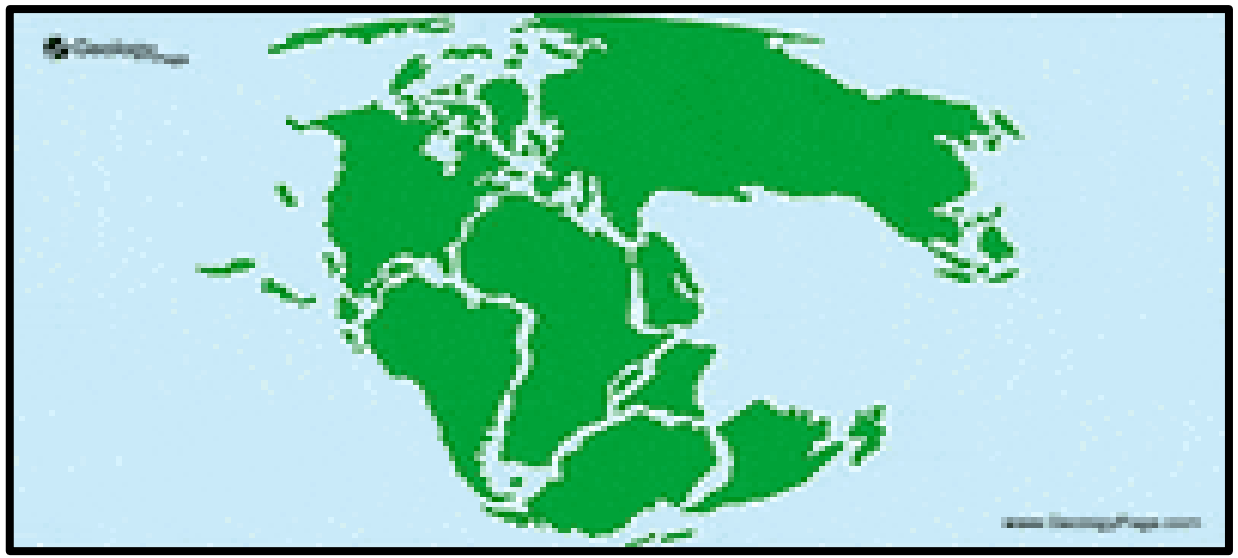
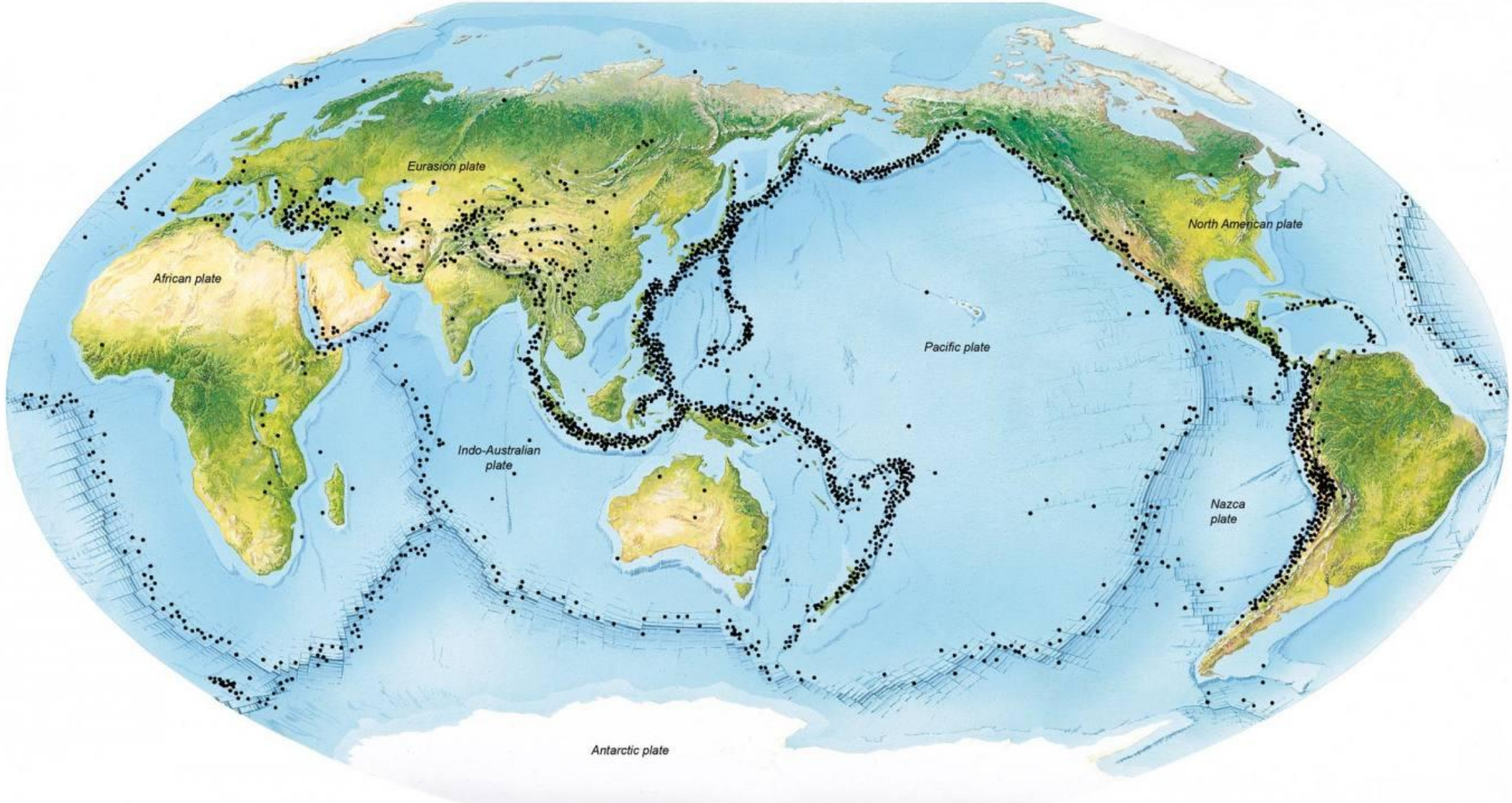
မြန်မာနိုင်ငံတွင်လူပ်ခတ်ခဲ့သောငလျင်ကြီးများနှင့်အနာဂါတ်တွင်ကြုံတွေ့နိုင်သည့်ငလျင်ကြီးများအပေါ်လေ့လာသုံးသပ်ချက်

