

Evaluation of the Japan - Indonesian Cooperation in Volcanology during the Period of 1993 - 1996

Wimpy S. TJETJEP*

*Volcanological Survey of Indonesia

Synopsis

The cooperation in 1993-1996 between Volcanological Survey of Indonesia (VSI) and Sakurajima Volcanological Observatory (SVO) has reached almost all targets that has been set up in the plan, in improvement of science and skill of VSI's personnel, transfer of science and technology, and establishment of data base. Benefits have been obtained by both sides in better understanding volcanic phenomena scientifically. VSI expects SVO to continue cooperation and enhance (1) more VSI's personnel to study in various university, not only for MSc but also PhD's program, (2) enhancing monitoring capability in other volcanoes outside Guntur and Merapi volcanoes, (3) application of GPS to monitoring, and (4) preparing of Japan-Indonesia workshop.

Keywords: cooperation; Volcanological Survey of Indonesia; Guntur volcano; Merapi volcano;

1. Introduction

Before 1993, Volcanological Survey of Indonesia (VSI) have already had an informal cooperation with Sakurajima Volcanological Observatory (SVO) and also with other institution in Japan. At that period of cooperation, both side felt that we are in the same direction of the mitigation of volcanic hazards in order to minimize the victims and material losses due to the volcanic eruption.

On July 2, 1993, the Memorandum of Understanding between Directorate General of Geology and Mineral Resources cq. VSI and Disaster Prevention Research Institute, Kyoto University cq. SVO was signed in Uji, Kyoto. There are three targets that we want to reach through this cooperation. Firstly, the cooperation has to result in the increase of knowledge and skill of VSI's personnel in conjunction with the transfer of science and technology. Secondly, considering a large number of active volcanoes, the cooperation is expected to enhance monitoring capability in term of technology.

We agreed firstly to focus the study at Guntur and Merapi Volcano. That could include monitoring methods, instruments, data acquisition and processing. Thirdly, the cooperation has to lead to increase of availability of volcanological data base.

2. Realization of targets

2.1 Improves science and skill of VSI's personnel

(1) Long-term training

- 2 geophysicists
- 1 geochemists

(2) Short term (JICA) training

- 8 scientists

(3) Visiting researchers to Japan

(4) Skill training for data collections (measurement) :

Ground deformation

- Precise leveling survey for VSI's technicians and other institutions
- Installation of benchmarks and tiltmeters
- Data Processing

Table 1 VSI - SVO cooperation

Fiscal year	1993 – 1994		1995		1996	
	Plan	Realization	Plan	Realization	Plan	Realization
Guntur	Seismic network Installation	Ok	Maintenance Training, data processing and analysis	Ok Ok	Maintenance Discussion, data analysis	Ok Ok
	MT survey	Ok				
Merapi			Installation of tiltmeter (2 stations)	Ok	Maintenance	Ok
	Gas chemistry	Ok	Gas chemistry	Ok		
West Java Tangkubanperahu	GPS MT survey Geology	Not implemented with VSI Ok Ok				

- Seismic (permanent and mobile)
- Installation of seismic stations
 - Data processing

- Chemistry of volcanic gas of various volcano have provided reference point to understand level of volcanic activity.

2. 2 Transfer of science and technology

- Inherent with training program
- Data processing and analysis of seismic and ground deformation data
- Improved monitoring facility :
 - Guntur volcano
 - 3 station for seismic (3 component)
 - 1 station for biaxial tiltmeter
 - 8 mobile seismic stations
 - Merapi volcano
 - 2 biaxial tiltmeters
 - 1 infrasonic microphone
- The benefit is obtained through interaction of both scientists during discussion and joint paper writing.
- Introduction on new technology such as for ground deformation and seismic monitoring.
- More volcanoes now have deformation networks.

2. 3 Data base

- Seismic data base of Guntur volcano has lead to better interpretation of seismicity in relation to tectonics and volcanic activity in Guntur area.
- Tiltmeter was data preliminarily available for Guntur. It still needs more station to study ground deformation spatially.

