Earthquake catalog integration (TEM PSHA2025, draft)

Catalog

- **GCMT**
- **USGS**
- **ISC**
- **CWA**
- **NIED**
- **JMA**
- **CENC**

Removed duplicated earthquakes

De-clustered

Subduction zone source

- **Mc, a, b**

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Catalog

Name	First event	Last event	Event number	M_{min}	M type
Global Centroid Moment Tensor Project (GCMT)	1977-01-07	2022-12-23	1087	4.6	M_w
U.S. Geological Survey (USGS)	1905-03-17	2022-12-26	9512	1.0	M_W, M_S, M_L, m_b
International Seismological Centre (ISC)	1915-02-28	2021-07-31	85221	2.4	M_s / m_b
Central Weather Administration (CWA)	1900-05-15	2022-12-31	862099	0.1	M_L
National Research Institute for Earth Science and Disaster Resilience (NIED)	2000-05-18	2022-12-29	4628	3.4	M_w
Japan Meteorological Agency (JMA)	1919-06-01	2022-03-31	132954	0.6	M_J (M_D / M_v), M_s, m_b
China Earthquake Networks Center (CENC)	2012-04-28	2022-12-26	716	2.0	M

鄭世楠等(2010):

CWASN: $M_L = 0.961M_w + 0.338 \pm 0.256 \ (M_L \leq 5.5)$

$M_L = 5.115\ln(M_w) - 3.131 \pm 0.379 \ (M_L \geq 5.5)$

$M_{W(GCMT)} = 0.951M_{w(CWA_{BB})} + 0.434 \pm 0.14$

Storchak et al. (2013):

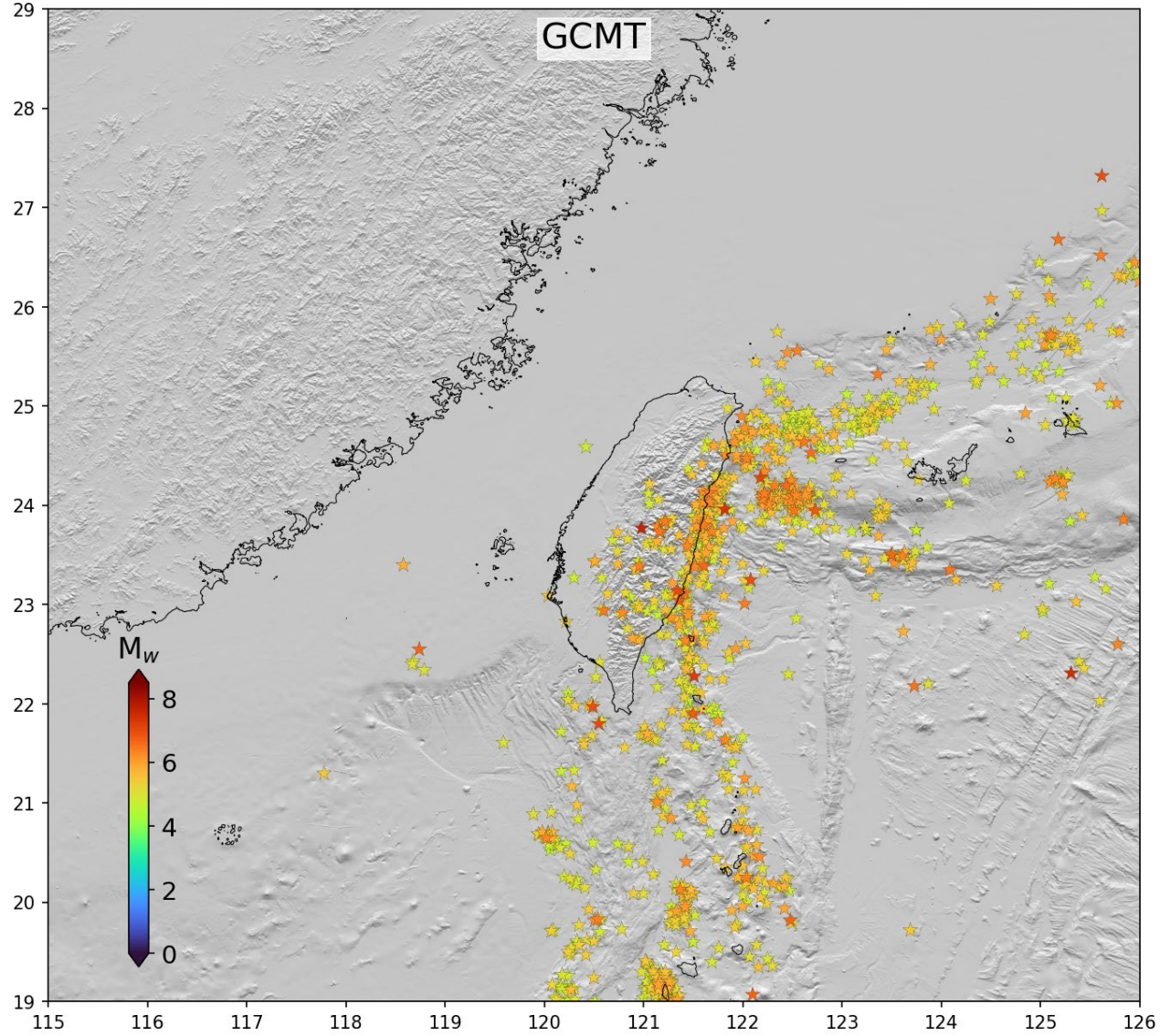
$M_w = 0.67M_S + 2.13 \ (M_S \leq 6.47)$

