



## **Drop Size Distribution Under Severe Wind Condition in Marine Observation and Wind-tunnel Experiment**

Hiroki Okachi (1), Tomohito J. Yamada (1), Yasunori Watanabe (1), Ayumi Saruwatari (1), Junichi Ohtsuka (2), Nobuhito Mori (3), Yasuyuki Baba (3), Hideaki Mizutani (3), Teruhiro Kubo (3), Junichi Ninomiya (4), and Yusuke Uchiyama (5)

(1) Hokkaido University, Sapporo, Japan, (2) Civil Engineering Research Institute for Cold Region, Sapporo, Hokkaido, (3) Kyoto University, Kyoto, Japan, (4) Kanazawa University, Kanazawa, Japan, (5) Kobe University, Kobe, Japan

Under extreme meteorological events such as tropical depressions, wave breaking occurs at sea surface by strong wind speed. Sea spray droplets are thrown into the air associated with wave breaking. Between ocean and atmosphere, there exists a thick layer which consists of a relatively tall cloud of sea spray droplets. It is suggested that the effects of sea spray droplets on momentum and enthalpy exchange between air-sea surface are important (Lighthill 1999). Additionally, potential contribution of raindrops has effects on the momentum and enthalpy exchange. Furthermore, there are discussions about the evolution process of extreme phenomena with sea-spray effects. Hence, it is necessary to quantify these effects and to predict the evolution process to achieve disaster mitigation. However, inadequate information on the sea spray droplets hampered previous attempts to consider the effects. We performed marine observation from 2013 to 2016 at an observational tower in Wakayama-prefecture, Japan, where typhoon often hits. In this study, laser-optical Particle Size Velocity disdrometer was installed at the tower to detect sea spray droplets and raindrops (diameter  $> 320\mu\text{m}$ ). Several typhoons passed near the tower for four years. We further performed wind tunnel experiment to directly observe sea spray droplets (diameter  $> 72\mu\text{m}$ ) for six high wind speed conditions ( $U_{10}=23\sim 28\text{m/s}$ ). We report on preliminary results which are characteristics of sea spray droplets and raindrops size distribution.