Comment on gmd-2021-429

Anonymous Referee #2

Referee comment on "Evaluation of WRF-Chem model (v3.9.1.1) real-time air quality forecasts over the Eastern Mediterranean" by George K. Georgiou et al., Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2021-429-RC2, 2022

The paper compares the forecasting skill of regional high-resolution and real-time WRF/Chem model with EU Copernicus Atmosphere Monitoring Service (CAMS) for regulated pollutants (NO2, O3, PM2.5) over the Eastern Mediterranean using 1- and 3-day forecasts and corresponding 9 ground stations in Cyprus. Overall, NO2 forecasts are more accurate for WRF/Chem with normalized mean bias (NMB) of 7% during winter and -44% during summer, whereas the corresponding biases for CAMS are -81% and -84%. For PM forecasts in winter, regional model has NMB of 54% and CAMS has NMB of 11%.

Overall, the paper is useful in verification of regional and global chemical models, but some minor details need to be clarified before the paper should be published. Also, although the paper is interesting and should be published I was not convinced that WRF-Chem is that much better than CAMS for the air quality forecasts.

Comments:

Page 2, Lines 20-25: On those lines it mentions that WACCM provides 10-day forecasts, why these forecasts are not compared to the WRF-Chem and CAMS in the paper?

Page 3, Lines 6-7: "daily 3-day-ahead meteorological and air quality forecasts" – what means daily? Are these 24-hour forecasts?

Figure 2: It is not clear how the right map is related to the left map. I recommend expanding the right map or at least placing a city there so it would be possible to find inset right map on the left map.

In Figure 6, is it 1-day or 3-day forecast?

Minor Comments

Page 1, Line 23: "(World Health Organization, 2018, (visited on 2020-01-19)" – parentheses are missing.

Figure 1: There appear to be some red marks next to the drawn domain, but I cannot make out them. Can those markings be made clearer?

Page 5, Line 4: "There are two operational power generation…" – it feels like it should be a separate paragraph.

Table 3: Please state between what the correlation is shown. I assume it is between WRF-Chem and ground observations. Same for Table 4.

Page 7: There are multiple instances of ppbV? Why is V capitalized?

Page 11, Line 25: "(EU, 2008, (visited 2022-01-19)"- parentheses are missing again.

Page 18, Line 18: "False exceedance predictions" – these are usually called false alarms.