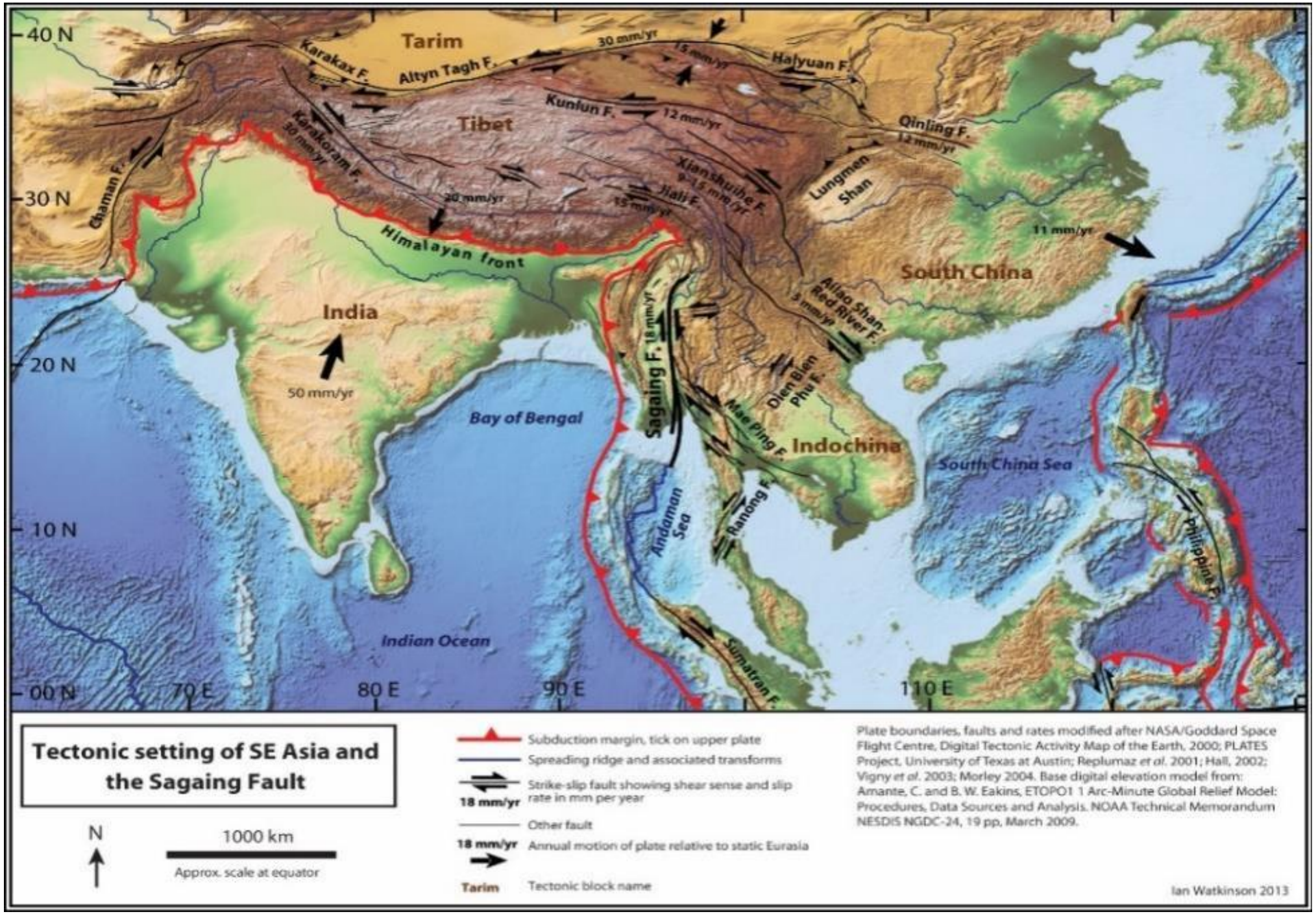


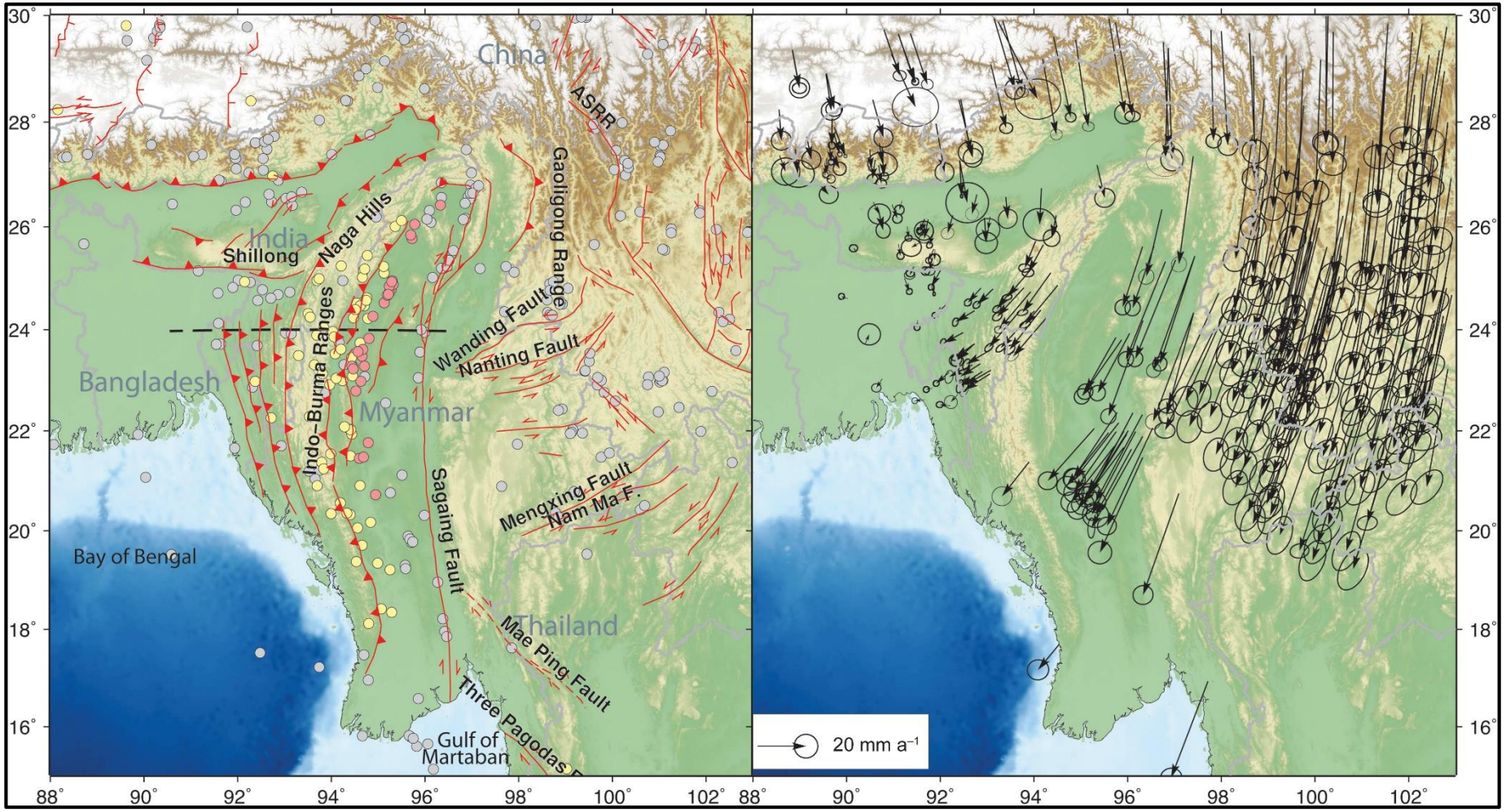
မြန်မာနိုင်ငံ၏ အနာဂါတ်တွင်ကြုံတွေ့နိုင်သည့် ငလျင်အန္တရာယ် ကာကွယ်ရေးနှင့်လျှော့ချနိုင်ရန်အတွက် စီစဉ် ဆောင်ရွက်ထားရန်အပေါ် တင်ပြခြင်း