3. Evaluation

- For long-term training, the number of VSI's scientists obtaining Monbusho Scholarship is still lower than expected Three potential candidates failed on the selection last year. For short-term training, the inclusion of two VSI's Personnel each year on JICA sponsorship is according to VSI's target.
- Introduction of new technique of measurement, such as Precise leveling and installation of ground deformation devices is greatly helpful for collection of high quality data.
- Exchange of researchers has brought better understanding and wider perspective in developing volcano monitoring capability in Indonesia

4. Conclusion and suggestion

- In general, the cooperation in the past has reached almost all targets that has been set up in the plan. Benefits have been obtained by both sides in better understanding volcanic phenomena scientifically.
- VSI expects a stronger push by Japanese

colleagues to Monbusho for more VSI's Personnel to attend long term training in University and also to give opportunity for potential VSI's Personnel to take Doctoral level.

- DPRI (SVO) is encouraged to be involved in enhancing monitoring capability in other volcanoes outside Guntur and Merapi. Strengthening ground deformation monitoring in Guntur remains priority to complete the existing one.
- Skill training is hoped for VSI's Personnel in practical knowledge such as programming, instrumentation and electronics.
- Application of GPS has not been implemented fully. Therefore, it needs more attention in order to this type of technology to be used in monitoring of Indonesian volcanoes.
- Preparing of Japan-Indonesia workshop in Volcanology in order to distribute the results obtained during the cooperation for the scientists.

5. Merapi activity in 1996-1997

The oldest historic eruption at Merapi volcano occurred in 1006 and the summit area were collapsed toward southwest. Eruptive activity resumed in 1548 and after the eruption, growth of lava dome at the summit crater and collapse of the dome with a time interval of a few years. Recently, major explosive eruption and pyroclastic flows occurred in 1984, 1986, 1992 and 1994. In the 1994 pyroclastic flows, more than 60 people were killed.

VSI started continuous monitoring of ground deformation of Merapi volcano by using tiltmeter in

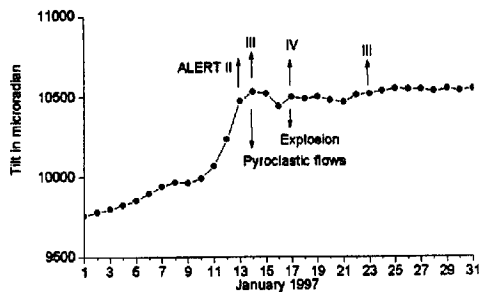


Fig. 1 Chronology of alert level determination prior to the January 17 eruption related to increase in tilt observed at station 3 at the summit.

Gunung Merapi "Sakit Keras"

Bandung, Kompas

Direktor Vulkanologi Ditjen Geologi dan Sumberdaya Mineral, Wimpy S Tjolep menyatakan, Gunung Merapi di perbatasan Jateng-DIY dalam keadaan "sakit keras".

Kepada Antara di Bandung hari Rabu (15/1), ia mengemukakan, Direktorat Vulkanologi memantau intensitas dan mengevaluasi gunung api paling aktif di antara 139 gunung sejenis di Indonesia itu, yang sejak sehari sebelumnya statusnya dinurunkan dari "Siaga Merapi" ke ke level tertinggi "Awat Merapi".

Situasi kritis di Merapi yang nyata terjadi pada hari Senin sampai Rabu, berkait peningkatan kegiatan gunung yang berlangsung sejak sebulan sebelumnya.

Selama sekitar 30 hari, pascakam magma Merapi ke permukaan sangat intensif, bahkan per hari bisa mencapai 30.000 meter kubik. Akibatnya, pada waktu terjadi krisis, volume kubah lava yang ditimbulkan dari suplai tersebut mencapai kurang lebih satu setengah juta meter kubik.

Dilaporkan dari Yogyakarta, sebagian wilayah Kabupaten Bantul, terutama di sisi barat, pada Selasa malam dihujani abu Gunung Merapi. Pada waktu bersamaan, seluruh penduduk Dusun Tritis dan Tugo di Bukit Tumpo, Sleman, (DIY), yang pernah dilalap awan panas pada 22 November 1994, diungsikan ke SD Tarakanita, Tritis.

