



Evidence for sustained long-period seismicity in Bouillante Northern hydrothermal system, Guadeloupe

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More than a year's worth of recordings from one Guralp CMG-40T broadband seismometer reveals the existence of small amplitude events having an average repeat time of about 30 s and main frequencies ranging 1 to 10 Hz. We show that most of them have characteristics of long-period hydrothermal events. They are repeatable in time, suggesting that their location is stable and that they have a non-destructive source mechanism.

In order to characterize better the origin of these events, we carried out a survey in the vicinity of the permanent station within an area covering about 1 km². At each of the 19 monitored points, one additional broadband seismometer (mobile station) was set up to record ground vibrations for about 20 minutes. We show that each period of common record has several examples of these long-period events at the permanent station, while ground motions are not always recorded at the mobile station. The analysis of their occurrence in space allows us to draw a map of their location. In addition, using their highly repeatable character and their frequent occurrence, we corroborate their location by using 3 complementary techniques: travel-time analysis using an event's first arrival time, amplitude analysis using both temporal and spectral amplitudes, and polarity analysis using particle motions.

We discuss possible mechanisms for this phenomenon in the light of tectonic features and geochemical data from Bouillante, and by comparing with seismological records at Yellowstone, USA that have similar features.