, Director of Environmental Meteorology Research Division, National Institute of Meteorological Sciences of Korea Meteorological Administration (NIMS/KMA), delivered opening remarks and warmly welcomed to the participants. Dr. Sang-Sam LEE from NIMS/KMA introduced the agenda of the meeting, which was adopted by all participants. All participants took a moment to introduce themselves to each other. The group took its official photos between the Sessions one and two.
3. In Session Two on “Looking Back at Discussion and Activities” chaired by Mr. Nobuyuki KONUMA from Ministry of the Environment, Japan (MOEJ), two participants made their presentations. Ms. Masae SUMIKOSHI from Overseas Environmental Cooperation Center, Japan (OECC) made a presentation on “Review on Previous Work”. In her presentation, she summarized the 11th Meeting of WG I (15th - 16th November 2018 in Tokyo, Japan) and also introduced the schedule of the 14th DGM and 13th SCM (17th - 18th October in Kitakyushu, Japan), and the 21st TEMM (24th November in Kitakyushu, Japan)
4. Dr. Sang-Sam LEE from NIMS/KMA made a presentation on the current status of DSS2017 data sharing. According to his report, skyradiometer data from Ishigakijima was newly added from Japan. He requested for all participating countries to reload data on web-hard (<http://www.webhard.net>) for those the quality checks are needed. And he expressed his thanks to all participating countries for sharing their data.
5. In Session Three on “The Study on DSS Monitoring and Modeling from Each Country” chaired by Dr. Liang LI from China National Environmental Monitoring Centre of Ministry of Ecology and Environment of P. R. China (CNEMC/MEE), seven participants made their presentations. Dr. Hee-Jung KO from NIMS/KMA reported “Physicochemical Characteristics of Atmospheric Aerosols during a Consecutive High Concentration Episode in Seoul, Korea”. She reported temporal variations in the observed physical, optical, and chemical properties show that there were three distinct episodes during the period: haze, mixed haze-Asian dust, and Asian dust episodes.
6. Dr. Atsushi SHIMIZU from National Institute for Environmental Studies (NIES) made a presentation on the comparison results between dust extinction coefficient by lidars and data from air-pollution monitoring systems in Japan. He showed that the correlation between lidar and PMc (PM10-PM2.5) was relatively better at Matsue than at Hedo in 2017, and appropriate screening on SPM/PM2.5 was useful to identify Asian dust events from air-pollution monitoring data.
7. Mrs. Xiaoyan MENG from CNEMC/MEE reported “The variations of PM2.5 concentration in China

since 2013”. She introduced the great achievements of air quality improvement have been made from 2013 to 2018, and also she mentioned the situation with air pollution prevention remained challenging for China. There are still many severe pollution events occurring in northern China in autumn and winter.

8. Dr. Sang Boom RYOO from NIMS/KMA made a presentation entitled “ADAM3 and its Predictability of Asian Dust over Northern China”. He reported that ADAM3 model performance in identifying Asian dust days varied systematically according to soil types; good performance for sand-type soil, and relatively poor performance for mixed and loess-type soil.
9. Mr. Takashi MAKI from Meteorological Research Institute of Japan Meteorological Agency (MRI/JMA) showed that the aerosol transport model developed by the MRI/JMA could reproduced qualitatively well in 2017 DSS events. In order to improve the quantitative reproducibility of the model, detailed observation data near the source of the DSS are also required. He also reported on the progress of data assimilation system development. The MRI/JMA has released an aerosol reanalysis product (JRAero) using 2D-VAR, and this system is scheduled to be introduced to the JMA's aeolian dust forecast system in the spring of 2020.
10. Ms. Yilin ZHAO from CNEMC/MEE made a special presentation entitled "Status of Environmental Air Quality Forecast in China & Analysis on Sandstorm Forecast". This presentation mainly summarized the work of the air quality forecast in China, the effectiveness evaluation of multi-model air quality forecast operating system, and the application of sandstorm forecast model in prediction analysis of pollution process.
11. Mr. Kang SUN from CNEMC/MEE reported "Overview of China Ambient Air Quality Monitoring". This presentation mainly showed remarkable development on China ambient air quality monitoring after through efforts during last decade. The report aims to introduce the improvement of China ambient air quality monitoring network, especially most representative urban ambient air quality monitoring network. The report includes three parts: current situation of China ambient air quality monitoring network, quality management of urban ambient air quality monitoring network and Quality Management System.
12. In Session Four on “Report from the Countries on DSS Events” chaired by Dr. Atsushi SHIMIZU from NIES, four participants made their presentations. Dr. Yun-Kyu LIM from NIMS/KMA made a presentation entitled “Analysis of model (ADAM3) and observation data in DSS 2017 cases”. In his presentation, two cases of DSS 2017 event were analyzed with observation data and numerical model results (ADAM3). In particular, the ratio of soil component in elemental composition of Asian dust case was about three times higher than that of non-Asian dust case.
13. Dr. Nobuo SUGIMOTO from NIES made a presentation on analysis of DSS2017 using Himawari-8, the lidar network, surface observations, and chemical transport models. He showed Himawari-8 Dust RGB (not yet shared in WG1) was useful for identifying dust emission areas, and the lidar network was useful for studying structure of transported dust. It was clearly shown in the analysis of the dust event of May that dust emitted in the Gobi desert was transported behind the cold front near the surface, up to Japan. Using the Dust RGB data, he showed dust emission areas predicted by CFORS were