Kawasan relokasi di Sudimoro dan Girikerto, juga di Sleman, sebagian mulai diisi pengungsi. Sedang barak pengungsian Kalitung, Pakembinangun, dan Pakem sudah disiapkan jika terjadi bencana.

Aktivitas Gunung Merapi sejak hari itu memang menunjukkan peningkatan luar biasa. Antara pukul 16.30-21.00 WIB tercatat 81 guguran lava. Pyroklastik letupan awan panas disertai bunyi dentuman dan luncuran lava juga makin tinggi, hingga mencapai 4,5 km ke arah barat daya.

"Kondisinya sekarang sudah menepati puncak yang diramalkan, yaitu dengan terbentuknya kubah lava baru, yang dalam empat hari belakangan ini naik 25 m. Dengan demikian ketinggian Merapi yang semula tercatat 2.948 meter, sekarang bertambah lagi 25 meter," kata Kepala Kantor Sekeloa Penyelidikan Gunung Merapi (PGM) DIY, Dr Mas Atje Purbanawana.

Kantor Sekeloa PGM DIY hari Selasa langsung menginformasikan ke seluruh Sekeloa PBA (Bantuan Koordinasi Pelaksanaan Pemangulangan Bencana

Alas) DIY dan Jateng, agar mempersiapkan penduduk guna mengantisipasi kemungkinan datangnya ancaman awan panas dan banjir lahar hujan.

Diperoleh informasi, dengan naiknya ketinggian kubah lava 25 meter dari ketinggian semula 200 m, maka volume kubah lava yang dihitung sejak Senin, diperkirakan mencapai 1.350 juta meter kubik. Sementara itu Sekeloa Kabupaten Sleman, RMH Triun Marwito mengimbau masyarakat agar tetap siaga dan tenang. Lotusan gunung merupakan gejala alam, tetapi perlu diwaspadai setiap saat.

"Kami setiap saat selalu ke lokasi untuk memberikan kesadaran kepada masyarakat agar selalu mempersiapkan diri kalau sewaktu-waktu terjadi letusan gunung Merapi," ujarnya.

Pemantauan Kompos di sekitar lokasi menunjukkan, masyarakat setempat sudah siap. Meskipun mungkin umumnya sibuk dengan pekerjaan, tapi tetap siaga penuh. Hampir di semua tempat yang tergolong rawan, telah dipasang sirens tanda bahaya. (hrd/jf)

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cooperation with Pennsylvania State University in 1992. Now the tiltmeter network is cooperated with SVO, France and German. A new lava dome started to grow in March 1996. The inflation of the volcano was observed at many tilt stations, associated with growth of lava dome. In early January, the volume of the lava dome attained more than 2 million cubic meter. Pyroclastic flows occurred on 14 January. After the two days quiescence of superficial activity, an explosion occurred at 10 o'clock on 17 January. We issued timely alerts as shown in Fig. 1 based on not only the seismic activity and surface phenomena but also ground deformation obtained by the tiltmeters. As the results, we had no casualties. Before the explosive eruption, VSI gave comment to press. The newspaper (KOMPAS) reported that the director of VSI stated that Merapi volcano, Jawa Central in the condition of "VERY SICK", on 16 January, one day before the explosion.



要 旨

1993年から1996年までのインドネシア火山調査所と防災研究所火山活動研究センターの共同研究の成果を顧みた。当初の計画どおり、グントール火山とメラピ火山において観測計器の設置とくり返し観測が行われた結果、インドネシア火山調査所職員の知識と技術が向上し、これらの火山におけるデータベースが構築された。インドネシア火山調査所は火山活動研究センターに対して、共同研究を継続することにあわせて、(1)更に多くの火山調査所の研究者が日本の大学において学べること(できれば博士課程まで)、(2)グントールとメラピ火山以外にも観測を強化すること、(3)GPS を観測に利用すること、(4)日本-インドネシアのワークショップを開催することを望む。

キーワード: 共同研究, インドネシア火山調査所, グントール火山, メラピ火山