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

[A-AS01_30PM1]Extreme Weather in Cities

Convener:*Masayuki Maki(ERCDP, Kagoshima University), Jun Matsumoto(Deaprtment of Geography, Tokyo Metropolitan University), Yoshinori Shoji(The Second Laboratory of Meteorological Satellite and Observation System Research Department, Meteorological Research Institute), Tsuyoshi Nakatani(National Research Institute for Earth Science and Disaster Prevention), Chair:Masayuki Maki(ERCDP, Kagoshima University)

Wed. Apr 30, 2014 2:15 PM - 3:45 PM 423 (4F)

It is recognized that large cities with a population of several million people are inherently vulnerable to extreme weathers such as torrential rain, lightning, strong wind, giant typhoon, and heat wave. It is argued that the occurrence of extreme weather phenomena tends to increase due to the climatic change. Cooperating with domestic and international academic scientists, the session will focus on the mechanism of extreme weather, its monitoring and prediction methods, effects of urbanization on hazards, and social experiments on resilient cities.

3:00 PM - 3:15 PM

△[AAS01-P01_PG]Analysis of meso-gamma-scale convection in tropical regions using GPS meteorology

3-min talk in an oral session

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Keywords:GPS meteorology, local heavy rain, meso-gamma-scale convection, tropical regions, Indonesia

In tropical regions such as Indonesia, strong wind with severe shower called squall occurs frequently, and has a large impact on residents in a rainy season. To predict accurately local heavy rain (occurring in a short time and in the range of a few km) is difficult today. Therefore, it is important to understand generation and development mechanism of the meso-γ-scale convection that leads to locally heavy rain."GPS meteorology" is a method to obtain the "atmospheric information" such as water vapor from atmospheric delay of radio waves based on a satellite "positioning error". We can estimate precipitable water vapor (PWV: integrated amount of water vapor along the zenith direction) with a high time resolution by using this method. Occurrence of rainfall associated with the meso-γ-scale convection has good correlation with the spatial non-uniformity and temporal variation of PWV estimated by the GPS meteorology technique (GPS-PWV).The purpose of this study is to find out the generation mechanism of meso-γ-scale convection in the tropics by focusing on the GPS-PWV.We analyzed GPS-PWV, radiosonde and rainfall data obtained from the campaign which was conducted during the rainy season of 2013 in Bandung, Indonesia.We carried out accuracy validation of GPS-PWV by analyzing the radiosonde data. As a result, the rainfall data showed that precipitation occurred often in the late afternoon together with an increase of PWV. Furthermore, we found the daily cycle of PWV showing minimum and maximum values in the morning and late afternoon, respectively. In addition, there is a difference in an altitude of more than 1000 m in each observation point. The difference has a severe influence on GPS-PWV. Therefore, it is need to correct altitude difference effect.