wrong in some cases. He also showed that spot-like dust emission sources were sometimes observed. The results suggest high spatial and temporal resolution Himawari-8 Dust RGB data can be useful for studying dust emission mechanism and for improving dust prediction

14. Mrs. Xu DAO from CNEMC/MEE made a special presentation entitled "The PM2.5 composition during DSS process". She introduced the variational characteristics of ion, OC, EC and heavy metal during DSS process. She emphasized the chemical composition observation of particulate matter in China to more accurately determine the chemical characteristics during the DSS process.
15. Dr. Masao MIKAMI from Japan Meteorological Business Support Center (JMBSC) reported "Investigation of recent yellow sand phenomenon in Japan and introduction of dust project at Tottori University". The MOEJ domestic committee, Yellow Sand Technical Committee, have been compiling every year a technical report on the status of the yellow sand activity in Japan. Dr. Mikami introduced the outline of the annual report of this year. In addition, as a report on the current status of research on yellow sand in Japan, the introduction of "Evaluation of climate change impacts and adaptation measures," which Tottori University is working on, was also made.
16. Mr. Dashdondog BATDORJ from National Agency for Meteorology and Environmental Monitoring (NAMEM) reported "Dust and sand storms monitoring in Mongolia". NAMEM has established the 9 DSS monitoring networking system since 2005 with support from Japan (NIES, JICA), Korea (KMA) and China (CMA), which enabled NAMEM to monitor dust concentrations such as PM10 and PM2.5 in Mongolia. He underlined that all stations have been running very well but maintenance are required in order to continue the DSS monitoring in Mongolia.
17. In Session Five and Six on "Discussion on the detailed milestones for mid-term action plan (2020-2024)" chaired by Dr. Sang-Sam LEE from NIMS/KMA, Mr. Nobuyuki KONUMA from MOEJ introduced an outline of draft version of the Proceeding Report (2015-2019). He reviewed the progress of the WG I activities in line with the Mid-Term Action Plan (2015-2019) and underlined the major achievements of the WGI activities. Further he proposed some ideas for the next Mid-Term Action Plan (2020-2024) and he also said that he will propose the Proceeding Report (2015-2019) and draft for Mid-Term Action Plan (2020-2024) in order to obtain the approval at the 14th DGM and the endorsement at 21st TEMM in 2019.
18. The goals of draft for Mid-Term Action Plan (2020-2024) are followings: 1) Continuation of previous WG I activities, 2) Expansion of data sharing for Joint Research, 3) Encouragement of sharing real-time data for developing early warning system, 4) Enhancement of the cooperation between the two working groups, 5) Encouragement of the participation of outreach research groups, and 6) Enhancement of research on sub-seasonal to seasonal (S2S) forecasts and long-term variations of DSS.
19. For joint research, the four countries decided to share the observation data during the period from March 20 to April 20 (DSS2018-01) and from November 25 to December 5 (DSS2018-02), 2018. The countries will upload the data designated website by the end of June, 2020.
20. Before closing, it was suggested that the 13<sup>th</sup> meeting of WG I will be held in September/October 2020 in Qingdao, China. As the host country of the next WG I meeting, China will propose the detailed date, venue, and timeline for preparing agenda and meeting materials more than 4 months before the meeting.