ဒေါက်တာစုံဟန်
မြန်မာနိုင်ငံဘူမိသိပ္ပံအသင်း

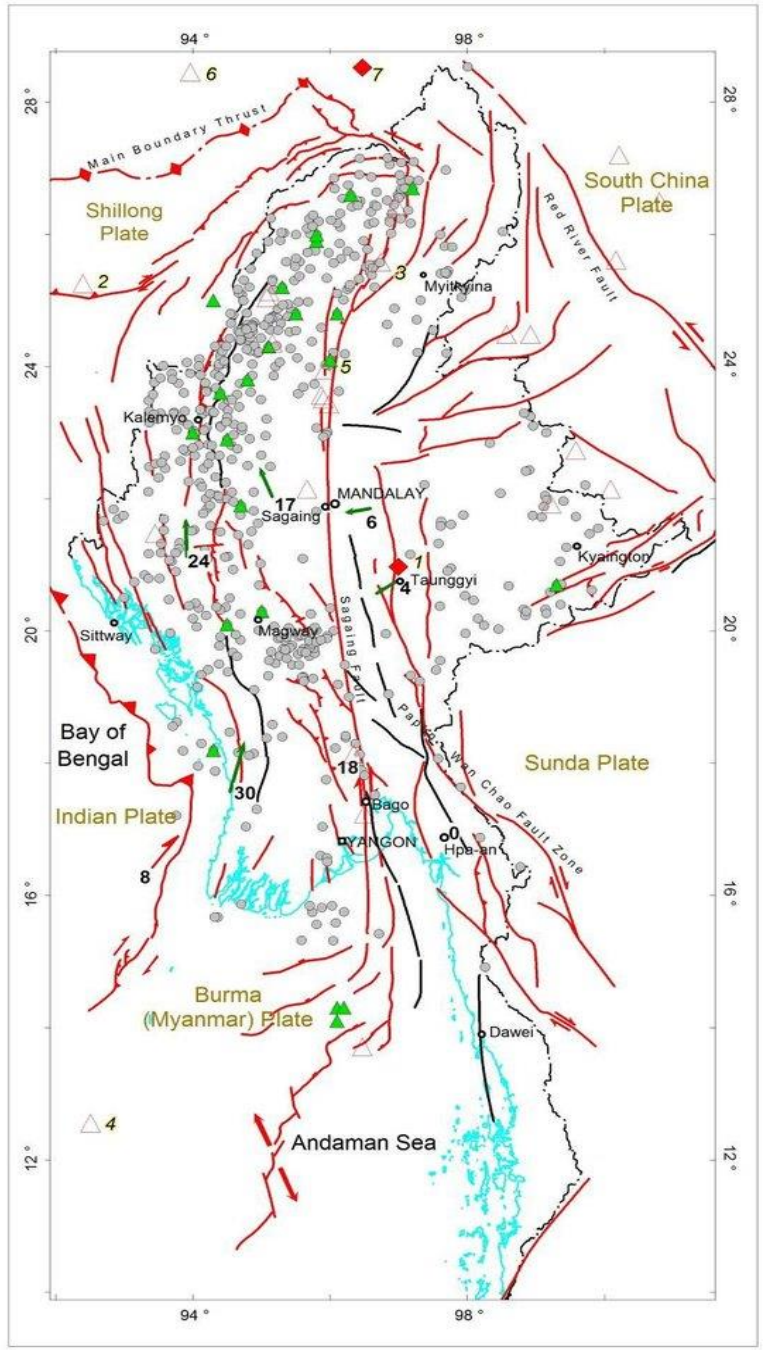


Two Major Earthquake Belts - (1) Circumpacific Belt (Ring of Fire) (81%)
(2) Alpide Belt (Mediterranean-Asiatic Belt (17%)


