Comparison of JMA and CWA catalogue
(Preliminary)

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Motivation

・A model of seismic activity around Taiwan is required for seismic hazard in the westernmost region of Japan

・Currently, earthquake frequency is modeled using the G-R relationship as a background earthquake.

・The area west of Yonaguni Island is outside the Japan Meteorological Agency's observation network and the reliability of the earthquake catalog is low.

・Using CWA's earthquake catalog to build a seismic activity model west of Yonaguni Island is required.

・In modeling the G-R relationship, the Japan Meteorological Agency magnitude (Mj) is used.

・Conversion from ML to Mj is required to use the CWA catalog.

Data

Term: Jan. 1, 1973 – Sep. 30, 2022 (JST)
Region: 15° N – 30° N, 115° E – 130° E

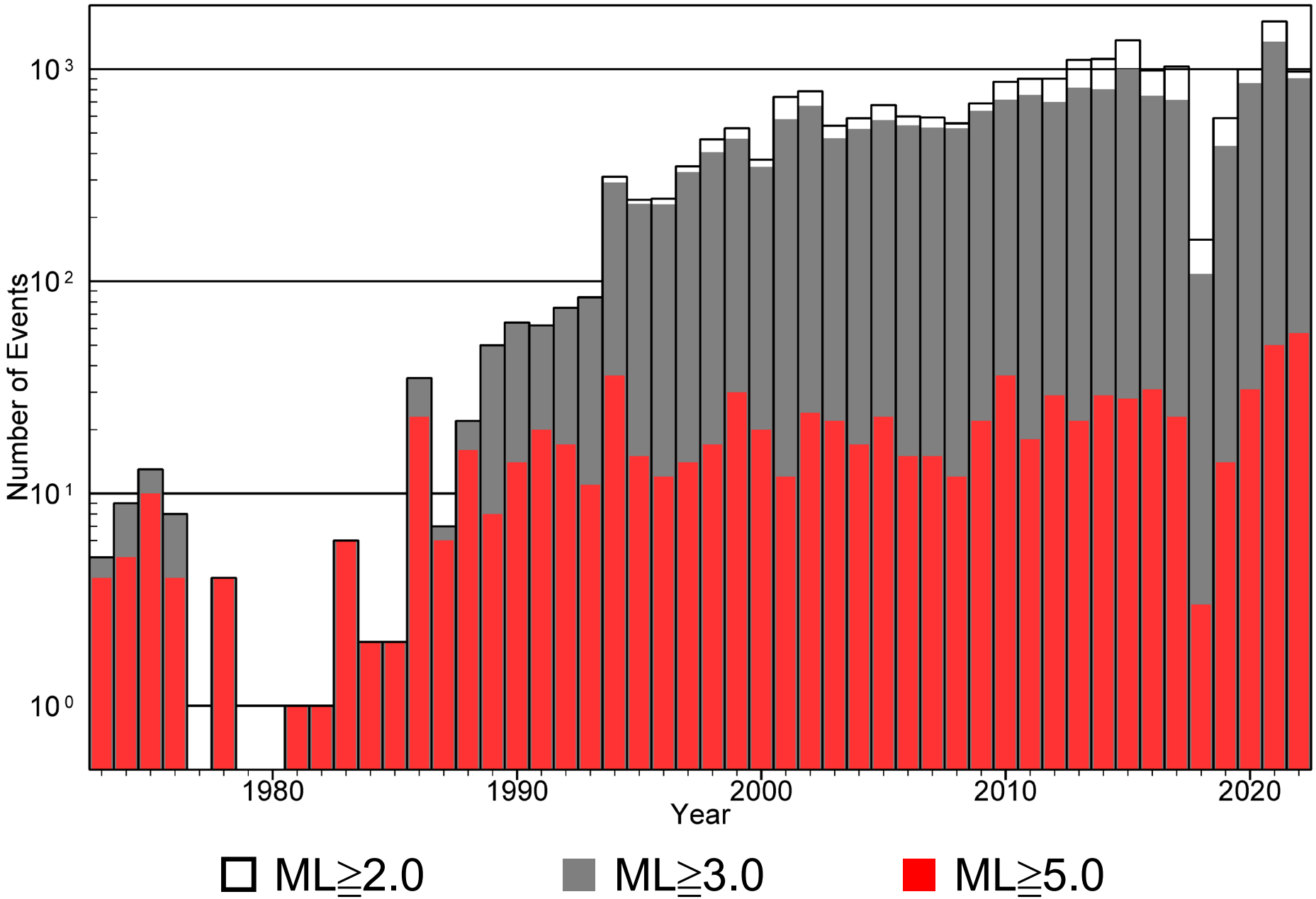
Japan Meteorological Agency (JMA)
https://www.data.jma.go.jp/eqev/data/bulletin/hypo.html (in Japanese)
https://www.data.jma.go.jp/eqev/data/bulletin/hypo_e.html (in English)