# The 12<sup>th</sup> Meeting of Working Group (I) for Joint Research on Dust and Sand Storms

◆ **Date : September 26 (Thu.) ~ 27 (Fri.), 2019**

**Venue : Ramada Encore HAEUNDAE, BUSAN, KOREA**

**Host: National Institute of Meteorological Sciences/KMA, KOREA**

◆ **DAY 1 (September 26)**

<b>09:00 - 09:30</b>	<b>REGISTRATION</b>
<b>Session I</b>	<b>Opening</b> Chair: Dr. Sang-Sam LEE (National Institute of Meteorological Sciences/KMA, KOREA)
<b>09:30 - 09:40</b>	<b>Opening Remarks</b> Dr. Sang Boom RYOO (National Institute of Meteorological Sciences/KMA, KOREA)
<b>09:40 - 09:50</b>	<b>Introduction of participants</b>
<b>09:50 - 10:00</b>	<b>Adoption of the agenda</b>
<b>10:00 - 10:10</b>	<b>Group Photo</b>
<b>10:10 - 10:20</b>	<b>BREAK</b>
<b>Session II</b>	<b>Looking back at discussion and activities</b> Chair: Mr. Nobuyuki KONUMA (Ministry of the Environment, JAPAN)
<b>10:20 - 10:40</b>	<b>Review on the 11th Meeting of Working Group (I)</b> Ms. Masae SUMIKOSHI (Overseas Environmental Cooperation Center, JAPAN)
<b>10:40 - 11:00</b>	<b>Current status of DSS Data Sharing</b> Dr. Sang-Sam LEE (National Institute of Meteorological Sciences/KMA, KOREA)
<b>Session III</b>	<b>The study on DSS monitoring and modeling from each country</b> Chair: Dr. Liang LI (Ambient Air Quality Monitoring Department/CNEMC, CHINA)
<b>11:00 - 11:20</b>	<b>Physicochemical Characteristics of Atmospheric Aerosols during a Consecutive High Concentration Episode in Seoul, Korea</b> Dr. Hee-Jung KO (National Institute of Meteorological Sciences/KMA, KOREA)
<b>11:20 - 11:40</b>	<b>Characteristics of Asian dust events detected by a lidar network in east Asia</b> Dr. Atsushi SHIMIZU (National Institute for Environmental Studies, JAPAN)
<b>11:40 - 12:00</b>	<b>The variations of PM<sub>2.5</sub> concentration in China since 2015</b> Mrs. Xiaoyan MENG (Ambient Air Quality Monitoring Department/CNEMC, CHINA)
<b>12:00 - 13:30</b>	<b>LUNCH</b>
<b>13:30 - 13:50</b>	<b>ADAM3 and its Predictability of Asian Dust over Northern China</b> Dr. Sang Boom RYOO (National Institute of Meteorological Sciences/KMA, KOREA)
<b>13:50- 14:10</b>	<b>Recent DSS related activities at the Japan Meteorological Agency and Meteorological Research Institute</b> Mr. Takashi MAKI (Meteorological Research Institute, JAPAN)
<b>14:10- 14:30</b>	<b>Status of Environmental Air Quality Forecast in China &amp; Analysis on Sandstorm Forecast</b> Ms. Yilin ZHAO (Environmental Quality Forecast and Early Warning Center/CNEMC, CHINA)
<b>14:30 – 14:50</b>	<b>Overview of China Ambient Air Quality Monitoring</b> Mr. Kang SUN (Ambient Air Quality Monitoring Department/CNEMC, CHINA)
<b>Session IV</b>	<b>Report from the countries on DSS Events</b> Chair: Dr. Atsushi SHIMIZU (National Institute for Environmental Studies, JAPAN)

14:50 - 15:10	<b>Analysis of model (ADAM3) and observation data in DSS2017 cases</b> Dr. Yun-Kyu LIM (National Institute of Meteorological Sciences/KMA, KOREA)
15:10 - 15:30	<b>Analysis of Asian Dust Events in 2017 Using Lidar Network, Satellite, and Surface Observation Data</b> Dr. Nobuo SUGIMOTO (National Institute for Environmental Studies, JAPAN)
15:30 - 15:50	<b>The PM<sub>2.5</sub> composition during a dust process</b> Mrs. Xu DAO (Ambient Air Quality Monitoring Department/CNEMC, CHINA)
15:50 - 16:10	<b>Investigation of recent yellow sand event in Japan and introduction of dust project at Tottori University</b> Dr. Masao MIKAMI (Japan Meteorological Business Support Center, JAPAN)
16:10 - 16:30	<b>Dust and sand storms monitoring in Mongolia</b> Mr. Dashdondog BATDORJ (National Agency for Meteorology and Environmental Monitoring, Mongolia)
16:30 - 16:40	<b>BREAK</b>
<b>Session V</b>	<b>Discussion on the detailed milestones for mid-term action plan(2020-2024)</b> Chair: Dr. Sang-Sam LEE (National Institute of Meteorological Sciences/KMA, KOREA)
16:40 - 18:30	<b>Proceeding report 2015 - 2019</b> Mr. Nobuyuki KONUMA (Ministry of the Environment, JAPAN) <b>Continuation of previous WG I activities</b> <b>Expansion of data sharing for joint research</b> <b>Sharing real-time observation data in the origins and routes of DSS</b> <b>Comparison of monitoring methods for particulate matters</b> <b>Enhancement of the cooperation between the two working groups</b> <b>Encouragement of the participation of outreach research group</b>
18:30 - 20:00	<b>BANQUET</b>

