

# Summary of the Ninth Meeting of Working Group I for Joint Research on Dust and Sand Storms Jeju, 30<sup>th</sup> November-2<sup>nd</sup> December 2016

1. The ninth 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 Seogwipo KAL Hotel, Jeju, Korea, from 30th November to 2nd December, 2016. Representatives from Japan, China, Mongolia and Korea participated in this meeting (Annex1: List of participants).
2. In Session One chaired by Mr. Hee Choon LEE, Senior Researcher of National Institute of Meteorological Sciences (NIMS)/KMA, Dr. Sang Boom RYOO, Director of Environmental Meteorology Research Division of NIMS/KMA, Korea, delivered opening remarks and warmly welcomed the participants. All participants took a moment to officially introduce to each other. Mr. LEE introduced the provisional agenda of the meeting, but it was adjusted to some extent because two participants (Mr. Liang LI & Dr. Munkhtsetseg ERDENEBAYAR) could not attend the sessions of 30th Nov. Besides the adjustment of some presentation order and the time of Session VI, the agenda was adopted by all participants (Annex 2: Meeting agenda). Group photo time was postponed to 1<sup>st</sup> Dec.
3. In Session Two chaired by Dr. Jeong Eun KIM, NIMS/KMA, the last discussion and activities were reported and previewed including mid-term Action Plan of WG I.
4. Mr. Kinichi SUDO, Ministry of the Environment of Japan, made a presentation on “Review on the 8<sup>th</sup> WG I meeting (Dec. 9-10, 2015 in Fukuoka, Japan), the 10<sup>th</sup> SCM (Feb. 26, 2016 in Tokyo, Japan), the 1<sup>st</sup> Joint Workshop (Feb. 27, 2016 in Tokyo, Japan), the 11<sup>th</sup> TDGM (Mar. 24, 2016 in Shizuoka, Japan) and the 18<sup>th</sup> TEMM (Apr. 26-27, 2016 in Shizuoka, Japan)”.
5. Dr. Sang-Sam LEE, NIMS/KMA, made a presentation on the current status of DSS2014 data sharing. According to his report, several data were newly added, for example, wind (5 sites) from Mongolia, and AOT & Angstrom exponent of SKYNET (6 sites) from Japan. He emphasized the availability of web-hard (<http://www.webhard.net>) to obtain the useful data and expressed his thanks to all participating countries for sharing their data.
6. In Session Three chaired by Dr. Nobuo SUGIMOTO, National Institute for Environmental Studies (NIES), Japan, several cases from the countries on DSS events (heavy dust storms during Mar. 13-23, 2014; May. 22 - Jun.4, 2014) were reported.
7. Dr. Nobuo SUGIMOTO, NIES, made a first presentation on “Analysis of dust events in 2014-2016 using the lidar network data”. On his presentation, he highlighted that Polarization Sensitive Lidars and Polarization Optical Particle Counters (POPC) are useful instruments to measure and distinguish dust from other types of aerosols in (near) real time.
8. Dr. Nobuo SUGIMOTO, NIES, made a second presentation on “Inverse Modeling of Asian Dust Emission with POPC Observation for DSS 2014 Case Study”, which was done by Prof. UNO (Kyushu

Univ., Japan). By combining chemical transport model (GEOS-Chem) and Green's function method, two heavy dust storm events in 2014 were applied. From this result, it is found that dust emissions were improved and the related two papers will be submitted to SOLA .

