# Side-sacn-sonar mapping of the sea-bottom in the caldera of Suiyo Seamountain

# Masato Joshima[1]; Kiyokazu Nishimura[2]; Kiyoyuki Kisimoto[3]

[1] mre-mgp(margeophys),mre(marinus),(GSJ),AIST; [2] MRE, AIST; [3] GSJ, AIST

The investigation of the circumference of the caldera bottom of the Suiyo Seamountain is done vigorously in this several years. Generally submarine hydro-thermal activities start after the magmatic activity, the flux of the hydro-thermal flow changes violently in 1-2 years, and it is considering having the final breath at several years. It confirms that there is no change in the hydro-thermal flow of the same high temperature more than ten years in the caldera bottom on the Suiyo Seamountain.

Many diving investigations were done and many images such as video are left. The position precision using the sound is bad, and it is uncertain in the position relations of each diving tracks.

5 lines of deep-towing side-scan-sonar investigation by Wadatsumi were performed at 2001 keeping the hight from the caldera bottom by 100m. The caldera bottom was nallow, and Wadatsumi was always raised and lowered, and a posture could not become stable, and the result was not so satisfactory one.

Side-scan-sonar (Sportscan of the simple and easy miniature this time at a low price) is remodeled into the one for the deep sea in the research cruise, NT03-14, of Hyper-Dolphin (Natsushima), JAMSTEC.

It is installed on Hyper-Dolphin to record the side-scan-sonar data. There is no applicable big targets of the scale as 10m at the caldera bottom, Wadatsumi

could not catch them. Hyper-Dolphin was able to maintain the height of 3-5m from the sea-bottom, and several survey lines, range 30m (both sides of ship 60m) and line interval 50m, were successfully investigated. We can see the rocks of 1 to several m in size at the caldera floor, probably some of them were chimneys.

At the same time, the problem of the precision in positions which always haunts is realized again, too. Because position is determined by acoustic SSBL, it became clear that the ROV, which was supposed to run by itself, could not run at a stable speed and direction. Probable cause is that the ROV is hung by a ship with a cable. Obviously agitation on the sea is conveyed even in monitor screen. Other cause is probably the influence of the bottom layer flow changing irregularly.

The ability which records the against-ground speed of the towing body and a position precisely is looked for while it is in the bottom of the sea.

Though doppler-sonar sensor has existed very since the old days, it doesn't listen to the example used for the diving ship. The precise condition of doppler-sonar may not last for several hours. The visible record of the sea bottom can't be changed easily into the position data although the visible state in the image of video is clearly moving to the advance, the recession and the right and left. It seems that because there was no problem in the ability of ROV which works at the sea bottom, the problem of the positioning precision wasn't raised very much so far. We hope for the accurate recording of ROV's speed against the bottom, resulting in the improvement of the positioning, with presenting the base map made at present.

Characteristic features can be compared with the record of side-scan-sonar, when it is recognised in the video record of other dive. This method is effective in the sandy area of the Suiyo Seamountain caldera because characteristic rock bodies is visible. But, this method meets with difficulty in the rocky area of the hydro-thermal zone inside of the caldera bottom, so that dotted rock bodies look like same each other and characteristics may be hardly extracted. When ROV runs higher than 5m from the sea-bottom for avoiding danger, rocks are not almost visible.