

# **REPORT FROM NIGERIAN NATIONAL NETWORK OF SEISMOGRAPHIC STATIONS**

**BY**

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# OUTLINE

❖ PREAMBLE

❖ NIGERIA SEISMIC NETWORK /  
INSTRUMENTATION

❖ PURPOSE & NOISE ANALYSIS FOR NNNSS

❖ COLLABORATIONS



## PREAMBLE

❖ Since 2006 the Centre for Geodesy and Geodynamics has been managing the Nigeria National Network of Seismological Stations (NNNSS)

❖ 5 Broadband operational stations

❖ 5 stations, no instruments installed

❖ Equipped with 24-bit 4-channel recorders (digitizer and data logger)



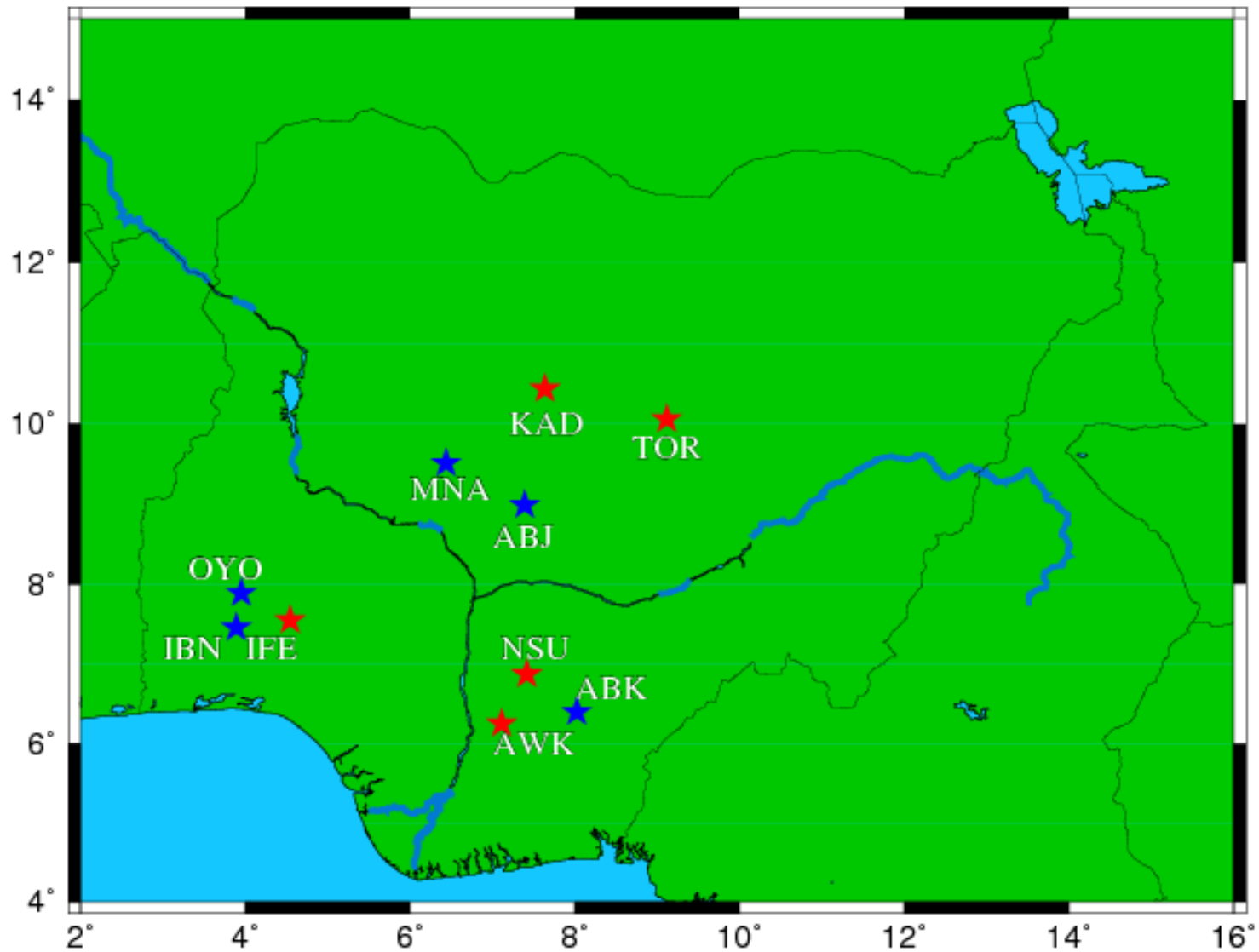


Figure 1: Map of Nigeria showing locations of existing (Red stars) and planned (Blue stars) stations



