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Understanding seismicity leading to volcanic eruptions: insight from new laboratory experiments

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Volcanic eruptions are preceded by seismic signals with different features, i.e. high-frequency and low-frequency earthquakes. Particularly interesting is the volcanic tremor, which is a signal that can last up to days and months. After such events, volcanic eruptions were often observed. Therefore occurrence of these signals may suggest the injection and transport of magma inside the volcanic edifice. Thus its understanding is crucial for volcanic hazard purposes. We provide the first experimental insight on some of these processes, by reproducing in the laboratory at high pressure and temperature the magma migration mechanism, while recording seismic velocities and acoustic emissions. High frequency events mark the opening of fractures, while the switch to low frequency and harmonic tremor indicates the flow of the melt inside the fractures. An harmonic tremor accompanies the bulk of the intrusion.