9. Dr. Takashi MAKI, Meteorological Research Institute (MRI), Japan, made a presentation on "DSS Modeling and Monitoring Study by MRI/JMA". He explained about Geostationary Satellite Himawari-8, reported the new version of MASINGAR mk-2, which will be updated from 2017, and showed the expectation of its better presentation for dust event in the future. One example of forest-fire event in May, 2016 by combining Himawari-8 AOT and MASINGAR mk-2 through data assimilation was presented.
10. Dr. Jeong Eun KIM, NIMS/KMA, made a presentation on "Dust monitoring results of DSS2014 cases in KMA". DSS2014-01 affected for a relatively short period, but all over the Korean Peninsula. While DSS2014-02 was two separated outbreaks from different source regions for five consecutive days, aerosol characteristics showed anthropogenic pollutants during this period.
11. Dr. Yun-Kyu LIM, NIMS/KMA, made a presentation titled "Simulation results of DSS2014 cases with ADAM". He introduced the new version of emission inventory and also showed its impact on aerosol modeling from the case experiments during Jan. 16~30, 2015. Additionally, he explained the features of ADAM-Haze through DSS2014-01, 02 cases. To improve the predictability of the ADAM-Haze, he mentioned that anthropogenic emissions over Asian dust pathway are also important.
12. In Session Four chaired by Dr. Sonomdagva CHONOKHUU, National University of Mongolia (NUM), Mongolia, results of other related activities were introduced from Korea and Mongolia.
13. Dr. Joo Wan CHA, NIMS/KMA, introduced KORUS-AQ campaign, which was carried out over the Korean Peninsula under the Korea-USA cooperation during May-June, 2016. This campaign was made for better understanding of satellite performance, fundamental understanding of atmospheric composition and improvement of air quality modelling. After the presentation, Dr. Maki showed the interest in joining this campaign in the future, but this time no plan was developed for the next campaign. In the future, however, it needs to consider making a joint campaign which includes Japanese institutes. The result from this campaign will be opened late next year.
14. Dr. Sonomdagva CHONOKHUU, NUM, explained "Ambient air quality and white dust dispersion and transport in Erdenet city, Mongolia". The purpose of the study was to identify the air quality, dispersion and trajectories of the "white dust", which was resulted from the process of Erdenet copper mining. To date, SO<sub>2</sub> and NO<sub>2</sub> were identified, whereas Silicium is still in process.
15. In Session Five chaired by Dr. Sang-Sam LEE, discussion was made on the detailed milestones for mid-term action plan (2015-2019). According to the agenda, participants discussed each item listed below.
  - 1) Continuation of previous WG I activities
    - a) Next target event for the next year's study
    - b) Next publication plan of the research results in SOLA
  - 2) Expansion of data sharing
    - a) Additional data to share among the countries
  - 3) Comparison of monitoring methods for particulate matters
    - a) Report on the current monitoring methods for particulate matters

- 4) Linking of WMO SDS-WAS web portal to share DSS model outputs
  - a) Current status of SDS-WAS RSG for Asia
- 5) Enhancement of the cooperation between the two working groups
  - a) Review of the 1<sup>st</sup> Joint Workshop between WG I and II
- 6) Encouragement of the participation of outreach research group

16. Regarding 1)-a) it was decided that the data for the DSS event (Feb. 18-28, 2015; Mar. 15-26, 2015; and Jun. 6-16, 2015) will be shared by the participating countries.

The countries will upload the data about the above suggested period to the data sharing website by 31th July, 2017.

17. Regarding 1)-b) Mr. Yu KUDO, Overseas Environmental Cooperation Center (OECC), Japan, made a presentation on “Next Publication Plan of the research results in SOLA” along with submission regulations. Two papers are already planned to be submitted from Japan. When papers are submitted to SOLA, all submitters will inform OECC (to Mr. Yasushi HIEDA). All accepted papers will be uploaded to the web-site one by one, and in the end they will be bound as one volume for distribution. All members will try to submit by the end of May 2017, and Korea plans to submit three papers potentially.

18. Regarding 2)-a) Expansion of data sharing, Japan and Korea agreed to share POPC data (2 sites) and OPC data (2 sites) of 2015.

19. Regarding 3)-a) Dr. Atsushi SHIMIZU, NIES, reported current monitoring methods for particulate matters. He emphasized that comparative verification of the monitoring methods among four countries in WG I is important for the DSS research and model development, and suggested sharing the information of PM<sub>2.5</sub> monitor type.

20. Regarding 4)-a) Dr. Sang-Sam LEE, NIMS/KMA, reported the meeting of the 5<sup>th</sup> WMO SDS-WAS Regional Steering Group for Asia, which was held on Sep. 22-23 in Jeju, Korea. He introduced information on the new web-portal site as well as the current status of observational data sharing between CMA, JMA and KMA.

21. Regarding 5)-a) Mr. Yasushi HIEDA, OECC, made a presentation on “Review of the 1<sup>st</sup> Joint Workshop between WG I and II”. For the 2<sup>nd</sup> Joint Workshop, Korea will share more detailed information after having a discussion with the Ministry of Environment of Korea and WG II.

22. Regarding 6) Encouragement of the participation of outreach research group was not discussed this time and decided to postpone to the next meeting.

