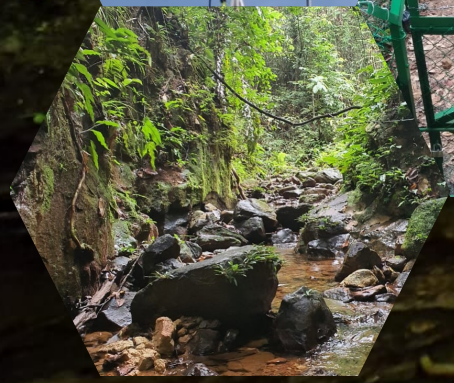


BRUNEI DARUSSALAM COUNTRY PRESENTATION FOR ITP-TEWS TRAINING PROGRAMME

HAWAII 2025

PREPARED BY:

MUHAMMAD ASRI AKMAL BIN HAJI SUHIP

GEOTECHNICAL, GEOLOGICAL AND RESEARCH SECTION(BKTKS)

DEPARTMENT OF TECHNICAL SERVICES

PUBLIC WORKS DEPARTMENT

BRUNEI DARUSSALAM

The population mostly living in the coastal areas of **Brunei-Muara, Tutong and Belait districts.**

Bandar Seri Begawan

5,765 Sq. km

429,999 persons

1,839 m at Bukit Pagon

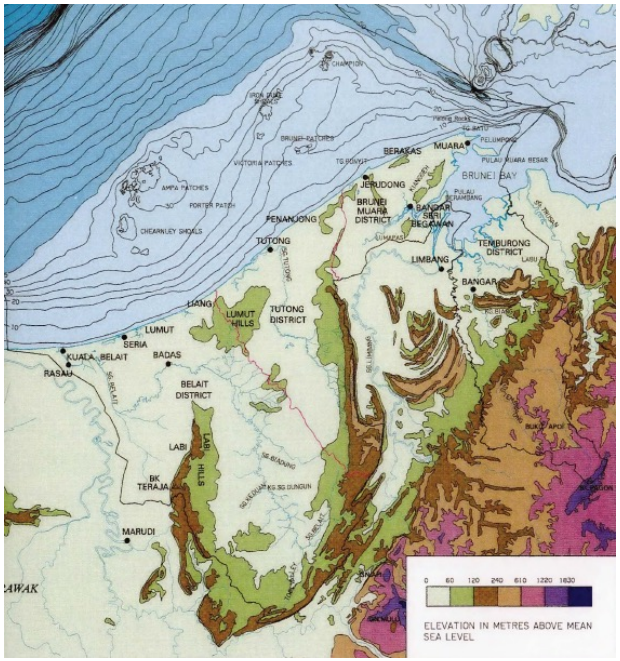
GEOLOGICAL BACKGROUND OF BRUNEI DARUSSALAM

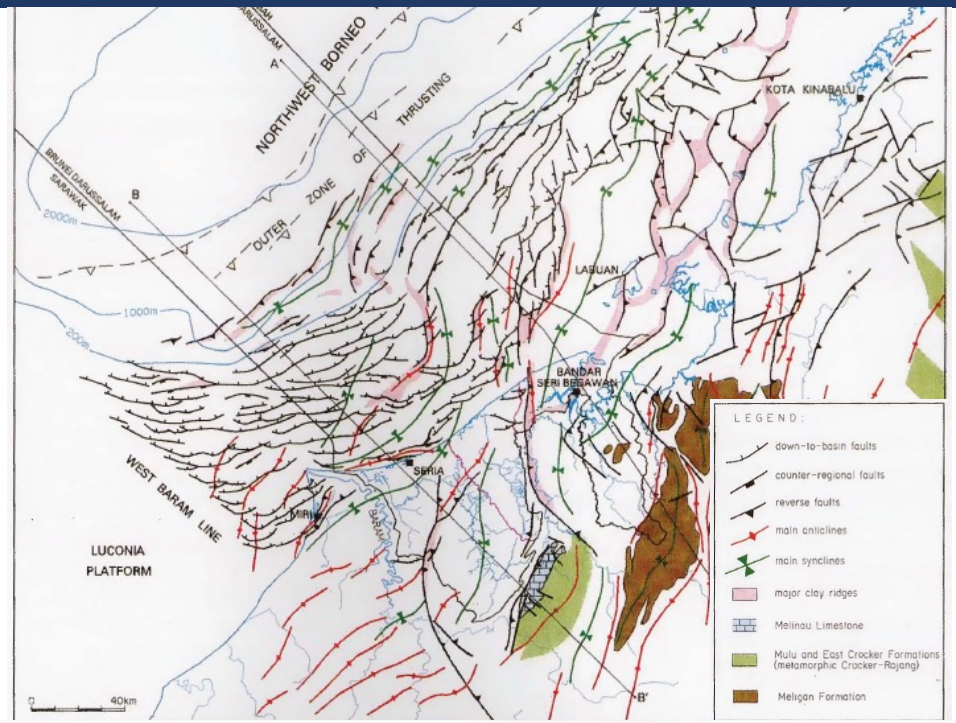
Brunei is made up of deltaic sediments that are comprised of:

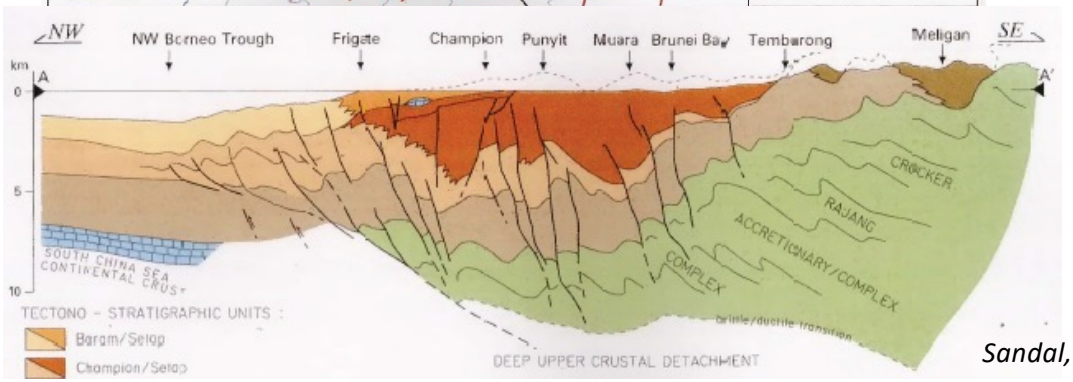
1) Upper layers – soft soil, clay, peat, sand, and alluvium (easily eroded, loose).

2) Underlayers– young sandstone, shale, and mudstone, often still weak and not fully hardened.

Higher elevation areas occur inland, where pristine protected forest reserves are located







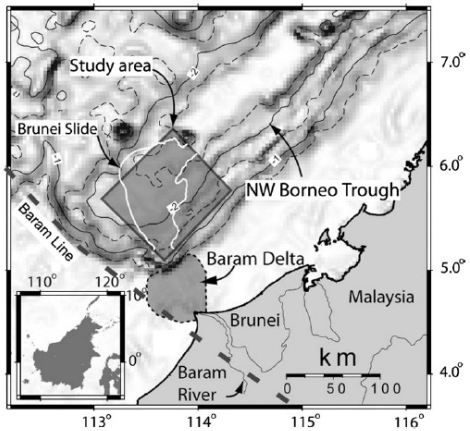
Sandal, 1996

PAST EARTHQUAKE AND POTENTIAL LOCAL TSUNAMI EVENTS

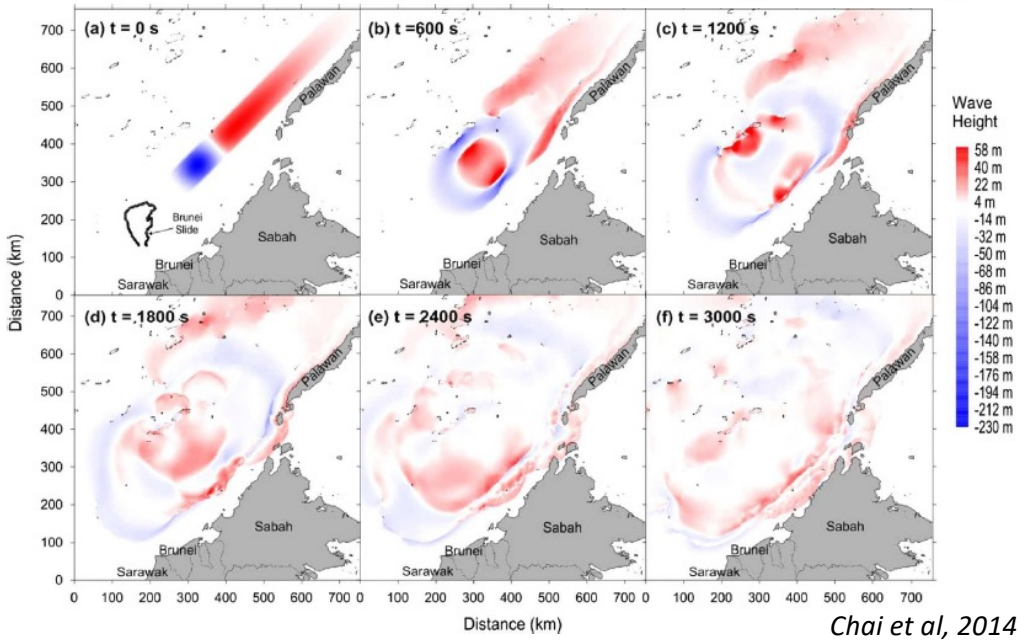
There has been 9 earthquake events that was felt in Brunei Darussalam since 1992

