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Short- and long-term evolution of the seismicity associated with the New Volcanic Edifice offshore Mayotte island

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In May 2018, a seismic crisis started in the Comoros archipelago, East of Mayotte, which was widely felt on the Island. The related discovery of a new, 800-m high, submarine edifice 50 km East of Mayotte showed that the seismicity was caused by the birth of a volcano. The eruption is still on going at the time of writing and has sparked a large interest in the scientific community.

The seismicity is still active and is being continuously monitored thanks to several seismic stations installed on the island of Mayotte. The oceanographic campaigns that were carried out since the beginning of the crisis deployed a number of ocean bottom seismometers directly above the seismicity, to accurately understand the crisis and particularly its location. A new technique of automatic detection based on Machine Learning enabled to considerably increase the number of earthquakes that can be used to constrain the extent of the seismicity. Furthermore, the development of a new velocity model for the region allowed a precise location of these earthquakes.

These new developments permitted to reconstruct the seismicity evolution during two years of this seismic crisis and to complete the seismicity map associated with the new seismic activity. These results provide more details on the active structures to study the evolution in time as well as their precise spacial variations, allowing the analysis of the daily-to-yearly timescales of this unprecedented eruption. This is crucial to understand the dynamics of the volcanic and magmatic processes beneath Mayotte island. Linking these spatial and time variations with the real-time data, as well as the deformation and petrology evolutions, will provide crucial details on the dynamics of submarine eruptions.