

# ENHANCING EARTHQUAKE MONITORING IN NAMIBIA WITH AN INTEGRATION OF IMS STATIONS

MAKO SITALI

Geological Survey of Namibia



10 September 2025



## OUTLINE

- Introduction
- Namibia Seismological Network
- Progress made
- Collaborations



## INTRODUCTION

- Seismicity in Namibia is considered low to moderate, has been monitored since the 1900s by International Monitoring Centres. By 2010, the Namibia Seismological Network (NSN) had only six permanent stations with outdated seismic equipment that were rapidly failing making difficult to monitor earthquake activities.
- With advent of social media, information on earthquakes felt by people in Namibia spread much more rapidly and the Survey was unable at the time to accurately determine the event locations and magnitudes felt by the public.

### ROLE:

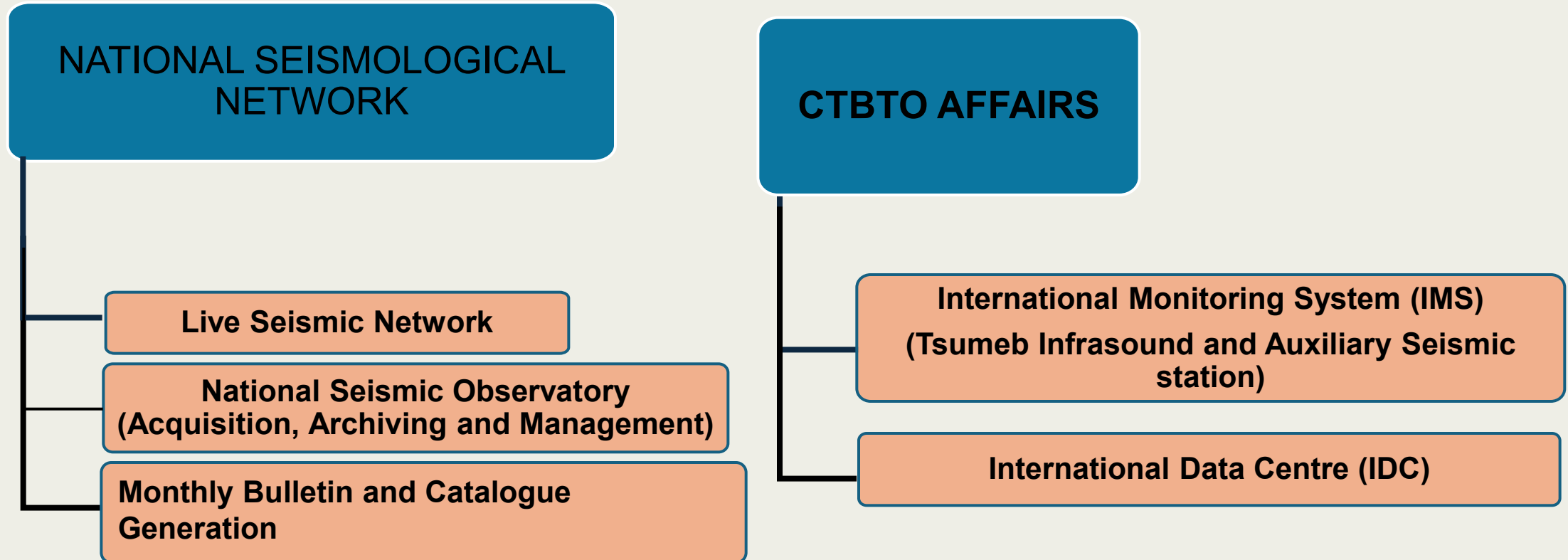
- To monitor earthquake activity countrywide with the aim of developing seismic hazard assessment for risk management and mitigation. Moreover, to disseminate earthquake information to the public and other stakeholders.
- Monitor nuclear explosion through the Tsumeb research station (Infrasound station IS35) which is part of the International Monitoring System (IMS) together auxiliary seismic station AS67 .



