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## **Feature signal extraction and classification of acoustic events at Villarrica Volcano using infrasound**

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Infrasound is a powerful tool to study and monitor the dynamics of explosive events in active volcanoes. Appropriate pattern recognition techniques on acoustic signals are useful to identify physical properties associated with explosive activity. We use these techniques to study the evolution of the activity that led to the eruption of Villarrica volcano on March 3, 2015. We created clusters with the intrinsic characteristics of infrasound waves using neural networks in order to analyze their temporal evolution through time. To create the clusters we selected a group of relevant features that are extracted from individual events, including the frequency content, maximum amplitude and amplitude decay. We show that the different clusters obtained reflect the changes in the characteristics of the volcanic activity observed before and after the eruption. This type of analysis allows us to relate specific activity patterns of the volcano with the acoustic signal, which for purposes of monitoring future activity can be very useful.