

Preliminary Crustal Deformation Observation around Mayon Volcano, Philippines using GPS

Kenji Fujiwara[1]; Jame S. Sincioco[2]; Eduardo Laguerta P[3]; Akimichi Takagi[4]; Shinobu Ando[4]; Mitsuyuki Shirasaka[5]; Nobuo Fukuda[5]

[1] JMA; [2] PHIVOLCS-DOST; [3] PHIVOLCS; [4] MRI; [5] Seismological and Volcanological Dept.,JMA

Mayon Volcano, located at the southeastern extremity of Luzon Island, is the most active volcano in the Philippines. Since 1616, Mayon has exhibited 48 mild to violent eruptions. Most of the eruptions produced andesitic to basaltic andesite pyroclastic flows, lava flows and airfall tephra. The pyroclastic surges that swept the southern sector of the volcano during the 1814 eruption killed about 1,200 people. It is important, therefore, to continuously monitor the activity of the volcano to provide sufficient warning to the growing population in the vicinity who rely on agriculture, commerce and tourism for their livelihood.

The main monitoring method of volcanic activity at Mayon is seismic observation. But historical observations have shown that some eruption occurred without clear earthquake precursors (e.g. 1993). In such a case, it is difficult to estimate the trend of volcanic unrest at Mayon using earthquake monitoring alone. A viewpoint to consider is that ground deformation should occur as a result of magmatic activity and that we may be able to detect such deformation leading to eruption even if magmatic intrusions are aseismic. For example, surveys by the Philippine Institute of Volcanology and Seismology (PHIVOLCS) showed evidence of slight uplift or 'inflation' of the edifice by Electro-optical distance measurement (EDM)(2000 and 2001) and precise leveling observations before eruptions(2002-2004 and 2006). Gravity changes have also been documented before and after eruption(Gerhard Jentzsch et al, 2001). But these data are limited in space and time, so that it is difficult to model the magmatic system and activity from these ground deformation data.

MRI and PHIVOLCS began preliminary Global Positioning System (GPS) observations around Mayon volcano in 2003. And MRI began SAR(ALOS) analysis of Mayon in 2008. We would like to present the results.

Future Plans.

Meteorological Research Institute (MRI), Japan Meteorological Agency (JMA) together with Kyoto University and Ibaraki University are planning a cooperative research project with PHIVOLCS. The research project includes the following:

- 1)GPS observation around Mayon volcano to compliment PHIVOLCS existing continuous recording GPS network;
- 2)Gravity observation;
- 3)Interferometric analysis of SAR; and
- 4)Numerical experiment of Mayon volcano model by FEM

and a brief overview of the proposed research cooperation programme.