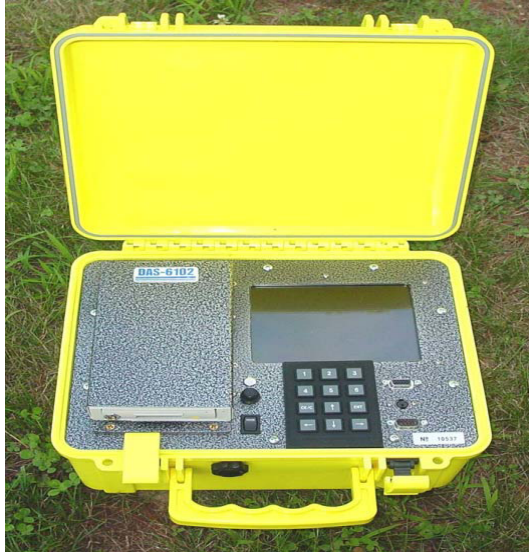


Figure 2: DR4000; A potable multi-channel low power Data Logger



Figure 3: Time signal receiver for Timing system installed at NNNSS stations to get accurate time and for time stamping of the acquired seismic data.

**The DR4000 has the following features:**

**24-bit high resolution**

**132dB dynamic range**





Figure 4: EEETEC EP-105 SEISMOMETER installed at all NNNSS stations



Figure 5: Pictures showing Sensor in an insulated box (left), and Vault at one of the NNNSS stations (right)

