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Talk title	Unraveling Seismic Swarm and Coupled Ground Motion in Kamanjab Inlier, Northern Namibia
By	Moses Angombe and Justin Chien
Date	Thursday, 18th July 2024
Time	17h45
VENUE	Auditorium at the MME

Abstract:

"Unraveling Seismic Swarm and Coupled Ground Motion in Kamanjab Inlier, Northern Namibia"

Moses Angombe and Justin Chien

Abstract

The last two decades have seen the onset of felt earthquake swarms including occasionally damaging earthquakes in the Kamanjab Inlier, Northern Namibia. The Geological Survey of Namibia (GSN) and Council for Geoscience, South Africa (CGS) deployed a temporary network of 10 seismic stations from June to September 2018 and cataloged ~1,500 events (Sitali et al., 2022). We used a neural network-based earthquake phase detector, EQTransformer, to enhance the GSN catalog to >10,000 detections and with new relocations of ~4,500 events. Our double-difference earthquake relocation reveals two major and three minor distinct spatial clusters that we interpret as revealing discrete faults crosscutting the NE-dipping seismogenic fault of 4 April 2021 Mw 5.4 earthquake as indicated by the USGS focal mechanism solution. The Mw 5.4 is the largest instrumentally ever recorded earthquake in Namibia. We name the "Anker Fault" and constrain its orientation using the Sentinel 1 Interferometric Satellite Aperture Radar (InSAR) to image surface uplift and subsidence patterns. Given the sudden onset of the seismic activity and absence of mineral or energy exploration projects, we eliminated the potential for anthropogenic triggering. We suggest the cause for the 2018 seismic swarm activity is shallow, natural groundwater migration possibly related to nearby hot springs. In our work, we have developed and utilized a cost-effective and accessible methodological workflow that enhances earthquake detection capabilities. This approach is particularly beneficial for capacity building in seismology and seismic hazard analysis in developing countries, where earthquake monitoring equipment is often limited.

Non-technical summary

Residents in the Kamanjab region of Northern Namibia have reported experiencing numerous, sometimes damaging earthquakes in recent decades. We used the seismic data collected by the Geological Survey of Namibia and Council for Geoscience, South Africa during June - September,

2018, as well as satellite data and data from international seismic networks to identify over 10,000 individual earthquakes and locate the fault system which generated the earthquakes. The faults are steep and trend in a NNW-SSE direction, parallel to other known active faults in central and southern Namibia. We found no correlation between these earthquakes and any human activity. We suspect that natural groundwater movement is playing a role in triggering this earthquake swarm.

