

Atmos. Chem. Phys. Discuss., referee comment RC2  
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## Comment on acp-2021-224

Anonymous Referee #2

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Referee comment on "Intercomparison of middle atmospheric meteorological analyses for the Northern Hemisphere winter 2009–2010" by John P. McCormack et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-224-RC2>, 2021

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\*REVIEW OF McCormack et al.: Intercomparison... (ACP224)\*

\*\* Summary

The authors present a documentation of four middle-atmosphere analysis products for the winter season 2009/2010. They illustrate the data with respect to wind and temperature distributions as well as selected wave types. This is very valuable information which is presented in a clear and feasible way and is worth publication. Although the authors themselves confess the necessity of further identification of physical processes and validation with independent observations. With respect to the diagnosed data masses the present study is a starting point which I accept. However, I suggest to further document the fate of the major-warming anomaly through the different models as lined out in the major comments. This requires additional work on data and text, and that's why I recommend major revision.

\*\* Major comments

Interhemispheric coupling: You show temperature and wind fields in Fig. 5, 6, 7 and 8 but the effect is hard to see. Instead, authors like those quoted by you, show correlation coefficient between temperature anomalies at different locations. This would allow not only to see the link but also to compare with such patterns from other models.

Major-warming anomaly: In the latitude-time plots (Fig. 17, 18 and 19) the impact of the major warming can not be clearly identified as you have noted. In order to quantify this, I suggest to indicate the amplitudes of the tides at the time of this event in Fig. 20. Maybe, it is more adequate to take an average over the week after the central date. Such a

presentation would support the aim of the study.

**\*\* Technical comments**

In the data-and-methods section, please include a brief remark on gravity wave parameterizations for each model system. As you later speculate on this detail as one of the reasons for differences between the models.

L159: Do you mean "zonal" wind with "horizontal" wind?

L170: "NWP" was already defined in L78.

L221: As you later refer to "JAGUAR-DAS" I would also use here this abbreviation including "DAS".

L423: At this point I recommend to quote Zülicke et al. (2018) who study this correlation in observations and models.

L584: Where do I find Fig. 2A? Shouldnt it be the supplemental "S2" instead?

**\*\* References**

Zülicke, C., E. Becker, V. Matthias, D. H. W. Peters, H. Schmidt, H.-L. Liu, L. de la Torre Ramos & D. M. Mitchell, 2018: Coupling of stratospheric warmings with mesospheric coolings in observations and simulations. *J. Climate* 31: 1107-1133, doi:10.1175/JCLI-D-17-0047.1.