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Influence of a M=7.3 earthquake on the explosive activity of Yasur volcano (Vanuatu)

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Since January 2008, we operate a temporary seismic network around Yasur volcano, a permanently active strombolian volcano located on the island of Tanna, Vanuatu. The network includes up to 22 stations with 10 three-component broad-band stations equipped with 30 s Guralp sensors and 12 seismic antennas each including up to nine short period components. We present preliminary insights into the first 7 months of recordings. During that period, the activity of the volcano was at a relatively high level with commonly several explosions per minute. The network recorded an intense seismic activity with thousands of transients per day. The number of events per hour is relatively constant but significant fluctuations in the intensity of the activty are observed. A strong very long period seismicity below 1 Hz is also recorded. Video recordings indicate that most of the high frequency transients are directly related to the strombolian explosions. They also outline the presence of fewer events who are not accompanied by any surface activity and which could be long period events related to deeper processes. The explosion quakes have a spectral content dominated by frequencies below 4-5 Hz with most of the time short higher frequency acoustic phases. A large amount of the events exhibits a high degree of waveform similarity. By scanning the first 7 months of continuous data with several pre-defined master events, we identified several large families of similar explosion quakes that dominate the activity. This result suggests that the explosive activity is characterized by the presence of dominant modes of resonance of the conduit in response to the gas slug ascents causing the explosions. These modes were apparently affected by the occurrence of a M=7.3 earthquake on April 9 about 50 km offshore of the island. While the earthquake did not significantly change the surface morphology of the volcano nor the intensity of the eruptive activity, it apparently caused significant changes to the resonance of the conduit as no family of similar explosion quakes is observed both before and after the earthquake.