Geophysical Research Abstracts, Vol. 9, 00235, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-00235

Wide deformation in the Azufre volcanic area, South America: A developing Giant?

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Collapse calderas are the structural surface expression of the largest volcanic eruptions on earth. The volumes of eruptions may exceed 100 km^3, and the diameter of the caldera larger than 25 km. Remnants of very large collapse edifices can be found in various volcanic regions, fortunately such vast caldera forming eruption have been never witnessed in historical times. However, as we show herein, some very large systems may be existing and evolving without receiving much attention. Using satellite-based SAR data, a 45km wide elongated area of ground deformation was observed in the Azufre volcanic area (Chile), where no deformation was detected 10 years ago. This deformation signal shows uplift, where the amount and area of uplift have been increasing significantly from 2003 to 2006 to about 8 cm affecting an area of about 1000 km^2. We explain the deformation data by a sill-shaped magma body inflating at about 10 km depth, expanding and propagating laterally at a velocity of several kilometres per year. Yet, it is not clear whether this intrusion will lead to an eruption, its vast dimension and rapid change shows the necessity of close observation also of caldera system that had their last eruption in prehistoric time.