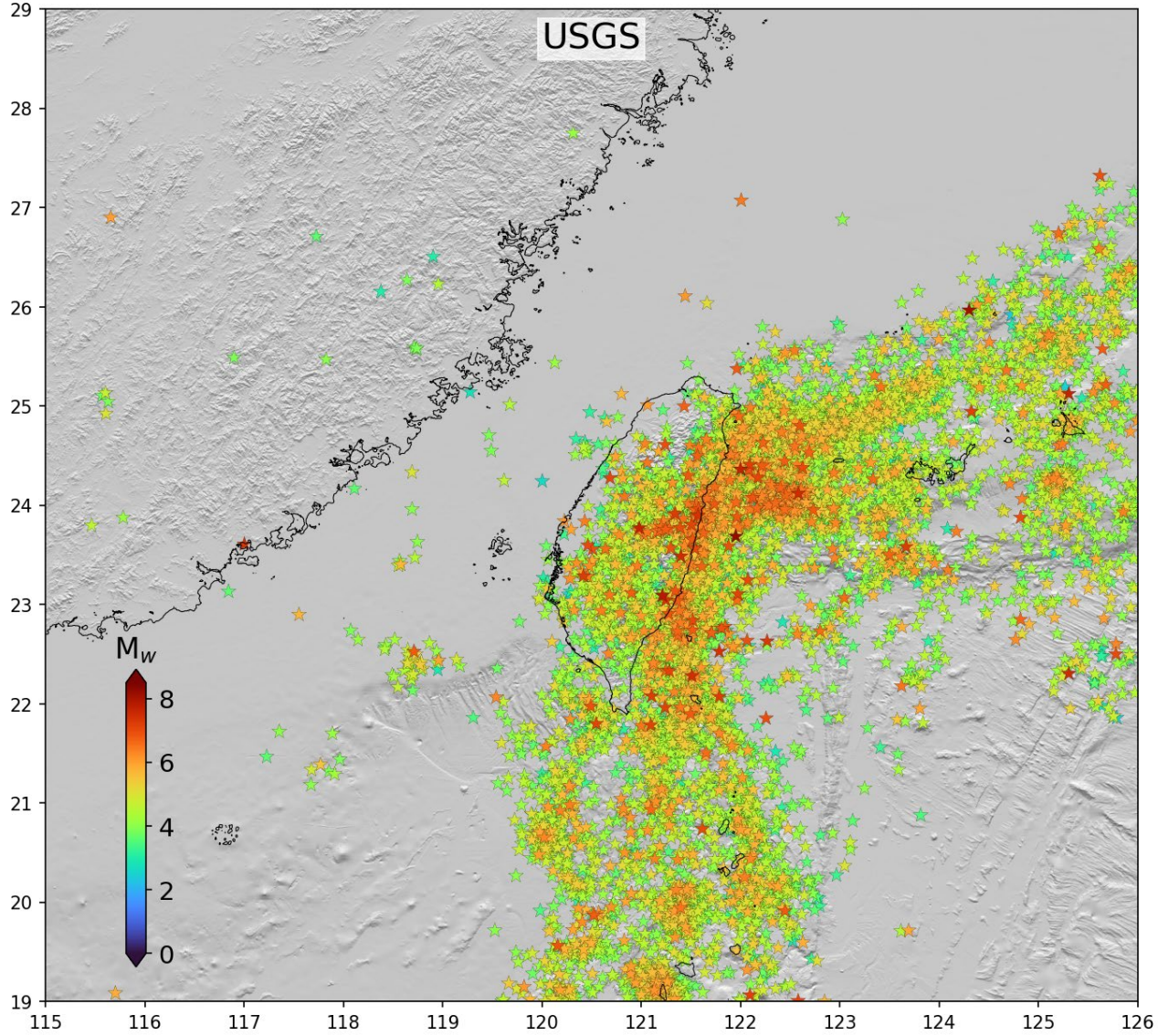
$M_w = 1.10M_S - 0.67 \ (M_S > 6.47)$

Storchak et al. (2013): $M_w = 1.38M_b - 1.79$

$M_w = 0.78M_J + 1.08$

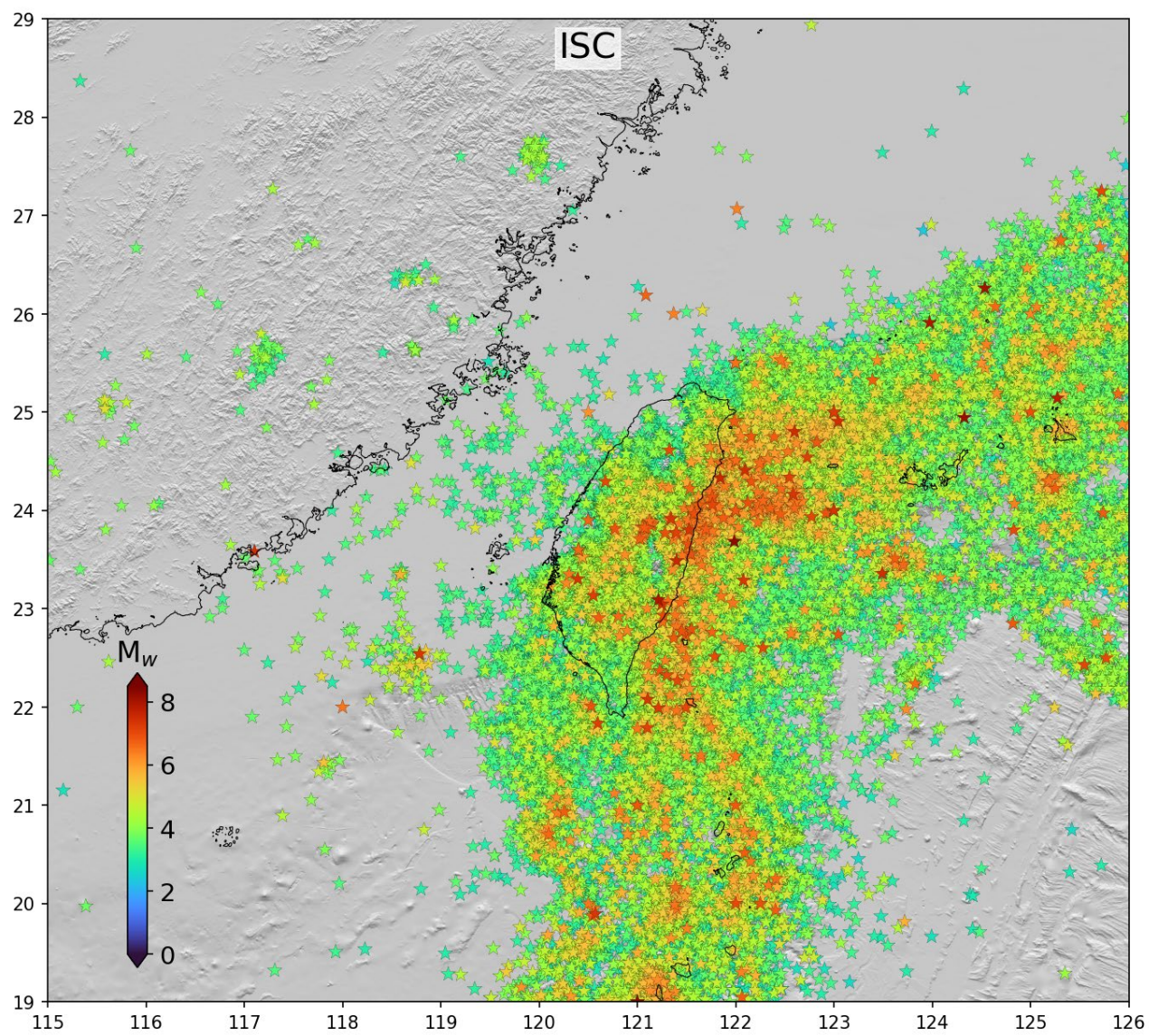
https://jishin.go.jp/main/choukihyoka/04mar_kakuritsu/setsumei_3.pdf

