5.3 Didrometer

(1) Personnel

Masaki KATSUMATA (JAMSTEC) - Principal Investigator (Leg-1 and 2)

(2) Objectives

The disdrometer can continuously obtain size distribution of raindrops (in 20 categories) and rainfall intensity. The objective of this observation is (a) to reveal microphysical characteristics of the rainfall, depends on the type, temporal stage, etc. of the precipitating clouds, and (b) to retrieve the coefficient to convert radar reflectivity (especially from Doppler radar in Section 5.2) to the rainfall amount.

(3) Methods

The "Joss-Waldvogel-type" disdrometer system (RD-80, Disdromet Inc.) was utilized. The system equipped a microphone on the top of the sensor unit. When a raindrop hit the microphone, the magnitude of induced sound is converted to the size of raindrops. The logging program "DISDRODATA" determines the size as one of the 20 categories as in Table 5.3-1, and accumulates the number of raindrops at each category. The rainfall amount could be also retrieved from the obtained drop size distribution. The number of raindrops in each category, and converted rainfall amount, are recorded every one minute.

The disdrometer was installed on the roof of the unti-rolling system of R/V Mirai, as in Fig. 5.3-1. The data was obtained over the high seas throughout the cruise.

Table 5.3-1: Category number and corresponding size of the raindrop.

Category	Corresponding size range [mm]		
1	0.313	-	0.405
2	0.405	-	0.505
3	0.505	-	0.696
4	0.696	-	0.715
5	0.715	-	0.827
6	0.827	-	0.999
7	0.999	-	1.232
8	1.232	-	1.429
9	1.429	-	1.582
10	1.582	-	1.748
11	1.748	-	2.077
12	2.077	-	2.441
13	2.441	-	2.727
14	2.727	-	3.011
15	3.011	-	3.385
16	3.385	-	3.704
17	3.704	-	4.127
18	4.127	-	4.573
19	4.573	-	5.145
20	5.145	or larger	

(4) Preliminary Results

Figure 5.3-2 displays the time series of the measured rainrate and accumulated. The temporal variation reasonably corresponds to the radar-observed echo coverage as shown in Fig. 5.2-1 (see Section 5.2).

(5) Data Archive

All data obtained during this cruise will be submitted to the JAMSTEC Data Integration and Analysis Group (DIAG). The corrected datasets will be available at CINDY website.

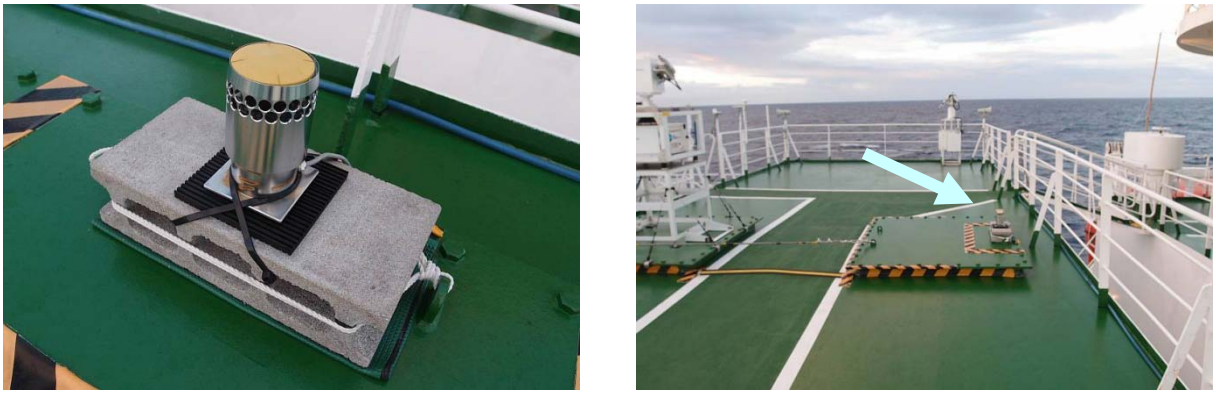

Fig. 5.3-1: Sensor unit (left) and its installed location (right, arrowed).

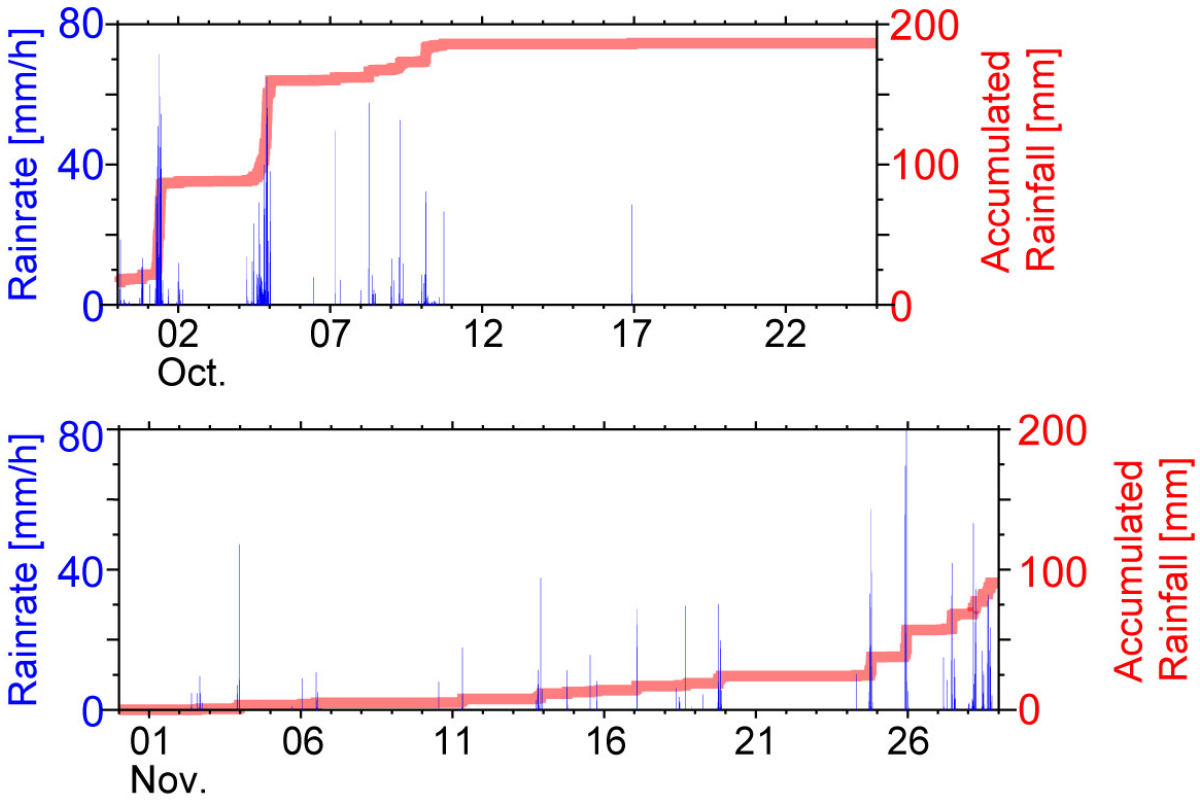

Fig. 5.3-2: Time series of the rainrate at every minute (blue vertical bars) and accumulated rainfall amount (red line) measured by the disdrometer, for the periods of stationary observation at (8S, 80.5E) during Leg-1 (upper) and Leg-2 (lower).