**The EP 105 Seismometer has the following features**

**Dynamic Range : 142 dB**

**Bandwidth : 0.033 – 50 Hz**



## **PLANNED STATIONS**

- Gombe, Calabar, Taraba, Maiduguri, (Toro), etc.
- GURALP

## **SOFTWARE**

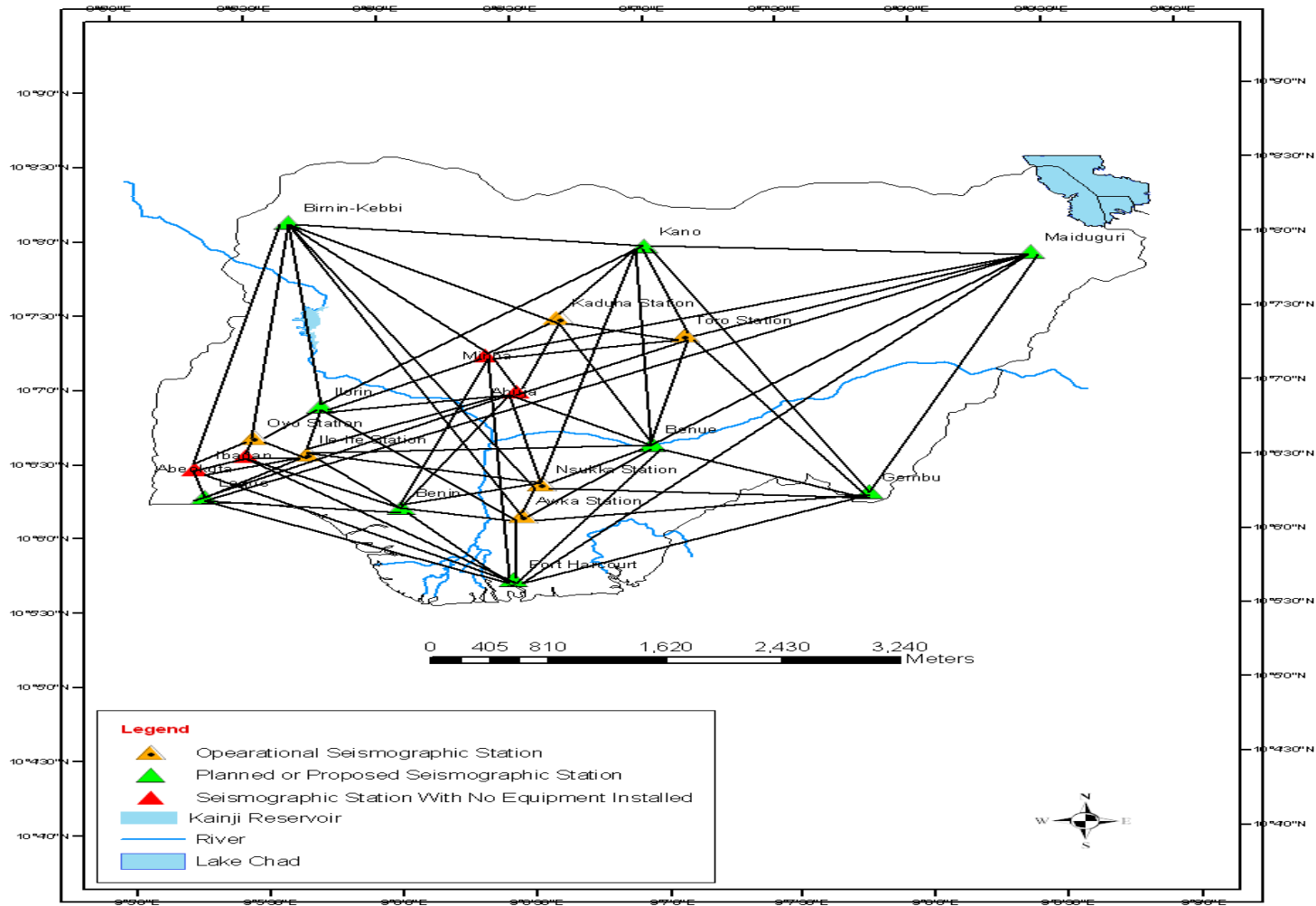
- SEISAN-- routine data processing
- PQL--preliminary noise evaluation
- SEISCOMP3--Data transmission



## WHY NNNSS?

- DETERMINATION OF ACCURATE EARTHQUAKE LOCATIONS
- SEISMIC HAZARDS RESEARCH & MONITORING
- MAPPING OF SUSPECTED FAULTS IN NIGERIA
- RESEARCH ON THE INTERIOR OF THE EARTH