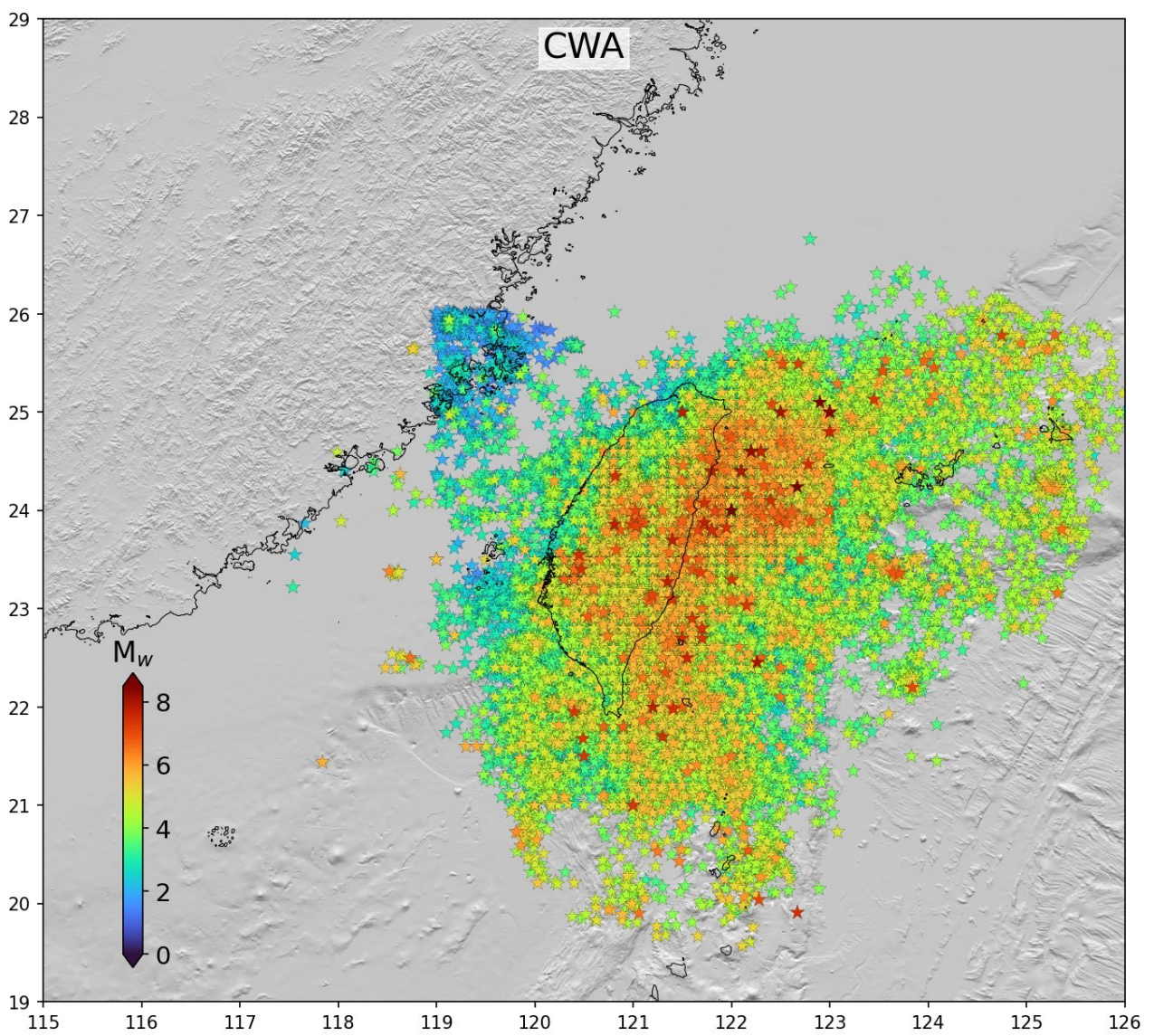




GCMT (1977 - 2022, M_{min}= 4.6)
https://www.globalcmt.org/CMTsearch.html

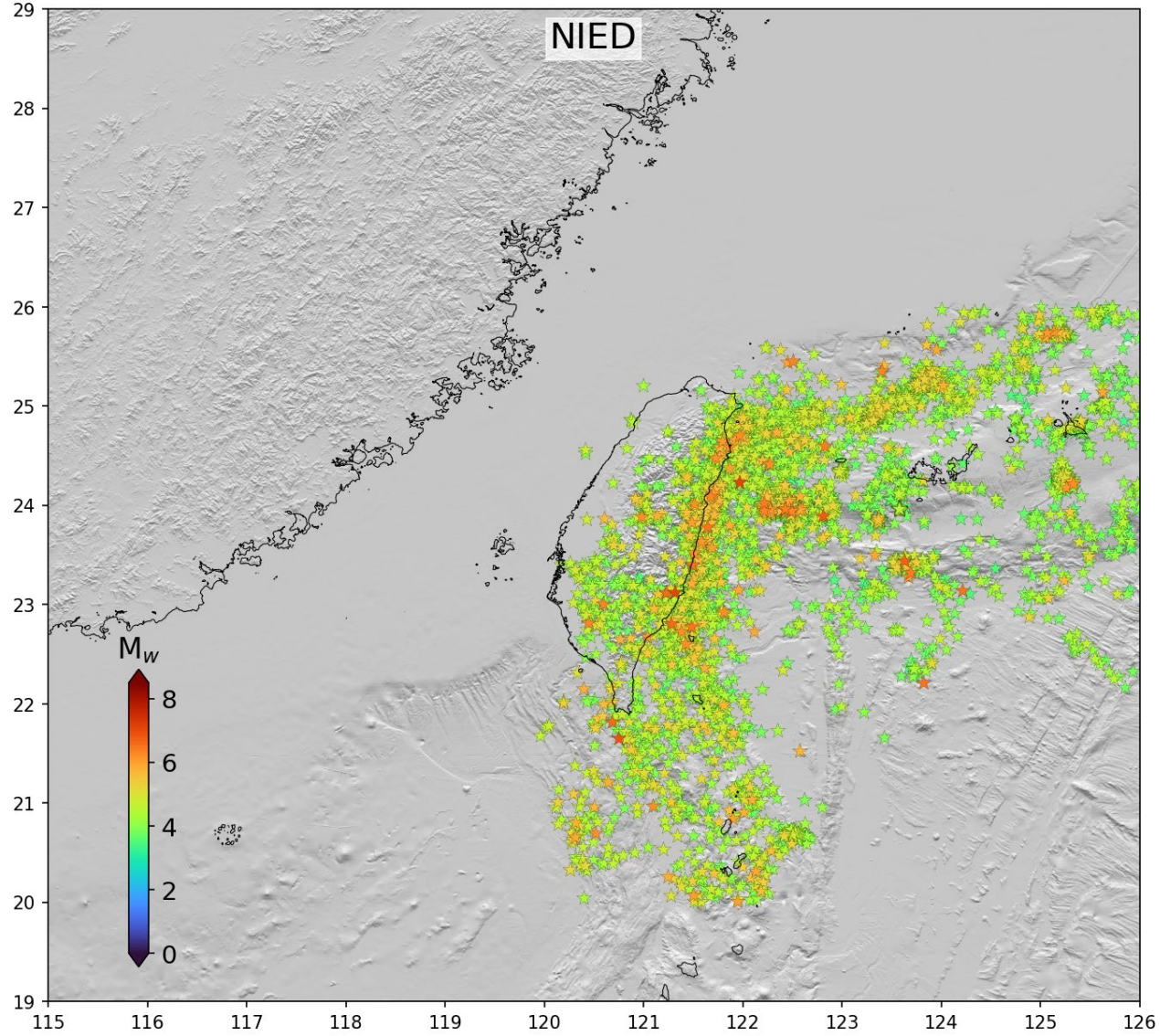
USGS (1905 - 2022 , M_{min}= 1.0)