40 N
30 N
20 N
10 N
00 N
70 E
80 E
90 E
110 E
Tarim
Tibet
India
South China
Indochina
Bay of Bengal
Indian Ocean
South China Sea
Andaman Sea
Karakax F.
Altyn Tagh F.
30 mm/yr
15 mm/yr
Haiyuan F.
Kunlun F.
12 mm/yr
Qinling F.
12 mm/yr
Karakoram F.
30 mm/yr
Chaman F.
20 mm/yr
Jiali F.
15 mm/yr
Xianshuihe F.
9-15 mm/yr
Lungmen Shan
Himalayan front
11 mm/yr
50 mm/yr
Sagaing F. 18 mm/yr
Red River F.
5 mm/yr
Dien Bien Phu F.
Mae Ping F.
Ranong F.
Sumatran F.
Philippine F.
Tectonic setting of SE Asia and the Sagaing Fault
N
1000 km
Approx. scale at equator
Subduction margin, tick on upper plate
Spreading ridge and associated transforms
18 mm/yr
Strike-slip fault showing shear sense and slip rate in mm per year
Other fault
18 mm/yr
Annual motion of plate relative to static Eurasia
Tarim
Tectonic block name
Plate boundaries, faults and rates modified after NASA/Goddard Space Flight Centre, Digital Tectonic Activity Map of the Earth, 2000; PLATES Project, University of Texas at Austin; Replumaz et al. 2001; Hall, 2002; Vigny et al. 2003; Morley 2004. Base digital elevation model from: Amante, C. and B. W. Eakins, ETOPO1 1 Arc-Minute Global Relief Model: Procedures, Data Sources and Analysis. NOAA Technical Memorandum NESDIS NGDC-24, 19 pp, March 2009.
Ian Watkinson 2013



Seismotectonic map of Myanmar (Burma) and surroundings. Faults are from Taylor & Yin (2009) with minor additions and adjustments. GPS vectors show velocities relative to a fixed India from Vernant *et al.* (2014), Gahalaut *et al.* (2013), Maurin *et al.* (2010) and Gan *et al.* (2007). Coloured circles indicate M_w > 5 earthquakes from the EHB catalogue. Grey events are listed for depths <50 km, yellow for depths of 50–100 km and red for depths >100 km.



Large Earthquakes within and near Myanmar (with dates and magnitudes)

Locations are shown by highlighted numbers

1. 23 May 1912 (8.0)
2. 08 July 1918 (7.6)
3. 27 Jan 1931 (7.6)
4. 26 June 1941 (7.7)
5. 12 Sept 1946 (7.5)
   15 Sept 1946 (7.75)
6. 29 July 1947 (7.9)
7. 15 Aug 1950 (8.7)

