

## Geodetic Observations at Anatahan Volcano, Northern Mariana Islands

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Anatahan is one of the most active volcanoes (788 m ASL) of the Northern Mariana Islands. The island of Anatahan is 9 km long from east to west and 4 km long from north to south. Sparseness of vegetation in the most recent lava flows on Anatahan indicated that they were of holocene age, but the first historical eruption of Anatahan did not occur until May 2003, when a large explosive eruption took place forming a new crater inside the eastern caldera. Formerly inhabited, it now has no population because of the volcanic eruptions. We have carried out GPS survey at the village of Anatahan Island since 1998. Soon after the eruption started in May 2003, we continued the GPS survey and geological inspection at Anatahan.

From 2008 we again started new seismic and geodetic observation campaign at Anatahan for understanding what goes on inside the volcano. In this presentation, we are going to focus on geodetic result of the observation. We established four new GPS benchmark pillars in the island. Including one old benchmark at the village, we set five GPS receivers to detect the crustal deformation of the volcanic island. Duration of the campaign is about 24 hours because of the limitation of Helicopter flight schedule. We also set ground-tilt meter with continuous recording system to detect crustal movement at the south rim of the west crater. The second GPS campaign was held in January 2009, and the tilt data was retrieved successfully. The data are now under analyzing, will be presented at the meeting.

We also carried out InSAR analyses for Anatahan Island using ALOS-PALSAR data in order to detect crustal deformation of the volcano. We cannot find out remarkable deformation due to magma activity inside of the volcano during period of 2007-08, however, in the interferogram we found a non-interference area and 2-20cm uplift around the non-interference area extending southwest to south of the east active crater. The result of our geological on-the-spot inspection of these areas, we found the thickness of the 2008 volcanic ash deposit was consistent with the value of the uplift. Thus ash deposit of 2-20cm thick act as uplift of the surface of the volcano in InSAR analyses, while the deposit of more than 20cm thick changes surface condition so much to make non-interference area to the interferogram map.