Magma system of Rabaul caldera and the recent eruprion series from 1994

Yuichi Nishimura[1]; Mitsuhiro Nakagawa[2]; Takeshi Ohba[3]; Kenji Nogami[4]; Ima Itikarai[5]; Jonathan Kudoun[5]; Kila Mulina[5]; Joseph Wukawa[5]

[1] Inst. Seismology and Volcanology, Hokkaido Univ.; [2] Earth & Planetary Sci., Hokkaido Univ.; [3] Volcanic Fluid Research Center, Tokyo Institute of Technology; [4] Kusatsu-Shirane Volcano Obs., TIT; [5] RVO

http://karkar.eos.hokudai.ac.jp/nishimura/

On September 19, 1994, Vulcan and Tavurvur Volcanoes broke into eruptions almost at the same time. These volcanoes are located at eastern and western rim of the Rabaul caldera, Papua New Guinea, respectively. Vulcan and Tavurvur have experienced simultaneous eruptions also in 1878 and 1937. In order to investigate the magma system of this Rabaul caldera and to evaluate the recent activities of the volcanoes, an international scientific research project was performed from 2001 to 2003. This study is supported by Grant-in-Aid by the Japanese Ministry of Education, Science and Culture.

During 2001-2003, Japanese team visited Rabaul three times and made cooperative observations with the Rabaul volcanological Observatory (RVO). In 2001, we clarified basic chronology for tephras from 1994 and some historical eruptions and collect rock samples for further chemical analyses. Geochemical surveys were carried out in 2002 and 2003. Fumarolic gases and hot spring water were samples on the foot of Tavurvur Volcano. CO2 flux from ground surface were measured repeatedly around Simpson harbor in order to evaluate spacial distribution of the anomaly and monitor the magma activity. During our survey in 2002 and 2003, Tavurvur emitted ash with Vulcanian eruptions and small explosions that occurred frequently. Chemical analysis of water leachates of the ash was useful for remote monitoring of the volcano. Tsunami deposits caused by the 1994 eruptions were identified as sand layers or characteristic pumiceous sand layers sandwiched by tephras from both Vulcan and Tavurvur Volcanoes. The chronological studies of both tephra and tsunami deposits was done to reveal the tsunamigenic volcanic process in the 1994 eruption series.