***Brunei Slide* is an ancient landslide that may have a potential to cause tsunami**

- **Occurred 50km+ offshore Brunei Darussalam**
- **Size:** 5300 km2 (*Gee et al, 2006*)
- **Tsunami Height:** 14-17m along Brunei's coast



No	Date/time	Magnitude	Source
1	22 Feb 1992 0039	5.1	South China Sea 68 km NW from Bandar Seri Begawan
2	17 June 1996 1122	6.3	Flores sea 1,605 km SE from Bandar Seri Begawan
3	30 Jun 2005 0609	4.4	Long Buang Sarawak 74km SE from Bandar Seri Begawan
4	23 July 2010 1008	6.4	Moro Gulf, Mindanao Philippines 1,020 km NE from Bandar Seri Begawan
	23 July 2010 1051	6.8	
	23 July 2010 1115	6.8	
5	04 June 2015 1115	5.8	Ranau, Sabah Malaysia 227km NE from Bandar Seri Begawan
6	20 Dec 2015 0647	6.0	Tarakan, Kalimantan Utara 335km SE from Bandar Seri Begawan
7	10 Jan 2017 0613	6.5	Celebes Sea 856 km E from Bandar Seri Begawan
8	21 Aug 2020 1209	6.6	Katabu, Indonesia (Flores Sea) 1596 Km SE from Bandar Seri Begawan
9	11 July 2024 1013	6.4	Mindanao, Philippines 725 KM SE from Bandar Seri Begawan



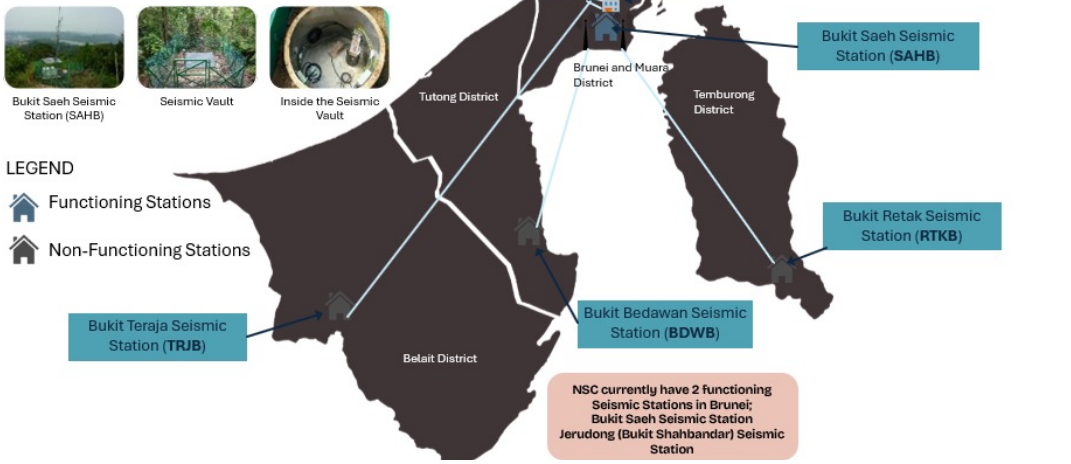
Chai et al, 2014

BRUNEI DARUSSALAM NATIONAL SEISMIC CENTRE (BNSC)

NSC is under the Geotechnical, Geological and Research Section (BKTKS), Department of Technical Service (DTS), Public Works Department (JKR)

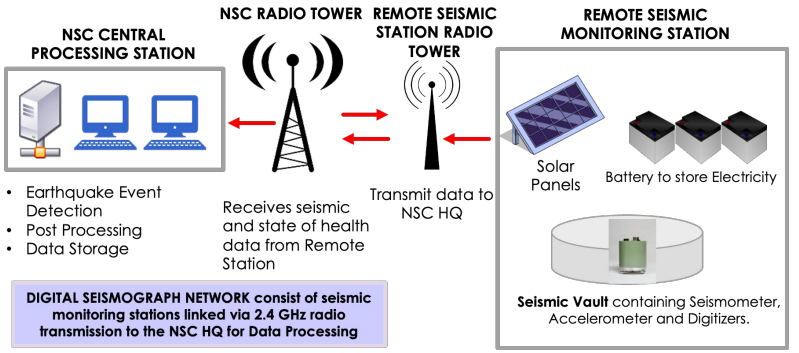
NSC was first established in 1995

NSC Digital system was established in 2012.