## STRUCTURE

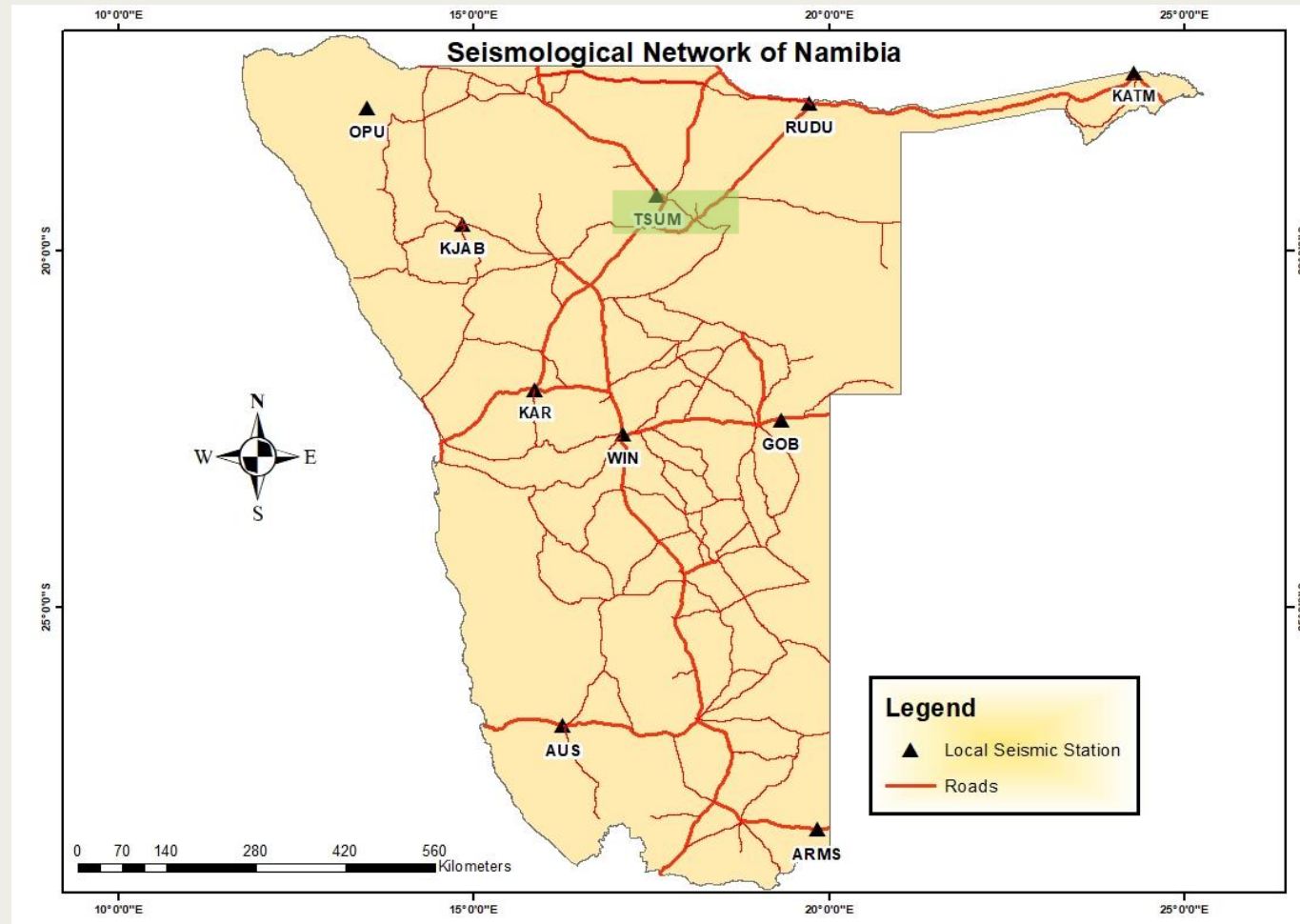
01.2-736

### CRUSTAL GEOPHYSICAL SUB-DIVISION



## NAMIBIA SEISMOLOGICAL NETWORK