◆ **DAY 2 (September 27)**

<b>Session VI</b>	<b>Discussion on the detailed milestones for mid-term action plan(Continue)</b> Chair: Dr. Sang-Sam LEE (National Institute of Meteorological Sciences/KMA, KOREA)
09:30 - 1200	<b>Continuation of previous WG I activities</b> <b>Expansion of data sharing for joint research</b> <b>Sharing real-time observation data in the origins and routes of DSS</b> <b>Comparison of monitoring methods for particulate matters</b> <b>Enhancement of the cooperation between the two working groups</b> <b>Encouragement of the participation of outreach research group</b>
12:00 - 14:00	<b>LUNCH</b>
<b>Session VII</b>	<b>Summary</b> Chair: Dr. Sang Boom RYOO (National Institute of Meteorological Sciences/KMA, KOREA)
14:00 - 15:30	<b>Meeting summary and discussions</b>
15:30 - 16:00	<b>Closing Remarks</b>

**The 12<sup>th</sup> Meeting of Working Group I Joint Research on Dust and Sand Storms**

**Busan, Korea**

**(26<sup>th</sup> – 27<sup>th</sup> September 2019)**

**List of Participants**

**China**

- Dr. Liang LI, Senior Engineer, Ambient Air Quality Monitoring department., China  
National Environment Monitoring Center, Ministry of Ecology and Environment, P. R.  
China
- Mrs. Xiaoyan MENG, Senior Engineer, Ambient Air Quality Monitoring department,  
China National Environment Monitoring Center, Ministry of Ecology and Environment,  
P. R. China
- Mrs. Xu DAO, Senior Engineer, Ambient Air Quality Monitoring department, China  
National Environment Monitoring Center, Ministry of Ecology and Environment, P. R.  
China
- Mr. Kang SUN, Engineer, Ambient air quality monitoring department, China National  
Environment Monitoring Center, Ministry of Ecology and Environment, P. R. China
- Ms. Yilin ZHAO, Engineer, Environmental Quality Forecast and Early Warning Center,  
China National Environment Monitoring Center, Ministry of Ecology and Environment,  
P. R. China

**Japan**

- Mr. Nobuyuki KONUMA, Deputy Director, Air Environment Division, Ministry of the  
Environment
- Dr. Nobuo SUGIMOTO, Fellow, Center for Environmental Measurement and Analysis,  
National Institute for Environmental Studies (NIES)
- Mr. Takashi MAKI, Head, 1st laboratory, Atmospheric Environment and Applied  
Meteorology Research Department, Meteorological Research Institute (MRI)
- Dr. Atsushi SHIMIZU, Senior Researcher, Center for Environmental Measurement and  
Analysis, National Institute for Environmental Studies (NIES)
- Dr. Masao MIKAMI, International Division Manager, International Division, Japan  
Meteorological Business Support Center (JMBSC)
- Ms. Masae SUMIKOSHI, Secretariat, Project Development Department, Overseas  
Environmental Cooperation Center (OECC)
- Ms. Hiroka WATARAI, Secretariat, Project Development Department, Overseas  
Environmental Cooperation Center (OECC) (OECC)

**Korea**

- Dr. Sang Boom RYOO, Director, Environmental Meteorology Research Division, National  
Institute of Meteorological Sciences, Korea Meteorological Administration
- Dr. Sang-Sam LEE, Senior Researcher, Environmental Meteorology Research Division,  
National Institute of Meteorological Sciences, Korea Meteorological Administration
- Dr. Yun-Kyu LIM, Scientific Researcher, Environmental Meteorology Research Division,  
National Institute of Meteorological Sciences, Korea Meteorological Administration
- Dr. Hee-Jung KO, Scientific Researcher, Environmental Meteorology Research Division,  
National Institute of Meteorological Sciences, Korea Meteorological Administration
- Mr. Dae-Geun Shin, Researcher, Environmental Meteorology Research Division, National  
Institute of Meteorological Sciences, Korea Meteorological Administration

Mr. Sae-Ho OH, Researcher, Environmental Meteorology Research Division, National Institute of Meteorological Sciences, Korea Meteorological Administration

Mr. Hong-Pyo KO, Researcher, Environmental Meteorology Research Division, National Institute of Meteorological Sciences, Korea Meteorological Administration

Ms. Da-Jeong LEE, Researcher, Environmental Meteorology Research Division, National Institute of Meteorological Sciences, Korea Meteorological Administration

**Mongolia**

Mr. Dashdondog BATDORJ, Engineer/Researcher, National Agency for Meteorology and Environmental Monitoring