

Comment on acp-2021-204

Anonymous Referee #2

Referee comment on "Air quality deterioration episode associated with a typhoon over the complex topographic environment in central Taiwan" by Chuan-Yao Lin et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-204-RC2>, 2021

Major Comments:

This manuscript investigated air quality deterioration episode associated with typhoon over the complex topographic environment in central Taiwan. The schematic summary in Figure 12 is interesting and clearly presented the diurnal process during the episode. This manuscript is well organized and is helpful to understand the interactions between ambient flow, sea-land breeze, boundary layer development with topographic in Taiwan and other regions. I recommend it to be accepted after minor revision. The following comments are referred as follows,

- Mechanism: It seems the easterly flows interacted with the central mountain range (CMR) is an important process and easily to deteriorate air quality over western Taiwan. Although typhoon circulations provided a stronger easterly flow, I am just wondering if a typhoon is not a necessary condition. In other words, perhaps other weather conditions will also form such an air quality deterioration, if so, you should also mention it in your article?
- The authors presented the sources of meteorological initial and boundary conditions for WRF-chem model and simulated well for the pollutants' variations in Fig. 5. Which anthropogenic emission inventory in Taiwan do the authors? The information on emission inventories used in WRF-Chem simulation is not introduced.
- The authors presented the aerosol composition analysis over western Taiwan and showed the differences in coastal, urban, and mountain sites. I am curious about what kind of instruments (models, ..) you used?
- L135-137 The sampling period of each sample was 12 h; daytime samples were collected from 08:00 to 19:00 LST, while nighttime sampling was conducted from 20:00 LST to 07:00 LST. Please check the sampling period since nighttime sampling is only 11 h.
- Line 181: Figure 2a-c, the monthly mean results for PM₁₀, PM_{2.5} and daytime ozone. What's the analysis period? It seems to me has a typo error for the starting in 1994, Please double check it.
- Line 294-295, 18:00 LT.....;; Line 487 " daytime ozone (08:00-17:00 LT); Please consistently present the abbreviation of local standard time (LST) or LT,
- Line 318, Is it "Maoli county", or " Miaoli county" ? In Figure 2b, it is "Miaoli." Please double check it.
- Summary: It is wordy, loss of focus, and needs to be more concise.
- References: Line 83: Lin Y. L. (1993) was not shown in the reference list. ; Line 48 and

Line 601: it should be Huang et al. (2021). Line 635: " Atmos. Environ., 41, 3684–3701, <https://doi.org/10.1016/j.atmosenv.2006.12.050>, 2007b" , it should be 2007.