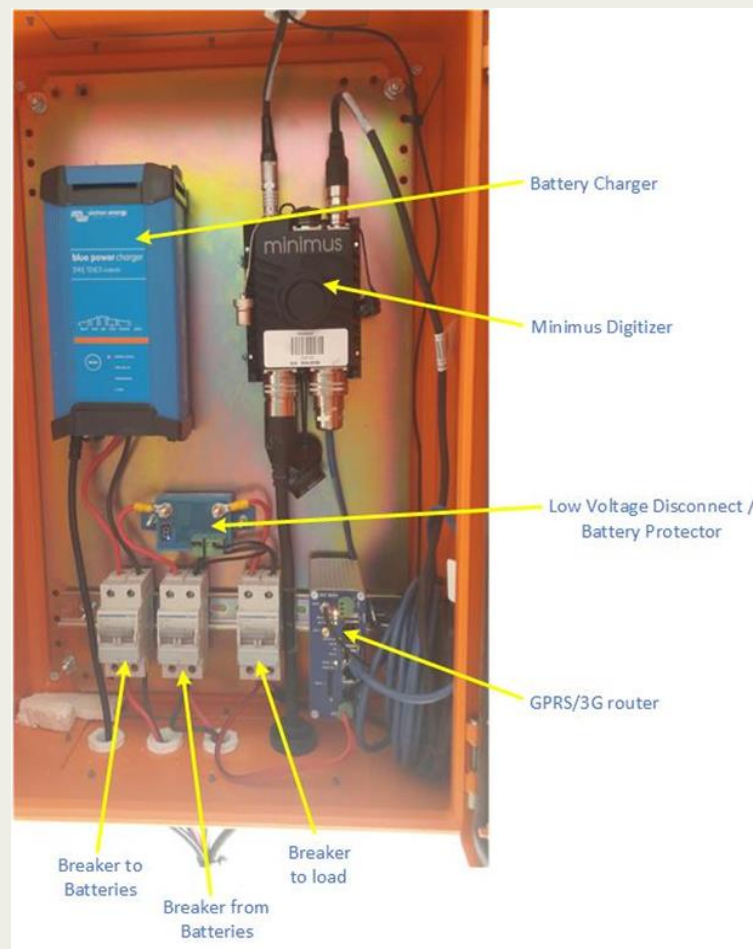
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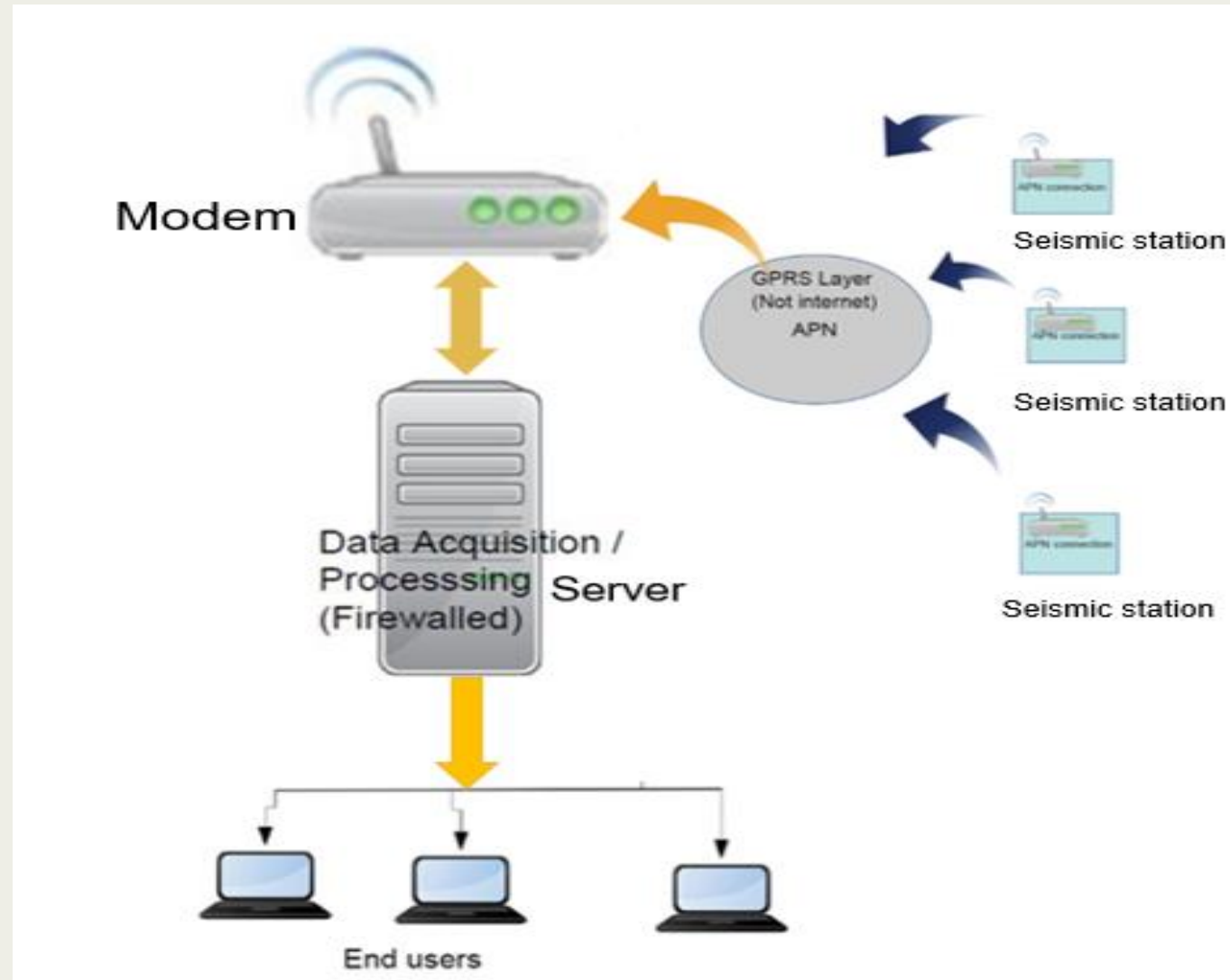


