



RECENT ERUPTIVE ACTIVITY FROM LASCAR VOLCANO (2006)

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1. INTRODUCTION

Lascar Volcano underwent a new eruptive cycle between 18 and 23 April 2006. These recent eruptions can be indicated as unusual activity, considering its characteristics, frequency and time of duration. A similar behaviour not had been observed since February–March 1995, when in a period of 13 days diverse explosions that reached up 3 km of height over the crater were accompanied by subterranean and explosion noises (GVN 20:03). Besides of this, only eleven months have elapsed after the last eruption in May 2005, a very brief interval of time considering that since 1995 the recurrence of eruptions with eruptive columns >5,000 m above crater was of 5 years. In this work are presented field and satellite data from April 2006 eruptions with the objective to characterize this eruptive period.

2. GEOLOGICAL SETTING AND ERUPTIVE HISTORY

Lascar is a composite volcano, located 270 km NE to Antofagasta city and 70 km SE to San Pedro de Atacama town. Its height is 5,592 m a. s. l. and is formed by 5 NE–SW trending aligned craters, being actually active the central crater, with 800 m of diameter and 400 m of profundity (Aguilera *et al.*, 2003). Lascar volcano is formed principally by Pleistocene–Holocene andesitic to dacitic lava flows and pyroclastic rocks.

Its normal activity is characterized by a permanent gas emissions, interrupted by occasional large eruptions with eruptive columns >5,000 m above crater (principally vulcanian eruptions) and more frequent small to moderate eruptions (eruptive columns between 500 and 5,000 m above crater). Main eruptions have occurred in September 1986, February 1990, April and December 1993, July 1995 (Matthews *et al.*, 1997), July 2000 (Aguilera *et al.*, 2003) and May 2005 (Aguilera *et al.*, 2006). However, the most important eruption took place in 19–20 April 1993, when a subplinian eruption generated an eruptive plume that reached up 25 km of height and pyroclastic flows that extended up 7.5 km from central active crater (Gardeweg and Medina, 1994).

3. 18 APRIL 2006 ERUPTION

Four explosions were registered at 15:20, 17:22, 19:00 and 21:00 hours (all in UTC time). First explosion, the biggest of four explosions, was visible from El Abra cooper mine (220 km NW to volcano) and reached up 10 km over summit crater (Figure 1). Grey clear colouring plume, with a little contents of ash, was dispersed to NNE. Second explosion reached up 3 km over summit crater, while third and fourth explosions reached up 800 m. These eruptive plumes were grey colouring, had higher contents of ash than first explosion and were dispersed to NNE. Scarce ash fall was registered on the around volcano, specifically on the north side. Seismic activity and eruption noises no were registered. Analysis of satellite data from GOES images sequence indicates that for first and second eruptive plumes the mean velocities were 70 and 85 km/h, respectively, while the maximum areas were ~8,240 and ~1,074 km², respectively. Minimal volume erupted were ~4.12 x 10⁶ and ~0.54 x 10⁶ m³ supposing a hypothetical ash fall deposit of 0.5 mm. Third and fourth explosions were not detected by satellite.

4. 19 APRIL 2006 ERUPTION

At 15:04 UTC time an explosion generated a grey coloured eruptive column that reached up 3 km over summit crater and was dispersed to NNE. Scarce ash fall was registered on the north side of volcano. Seismic activity and eruption noises no were registered.

5. 20 April 2006 eruption

Two explosions were registered at 15:05 and 17:39 UTC time. Eruptive plume of first explosion reached up 2.5 km over summit crater and contained a little amount of ash. Second explosion, the bigger of two explosions, reached up 7 km over summit crater, lasting by 1 hour 50 minutes. Both

plumes were dispersed to N and scarce ash fall was registered on the north side of volcano. Seismic activity and eruption noises no were registered. Analysis of satellite data from GOES images sequence indicates that for first and second eruptive plumes the mean velocities were 40 km/h, while the maximum areas were ~ 433.56 and ~ 800.53 km², respectively. Minimal volume erupted was $\sim 0.4 \times 10^6$ and $\sim 0.22 \times 10^6$ m³ supposing a hypothetical ash fall deposit of 0.5 mm.



Figure 1. First explosion of 18 April from El Abra cooper mine, 220 km NW from volcano. Courtesy of El Abra cooper mine personnel



Figure 2. 23 April eruption. Photograph taken from SW edge border of Atacama salar, ~ 40 km SW from volcano. Courtesy of Dr. Gabriel González

6. 21 APRIL 2006 ERUPTION

Two explosions were registered at 12:48 and 15:47 UTC time, lasting ~ 15 minutes. Their eruptive columns reached up 3 km over summit crater and were rapidly dispersed to ESE. Seismic activity and eruption noises no were registered.

7. 22 APRIL 2006 ERUPTION

At 15:18 UTC time an explosion generated an eruptive column that reached up 3 km over summit crater and was dispersed to SE. According to inhabitants information were perceived subterranean noises.

8. 23 APRIL 2006 ERUPTION

At 16:00 UTC time an explosion generated a grey clear coloured eruptive column that reached up 2.5 km over summit crater and was dispersed to NNW (Figure 2). Seismic activity and eruption noises no were registered.

9. CONCLUSIONS

April 2006 eruptive period probably correspond to phreatic-vulcanian eruption, being the most important the phreatic component, principally indicated by scarce amounts of ash, coloration of eruptive columns and small volumes erupted. Although there are not direct evidences of magmatic component, this cannot be ruled out, principally considering the continuity and frequency of eruptions. Finally, must be take attention in the unusual direction of dispersion of eruptive plumes of 18, 19, 20 and 23 April, principally for the ash fall hazard evaluation, because that in this eruptive period have been demostred that populated places near to Lascar Volcano as Talabre or Toconao towns, and distants populated places as San Pedro de Atacama, road infraestructure as San Pedro de Atacama-Paso de Jama-Jujuy international road and buildings as ALMA radio astronomy project in Chajnantor can be affected by ash fall. Others evidences of changes in wind directions have been observed by the autors during December 2005 field campaing, when a constant west trending plume over Talabre town remained during a week.

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