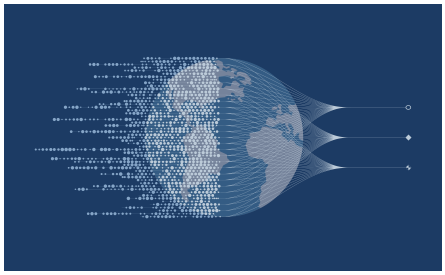

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Seismoacoustic Signals of Eastern Helwan Quarry Blasts, 2022

Mysterious seismoacoustic events were reported at the beginning of 2022 near Helwan city. The majority of these events were recorded in our Egyptian National Seismic Network (ENSN). The source characteristics of these events were unknown. In May 2022, a temporary infrasound array station was established with a small aperture of 450 meters in Helwan. Throughout the six-month monitoring period, we employed a recursive Short-Term Average/Long Term Average (STA/LTA) trigger method across all sensors, leading to the detection of the impulsive seismoacoustic events. The infrasound propagation models, coupled with F-K analysis, further confirmed the locations and directions of the recorded events, providing robust evidence which could be correlated with the Planet satellite images of the referred detected azimuth directions from the infrasound array analyses.

Our study demonstrates the effectiveness of integrating seismic sensors with infrasound arrays for enhanced source characterization. The combination of these tools enabled precise discrimination of quarry blasts in Eastern Helwan. Additionally, our findings suggest that inexpensive sensors can be a cost-effective solution for monitoring higher-frequency events.

In conclusion, after investigating various seismoacoustic techniques, the mysterious signals were identified as originating from a significant construction project in Egypt: the high-speed railway train corridor.

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