https://earthquake.usgs.gov/earthquakes/search/

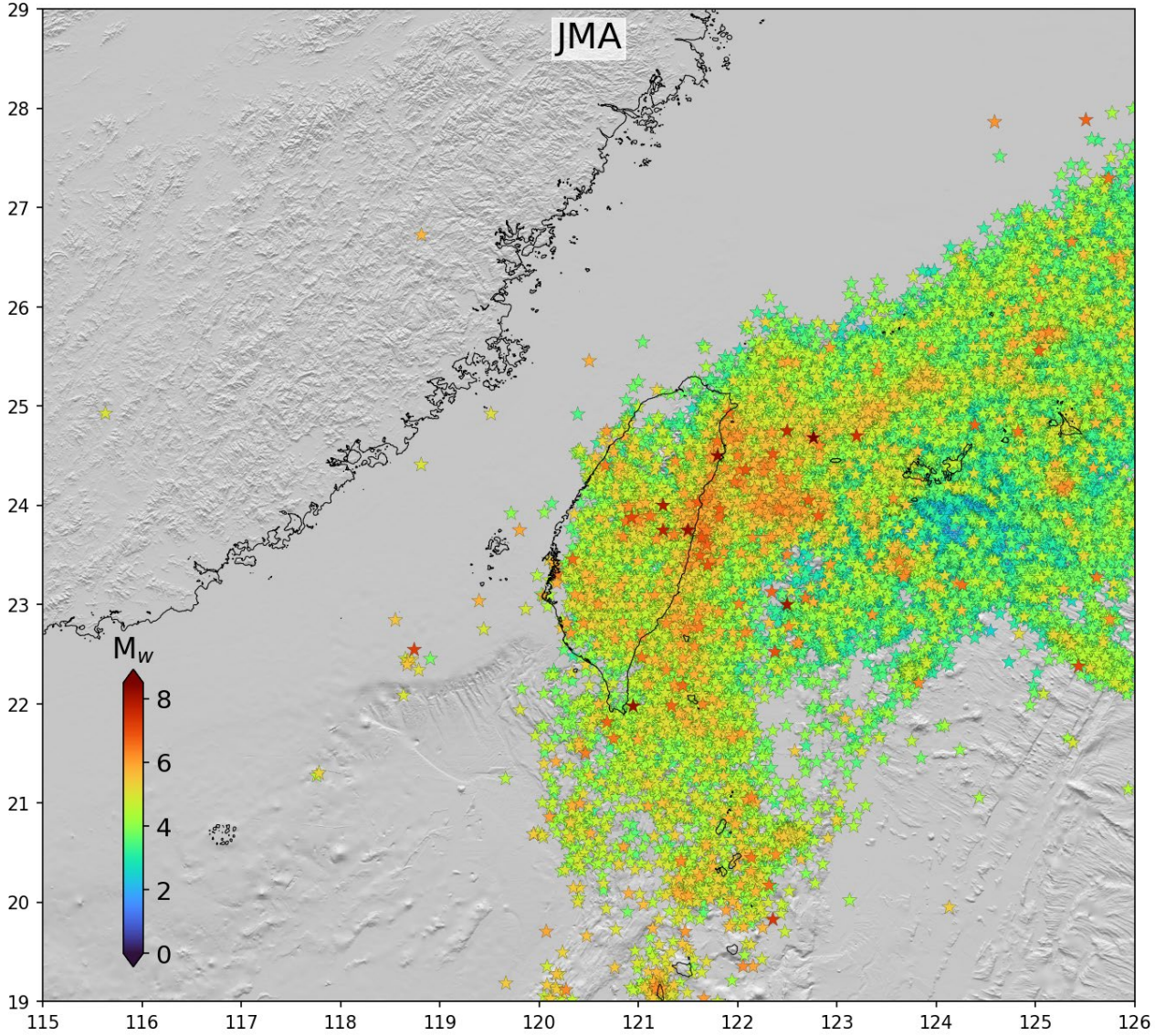




ISC (1915 – 2021 July, M_{min}= 2.4)
http://www.isc.ac.uk/iscbulletin/search/catalogue/

