Review Wen et al.,

Spatiotemporal seismicity pattern of the Taiwan orogen

This work performs statistical analyses of the seismicity behavior prior to eight M6+ events in Taiwan. Their main conclusion is that there are two types of events. Four events in southern Taiwan experienced a seismic quiescence stage before the mainshock. The other Four events in central Taiwan experienced a seismic activation stage before the mainshock. They argue that the distinctive patterns are corresponding to the different tectonic settings between southern and central Taiwan. In general, I think this is an interesting work. However, the manuscript is not ready for publication without substantial revisions. The observations presented in this manuscript, especially the figures, need to be improved to better support the conclusion and discussions.

Comments and Questions:

1. Since the author proposed the distinctive patterns between Q-type events and A-type events corresponding to tectonic settings, the focal mechanism (beach ball) of these 8 events should be plotted on the map in Figure 1 and Figure 3. The focal mechanism will help the readers to understand the fault types and the regional tectonic setting. If any interesting pattern shows up, making some discussions on it would be great.

2. The RTL values before the Nos. 2, 5, 8, 3, and 4 events are small compared to the max to min range shown in Figure 2. To justify that these variations are statistically significant, it is necessary to show the error of these blue lines (Make a zoom-in version in the 4 years before the mainshock if necessary). The readers would like to see the variations are significantly higher than their measurement errors.

3. The authors already explained the strong effects of the 2003 Chenkun earthquake on the results during 2002-2004 in Figure 2. However, some interesting patterns in these plots in Figure 2 still need more explanations. For example, positive RTL values right before the 2012 M6.3 event in the plot of the No. 8 event, and negative RTL values right before the M6.1, M6.2, and M6.4 events around 2010 in the plots of Nos. 6 and 7 events. They show reverse patterns in the RTL values before these mainshocks and the target mainshock that occurred several years later, why?

4. At line 135, “We note that the length of the seismic quiescence stage prior to the Q-type event might correspond to the magnitude.” It will be great if the authors can label the magnitude information of these eight events on each title of the plot in Figure 2.

5. The way how the data are presented in Figure 4 is kind of 'biased'. It is necessary to show the values between [0, +1] in Figure 4a and the values between [-1, 0] in Figure 4b. If the observations of the decreased and increased RTL values before each mainshock are significant enough, we should be able to see it based on the plots with a range from -1 to +1 for each event instead of only showing half of it and hiding the other half.

6. At line 102, "catalog completeness is an important factor". M2.5 is a reasonable magnitude completeness value for the whole CWBSN catalog. However, since the seismic station density is not exactly uniform in Taiwan, the magnitude completeness should have some spatial variations in different regions in Taiwan. For the nearby region of eight events analyzed in this work, the authors need to justify if M2.5 is a good magnitude completeness value for all of these events. To show this, I suggest the authors also plot the data between M0-2.5 in Figure 5. The readers would like to see if there is a clear change in the slope around M2.5 for all the plots in Figure 5.

7. At line 336, "the mechanisms causing these different phenomena are not clear, and further study is still needed.". I suggest moving this to the end of the discussion section and expanding it by adding some details. For example, to get more useful data on small earthquakes with a magnitude below 2.5, future studies can build a more complete earthquake catalog in Taiwan using some state-of-art techniques developed in recent years. Machine-learning-based earthquake detectors and template-matching techniques will be helpful. Liao et al. (2021) and Zhai et al. (2021) can be cited as recent example studies.

8. A possible typo in the captain of Figure A2: "B-type" -> "Q-type".

Reference:

Liao, W. Y., Lee, E. J., Mu, D., Chen, P., & Rau, R. J. (2021). ARRU phase picker: Attention recurrent-residual U-Net for picking seismic P-and S-phase arrivals. *Seismological Research Letters, 92*(4), 2410-2428.

Zhai, Q. S., Peng, Z. G., Chuang, L. Y., Wu, Y. M., Hsu, Y. J., & Wdowinski, S. (2021). Investigating the Impacts of a Wet Typhoon on Microseismicity: A Case Study of the 2009 Typhoon Morakot in Taiwan Based on a Template Matching Catalog. *Journal of Geophysical Research-Solid Earth, 126*(12). https://doi.org/10.1029/2021JB023026