

2012 Copahue volcano eruption (Argentina)

Alberto T Caselli¹, Mariano R Agosto², Maria L Velez², Pablo Euillades³, Cintia L Bengoa², Pablo B Forte², Franco Tassi⁴, Bruno Capaccioni⁵

¹GESVA - Universidad nacional de Rio Negro, Argentina, ²GESVA - Universidad de Buenos Aires - CONICET, Argentina, ³CEDIAC, Universidad de Cuyo - CONICET, Argentina, ⁴Universidad de Florencia, Italia, ⁵Universidad de Bologna, Italia

E-mail: atcaselli@gmail.com

Copahue volcano (37,8°S, 71,2°W, 2997 masl) is one of the major examples of active volcanism in Argentina. This basaltic-andesitic stratovolcano is located on the western edge of the Caviahue caldera in the Andes. The volcano summit has nine craters aligned in the N60 °E direction, the eastern crater is the active one and it currently hosts an acidic crater lake (pH ~1) with a diameter close to 250 m and 40 m depth. During the last 250 years this volcano has experienced at least 12 low intensity phreatic and phreatomagmatic eruptions. The last eruptive cycles took place from the active crater, during 1992 and 1995 characterized by phreatic eruptions and from July to October 2000 with a phreatomagmatic eruptive type, all of them with VEI 1-2. After the 02-27-2010 Maule earthquake (Chile, Mw 8.8), several variations were observed related to the local seismicity, primarily associated with an increase in the amount and type of signals. Later, on 12-01-2011 a seismic swarm was registered and gaseous emissions from the crater lake started to increase in both temperature (62 °) and acidity (pH<0). Deformation measurements were made by processing Envisat images available from January 2011 until April 2012 allowing the construction of 33 interferograms. The analysis of temporal deformation series indicate an inflation process starting on November-December 2011, located mostly on the northern slope of the volcano edifice. After April 2012 the satellite was out of operation. The 07/16/2012, after a marked increase in seismic activity from 07/09/2012, some phreatic events were observed and two days later a phreatic explosion throws pyroclastic sulfur from deposits of the crater lake bottom. The phreatic manifestations produced by degassing continued until December 2012, decreasing the volume of water from the crater lake. Finally, on 12-22-2012 at 9:15 pm a phreatic eruption began, vaporizing the crater lake waters and the hydrothermal system in a few minutes. At 9:40 hs it became phreatomagmatic with generation of a convective cloud and emission of blocks and bombs in ballistic projection outflow of the plume. Diluted pyroclastic flows were observed during this eruptive phase. Several hours later (15:30 hs) burning clouds were viewed getting out of the crater produced by combustion of volcanic gases. Thus, an eruptive strombolian phase began, with the emission of elongated volcanic bombs, up to 1.5 m in length. This eruption ended in a few hours, continuing to the present with gas emissions.