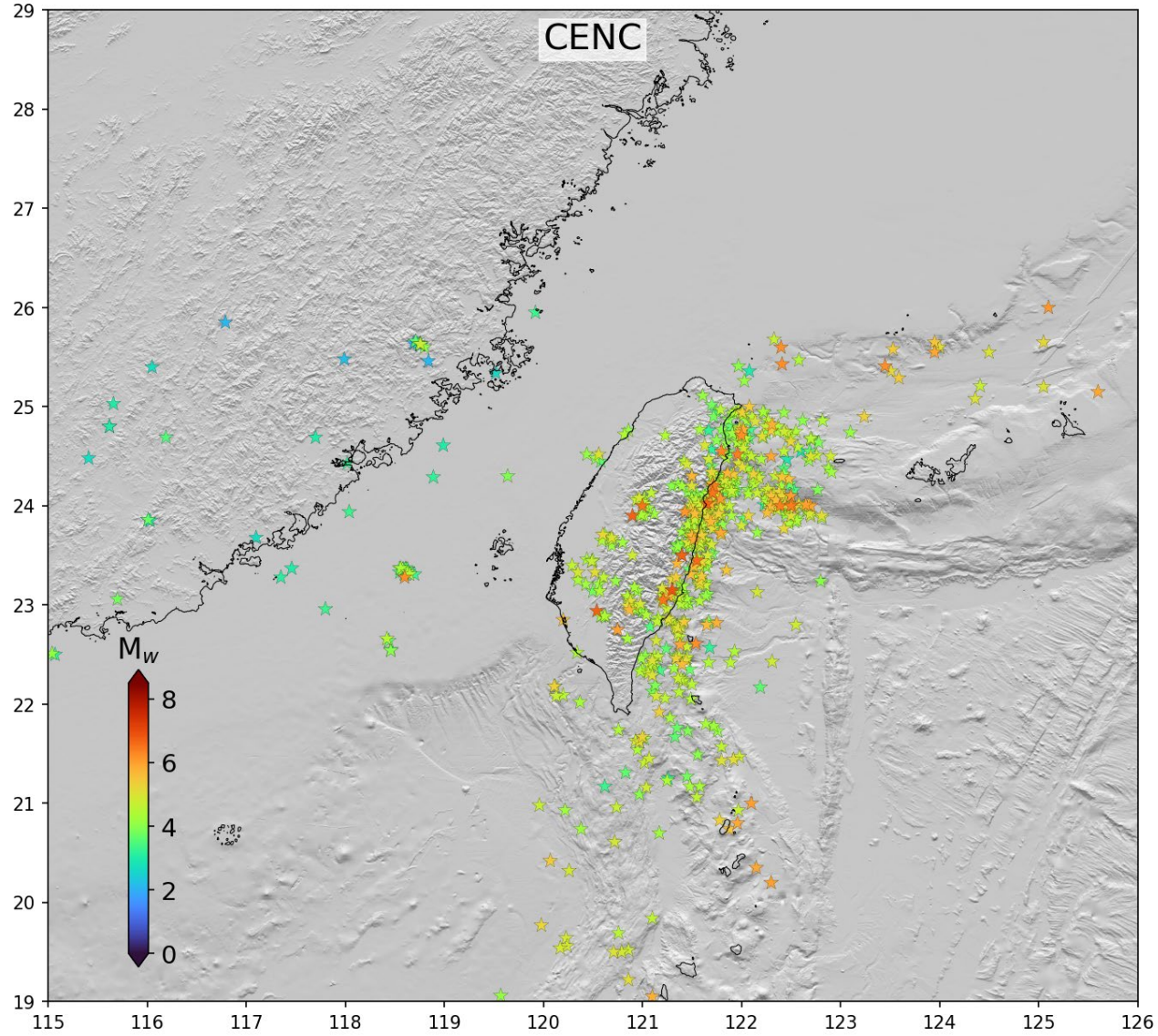
CWA (1900 - 2022, M_{min}= 0.1)
https://gdms.cwa.gov.tw/catalogDownload.php





NIED (2000 - 2022, M_{min}= 3.4)
https://www.fnet.bosai.go.jp/event/search.php?LANG=en

JMA (1919 – 2022 March, M_{min}= 0.6)
https://www.data.jma.go.jp/svd/eqev/data/bulletin/hypo_e.html



CENC (2012 - 2022, M_{min}= 2.0)
http://www.ceic.ac.cn/history

Merged catalogs

↓

Removed duplicate earthquakes

- It can be regarded as the same earthquake if it meets the following criteria:

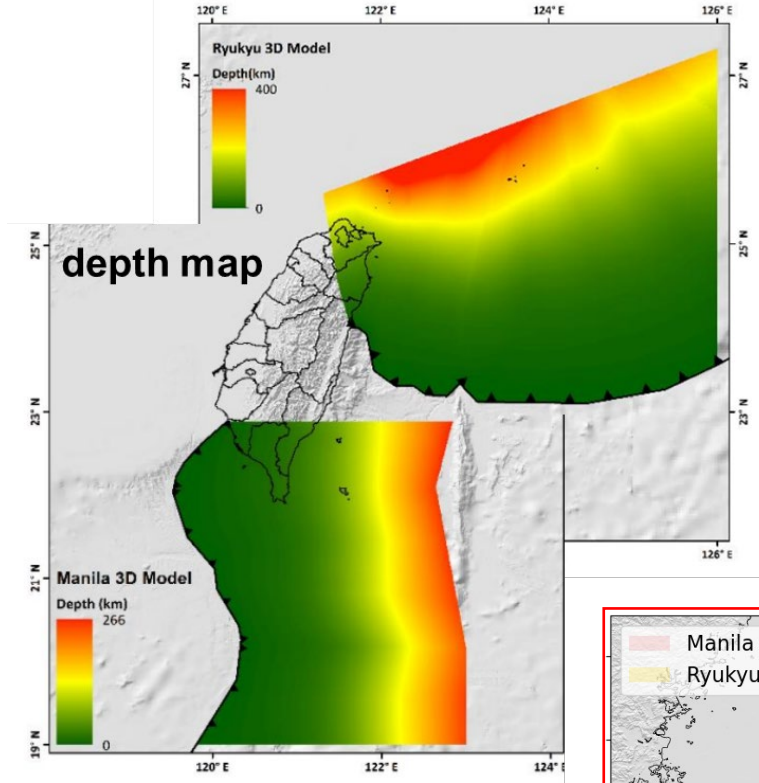
Distance : A difference of less than **30 kilometers**.

Time : A difference of less than **10 seconds**.

