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Parameters and seismic techniques used to forecast the eruption of 2011 in the Volcanic Complex Puyehue - Cordón Caulle (CVCC), Chile

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The CVCC is located in the central volcanic province of the Southern Andes. It is made up of a NW-SE volcanic alignment of Cordillera Nevada caldera, the Cordón Caulle volcano and Puyehue stratovolcano, respectively. Since 2010 the Southern Andes Volcanic Observatory (OVDAS) has been installing seismic stations for a continuous monitoring, implementing a seismic network of 4 broadband seismic stations. The first signs of unusual seismic activity were recorded during late February and March 2011, where a series of volcano-tectonic (VT), long-period (LP), very long period (VLP) and hybrid (HB) events were recorded, confirming a change in the dynamics of the volcanic system. Location of seismic events based on both P and S wave arrivals as well as local magnitude and evolution of the b-value calculations were taken as reference in order to evaluate changes in the CVCC activity. In addition, parameters such as the temporal and spatial evolution of localized events, changes of frequency, breadth monitor, local magnitude, and the periodicity in the evolution of seismicity were decisive when evaluating volcanic alert variations. The latter led to a good forecast of the eruption of CVCC on 4 June 2011. This appropriate management during the crisis led to an optimal deployment of those ones responsible for the evacuation of people in areas surrounding the volcano, fulfilling the most important goal of our work: save lives.