

## A large hydrothermal reservoir beneath Taal Volcano (Philippines) revealed by MT surveys and its relation to the volcanic activity

# Paul Alanis[1]; Yusuke Yamaya[2]; Akihiro Takeuchi[3]; Yoichi Sasai[3]; Toshiyasu Nagao[3]  
[1] PHIVOLCS; [2] GSJ, AIST; [3] EPRC, IORD, Tokai Univ.

Located in the island of Luzon and 60 km south of the capital city of Manila, Taal Volcano is one of the most active volcanoes in the Philippines. Past eruptions of Taal Volcano occurred in two distinct cycles, depending on the location of the eruption: eruptions centered at the Main Crater and eruptions occurring at the flanks. The results of the MT study made in 2011 and 2012 shows evidence of a large high resistivity anomaly beneath the Main Crater. This anomaly is hypothesized to be a large hydrothermal reservoir and has a direct influence on the volcano's eruptive activity. In particular, the 1911 January 30 eruption showed an anomalous feature which may be attributed to a catastrophic collapse of the large hydrothermal reservoir. An evidence was found very recently that the deposit due to the 1911 eruption contains a small amount of juvenile materials. However, this fact does not affect our understanding that the 1911 eruption was a violent type of phreatic eruption, which is called the magmatic hydrothermal eruption. This concept was recently proposed by some volcano-geologists, e.g. Browne and Lawless (2001). Magmatic intrusion into a hydrothermal reservoir could cause explosions more violent than ordinary phreatic explosions, but it does not always accompany magmatic substances. We apply McTigue's (1987) model to estimate the collapse pressure of the cap rocks, which was around 2000 MPa according to historical documents on the event.