### SEISMIC STATION SET-UP

O1.2-736



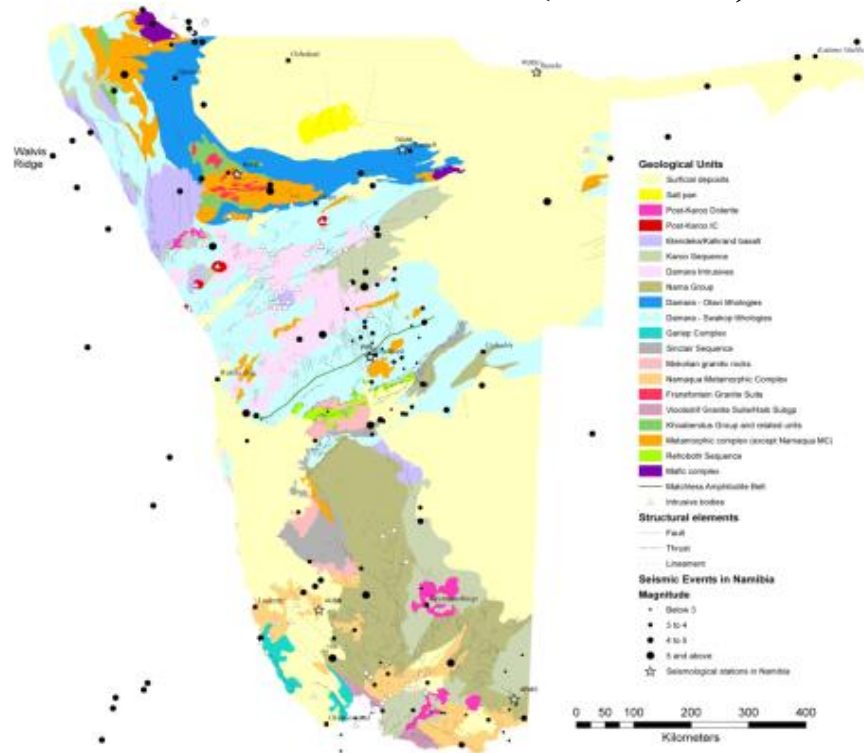
## DATA TRANSMISSION



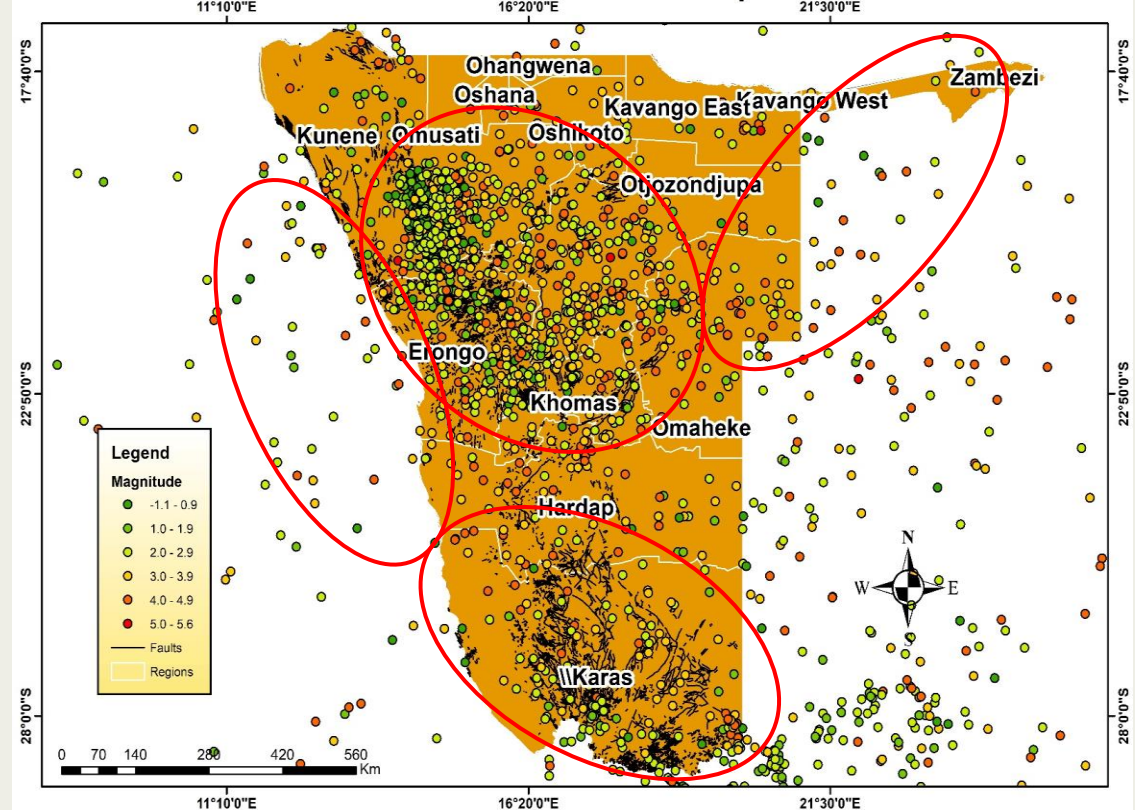


# SEISMICITY

## Seismic Events in Namibia (1910-2013)



### Seismic Events in Namibia from 1910- September 2023



## Seismic record from 2018 – 2023 after network upgrade








## COMMUNITY AWARENESS



```
/home/seismo/REA/NAM_/LOG/01-0000-00L.S202404
/home/seismo/REA/NAM_/CAT/202405.CAT
# 1 2024 5 1 1319 20.4 L -29.178 18.752 0.0 NAM 4 3.0 1.8LNAM
# 2 2024 5 3 0257 47.5 L -22.068 16.617 0.0 NAM 818.5 2.6LNAM
# 3 2024 5 3 1341 35.0 R -29.240 18.919 0.0 NAM 4 1.1 2.0LNAM
# 4 2024 5 7 0726 42.7 L -28.570 17.902 0.0 NAM 522.2 2.4LNAM
# 5 2024 5 8 1350 26.4 L -30.496 20.743 39.1 NAM 885.8 3.2LNAM
# 6 2024 514 1050 14.0 L -28.029 17.131177.7 NAM 418.3 3.4LNAM
# 7 2024 516 2317 9.9 L -24.063 21.600370.9 NAM 632.6 3.0LNAM
# 8 2024 518 1452 55.0 L -22.897 15.386 0.0 NAM 513.2 3.1LNAM
# 9 2024 519 2328 55.3 L -19.583 15.004 0.0 NAM 413.6 2.5LNAM
# 10 2024 524 2310 16.6 L -24.723 15.884 41.6 NAM 517.2 3.4LNAM
```




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### The Geological Survey of Namibia (NAM)



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Phone: +264-61-2848142

Fax: +264-61-249144

Address: Ministry of Mines and Energy, Geological Survey of Namibia, 6 Aviation Road, Private Bag 13297, Windhoek, Namibia