Central Weather Administration (CWA)
https://gdms.cwa.gov.tw/catalogDownload.php

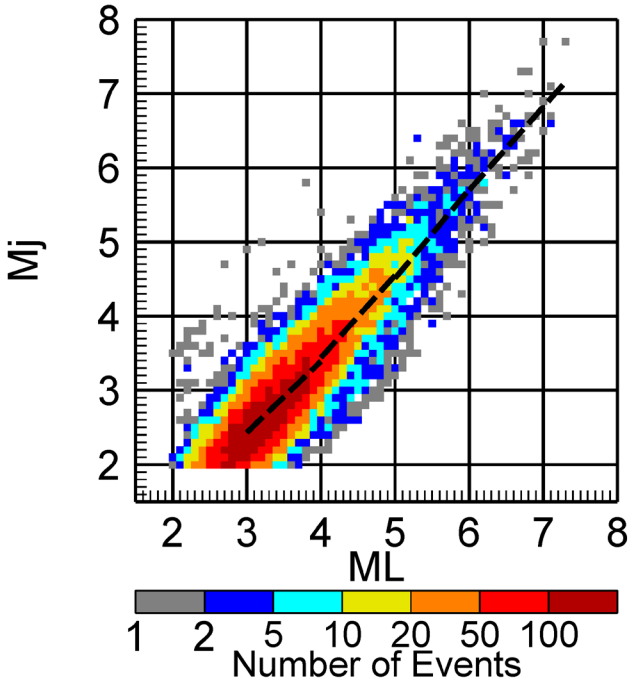
Here, earthquakes that meet the following conditions between both catalogs are determined to be the "same earthquake.“

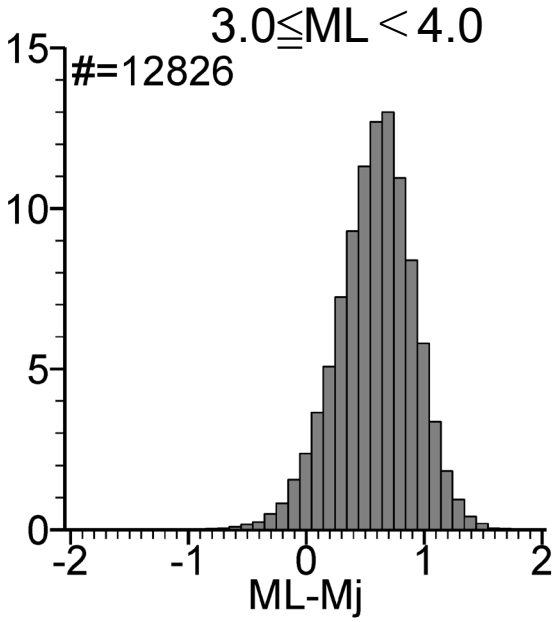
- Difference in firing time: Within ±10 seconds
  ※ However, the main shock of the 1999 Chi-Chi earthquake, which had a difference of 12.75 seconds, was an exception.
- Difference in epicenter latitude and longitude: within ±5° , respectively
- Difference in epicenter depth: within ±50km

