

## CONTEMPORARY SEISMICITY OF MONTSERRAT, WEST INDIES

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### ABSTRACT

Montserrat is one of the islands forming the inner volcanically active segment of the Lesser Antilles arc. None of the volcanic centres on Montserrat has erupted within historical times although dating of one charcoal sample from a thin pyroclast flow on the Soufriere Hills in the south of the island gave an age of  $320 \pm 50$  years, suggesting that a minor eruption may have occurred just before the European colonization in 1632. However, the southern part of the island has seven active soufrieres and several hot springs, indication that most of the volcanic centres in this area are potentially active.

The historical seismicity of Montserrat seems to have been dominated by the occurrence of long-duration, major earthquake swarms or volcano-seismic crises: 1897-98, 1933-37 and 1966-67. None of these was accompanied by an eruption although there was increased activity at some of the soufrieres and possible minor ground inflation in the southern part of the island during the 1933-37 and 1966-67 episodes.

Contemporary seismicity of Montserrat is also dominated by energy release in the form of earthquake swarms. Since 1992, nine earthquake swarms of variable durations and intensities have been recorded by seismic stations operated on the island. The latest sequence was on February 18-19, 1995, and consisted of a burst of more than 40 events within a 13 hour period, several of which were felt slightly. In spite of their relatively short duration (a few hours to several days), these swarms are often characterized by a non-stationarity of events within them, i.e., there is clustering of earthquakes into subswarms. Hypocentres calculated for some of these earthquakes yield focal depths generally less than 20 km. The spatial distribution of epicentres exhibits a predominant WNW-ESE trend, supporting the suggestion that recent volcanism in Montserrat may be controlled by an ENE-trending fault-bounded weak zone. In contrast to the major sequences in 1897-98, 1933-37 and 1966-67, no change in activity rates at the soufrieres was observed during the recent swarms. These swarms are most probably caused by the episodic injection of magma into the upper crust.