

## COMPARISONS OF RAINGAUGES IN NATURAL RAINFALL CONDITION

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### ABSTRACT

Three kinds of tipping bucket rain gauges (0.2, 0.5 and 1.0mm) are compared in the relatively heavy rainfall region of Japan for three months from June to November of 2013. Total amount of observed rainfall are somewhat smaller in 0.2mm rain gauge than other two rain gauges. In particular, when the typhoon approached in the observational site and heavy rainfall occurred from 14th to 16th of September, the difference of the amount of observed rainfall are large. Rainfall amount for each 10 minutes by 0.2mm type is in good coincidence with 1.0mm type in the weak and moderate rain intensity and smaller in the high intensity rainfall.

### 1. Introduction

Tipping bucket type rain gauges are prevailing as one of the standard instruments for rainfall measurement. However, the small amount for one tipping cannot respond sufficiently in the heavy rainfall and sometimes makes the small evaluation of true rainfall. Simultaneous comparison of three types of rain gauges was carried out of Different amount of rainfall for one tipping exists and of these rain gauge

### 2. Observation

Observation of comparison of response of tipping bucket rain gauges were conducted at Shionomisaki Wind Effect Laboratory (SWEL) of Disaster Prevention Research Institute (DPRI) of Kyoto University, which is located at the end of the southern end of the Main Island of Japan. Three types of tipping bucket rain gauges (0.2, 0.5 and 1.0mm) were installed at the test field, as shown in Figure 1 and the distance of each rain gauge is 1.5m.



Fig.1 Installation of rain gauges at the test field(left), 1.0mm type (left), 0.5mm type(center) and 0.2mm type(right).

### 3. Results

Total amount of observed rainfall are as follows; 1258.0mm for 1.0mm type, 1244.5mm for 0.5mm type and 1209.4mm for 0.2mm type in Figure 2. The difference of observed rainfall is 35mm between 0.2mm type and 0.5mm type, and 13.5mm between 0.5mm type and 1.0mm type. In particular, when the typhoon approached in the observational site and heavy rainfall occurred from 14th to 16th of September, the amount of observed rainfall are 274.0mm for 1.0 type and 251.0mm for 0.2mm type. The difference of rainfall amount is 21.0mm. Rainfall amount for each 10 minutes by 0.2mm type is in good coincidence with 1.0mm type in the weak and moderate rain intensity and smaller in the high intensity rainfall.

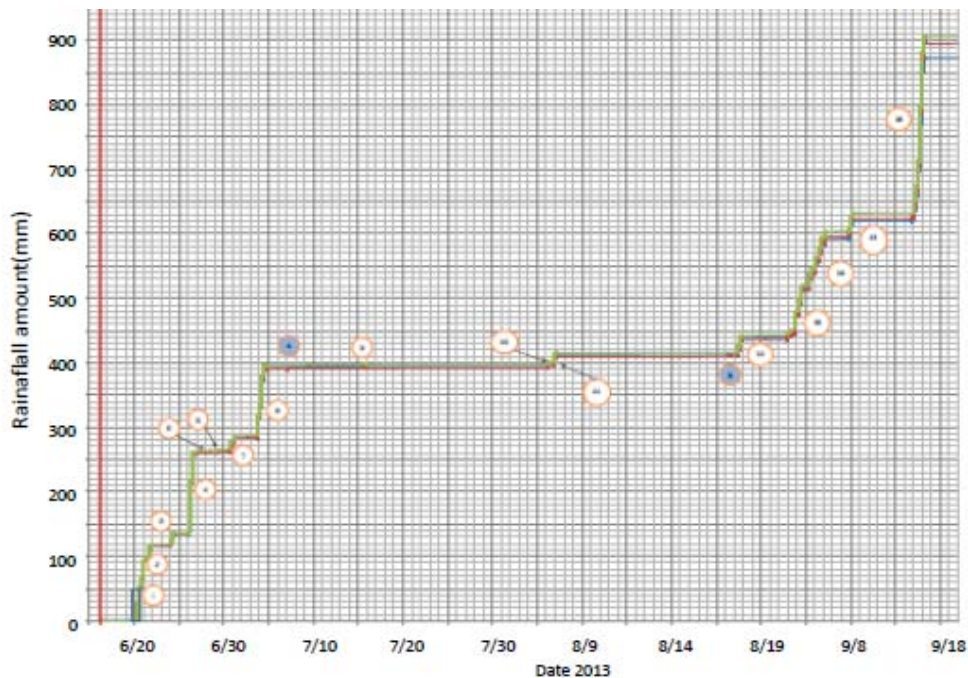


Figure 2 Total rainfall time series of three rain gauges

#### **4. Summary**

Three tipping bucket rain gauges (0.2, 0.5 and 1.0mm) are compared in natural rainfall condition in the relatively heavy rainfall region of Japan in the rain season from June to November of 2013. Total amount of observed rainfall are as follows; 1258.0mm for 1.0mm type, 1244.5mm for 0.5mm type and 1209.4mm for 0.2mm type. The difference of observed rainfall is 35mm between 0.2mm type and 0.5mm type, and 13.5mm between 0.5mm type and 1.0mm type. In particular, when the typhoon approached in the observational site and heavy rainfall occurred from 14th to 16th of September, the amount of observed rainfall are 274.0mm for 1.0 type and 251.0mm for 0.2mm type. The difference of rainfall amount is 21.0mm. Rainfall amount for each 10 minutes by 0.2mm type is in good coincidence with 1.0mm type in the weak and moderate rain intensity and smaller in the high intensity rainfall.