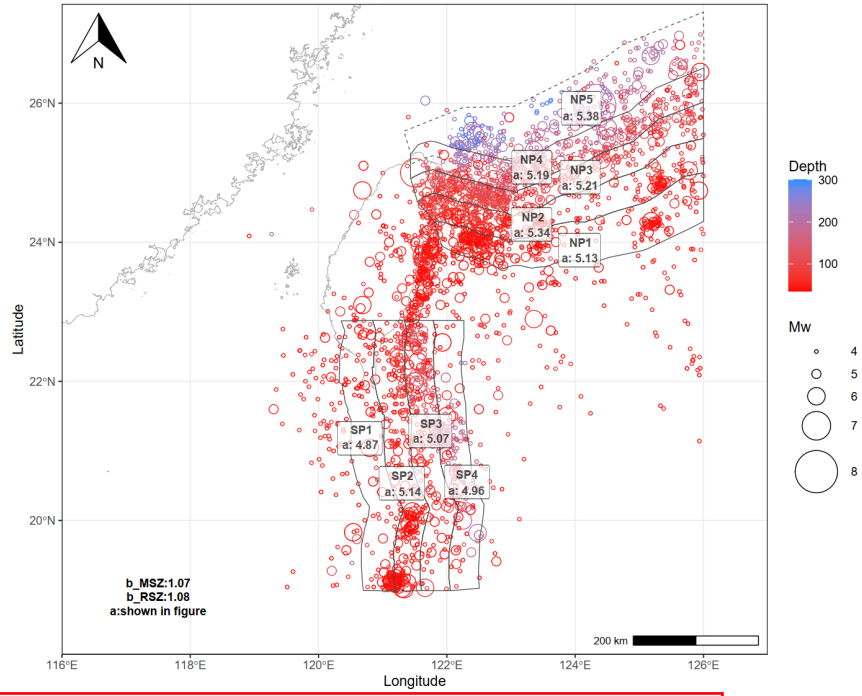
↓

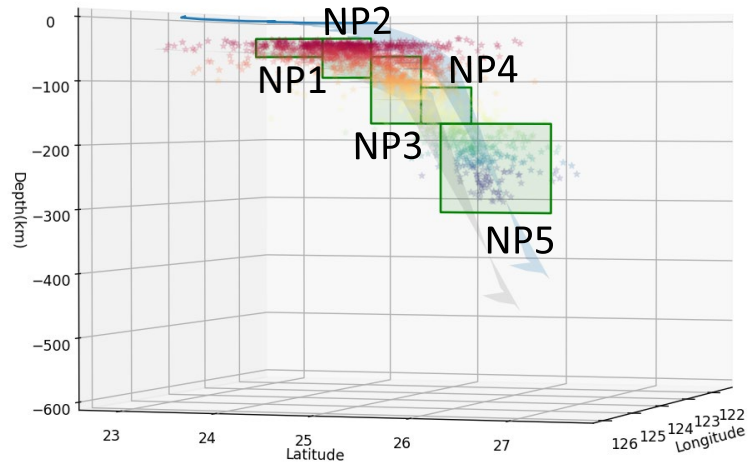
Removed foreshocks and aftershocks

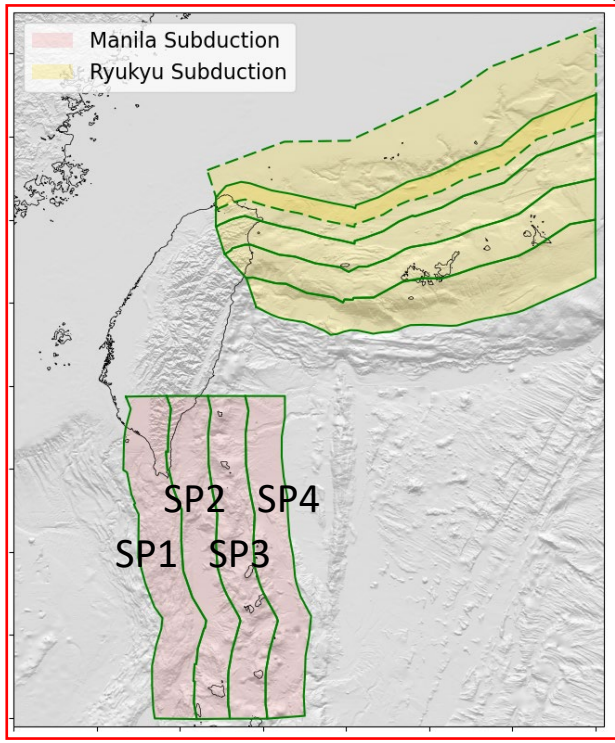
- Meet two of following De-clustered method:
  1) Arabasz and Robinson (1976)
  2) Gardner and Knopoff (1974)
  3) Uhrhammer (1986)
- Earthquakes are regarded as foreshocks or aftershocks if they fulfill at least two of the three declustering approaches.



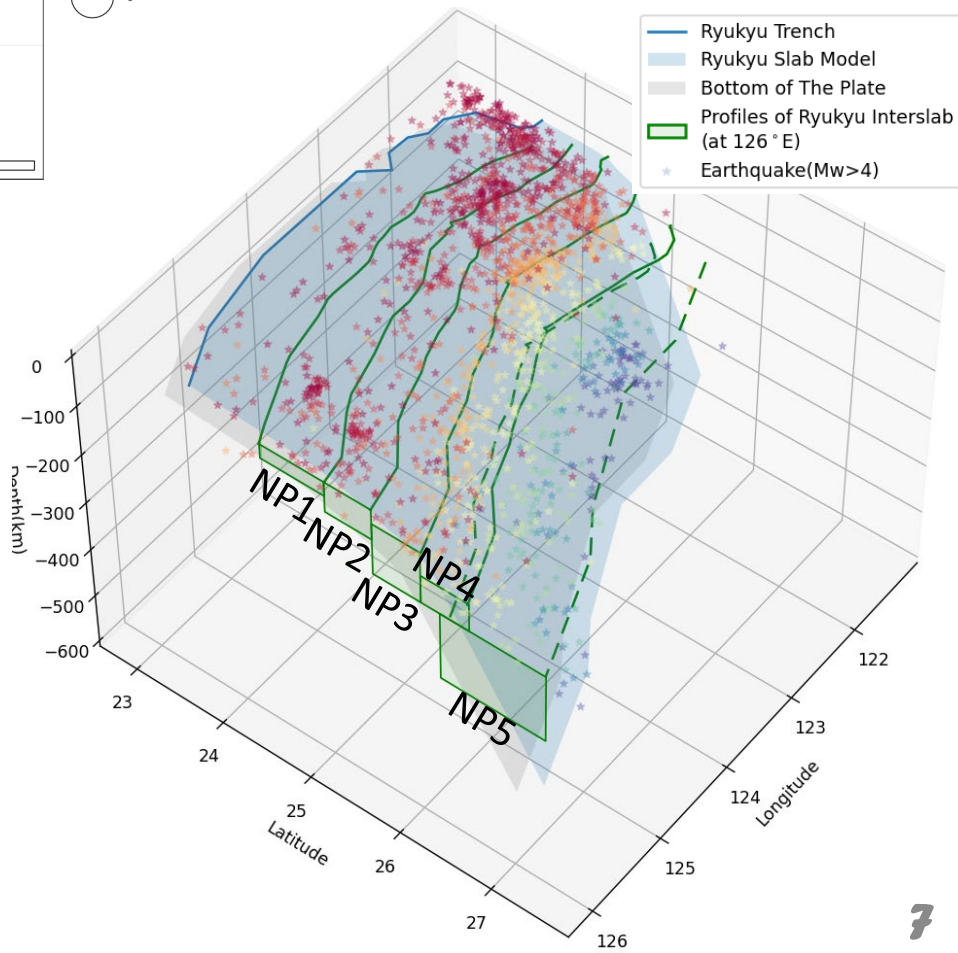
Tai power (2015-2019)

