

GPS Measurements of Crustal Deformation at Mayon Volcano, Philippines

Teresito C. Bacolcol¹, Ruey-Juin Rau², Huang-Kai Hung², Eduardo Laguerta¹, and Renato U. Solidum¹

¹Philippine Institute of Volcanology and Seismology, Diliman, Quezon City, Philippines

²Department of Earth Sciences, National Cheng Kung University, Tainan, Taiwan

Abstract

Mayon volcano, located within the Bicol region in the southeastern Luzon, Philippines, is a classic conical shape, steeply-sided andesitic stratovolcano. It has an elevation of 2463 meters, base diameter of ~20 km, and upper slope of 35-40 degrees. Mayon is one of the most active volcanoes in the Philippines, with about 50 historical eruptions in the past 400 years and moderate-to-major recent eruptions in 1984, 1993, 1999, 2000, 2001, 2003, 2004, and 2006. After the eruption of 1984, various seismological and geodetic measurements have been carried out in either continuous or campaigned-mode basis in the Mayon region. Repeated microgravity and GPS measurements from 1992 to 1996 showed gravity changes just before the eruption of 1993, but was accompanied by insignificant GPS-measured elevation variations at the volcano. It probably indicates mass redistribution in a localized shallow magma chamber system near the volcano's summit. In this study we use the results from seven continuous GPS stations established by the Philippine Institute of Volcanology and Seismology (PHIVOLCS) in the Mayon region to understand the on-going magmatic processes at the Mayon volcano.