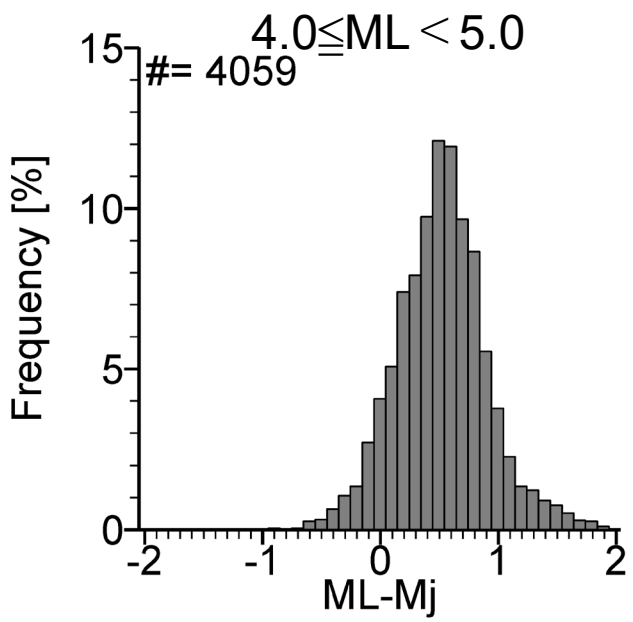
Retrieved data

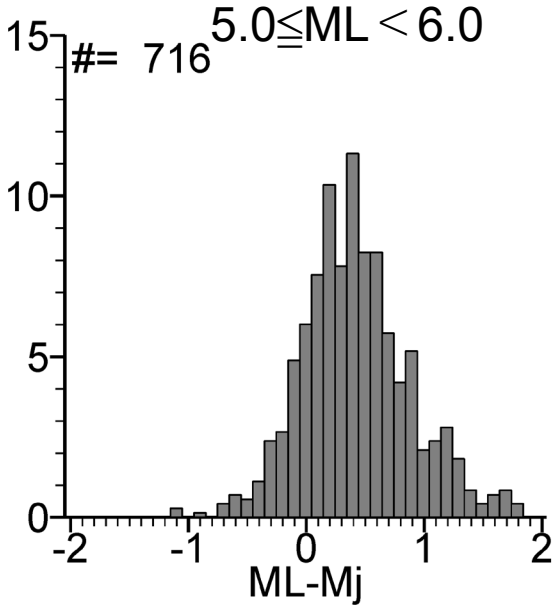


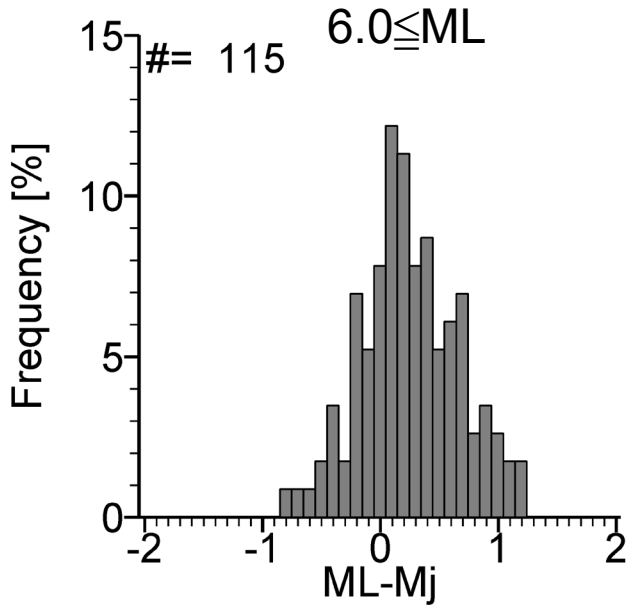
Mj (JMA) vs. ML (CWA)











