

On the use of seismic broadband sensors in volcanic settings

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Good broadband seismometers are capable to record seismic transients with dominant wavelengths of several tens or even hundreds of seconds. This allows us to generate a multi-component record of seismic volcanic events that are located in between the conventional high to low-frequency seismic spectrum and deformation signals. With a much higher temporal resolution and accuracy than e.g. GPS records, these signals fill the gap between seismicity and deformation studies. Furthermore, a broadband seismometer can also be used as a tilt-meter and due to the fact that the vertical component is less susceptible to tilting than the horizontal components, true horizontal displacements can be separated from tilt effects.

In this contribution we will review the non-trivial processing steps necessary to retrieve ground deformation and tilt from the original velocity seismogram and explore which role the resulting displacement signals have in the analysis of volcanic events. We use examples from Stromboli volcano, Italy, and Soufriere Hills volcano in Montserrat, West Indies, to emphasise the benefits of using broadband seismometers to their full capacity to gain new insights into volcanic processes.