

Monitoring the 2011 dome growth at Colima Volcano using Digital Image correlation

Jacqueline Salzer¹, Thomas Walter¹, Legrand Denis², Breton Mauricio³, Reyes Gabriel³

¹GFZ Potsdam, Germany, ²Universidad Nacional Autonoma de Mexico, Mexico, ³Universidad de Colima, Mexico

E-mail: salzer@gfz-potsdam.de

The current dome at Colima began growing in 2007, but the steep slopes and explosive nature of the volcano limit the possibilities for monitoring it directly. However, measuring deformation in the region of the crater as well as getting accurate estimates of the volume of material being extruded is important to determine the rate of the ongoing eruption and the stability of the dome. The number of explosive activity as determined in seismic data was very high in early 2011, but decreased significantly by June 2011 and remained low since then.

Here we report on a video camera system installed by the University of Colima volcano observatory to monitor the dome growth. We have analysed the optical camera data obtained between February and June 2011 using spatial digital image correlation techniques. By determining the optical flow we show that the velocity of dome extrusion varies strongly on a daily basis, reaching up to 3m/day, and systematically decreased over the 5-month period analysed. Deformation was barely above the detection threshold of 30cm/day in the weeks prior to June 21st 2011, when a significant explosion occurred, removing part of the dome. The potential links between the stagnation of dome growth and the explosion will be discussed.