23. All participants including Mr. Liang LI and Dr. Munkhtsetseg ERDENEBAIYAR participated in Session Six which was held on 1st December and chaired by Dr. Sang Boom RYOO, NIMS/KMA.

24. Mr. Liang Li, China National Environmental Monitoring Center (CNEMC), made a presentation on “Progress on joint journal of WG I (2014-2016)”. To date, PARTICUOLOGY has accepted three papers out of six submitted papers from WG I experts. And two papers were rejected, and one paper is under revision. Three accepted papers were published in volume 28.

25. Mr. Liang LI, CNEMC, made a presentation on “Cases of DSS 2014 Monitoring Result in China”. According to Mr. LI, the climate factor is conducive to dust and sand storms in April, 2014 in China.
26. Dr. Munkhtsetseg ERDENEBAIYAR, NUM, presented “Sand fluxes and its vertical distribution in the southern Mongolia”. According to Dr. Munkhtsetseg ERDENEBAIYAR, it is crucial to quantify the amount of soil loss by DSS, and defining the sand fluxes and measuring its vertical transportation are worth understanding DSS phenomena and atmospheric environment.
27. Dr. Sang Boom RYOO, NIMS/KMA, confirmed a summary of the meeting and announced that the next DSS SCM venue will be held in Korea 2017, and the results of the discussion at this meeting will be reported to the SCM.
28. Before closing, it was announced that the tenth meeting of WG I will be held in China based on the decision of the TOR of WG I. The details of the tenth meeting will be confirmed at a later date. Lastly, all participants took a group photo.

**The 9<sup>th</sup> Meeting of Working Group I Joint Research on Dust and Sand Storms**

**Jeju, KOREA**

**(30 November - 2 December, 2016)**

**List of Participants**

**Japan**

Mr. Kinichi SUDO

Senior Analyst

General Affairs Division, Environmental Management Bureau

Ministry of the Environment, Government of Japan

Mr. Takashi MAKI

Head, 1<sup>st</sup> laboratory

Atmospheric Environment and Applied Meteorology Research

Department

Meteorological Research Institute

Dr. Nobuo SUGIMOTO

Fellow

Center for Environmental Measurement and Analysis

National Institute for Environmental Studies

Dr. Atsushi SHIMIZU

Senior Researcher

Center for Regional Environmental Research

National Institute for Environmental Studies

Mr. Yasushi HIEDA

Principal Researcher

First Operation Department

Overseas Environmental Cooperation Center

Mr. Yu KUDO

Researcher

First Operation Department

Overseas Environmental Cooperation Center

**China**

Mr. Liang LI

Senior Engineer

Ambient Air Quality Monitoring Dept

China National Environmental Monitoring Center

**Korea**

Dr. Sang Boom RYOO  
Director  
Environmental Meteorology Research Division  
National Institute of Meteorological Sciences,  
Korea Meteorological Administration

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**Mongolia**

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National University of Mongolia

Dr. Sonomdagva CHONOKHUU  
Associate Professor  
Department of Environment and Forest Engineering  
National University of Mongolia

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Dr. Hee-Jung KO  
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Environmental Meteorology Research Division  
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Mr. Won Ick SEO  
Researcher  
Environmental Meteorology Research Division  
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Korea Meteorological Administration

# The 9<sup>th</sup> Meeting of Working Group (I) for Joint Research on Dust and Sand Storms

◆ **Date:** November 30 (Wed.) ~ December 2 (Fri.), 2016

**Venue:** Seogwipo KAL Hotel, Jeju, KOREA

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

◆ **DAY 1 (November 30)**

**09:00 - 09:30 REGISTRATION**

**Session I Opening**

Chair: Mr. Hee Choon LEE (National Institute of Meteorological Sciences/KMA, KOREA)

**09:30 - 09:40 Opening Remarks**

Dr. Sang Boom RYOO (National Institute of Meteorological Sciences/KMA, KOREA)

**09:40 - 09:50 Introduction of participants**

**09:50 - 10:00 Adoption of the agenda**

**10:00 - 10:20 Break**

**Session II Looking back at discussion and activities**

Chair: Dr. Jeong Eun KIM (National Institute of Meteorological Sciences/KMA, KOREA)

**10:20 - 10:40 Review on the 8<sup>th</sup> WG I, the 10<sup>th</sup> SCM, the 11<sup>th</sup> TDGM and the 18<sup>th</sup> TEMM**