M 5 - 5.9

M 6 - 6.9

M 7 - 7.9

M 8

6 Plate motion in cm/yr (GPS data: Socquet et al. 2007)

Plate Boundaries

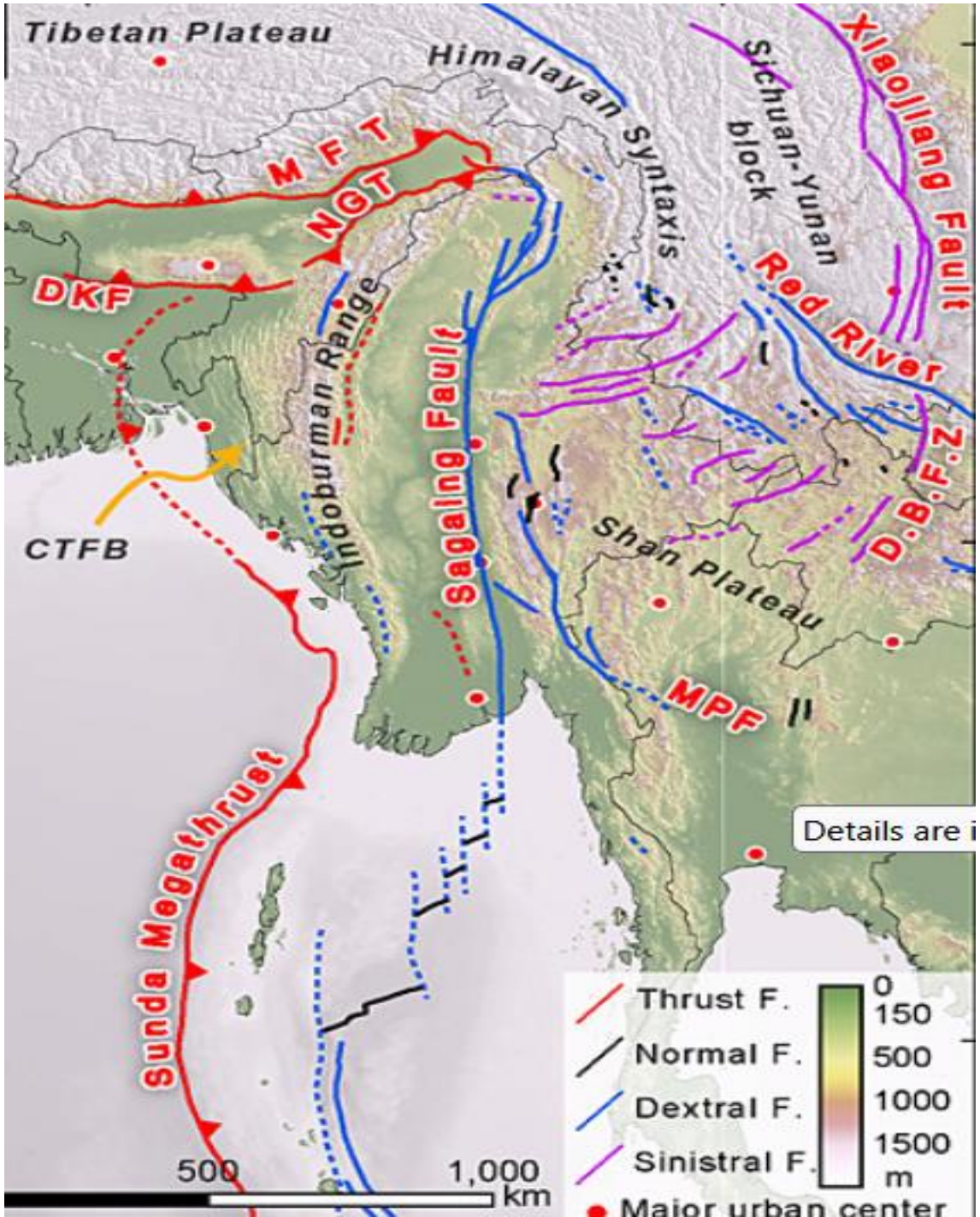
Collision Zone

Subduction Zone

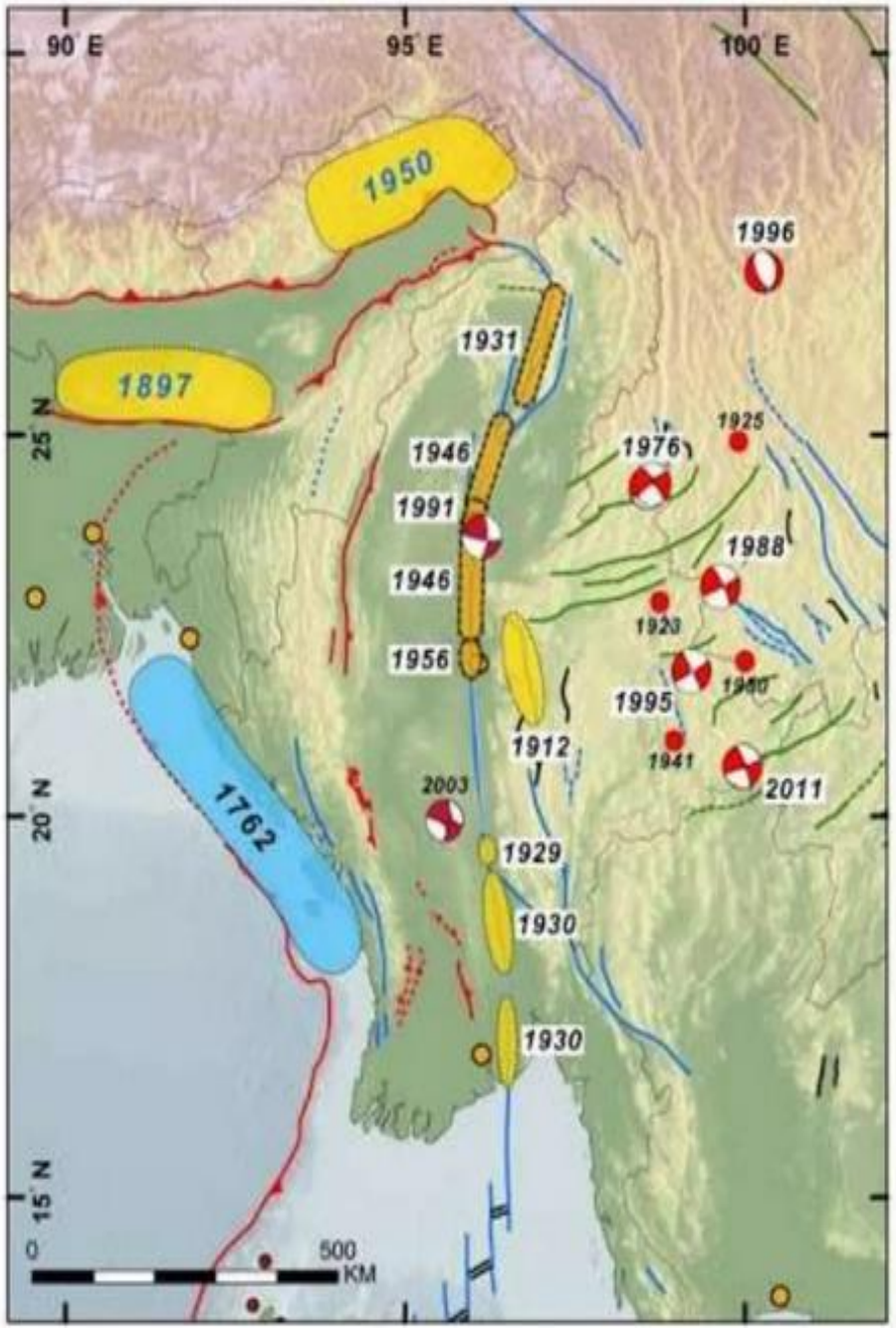
Transform Fault

Active Spreading Center

