Virgin dive of JHOD’s new AUV to a volcanic caldera and new findings

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GEBCO Science Day, October 2013, Venice Italy
Quiz: Who is he?

September 23 to 27, 2013 SCUFN in Japan
Study area and tectonic setting

The study area is located just on the active volcanic front.
Bathymetry acquired by S/V Takuyo (MBES EM122 12 kHz)
Illumination angle 0°, Contour interval 10 m

Relative Height : ~ 700 m
Shallowest Depth : 245 m
Size of the Caldera: ~ 1.5 km
AUV was deployed to figure out details of the Plumes.
AUV “Gondou”

<table>
<thead>
<tr>
<th>Manufacture</th>
<th>International Submarine Engineering Limited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>4.3 m</td>
</tr>
<tr>
<td>Weight</td>
<td>610 kg</td>
</tr>
<tr>
<td>Speed</td>
<td>3 knot (Max. 5 knots)</td>
</tr>
</tbody>
</table>

Gondou (Japanese) = Pilot Whale

Reference http://www.plus-hawaii.com
## Payloads on "GONDOU"

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Model</th>
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</thead>
<tbody>
<tr>
<td>Multibeam Echo Sounder</td>
<td>R2Sonic 2022 200-400 kHz</td>
</tr>
<tr>
<td>Side Scan Sonar</td>
<td>EdgeTech 2200-M 120/410 kHz</td>
</tr>
<tr>
<td>Sub-bottom Profiler</td>
<td>EdgeTech DW424 4-24 kHz</td>
</tr>
<tr>
<td>CTD</td>
<td>SeaBird 49 FastCAT</td>
</tr>
<tr>
<td>ADCP</td>
<td>Workhorse Navigator 300 kHz</td>
</tr>
</tbody>
</table>

![Image of GONDOU submarine with labeled sensors and payloads](image_url)
Result for MBES Survey

S/V Takuyo: spatial resolution ~ 10m

S/V Takuyo: resolution ~ 10m

AUV Gondou: resolution ~ 1m
Side Scan Image (2/2)
Water Temperature Profile

\[\text{Temperature (C}^\circ\text{)}\]

- XBT Cast at Amami-Daiichi-Knoll
- XCTD Cast at 8 km away from Amami-Daiichi-Knoll

2~3 C\(^\circ\) temperature increases near the seafloor!!

AUV Gondou showed no temperature increase at altitude 40~50 m above the seafloor
GEBCO in the future

Ancient GEBCO

Current GEBCO

Based on Smith & Sandwell, and MBES surveys

GEBCO in the future

Super high-res. grid based on AUV surveys