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Seismic study of the explosive events of Colima Volcano, Mexico.

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The current eruptive process of Colima Volcano, which began in August 1998, has presented several intermittent effusive and explosive phases. Many of the explosive events were recorded by the digital three-component seismic stations operated by the University of Guadalajara and Jalisco State Civil Defense. These signals were recorded not only by stations located on the volcanic edifice, but also by stations on the northern coast of Jalisco(MCUJ, BSSJ) and Ceboruco Volcano at 184, 182 and 200 km distance, respectively. A study of these signals is presented.

Each explosion was preceded by a seismic event. Nevertheless, the located earthquakes preceding explosions did not show a common source under the volcano structure, which suggests the existence of a complex structure with more than one conduit, this fact is also confirmed from a first motion analysis for station F03J located 12 Km at north of the volcano. On the other hand, using the waveforms, spectra, time-frequency and time-scale (wavelets) representations of the seismic signals it is suggested that the source processes are non-stationary, implying that for the case of this period, a general model of the source process of the Colima volcano explosions can not be formulated. By means of seismic record sections it was determined that the sound velocities of the shock waves vary 10 percent around the volcano. Size of the events is evaluated using different criteria. A clear relation between the magnitude of the seismic signals and the amplitude of the sonic and infrasonic waves was not observed. Subsonic signals were recorded at stations MCUJ and BSSJ.