



## **Parametrization of Tremor Signals at Galeras Volcano, Colombia**

St. Graupner (1), G. Jentzsch (1), Ch. Reichert (2)

(1) Friedrich-Schiller-Universität Jena, Germany. (2) Bundesanstalt für Geowissenschaften und Rohstoffe, Hannover. ([gerhard.jentzsch@uni-jena.de](mailto:gerhard.jentzsch@uni-jena.de) / phone +49-3641-948660)

Since 1997 the Federal Institute for Geosciences and Natural Resources (BGR) runs in cooperation with the Colombian partner INGEOMINAS a multiparameter station of several geophysical and geochemical sensors at Galeras Volcano in southern Colombia. This multiparameter station is maintained by the Observatorio Vulcanológico y Seismológico de Pasto (OVP) and aims for the monitoring of volcanic activity as well as for the research into fundamental processes of this volcanic activity. Central among the geophysical instruments are the three-component broadband seismometers in close proximity of the crater area.

Basically, two different groups of seismic signals are recorded with these broadband seismometers at Galeras: Volcano-tectonic signals with their sources in rupture processes inside the solid material of the volcano and tremor signals emitted by the fluid system of the volcano. The terminus “Tremor” herein is used in its broadest sense referring to all seismically recordable forms of fluid flow induced noise, as it originates from nonstationary flow of the magma-gas fluid in the uppermost reservoirs of the volcanos magmatic system. Tremor signals moved into the focus of scientific interest for their potential to give new insights into the flow regime. At Galeras we record three different types of Tremor signals: the distinct and singular signal types of the Tornillo and longperiod (LP) events and harmonic Tremor. Since their appearance in the vicinity of the 1993 eruption at Galeras volcano, Tornillo signals are intensely studied for their possible value as precursors in eruption forecasting.

An extensive data set of tremor signals has been collected up to now since the installation of the multiparameter station at Galeras in 1997– especially during the periods of reactivation in winter 2000, autumn 2004 and 2005. In our work we do not focus on the

analysis of the signature of only a few single events, but rather on the parametrization of a larger data set to use the distribution functions of these parameters as a base for physical modelling of possible oscillator and resonator sources. While the Tornillos are precisely determined by a few parameters, it has been shown, that the LP-Signals extend over a wide range of kinematic and spectral parameters and parameter values. There are LP-Signals inhabiting the characteristics of Tornillos or Tremors and thereby causing great difficulty in the signal classification. One possible explanation for this heterogeneity of the classified LP-Signals is the assumption of single source for the three signal classes, emitting in dependence of the stimulation mechanism the pure signal forms Tornillo/LP/Tremor or a continuum of transition forms. First results of the parametrization will be presented.