

Automated method to detect and locate long-period seismicity emitted by fluid migration

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Distribution of Long-Period (LP) seismicity emitted by a resonance of fluid-fill crack is estimated in order to study the dynamic condition of a hydrothermal system. Due to the emergent onset of LP signals, conventional methods to pinpoint source locations which is based on arrival time picking would be challenging. Thus, the waveform-based localization method is usually applied. Accurate monitoring results (i.e. origin times and spatial distribution of sources) are important to realize effective and safe reservoir managements. A modified waveform-based seismic event localization method will be presented in this talk. The method has been applied to delineate fluid-fill fracture reservoir beneath Aso volcano, central Kyushu Island. Data used in this study consists of 29 Tilt-meter recordings (Hi-net) and five broad-band seismometers of F-net and V-net, recorded between April – December 2016. A strategy to identify LP signals from large amount of continuous seismic recordings will be discussed. Our developed method detects many LP events, particularly a couple months before the October eruption. Furthermore, fracture reservoir geometry is delineated based on shallow LP sources. Deep LP sources need to be studied in more detailed in order to reveal the relationship between deep LP sources with volcanic eruptions. The developed methods can be used also for reservoir characterization and monitoring of stored CO₂ during CCS project.