**Geoscientific**
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Discussions

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# *Interactive comment on* "Evaluation of the high resolution WRF-Chem air quality forecast and its comparison with statistical ozone predictions" *by* R. Žabkar et al.

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This paper presents an operational model evaluation of a new model configuration for air quality forecasting for Slovenia which has previously used a statistical technique. The model is benchmarked against a statistical model and persistence. The methods and assumptions are generally clearly outlined and the abstract is in general a concise and complete summary. The language could be improved in a number of places. With modifications this paper will be suitable for publication in GMD.

Title. As per the instruction of GMD, please include the version of WRF-Chem in the title

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Abstract. Please specify the resolution of the model configuration applied (high resolution is rather a relative term)

2.1 WRF-Chem forecast system.

Please state the height of the model top.

Please provide a reference (even if it is only a report) for the emissions inventory

2.2 Statistical ozone daily maximum forecast.

Please provide references for the statistical model.

2.3 Evaluation methodology

What is the height of the lowest model level, and how does that compare to a typical inlet height?

Have you considered using data from above level 1 - in very mountainous terrain, an observation site can be well above the model orography at the relevant grid point and it is more appropriate to use data from level 2 or above.

3.1 Evaluation of meteorological variables

There is a large decrease in the precipitation bias from day 1 to day 2 - is this a model spin up issue? If so would a different initialisation improve this error?

Please provide some evidence for the statement "the main precipitation events were well predicted and simulated" or remove this statement.

3.3 Evaluation and comparison of diferent methods for O3 daily maximum predictions.

Please correct the statement "ideal forecast would lie in the right-bottom corner". It fact the ideal model would have correlation coefficient of 1 and a standard deviation equal to the observations, i.e. it would be co-located with the black dot which indicates the model. The black dot is not always in the bottom right corner on these plots.

In the section on the evaluation of the model's ability to predict episodes, too much wieght is given to accuracy. For example, the statement "Accuracy ... increases with threshold level" is misleading. A model which always forecasts "no event" will have an increasing accuracy as the number of events decreases. To compare skill at different thresholds you need to use a differnt metric e.g. Critical Success Index or Equitable Threat Score. These would be better choices in general than accuracy in this section. There is no harm in including accuracy in the tables, but it should not be the primary criterion for judging forecast skill.

Also why were these specific three thesholds chosen?

Grammatical and other minor corrections.

p1030 line 22, "The first RT-AQF systems.."

p1030 line 25, delete "existing"

p1032 line 13, "during summertime conditions"

p1032 line 21, "a one-way"

p1032 line 22, "evaluated a forecast"

p1033 line 2, "based on WRF-Chem are implemented worldwide"

p1033 line 4, "over the topographically complex"

p1033 line 6, "with a statistical model"

p1033 line 6, "at the Slovenian"

p1036 line 19, "a southwestern"

p1036 line 24, "shows a mean O3 daily mean"

p1037 line 27, "is a mountainous station"

p1037 line 27, "As well as the elevated station KRV, the ISK, OTL and VNA stations

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area are also influenced by regional transport of pollutants.

p1038 line 7, "information about the AQ forecast can also be gained by the evaluation of meteorological forecasts for these stations."

p1038 line 16, "index of agreement"

p1041 line 3, "with a range of 0.64 to 0.90 for 1 day forecasts"

p1041 line 7, "On average"

p1042 line 8, "3 month accumulations by"

p1042 line 3, "has problems simulating the"

p1043 line 1, "the model over-predicts"

p1043 line 5, "explained by model error in"

p1043, line 16, "poorly reproduced meteorological"

p1043, line 26, "Also interesting to discuss are the results"

p1045, line 3, "In this section we want to answer the question: 'how accurate is the 1 h O3 daily maximum WRF-Chem forecast in comparison to the statistical model prediction or to persistence?'."

p1045, line 8 "which is, along with their computational efficiency, "

p1045, line 9 "Among the strengths of the deterministic models are that they give"

p1045 line 12, "Furthermore, they also allow forecasts for"

p1045 line 14, "descriptions of"

p1045 line 27, "because a statistical"

p1046 line 1, "with an available"

p1046 line 5, "already beats persistence"

p1046 line 12, "than the statistical forecast"

p1046 line 25, "MNBE in Fig. 8 has very similar results to ME."

p1047 line 13, "also contingency-table-based statistics are an important metric of"

p1047 line 15, "It is important to take into account"

p1048 line 9, "were to be applied to"

p1049 line 7, "local emissions result in model underestimations of NO2"

p1049 line 12, "show good WRF-Chem model performance"

Interactive comment on Geosci. Model Dev. Discuss., 8, 1029, 2015.

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