

## Soil air and respired carbon dioxide in the Shimabara peninsula: flux, concentration and carbon isotopic composition

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In the present study, the carbon isotopic approach was used for identification of magmatic contribution in soil air carbon dioxide. Here we represent the carbon dioxide data of concentration and carbon isotopic composition in soil air and flux from land surface in order to estimate the effect from Unzen Volcano in the Shimabara peninsula.

We took soil air through a sampling tube pricked at 30cm depth below the land surface, and measured concentration of carbon dioxide by the GASTEC tube. For the isotopic analysis, soil air was sampled in a glass reservoir (100 ml: for stable carbon isotopic measurement) or an aluminized plastic bag (ca. 2 liters: for radiocarbon measurement). Carbon dioxide was collected from the sampled soil air under the vacuum at the laboratory, and its stable carbon isotopic composition was measured by the IR-MS. Some samples measured radiocarbon concentration by the accelerator mass spectrometry at the Nagoya University. The flux of carbon dioxide from land surface was measured by the dynamic closed chamber observation method.

The field observations were carried out in September 2001 and January 2002. In the former period, we had two traverses (500-600 m) across the fault near the USDP-2 site and embouchure of the Waren River. We also took bubbles in the spring water at the Waren River and the smoke air of Heiseishin-zan volcano. In the later observation, the mapping of soil air and respired carbon dioxide was done (35 samples) in the Shimabara peninsula.

We found that several points had the high carbon dioxide concentration and flux in the two traverses of the USDP-2 and the Waren River. Some of them showed the relatively higher value of stable carbon isotopic ratio. This indicates that the magmatic carbon dioxide might be brought to the land surface in the area of Unzen Graven. Moreover, radiocarbon technique tells us the stable carbon isotopic ratio of magmatic carbon dioxide and contributions of magmatic, biogenic and atmospheric carbon dioxide. The value of stable carbon isotopic ratio was estimated to be -5.4 per-mil. The proportions of respective contributions were 75:0:25 for smoke air, 60:40:0 in soil air nearby the Waren River spring and 0:30:70 in soil air at 500m away from the Waren River.

With regard to the mapping observation, although some high concentration and flux were detected, those points were not associated with the geographical feature. We would like to measure carbon isotope in near future, and report the magmatic contribution in the Shimabara peninsula.