Status: active

Last data: 2023-01-31

Web page: <http://www.nme.gov.na/gsn/geophysicsdiv.htm>

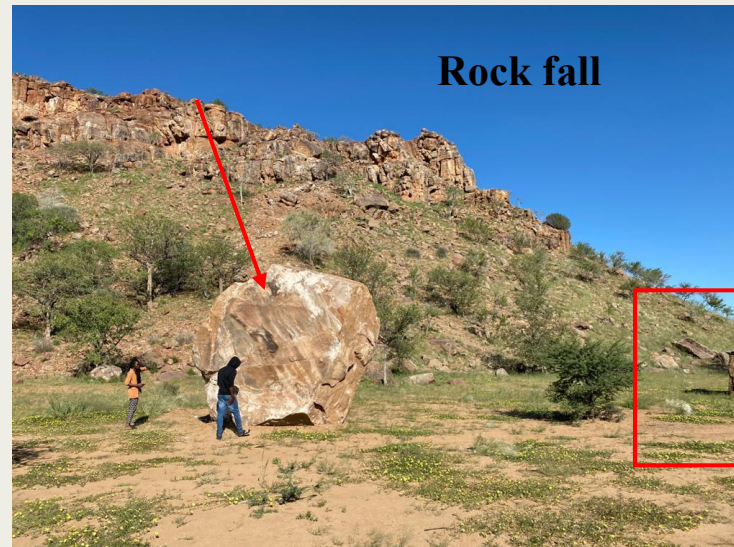




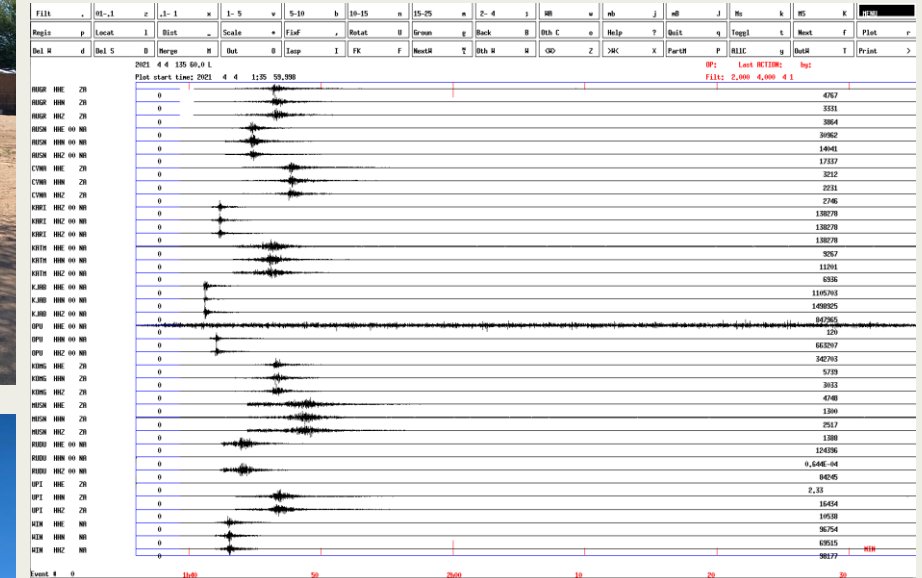
## INTENSITY SURVEY



Home shop



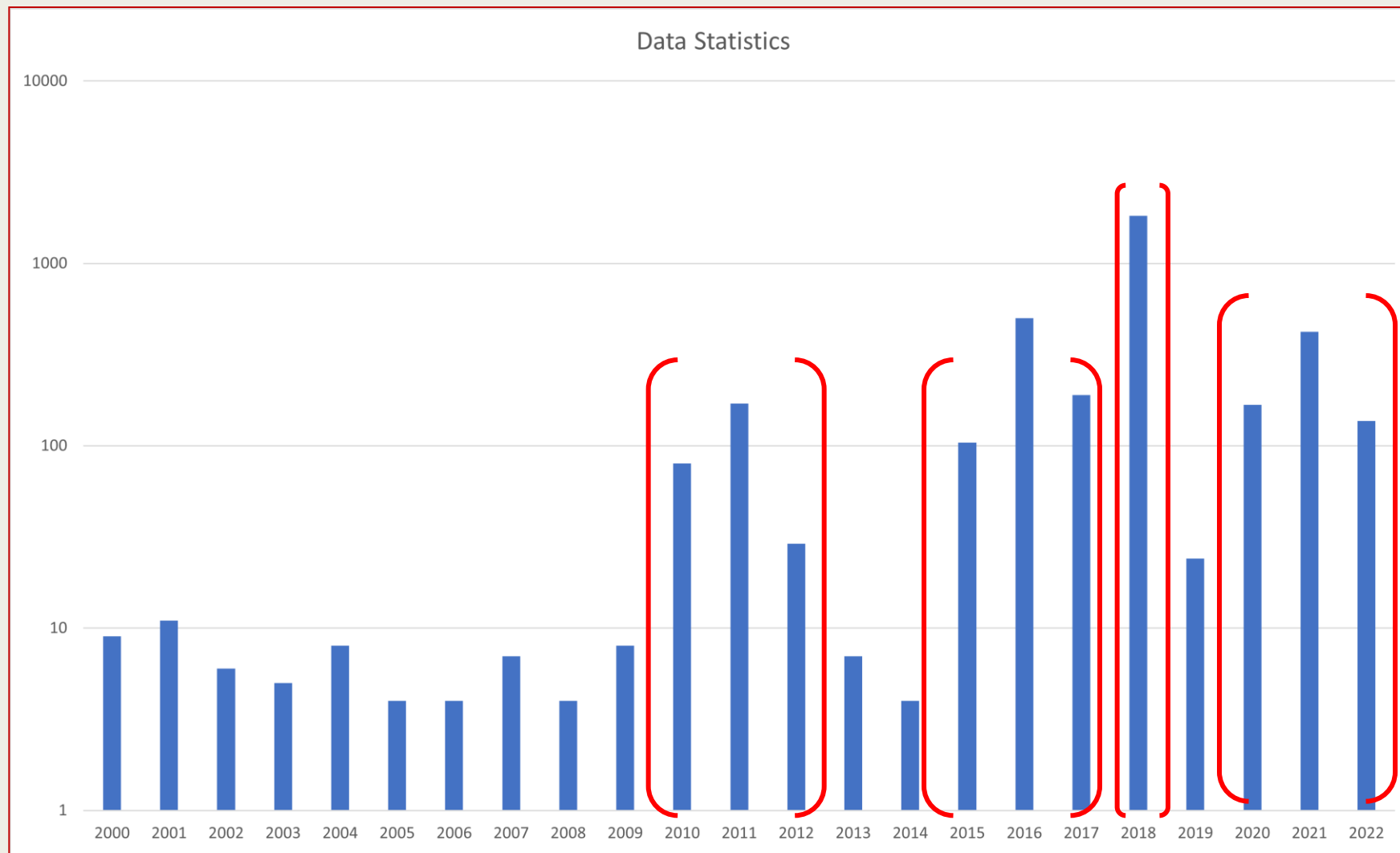
Rock fall



Local Event, recorded on April 4, 2021 at 03:41  
5.6 4km SE of Erwee



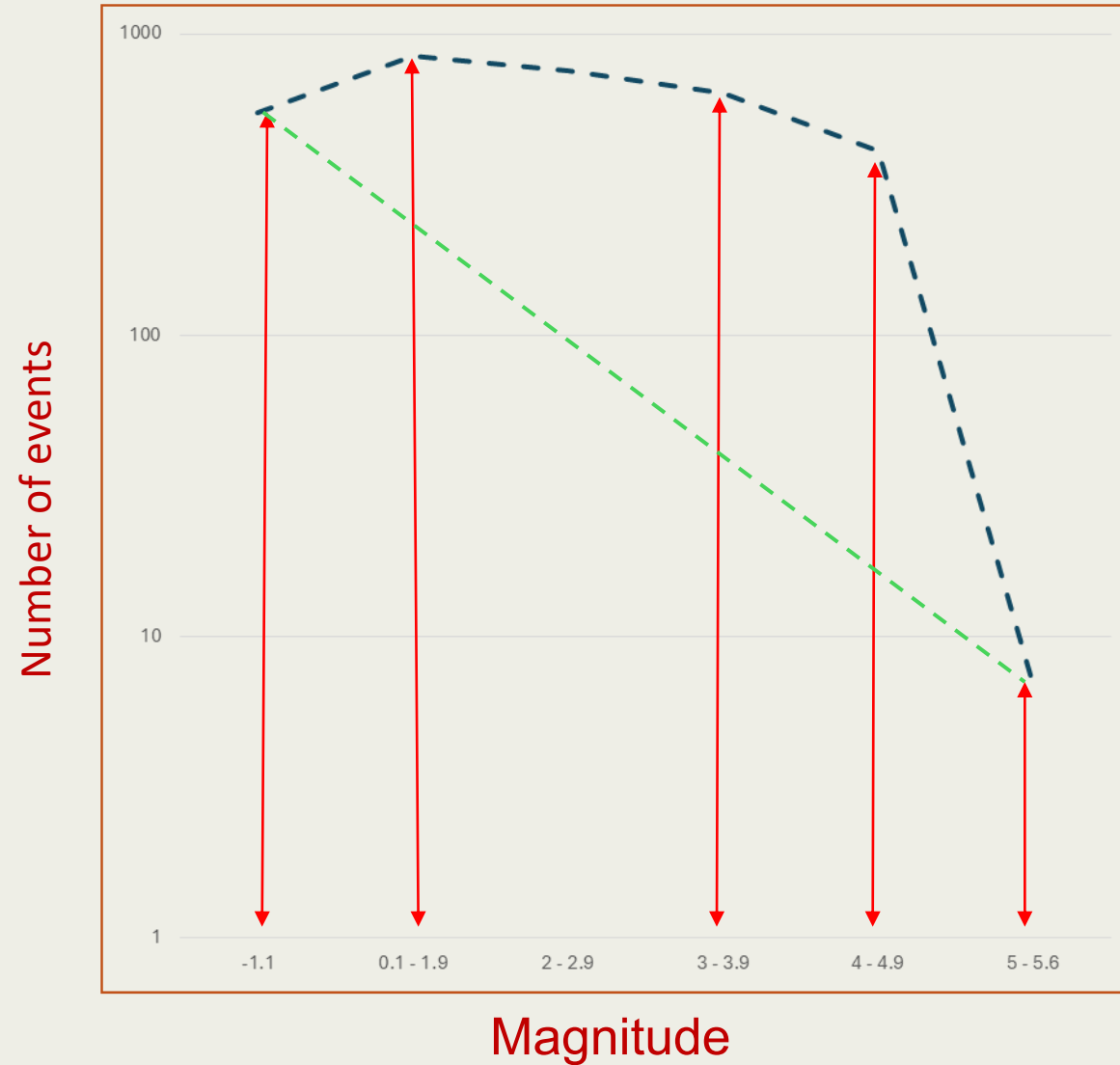
Number of events



Years

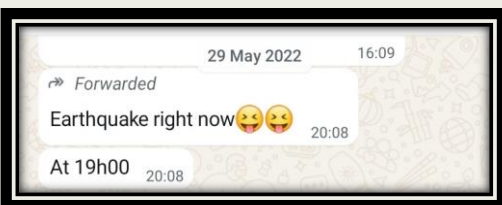


## EVENT MAGNITUDE PROFILE



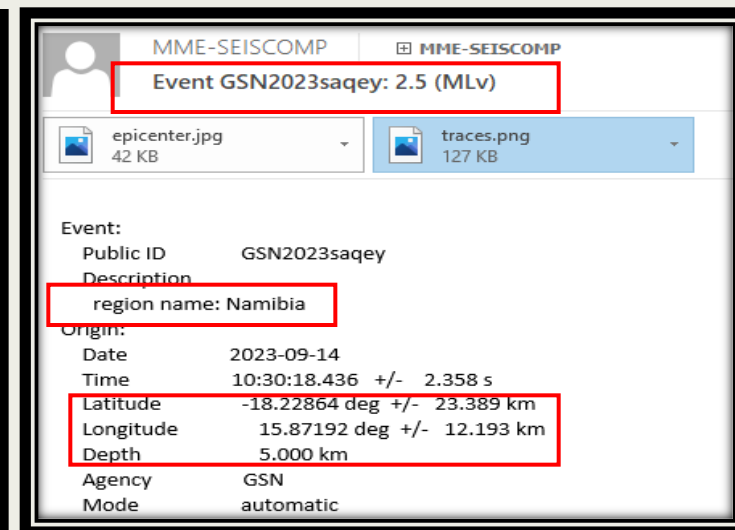


### PROGRESS MADE



#### Features

- Data acquisition,
- Data quality control,
- Data recording,
- Real-time data exchange,
- Network status monitoring,
- Real-time data processing,
- Issuing event alerts,
- Waveform archiving,
- Waveform data distribution,
- Automatic event detection and location,



gempa


GLOBAL EARTHQUAKE MONITORING PROCESSING ANALYSIS






SeisComp

Real time data acquisition and processing




# IMS FACILITIES AND TECHNOLOGY



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## COUNTRY PROFILES

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Country	Annex 2 State*	Signature Date	Ratification Date
Namibia	No	1996-09-24	2001-06-29