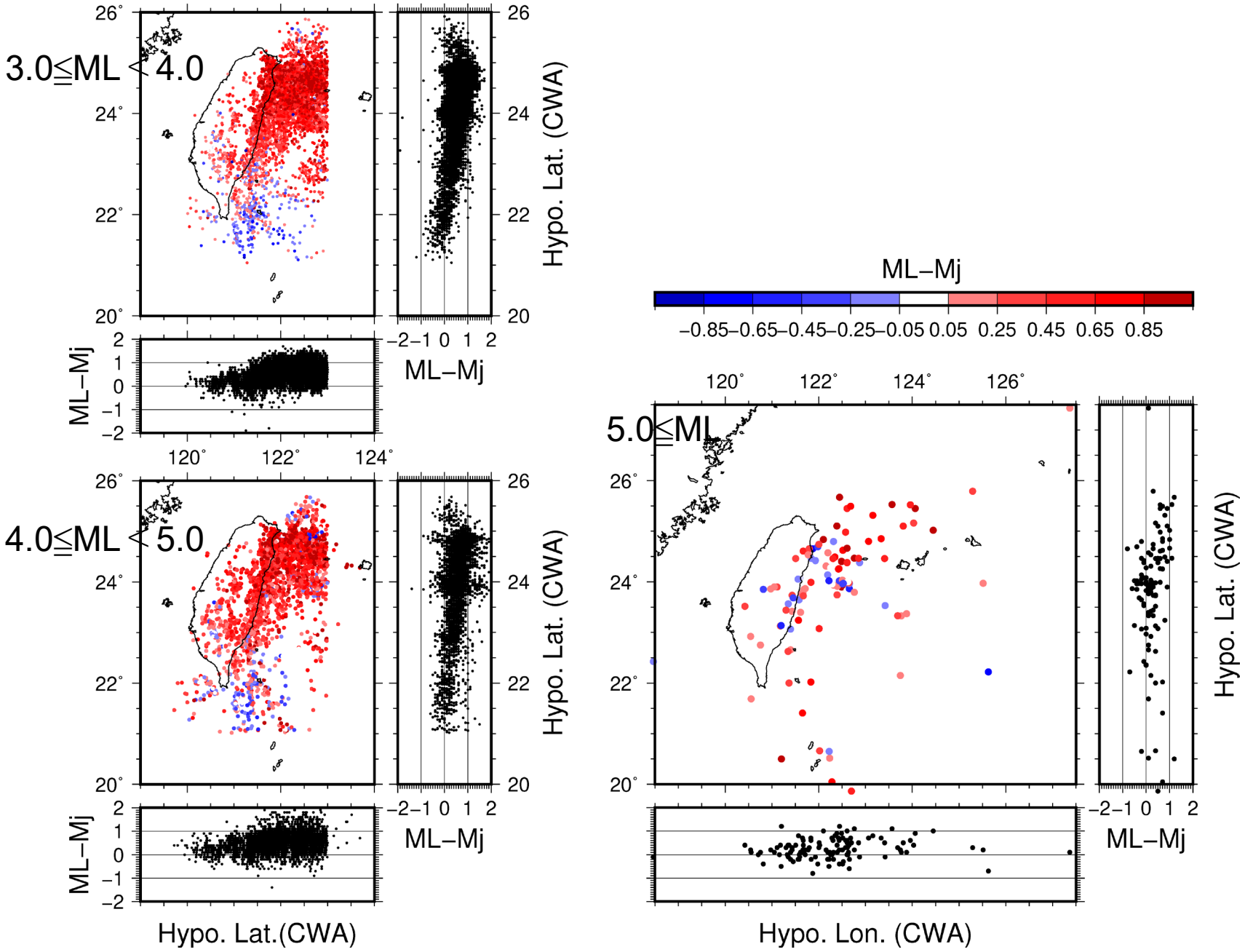
Mj=0.96ML-0.45 : **3.0≦ML＜4.0**

Mj=1.12ML-1.02 : **4.0≦ML＜5.0**

Mj=1.19ML-1.45 : **5.0≦ML＜6.0**

Mj=1.12ML-1.03 : **6.0≦ML**

Mj (JMA) vs. ML (CWA)



For the future

・It seems possible to construct a relational expression between Mj and ML

・Is Mj≒ML for earthquakes south of 22 degrees north latitude?

・Is it okay to use data of ML3.0 or higher for areas west of 123 degrees east longitude?

・Data from 1973 to 1990 was added to the CWA catalog this month, but is the detection ability and accuracy the same as after 1991?

Mj (JMA) vs. ML (CWA)