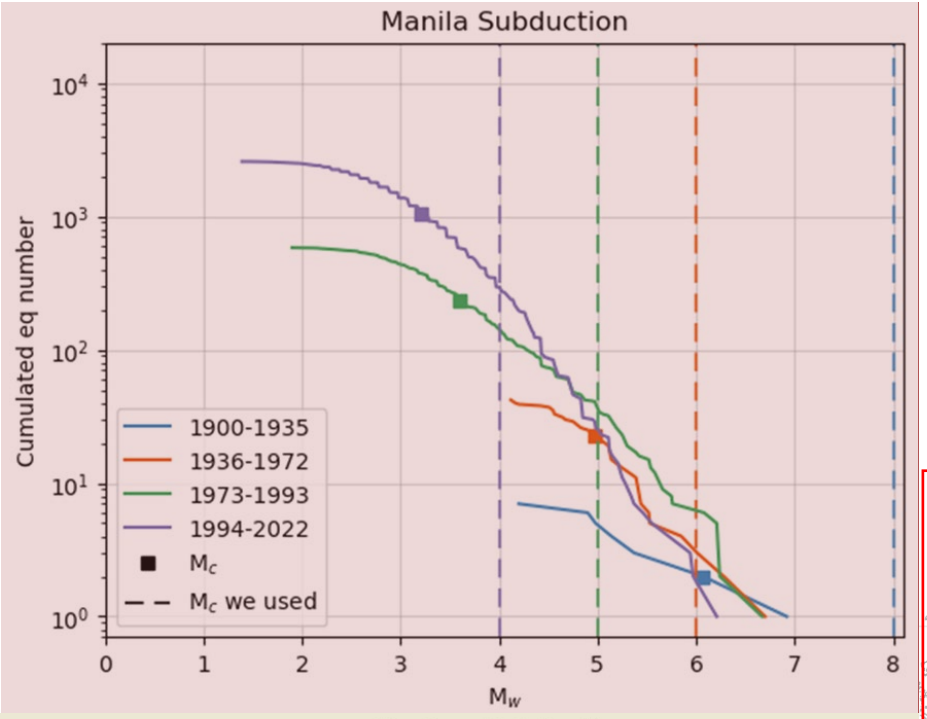


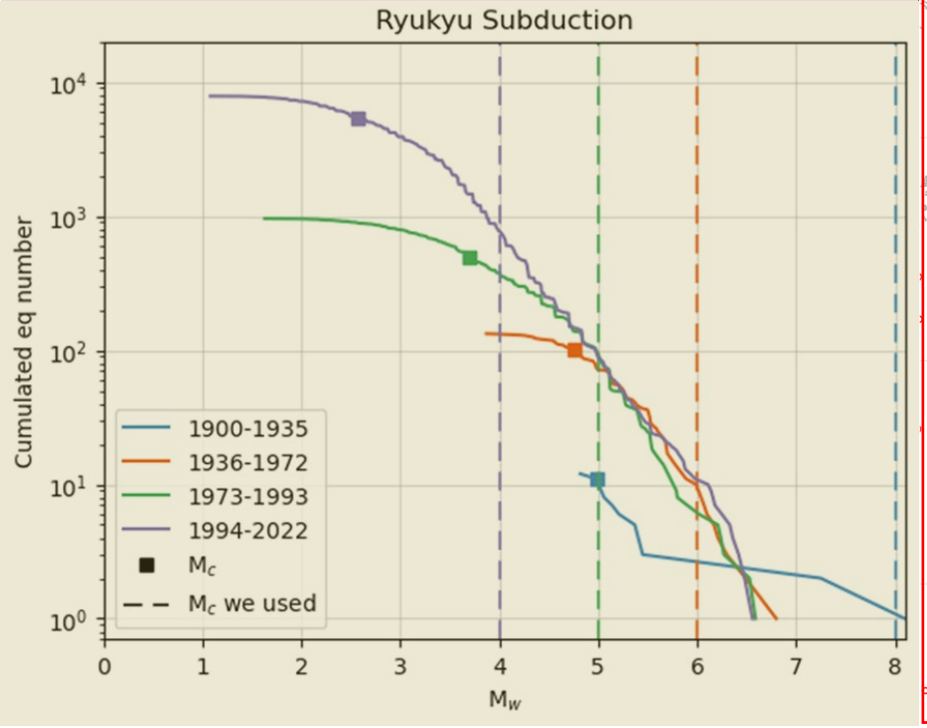


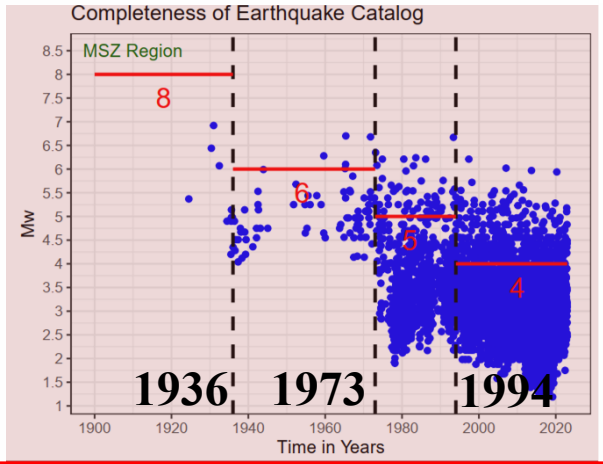


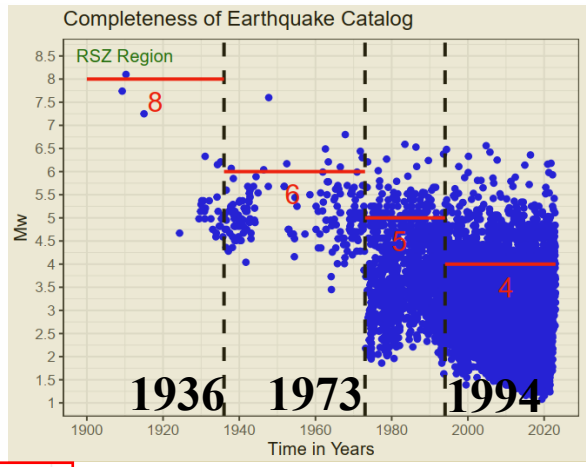
NP5 (165-300km)
NP4 (110-165km)
NP3 (63-165km)
NP2 (35-95km)
NP1 (35-63km)











Thanks
