Oral | Symbol A (Atmospheric, Ocean, and Environmental Sciences) | A-AS Atmospheric Sciences, Meteorology & Atmospheric Environment

[A-AS23_28PM2]Hyper-dense observation network to elucidate micro-scale atmosphreric phenomena

Convener:*Jun-ichi Furumoto(Research Institute for Sustainable Humanosphere, Kyoto University), Jun-ichi Furumoto(Research Institute for Sustainable Humanosphere, Kyoto University), Hisakazu Tsuboya(Division of life support business promossion,NTT DOCOMO Corporation), Chair:Kosei Yamaguchi(Disaster Prevention Research Institute, Kyoto University)

Mon. Apr 28, 2014 4:15 PM - 6:00 PM 424 (4F)

The recent development of sub-kilometer scale hyper-dense network of meterological instruments enables us to unveil the detailed behavior and structure of micro-scale meteorological penomena. The potential of the hper-dense netork widely include the research of the disatrous phenonema such as windstrom or tornado and the precise forecast of active cumulus convection by monitoring near-surface conversience lines. It is also noteworthy that the micro-scale phenomena is represented by non-hydrostatic meteorological model with very fine horizontal resolutions.In this sense, the complehensive studies combining observation and model are keenly expected.This session widely welcomes research topics and future actions regarding micro-scale meteorological phenomena.The new design of hyper-sense network and QC method of big-data obtained from the hyper-dense netorwk is also included in the session scope.

5:40 PM - 5:55 PM

[AAS23-P02_PG]Development of a 266 nm Raman lidar for profiling atmospheric water vapor

3-min talk in an oral session

*Takuma UESUGI[1], Masanori YABUKI[1], Yutong LIU[1], Toshitaka TSUDA[1] (1.Research Institute for Sustainable Humanosphere)

It is projected that localized extreme weather events could increase due to the effects of global warming, resulting in severe weather disasters, such as a torrential rain, floods, and so on. Understanding water vapor's behavior in the atmosphere is essential to understand a fundamental mechanism of these weather events. Therefore, continuous monitoring system to measure the atmospheric water vapor with good spatio-temporal resolution is required. We have developed several water vapor Raman lidar systems employing the laser wavelengths of 355 and 532 nm. However, the signal-to-noise ratio of the Raman lidar strongly depends on the sky background because of the detection of the weak inelastic scattering of light by molecules. Therefore, these systems were mainly used during nighttime.Hence, we have newly developed a water vapor Raman lidar using a quadrupled Nd:YAG laser at a wavelength of 266 nm. This wavelength is in the ultraviolet (UV) range below 300 nm known as the "solar-blind" region, because practically all radiation at these wavelengths is absorbed by the ozone layer in the stratosphere. It has the advantage of having no daytime solar background radiation in the system. The lidar is equipped with a 25 cm receiving telescope and is used for measuring the light separated into an elastic backscatter signal and vibrational Raman signals of nitrogen and water vapor at wavelengths of 266.1, 283.6, and 294.6 nm, respectively. This system can be used for continuous water vapor measurements in the lower troposphere. This study introduces the design of the UV lidar system and shows the preliminary results of water vapor profiles.