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Seismic signals at the Nirano Mud Volcanic Field, Italy

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Mud volcanoes are geological phenomena that only recently are beginning to be investigated with passive seismic methods. To shed light on the seismic signals associated with mud volcanic activity we deployed a temporary network composed of 7 seismic stations around Nirano, Italy. We identified the different types of signals generated by this active system.

During the three months survey period, the stations repeatedly recorded drumbeat signals beneath the structure. We have identified two types of drumbeat signals: one with durations of about 50 seconds and frequency range of 10-45 Hz; the second has a duration of about 4 seconds and frequency range of 5-45 Hz. These drumbeat signals were captured depending on the position of the seismic station and the distance from the mud vents. We also identified a third signal, present in almost every station in the network, with a duration of about 10 seconds and frequency range of 5-45 Hz.

The amplitude of these signals varies across the stations suggesting that the most active part of the system is located in the north eastern-most area of the mud volcanic field where new mud vents recently appeared.