Mr. Kinichi SUDO (Ministry of the Environment of Japan/MOEJ, JAPAN)

**10:40 - 11:00 Current status of DSS Data Sharing**

Dr. Sang-Sam LEE (National Institute of Meteorological Sciences/KMA, KOREA)

**Session III Report from the countries on DSS events (2014.3.13-23, 2014.5.22-6.4)**

Chair: Dr. Nobuo SUGIMOTO (National Institute for Environmental Studies, JAPAN)

**11:00 - 11:20 Analysis of dust events in 2014-2016 using the lidar network data**

Dr. Nobuo SUGIMOTO (National Institute for Environmental Studies, JAPAN)

**11:20 - 11:40 Inverse Modeling of Asian Dust Emission with POPC Observations for TEMM DSS 2014 Case Study**

Dr. Nobuo SUGIMOTO (National Institute for Environmental Studies, JAPAN)

**11:40 - 12:00 DSS Modeling and Monitoring Study by MRI/JMA**

Dr. Takashi MAKI (Meteorological Research Institute/MRI, JAPAN)

**12:00 - 14:00 LUNCH**



**14:00 - 14:20 Dust monitoring results of DSS2014 cases in KMA**

Dr. Jeong Eun KIM (National Institute of Meteorological Sciences/KMA, KOREA)

**14:20 - 14:40 Simulation results of DSS2014 cases with ADAM**

Dr. Yun-Kyu LIM (National Institute of Meteorological Sciences/KMA, KOREA)

**Session IV Other Related Activities**

Chair: Dr. Sonomdagva CHONOKHUU (National University of Mongolia, MONGOLIA)

**14:40 - 15:00 Introduction of KORUS-AQ campaign**

Dr. Joo Wan CHA (National Institute of Meteorological Sciences/KMA, KOREA)

**15:00 - 15:20 Ambient air quality and white dust dispersion and transport in Erdenet city, Mongolia**

Dr. Sonomdagva CHONOKHUU (National University of Mongolia, MONGOLIA)

**15:20 - 15:40 Break**

**Session V Discussion on the detailed milestones for mid-term action plan(2015-2019)**

Chair: Dr. Sang-Sam LEE (National Institute of Meteorological Sciences/KMA, KOREA)

**15:40 - 18:00 Continuation of previous WG I activities**

- Next target event for the next year's study
- Next publication plan of the research results in SOLA (Mr. Yu KUDO, JAPAN)

**Expansion of data sharing**

- Additional data to share among the countries (Dr. Sang-Sam LEE, KOREA)

**Comparison of monitoring methods for particulate matters**

- Report on the current monitoring methods for particulate matters (Dr. Atsushi SHIMIZU, JAPAN)

**Linking of WMO SDS-WAS web portal to share DSS model outputs**

- Current status of SDS-WAS RSG for Asia (Dr. Sang-Sam LEE, KOREA)

**Enhancement of the cooperation between the two working groups**

- Review of the 1<sup>st</sup> Joint Workshop between WG I and II (Mr. Yasushi HIEDA, JAPAN)

**Encouragement of the participation of outreach research group**

- EANET, CMA, WMO

**18:00 - 20:00 BANQUET**

◆ **DAY 2 (December 1)**

**Session VI Summary**

Chair: Dr.Sang Boom RYOO (National Institute of Meteorological Sciences/KMA, KOREA)

**12:00 - 14:00 LUNCH**

**14:00 - 14:10 Current status of published research papers to the Particuology**

Mr. Liang LI, Pan BENFENG (China National Environmental Monitoring Center, CHINA)

**14:10 - 14:20 A Cases of DSS 2014 Monitoring Result in China**

Mr. Liang LI (China National Environmental Monitoring Center, CHINA)

**14:20 - 14:30 Sand fluxes and its vertical distribution in the southern Mongolia**

Dr. Munkhtsetseg ERDENEYAYAR (National University of Mongolia, MONGOLIA)

**14:30 - 17:30 Discussion and adoption of meeting summary**

**17:30 - 17:40 Closing Remarks & Group Photo**

◆ **DAY 3 (December 2)**

**Scientific Site Visiting**

**9:00 - 12:00 Gosan GAW site**

**12:00 - 13:30 LUNCH**

**13:30 - 18:00 Jeju World Natural Heritage Site Visiting**