### Monitoring Facilities

Location	Type	Treaty Code	Status
<a href="#">Tsumeb</a> 	Auxiliary Seismic	AS67	Certified
<a href="#">Tsumeb</a> 	Infrasound	IS35	Certified

### Additional Information

Namibia was the 77th State to ratify the CTBT, see [CTBTO press release](#).

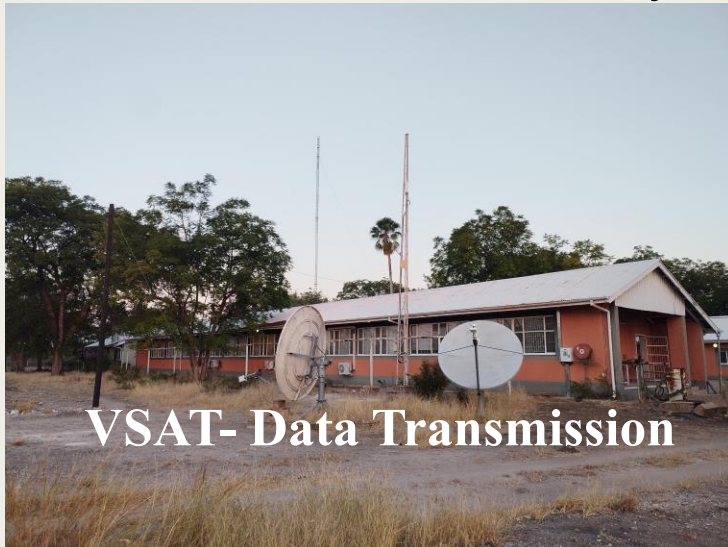


## IMS FACILITIES AND TECHNOLOGY

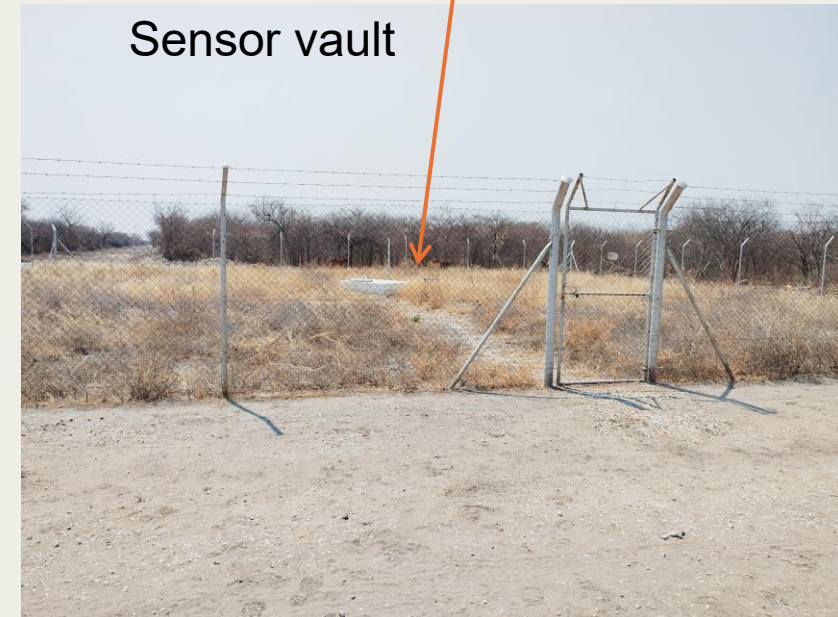
### Infrasound station IS35

#### Antena and the Infrasound hut

#### Outside the Tsumeb facility



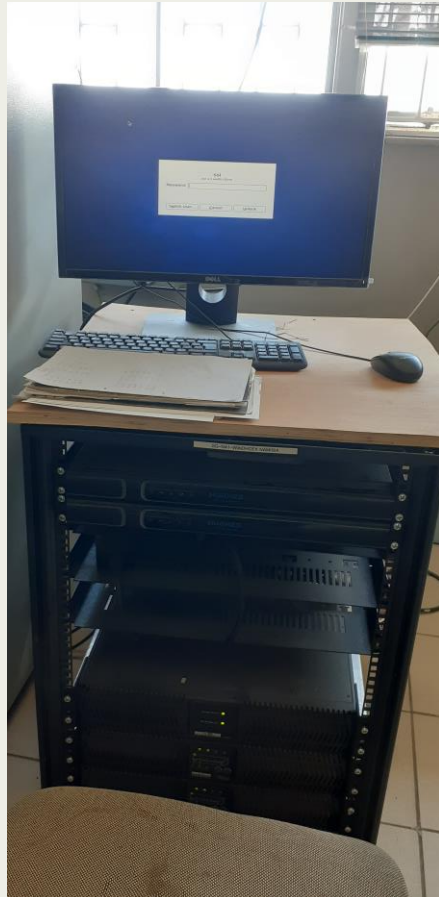
#### Sensor vault





# IMS FACILITIES AND TECHNOLOGY

**NDC**



**Auxiliary Seismic Station AS67**





# BENEFITS OF HOSTING IMS STATIONS IN THE NAMIBIAN CONTEXT



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1BR in Swako...

