2025 Myanmar Earthquake

Investigating damage through remote sensing and news reports

Disaster Geoinformatics Laboratory 東北大学 災害科学国際研究所 (IRIDeS)

Shunichi Koshimura Erick Mas Bruno Adriano Ayumu Mizutani Ruben Vescovo Sesa Wiguna Chia Yee Ho Xuanyan Dong Ira San José

Disaster Geo-informatics Team



Prof. Shunichi Koshimura



Assistant Professor Ayumu Mizutani



Postdoctoral Researcher Chia Yee Ho



Associate Professor Erick Mas

ciate ssor Mas

Associate Professor Bruno Adriano

Postdoctoral Researcher Sesa Wiguna

Assistant Professor Ruben Vescovo



Ph.D. candidate Xuanyan Dong



Ph.D. candidate Ira San José





TOHOKU UNIVERSITY



Acknowledgements

Satellite Data

MAXAR



JAXA

Building Data



Microsoft

International Cooperation Project



Population & national data



OCHA

United Nations Office for the Coordination of Humanitarian Affairs

Seismic profile

USGS data science



тоноки

UNIVERSITY



Classical remote sensing → satellite imagery, physical meters (seismic, offshore pressure) Social sensing → News media coverage, social media

Objective:

- 1. Use Google News articles to identify impacted areas
- 2. Use **Satellite Image** analysis to detect possible damaged areas

Population data (CC 4.0) Humanitarian OSM (HOT) and WorldPop through OCHA HDX

Aggregated Population							
	5000						
	10000						
	15000						
	20000						
	25000						
	30000						
	35000						
	40000						
<	45000						

USGS impact estimates by city:

MMI City		Population		
IX	Sagaing	79 k		
IX	Pyu	40 k		
IX	Yamethin	60 k		
IX	Pyinmana	97 k		
VIII	Mandalay	1,208 k		
VIII	Nay Pyi Taw	925 k		
V	Yangon	4,478 k		
V	Bangkok	5,104 k		

USGS: United States Geological Survey **MMI**: Modified Mercalli Index





TOHOKU UNIVERSITY

OBJECTIVES



News-based structural impact, geo-location, and frequency analysis (48 hours)

Impacted areas and number of **distinct** damaged buildings reported in the news

2

4

6



DeS International Research Institute of Disaster Science



тоноки UNIVERSITY

NEWS-BASED ANALYSIS: METHODS & MAPPING



RIDeS nternational Research Institute of Disaster Science тоноки UNIVERSITY **NEWS-BASED ANALYSIS:** DAILY BREAKDOWN

*only first 17:40 hours (UTC)



Info about surrounding rural areas is available: Kyaukse Taungoo Taunggyi Kalaw Magway





TOHOKU UNIVERSITY



[00:00 UTC - 23:59 UTC]

More detailed urban areas are added:

- Sintgaing (MM)
- Si Lom business district (TH)

Regional additions:

- Yamethin (MM)
- Chiang Rai (TH)







тоноки UNIVERSITY







TOHOKU UNIVERSITY



IRIDES International Research Institute of Disaster Science



TOHOKU UNIVERSITY

Impacted infrastructure as reported in the first 96 hours (Collapsed, damaged, out of service)



Availability timeline & coverage of open-source satellite imagery

2025-03-28	03-29	03-30	03-31	04-01	04-02	04-03	04-04
• WV02	WV02PNEOGE01	 ALOS-2* WV03 SENTINEL2 	WV02PLEIADES	PLEIADESPNEO	 PLEIADES 	WV02PLEIADES	 WV01 ALOS-2** SENTINEL1



Footprints of satellite coverage for each day

Coverage generally limited or delayed: main releases on day 3 and day 8

* ScanSAR ** StripMap

SATELLITE DATA **ACQUISITION**

ALOS-2 PALSAR-2 JAXA

- Pre-event: 2022-04-08 and 2024-04-19
- Post-event: 2025-04-04

Change detection method: Computing **z-score of** pre-event and coevent SAR coherences





CHANGE AREA IDENTIFICATION

Through satellite imagery we identified changed areas, beyond disaster charter working areas (Copernicus EMS, SERTIT and UNOSAT). These areas also might have been affected.



News extracted info & change detection – Mandalay City

Combination of available imagery with news-based analysis.

- Damaged landmarks as reported on the news extracted within 24 hours
- RS confirms wider-spread damage in Mandalay area
- Earliest damage assessment by UNOSAT* on 2025-04-03



2025-03-28 Mandalay Ava Bridge, Ma Soe Yane Monastery, Mahamuni Pagoda, Mandalay Airport, Mandalay General Hospital, Mandalay National Museum, Mandalay Palace, Mandalay University, Phaya Taung Monastery, Shwe Phone Shein Mosque, Shwe Sar Yan Pagoda, Sky Villa Condominium, St. Michael's Catholic Parish, Thabyagygone market, U Hla Thein monastery, Wisdom Villa Private High School Unnamed multi-storey apartment Highway section ...

2025-03-29 Mandalay West Mye Mye Kyi pre-school, air traffic control tower





TOHOKU UNIVERSITY

News extracted info & change detection – Mandalay Surroundings



Summary of findings

As of four weeks post-disaster, there appears to be **no comprehensive report** compiled on the overall **damage** and **humanitarian** impacts

- +750 English and Japanese main report areas: Bangkok 25%, Mandalay 24% and Nay Pyi Taw 12%
- Reporting becomes progressively more accurate over time: i.e. more detailed reporting of smaller administrative boundaries
- Reporting is most accurate at identifying landmark damage. Damage to housing is general or given at the "district" level
- Combine News and RS based assessments to gain better insight:
 - 1. Leverage news-based assessment to verify RS assessment findings & identify not covered by limited scope surveys (i.e. Copernicus EMS)
 - 2. Leverage RS to identify fine grained areas (esp. remote) that are not picked up through news media
- News-based impact extraction can operate in real time and can be immediately available when satellite image is released





Thank you

Shunichi Koshimura Erick Mas Bruno Adriano Ayumu Mizutani Ruben Vescovo Sesa Wiguna Chia Yee Ho Xuanyan Dong

Disaster Geoinformatics Laboratory 東北大学 災害科学国際研究所 (IRIDeS)