for your attention!

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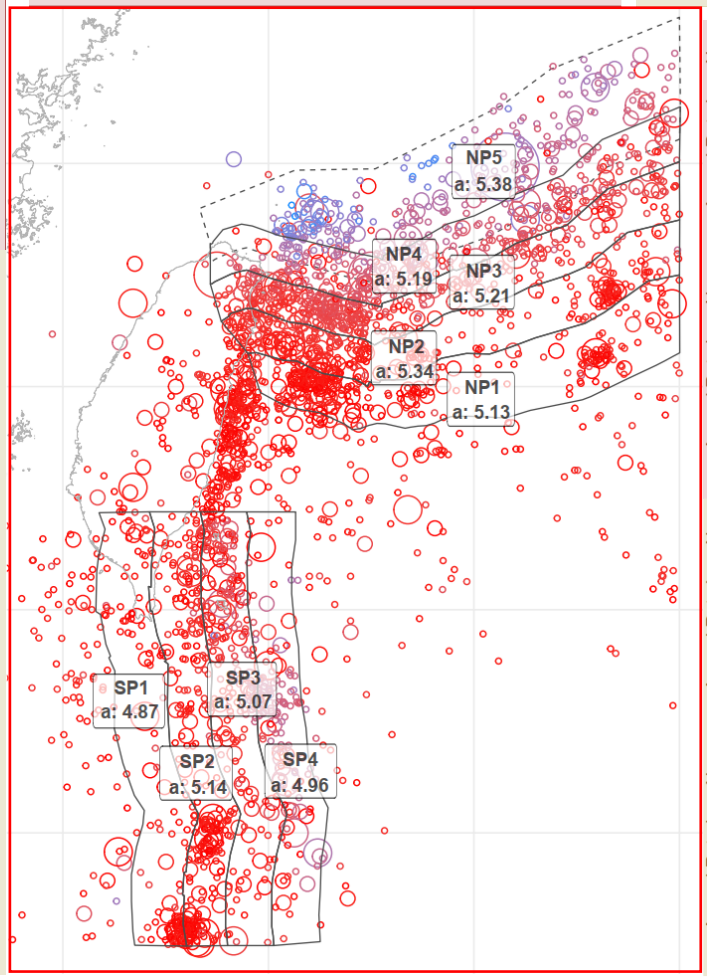

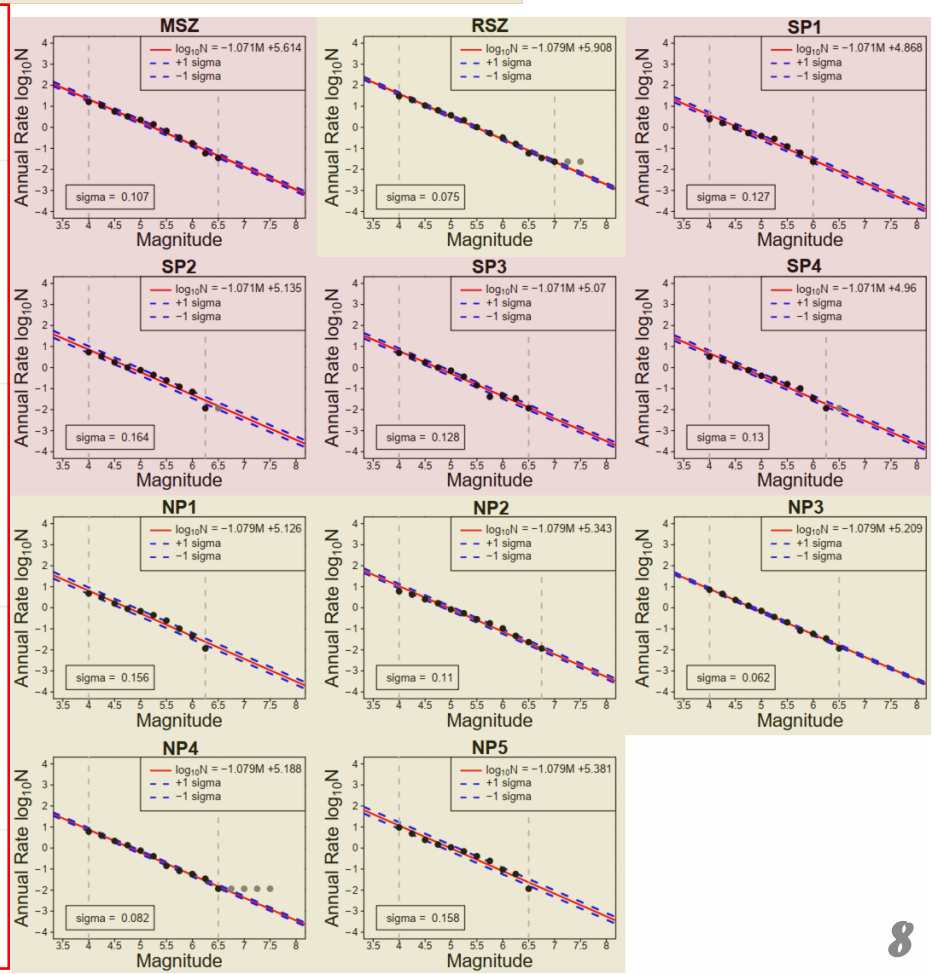

Thanks for your attention!
Thanks for TEM working group’s help!

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