

Can we isolate deformation due to tectonic and volcanic origin? - New results from deformation monitoring at Mayon volcano, a collaborative project EOS-PHIVOLCS

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Mayon is an openly-degassing volcano with low seismicity dominated mostly local and regional tectonic earthquakes. A research collaboration between Earth Observatory of Singapore-NTU and Philippine Institute of Volcanology and Seismology (PHIVOLCS) aims to understand the mechanisms, timing, rates, and other details of magma supply and degassing at Mayon. Deformation monitoring using tiltmeters has been done at Mayon since 1999. We are comparing the tilt data of 1999-2001 and the past one year. In the earlier period, there was a much higher rate of seismicity and frequent strombolian to vulcanian explosions. The tilt signals also showed significant inflation and deflation prior to and following a few explosions with some hints of signal due to local tectonics during pauses between eruptions. On the other hand, seismicity and deformation following the latest eruption in 2009 has been much lower. Regional seismicity has dominated seismic records, and tilt data reflect mainly tectonic deformation. A method to separate deformation due to regional tectonics and magma intrusion is tested on Mayon tilt data assuming an active NW-SE trending fault. The preliminary result is that after removal of tectonic signal, there is still slight inflation of Mayon during the period 2011-2012. However, understanding exactly where deformation (including fault slip) is occurring and how it is partitioned between tectonic and volcanic origins will need additional data such as GPS. We are developing a time series of tilt and GPS data to understand the volcano-tectonic interaction at Mayon Volcano.