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# Existence and non existence of correlations between different broad band seismic signals of vulcanian explosions of the 2005 Volcan de Colima, Mexico

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Vulcanian explosions of Volcan de Colima, 2005, are studied with a 4 km distant broad band seismometer. Waveforms of these explosions are very different, suggesting different source locations and focal mechanisms at different frequency ranges. The 17 largest explosions are studied in four frequency intervals: the VLP (30-10 sec), LP (0.1-1 Hz), SP (1-10 Hz) and HF (10-50 Hz) bands. Even though the vertical components of the VLP signals of 14 explosions are very similar, with a correlation coefficient higher than 0.8, large differences are observed for the horizontal components, suggesting a source with a different location and/or focal mechanism. For most of the explosions, the polarizations are not linear, and when they are, their directions are different. These observations suggest that the source of VLP events at Colima is not repetitive and/or the waveforms are strongly affected by complex path effects. The amplitudes of VLP, LP and SP signals are not well correlated with the duration of the signals, reflecting low or non-linear coupling between the corresponding sources. On the other hand, significant correlation is obtained between the VLP's amplitude and the duration of pyroclastic flows estimated from the HF bands. This relationship indicates a possible link between the VLP source and the volume of erupted material.