The <u>main purpose</u> of NSC:

- **To monitor seismic activity in the region and the surrounding countries.**
- **To verify information on earthquake/tremor events.**
- **To disseminate information on earthquake occurrences to relevant agencies.**



STANDARD OPERATING PROCEDURE

Earthquake Occurence

Automatic Detection & Monitoring - Seismic event is detected in real time by the seismic monitoring system.

Athena software, Response Hydra Software, Helicorder Software processes waveforms and calculates location, magnitude, and depth.

The Geologist verify the event using waveform data and station reports.

Producing Earthquake Bulletin Report

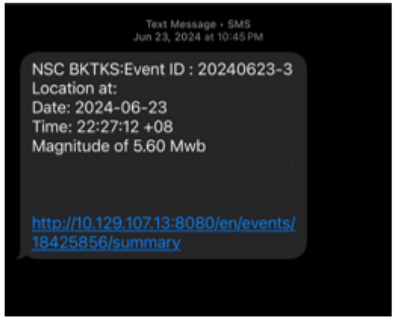
Notify relevant agencies, such as National Disaster Management Centre (NDMC).

Daily Earthquake Monitoring

- **Verify** earthquake events detected locally with global/regional sources (e.g. USGS, BMKG, MetMalaysia).
- Ensure accuracy of event parameters (location, depth, magnitude).
- Detect local tremors that may be missed by international networks.
- Support coordinated regional response and information sharing.
- Build a reliable earthquake database for national hazard assessment.
- **Strengthen international collaboration in seismic monitoring.**

Call-out Notification

via SMS



via email

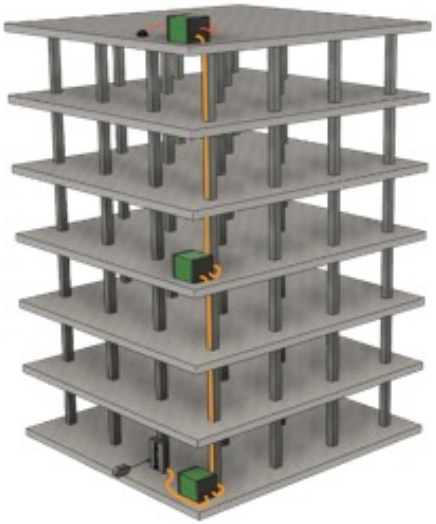
*Both SMS & Email notification are for NSC use only (not for public)

FUTURE PLANS

Expansion of seismic stations and installation of building accelerometers

Purpose:

- More accurate detection of local and regional earthquakes.
- To monitor earthquake events and assess the seismic response of building structures in Brunei

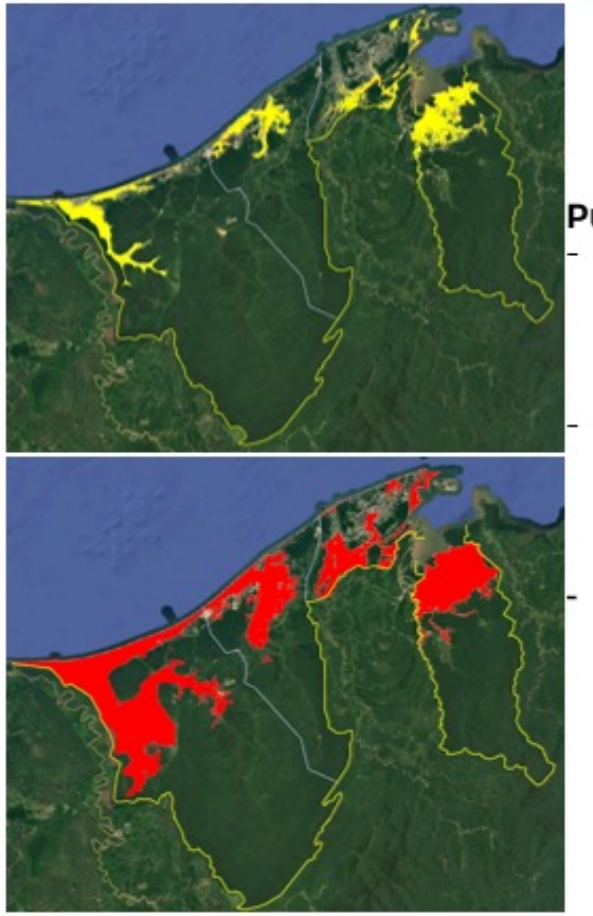


Upgrade of seismic monitoring systems

Purpose:

- System upgrades implemented according to international standards
- Adoption of hybrid communication IOT/VSAT for reliable real-time data transmission

Establishing tsunami monitoring systems and conducting research for tsunami potential inundation maps



Purpose:

- Integration with regional and global tsunami early warning systems
- Creation of tsunami potential inundation maps for Brunei's coastal zones
- Development of tsunami numerical models and hazard simulations

THANK YOU FOR YOUR ATTENTION