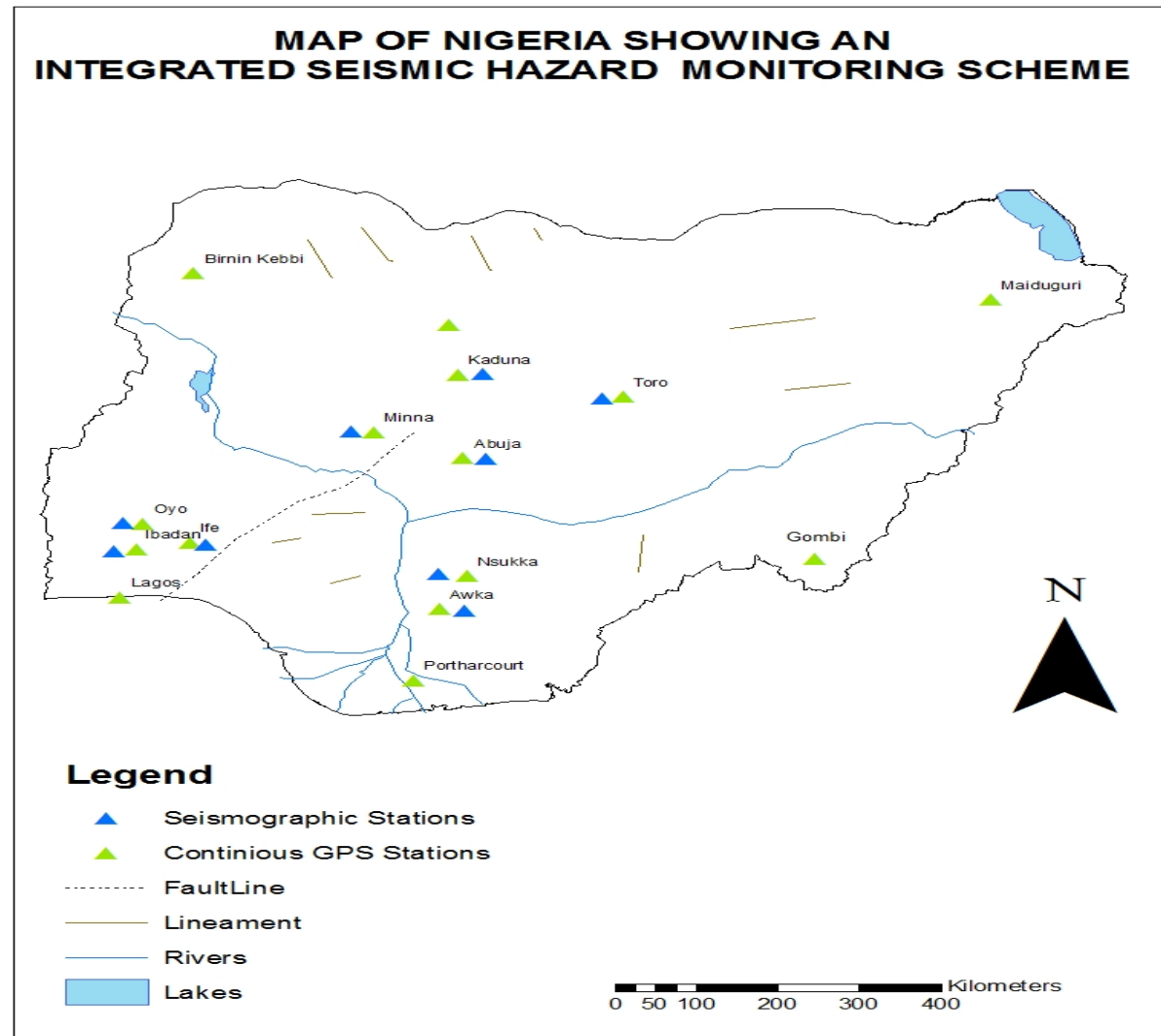
Map showing Stations Networked

**Figure 6: NNSS networked for online data transmission**



For effective and efficient disasters monitoring, installation permanent GPS stations, densification of GPS and seismic stations

•An integrated monitoring system is an effective tool for monitoring faults .



**Figure 3:** Map of Nigeria showing the locations for the instrumentation making up an Integrated Seismic-hazard Monitoring scheme.



## WHAT WE INTEND TO ACHIEVE FROM NNNSS

- Development of a velocity model for Nigeria.
  - Development of seismicity map of Nigeria.
  - Geophysical methods for mapping of the fracture zones and its extension into the Atlantic Ocean.
  - Integrated monitoring of tectonics using GPS (Global Project involving NASA-USA)
  - Seismic hazard assessment for critical facilities (e.g NPP, Dams, etc. (World Bank project: STEP-B)
  - Surface wave tomography of Nigeria from seismic ambient noise
  - Moho depth in Nigeria from Receiver function
  - Tomography using earthquake events/P-arrival times
- Etc.



## **COLLABORATIONS**

- ❖ **NASA (real-time data...GPS, VLBI, SLR)**
- ❖ **CTBTO (signed and ratified treaty)**
- ❖ **Joint Geohazard monitoring and data shearing with Cameroon, Benin Republic...**
- ❖ **AfricaArray**
- ❖ **ISC**
- ❖ **ICTP (Geohazard projects)**
- ❖ **Some Universities in Nigeria**
- ❖ **GFZ on Geofone project**
- ❖ **Research Institutes like NAEC, NEMA, etc.**
- ❖ **Oil Companies**
  
- ❖ **We seek more collaborations (data sharing, Cross border hazard monitoring etc.**



**❖ WE NEED TO SHARE QUALITY  
DATA....**

**❖ ...HENCE NOISE EVALUATION OF  
NNSS**

**Thank you for your kind attention**