0 100 200
miles

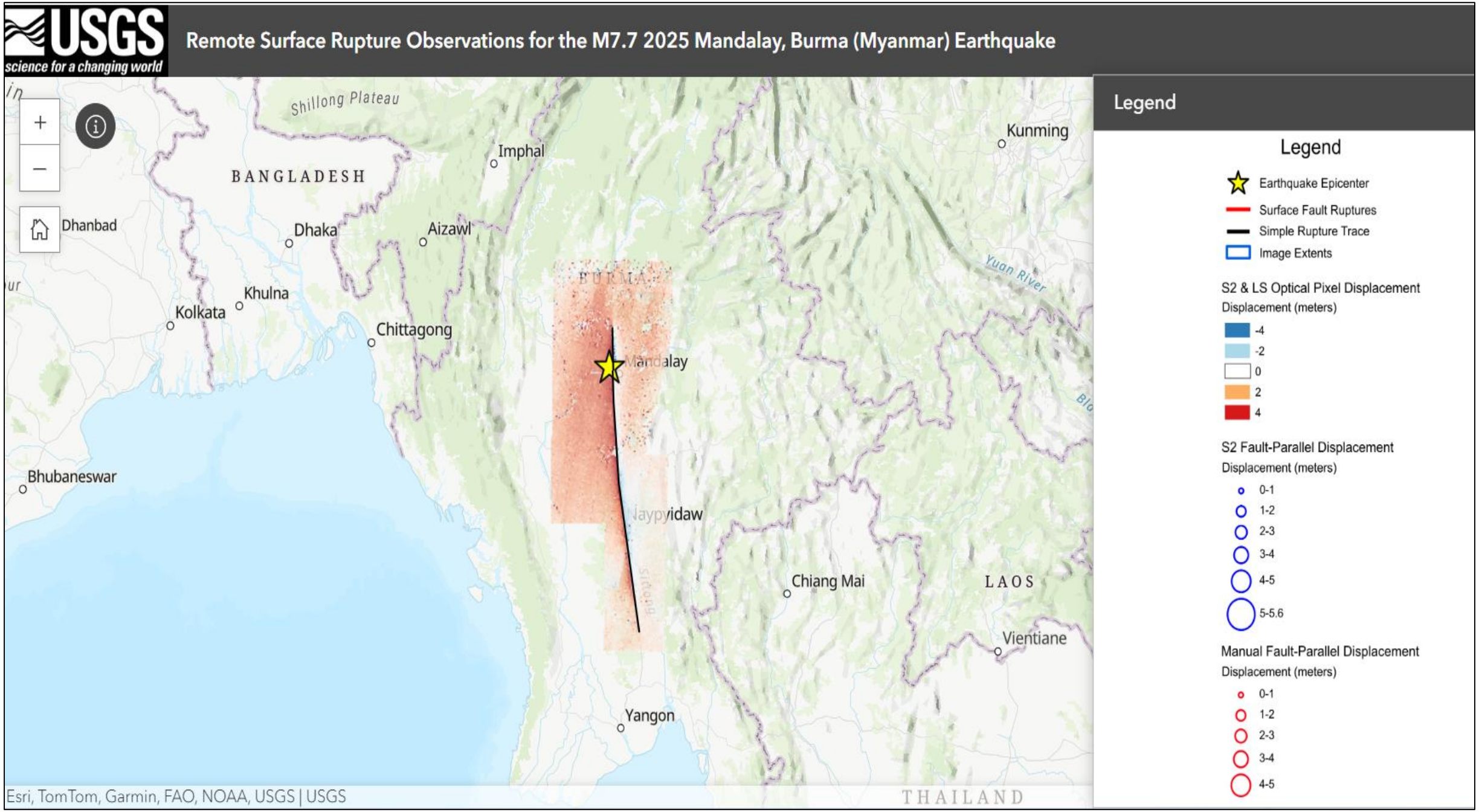


Critical Stress Release Mechassnisms



Manitude 7 and above Major Earthquake along Sagaing Fault

1929 - Swa-Taungoo
1930 - Bago
1930 - Phu
1931 - Indawgyi
1946- Tagaung
1956 - Sagaing
1991 - Tagaung
2025 - Mandalay


