

Interactive comment on “Case study of ozone anomalies over northern Russia in the 2015/2016 winter: Measurements and numerical modeling” by Y. M. Timofeyev et al.

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Response to the comments on the paper by Referee #1

Case study of ozone anomalies over northern Russia in the 2015/2016 winter: Measurements and numerical modeling By Yury M. Timofeyev, Sergei P. Smyshlyaev, Yana A. Virolainen, Alexander S. Garkusha, Alexander V. Polyakov, Maxim A. Motsakov, Ole Kirner

Dear Referee,

Thank you for your comments on the paper and constructive recommendations. We

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have tried to follow your suggestions and have utilized most of them. Following we mention how the manuscript has been changed according to your comments.

General comments:

1. In Section 3, the motivation for using two different models is added, consisting in an attempt to assess the impact of the interactive interaction of the chemical and dynamical processes (the EMAC model) with a re-analysis data nudging against the background of using re-analysis data in the RSHU model. In addition, the models have different spatial resolution, which makes it possible to estimate the effect of model resolution on the comparison with the observations related to the local points. 2. An additional numerical experiment using the ERA-INTERIM reanalysis data was performed with the RSHU model in order to compare the effect of different meteorological data on the comparison of the results of numerical modeling and local observations. 3. At the end of section 3, the results of a comparison of numerical modeling and observations, as well as comparisons between models with different meteorological data, are expanded. 4. Figures 2 and 3 are made in color, and the RSHU model simulation results with the EPA-INTERIM data are added in Figure 3.

Specific comments.

1. Page 2, lines 10-11 and elsewhere. The depletion of ozone is everywhere replaced by ozone loss.
2. Page 3, line 10-14. Clarification has been done.
3. Page 3, line 10. Climatological period is specified to be from 1979 to 2017.
4. Page 3, line 13. Clarification for the ranges of values has been done..
5. Page 3, line 18. Location of stations has been indicated at the fig.2.
6. Page 3, line 24. Clarification for short-term ozone loss have been done.
7. Page 3, line 30. Short-term period of ozone loss is clarified.

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8. Page 3, line 31-32. The sentence has been modified.
9. Page 3, line 32-33. The sentence has been corrected.
10. Page 4. Section 3 has been extended with a more detailed comparison for observations and modeling.
11. Page 4, line 25. Figures 2 and 3 now are plotted in color.
12. Page 5, lines 10 and below. Figure 4 captures are corrected – top panels are for model output, and low panels – for MERRA data.

Thank you again for taking the time to review our manuscript.

With respect, Yu.M.Timofeyev, S.P.Smyshlyaev, Ya.A.Virolainen, A.S.Garkusha, A.V.Polyakov, M.A. Motsakov, O.Kirner.

Interactive comment on Ann. Geophys. Discuss., <https://doi.org/10.5194/angeo-2018-15>, 2018.

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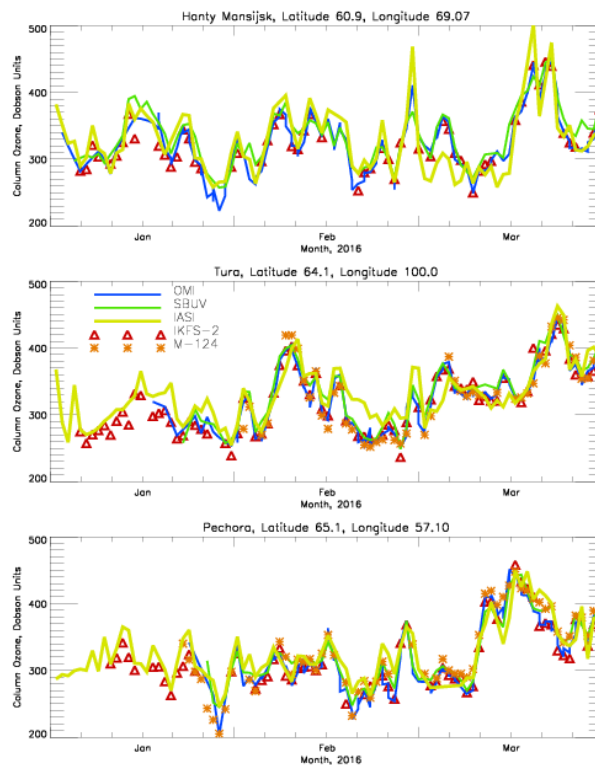


Fig. 1. Figure 2 in color

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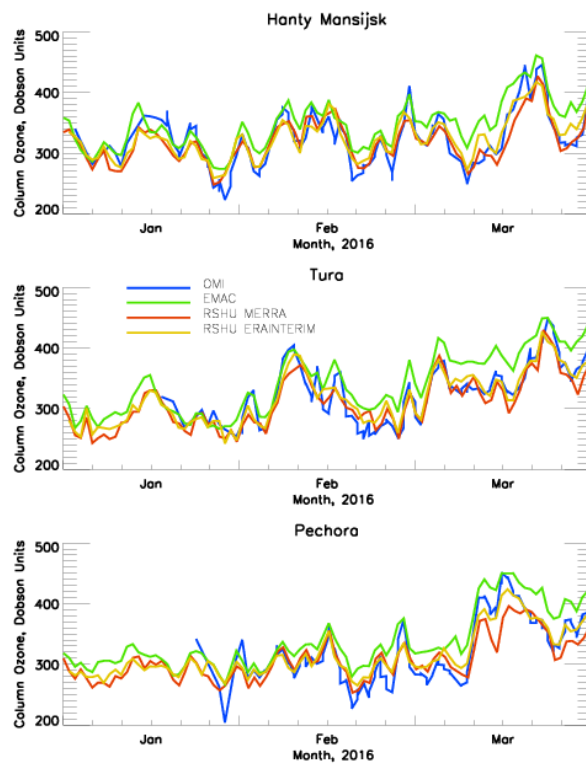


Fig. 2. Figure 3 in color with result of additional run