



Ocean noise triggering of LP events at Deception Island volcano

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During the austral winter 2009, swarms of long-period (LP) events with astonishingly regular interevent times were recorded at Deception Island volcano, Antarctica. Swarm events have similar waveforms, indicating the repeated activation of a non-destructive source process. These swarms may last up to a few hours, and characteristic inter-event times range from \sim 10 s to \sim 20 s for individual swarms. The amplitudes of the periodic LPs vary significantly over a short time scale, which makes an association with a steady state internal process complicate. On the other hand, we observe that LP inter-event times are approximate integer multiples of the dominant periods of the oceanic microseism, and propose that the periodicity observed in the occurrence times of LP events is the result of dynamic triggering of the LP source process by the effect of oceanic microtremors. A positive correlation between microseism amplitude and LP periodicity supports this idea. We attribute LP periodicity to the coincidence of sustained LP activity in an unstable hydrothermal system and external forcing by ocean noise that introduces periodic pressure variations in volcano fluids. We estimate the volumetric strain change generated by the oceanic microseism at the source location and conclude that strain of order 10^{-7} is sufficient to introduce clear periodicity in the LP sequences.