USGS
science for a changing world
Remote Surface Rupture Observations for the M7.7 2025 Mandalay, Burma (Myanmar) Earthquake
Shillong Plateau
BANGLADESH
Imphal
Kunming
Dhanbad
Dhaka
Aizawl
Yuan River
Khulna
Kolkata
Chittagong
BURMA
Mandalay
Bhubaneswar
Naypyidaw
Chiang Mai
LAOS
Vientiane
Yangon
THAILAND
Esri, TomTom, Garmin, FAO, NOAA, USGS | USGS
Legend
Legend
Earthquake Epicenter
Surface Fault Ruptures
Simple Rupture Trace
Image Extents
S2 & LS Optical Pixel Displacement
Displacement (meters)
-4
-2
0
2
4
S2 Fault-Parallel Displacement
Displacement (meters)
0-1
1-2
2-3
3-4
4-5
5-5.6
Manual Fault-Parallel Displacement
Displacement (meters)
0-1
1-2
2-3
3-4
4-5

Post Earthquake Hazard Assessment 2025 Mw 7.7 Sagaing Fault Earthquake

1. **Mainshock Characteritics and Tectonic Context**

- Supershear Rupture Dynamics: The Earthquake propagated at 5 km/s southward(exceeding crustal shear wave velocity)radiating intense seismic energy directionally.
- The supersonic rupture extended more than 400 kmwith peak surface displacements more than 6 meters, consistent with more than 300 years strain relaese.

2. **Seismic locked segment analysis and future rupture potantial**

- Unruptured segments- The southern Bago segment (last ruptured 1929) remain locked, capable of generating Mw 7.4 events. GPS data indicate 18-24 mm/yr slip deficit, 8-18 km locking dept, signifyinghigh strain accumulation.

- Heterogeneous slip distribution: The sagaing earthquake rupture exibited variable slip (1-6m), with minimal slip in the Pyu region and southern terminus. These areas now represent high probability seismic locked area for Mw 7.0 events. (Slip distribution revealed asymmetic slip -max 6.3 m near Mandalay and less than 1.0 m in Pyu segment) (https://earth.esa.int)
- Segments with elevated future seismic potential-

Fault segment	Slip rate(mm/yr)	Locking Dept(km)	Potential Magnitude	Last major rupture
Bago	20-22	12-15	Mw - 7.4	1929(Mw < 7.0)
Pyu	18-20	8-12	Mw- 7.2	Partial slip in 2025
Meiktilar (re-ptured)	24	18	Mw- 7.6	2025(primary energy release)

- Generated on SagaingFault- 1400km transform boundary between Burma microplate and Sunda plate with a 18-24mm/year slip rate of right lateral motoin. Vertical motion detected 1.2 m uplift on Burma plate side and 0.8 m subdience on Sunda plate side. (https://www.eorc.jaxa.jp)
- Reactivated segment repviously ruptured in 1965 (Sagaing, Mw 7.0), 1946 (Tagaung, Mw 7.7), 1930 (Bago, Mw 7.3) ending 69 -year seismai quiescence period that allowed substantial strain accumulation.
- Locked segment is shown less than1mm/yr creep in the Bago segment, confirming high strain accumulation. (InSAR time series 2014-2025)
- Post-seismic creep was measured 5-20cm of shallow slip along central segments 30 day post mainshock, reducing stress on southern gaps. (nature of Geoscience, 2025)

Integrated risk out look: The Saging Fault remains a heightened stress state with four principle hazards dominating.

Short Term (< 1 year)	(a) Aftershock Mw > 5.0 (b)Monsoon triggered landslides and damaged buildings collapses
Medium-term (1- 10 years)	Increased probability of Mw > 7.0 events on southern segments(Bago)
Long-term (>10 years)	Cumulative strain buildup from plate motion (35mm/yr) ensures earthquake recurrence.

Mitigatin Strategies - (a) Deploy mobile seismic arrays along central locked segment of fault to refine aftershocks forcast (b)Expand GPS and InSAR networks or Drone Lidar survey on Bago segment to quantify strain rate.(c) To develope not only seismic microzonation map but also disaster prevention and mitigation basic plan and scenario-based evacuations plan for cities which are considered to be affected.

THANK YOU FOR YOUR KIND ATTENTION