Nat. Hazards Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/nhess-2019-189-RC2, 2019

Natural Hazards and Earth System Sciences
Discussions
Open Access
EGU

Interactive comment on "Processes culminating in the 2015 phreatic explosion at Lascar volcano, Chile, monitored by multiparametric data" *by* Ayleen Gaete et al.

Anonymous Referee #2

Received and published: 8 October 2019

I found the manuscript very interesting. The authors report a multidisciplinary data set characterizing the phreatic explosion at Lascar occurred in 2015. They observe long-term changes in LP seismic activity preceding the eruption, with a rapid increase in the LP activity about one year before the eruption and a drop in the LP activity 3-6 months before. The decrease of the LP activity is accompanied with a decrease of the persistent thermal anomaly observed in the crater floor.

Two heavy snow events are reported few months before the eruption, not leading to detectable changes at the volcano. However, an heavy rain event about ten days before the eruption is considered by the authors a precursory of the explosion.

Printer-friendly version

Discussion paper

The correlation between the rain and the phreatic explosion occurred in 2015 is explained as the heating of the percolated water inside the carapaces of a pre-existing and still hot (?) lava dome in the crater zone.

However, a less clear effect of the lava dome is introduced in section “5.4 Conceptual model”, were the lava dome has also the effect of blocking the path of the deep fluids and inducing a long-lasting gradual pressure build-up. This last interpretation is associated to the increase of LP events starting one year before the explosion. I think that the authors should better describe the inter-relationship between pressure increase due to arrival of deep fluids, degassing and the observed subsidence of the crater zone.

Considering a possible seasonal effect on the occurrence of the phreatic explosions at Lascar, and the possible role of the rain, it would be interesting to know, if possible, whether previous phreatic explosions, such as that occurred on 18 April 2006 (ie: after the emplacement of the dome) were preceded by events of heavy rain.

In general, I think that the information contained in the paper can help to better understand the processes leading to the conditions for phreatic explosions.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2019-189, 2019.

Printer-friendly version

Discussion paper