3BR in Swako...

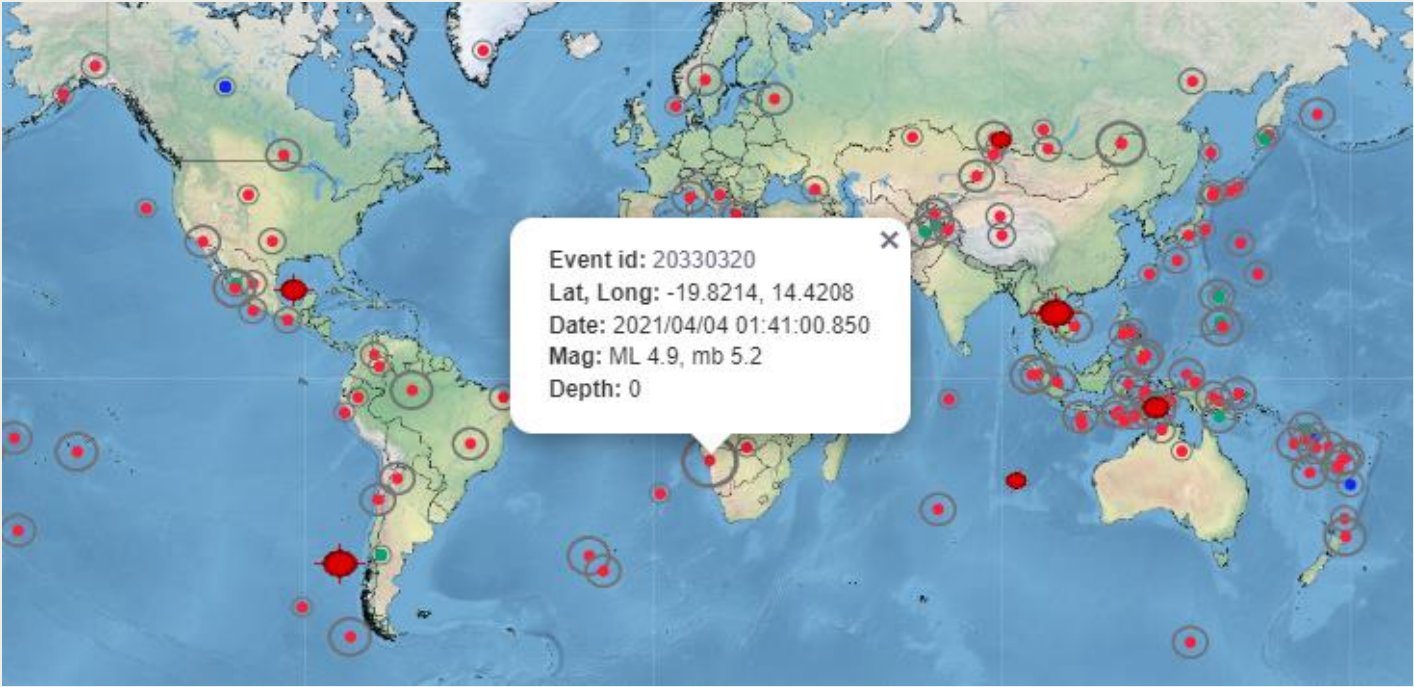
1BR in Swako...


3BR in Swako...

1BR in Swako...

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# BENEFITS OF HOSTING IMS STATIONS IN THE NAMIBIAN CONTEXT





REPUBLIC OF NAMIBIA

MINISTRY OF MINES AND ENERGY

GEOLOGICAL SURVEY OF NAMIBIA

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 WINDHOEK

Enquiries: Mako Sitali/ Bufelo Lushetile  
 Reference: 13/4/11/3/6


04 April 2021

**REPORT ON THE 04/04/2021 EARTHQUAKE RECORDED IN NAMIBIA**

The Ministry of Mines and Energy confirms that an earthquake was recorded approximately 97 kilometers NNW of Khorixas (4km SSE of Erwee) in the early hours of Sunday, 04 April 2021 at 03:41 AM Namibian Time. The event was recorded by seven seismic stations of the Namibian Seismology Network, namely Windhoek, Kamanjab, Opuwo, Rundu, Katima, Karibib, and Aus. The earthquake registered a preliminary local magnitude (*ML*) of 5.6 as recorded by the Namibian Seismological Network at latitude (*Y*): -19.722° South, longitude (*X*): 14.399° East. The earthquake was shallow at a depth of less than 15 km. In addition to the main event, seven (7) aftershocks (earthquakes occurring after the main event) were recorded in the same area with local magnitudes (*ML*) ranging from 2.3 and 3.6 in the same area. As the data continue to be recorded, more and more events will be analysed.

Precautionary measures in case you feel an earthquake:

- If you find yourself indoors, try going outside safely when possible, otherwise find refuge under the table.
- If you are outdoors, find a clear spot well clear of buildings, trees and power lines.
- Stay and face away from windows.
- Watch out for falling objects.



MINISTRY OF MINES AND ENERGY  
 GEOLOGICAL SURVEY OF NAMIBIA  
 04 APR 2021  
 Private Bag 13297, Windhoek, Namibia  
**OFFICIAL**



2021/04/04 01:41:00.850	-19.8214	14.4208	27	0	ML 4.9 mb 5.2	NAMIBIA
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### COLLABORATIONS



PUTTING AN  
END TO NUCLEAR  
EXPLOSIONS





**The Beautiful Sandwich Harbour and Deadvlei (left) and the Fish River Canyon (right)**







**Thank You**

