

Response to minor reviews: At-scale Model Output Statistics in mountain environments

Editor Comments

Reviewer 2 has made some recommendations to improve the clarity of the figures and texts. Based on the assessment, there are also many places in the jupyter notebook need to be clarified or modified to ensure clarity and functionality of the model, which is particularly important to the readers of Geoscientific Model Development.

Thank you for the comments and suggestions. We appreciate the feedback from Reviewer 2 regarding the clarity of figures and the Jupyter notebook. We will address these points to ensure that both the manuscript and the accompanying code are as clear and functional as possible. We respond to the specific comments provided by Reviewer 2 between the lines below.

Reviewer 1

The manuscript has been thoroughly revised and improved based on the comments and suggestions from the two reviewers. No further revisions are required.

Thank you for your positive feedback and for acknowledging the improvements made to the manuscript. We appreciate your thorough review and are glad no further revisions are required. Your comments have greatly contributed to the refinement of our work.

Reviewer 2

I thank the authors for their responses and the revisions to the manuscript. The methods section has been expanded and more comprehensively describes the workflow. I have some minor comments on the figures, which I feel could still be modified a bit to improve clarity.

I also added some suggestions related to the jupyter notebook since the authors repeatedly point to this for additional documentation of the workflow. I am not sure if or to what extent code is supposed to be assessed during the review. I assume it is up to the authors whether or not to implement these points and it won't be a factor for the decision making in the review process.

Thank you for your thoughtful review and for recognizing the improvements made in the revised manuscript. We appreciate your continued feedback and have addressed your minor comments as follows:

Manuscript:

Fig 2: “Define necessary pro-processing functions” → typo, pre-processing

We have corrected the typo from "pro-processing" to "pre-processing."

Fig 6, 7, 8: The captions are improved and the figures are overall easier to follow. However, I would still recommend adding legends to the panels so that the figures can be understood in a general sense without the captions → add legend for red and black line to panel a) stating what the lines are, same for the other panels.

Since the aim of these figures seems to be comparing the different models, I am also wondering if the comparison between the three modeling approaches would be easier if the figures were divided by visualization type rather than model? The model output could be directly compared in multi-panel plots showing one kind of visualization for all three models.

We have added legends to panel a to ensure the figures can be understood independently of the captions. Additionally, we considered your suggestion to compare model outputs by visualization type rather than model. However, after careful consideration, we believe the current layout provides a clearer comparison for the readers, with the different ‘difference’ indicators more meaningful when adjacent to each other.

Fig 9: caption is missing explanations of panel b and c. Why not add the GFS data to the temperature, WCT and FFT panels? WCT and FFT can be calculated from GFS wind and temp and since you stress the importance of these variables you might show how they vary between GFS and your MOS approach. The irregular ticks on the x-axis seem unusual and don’t add information (2 day tick spacing except for Aug 31 and Sep 1). Perhaps this could be homogenized if you have ticks for each day and tick labels every second day or some such solution.

We have revised the caption to include explanations for panels b and c, and homogenized the x-axis ticks to a daily frequency for consistency. We have also added GFS data to the temperature, WCT, and FFT panels to demonstrate the variation between GFS and our MOS approach.

L69: “synchronise measurement and NWP measurement measurement timings”

Typo, and NWP output is not a measurement. I suggest rephrasing.

We have rephrased the sentence to "synchronise measurement and NWP output timings."

L223 I think "Figures 5, 6, 7" should be 6, 7, 8 ?

Thanks, we have corrected the reference to the figures from "Figures 5, 6, 7" to "Figures 6, 7, 8."

L271 ('dangerous/safe') you say in line 211 that you do not call wind below the threshold "safe", yet here you do. I suggest checking the manuscript for consistency regarding this.

We have reviewed the manuscript for consistency regarding the terminology "dangerous/safe", and modified this to read as 'dangerous/potentially safe' instead.

Jupyter notebook:

I downloaded the files on <https://zenodo.org/records/10889510> and opened the Jupyter notebook. The Readme file states "Details are in the commented jupyter notebook 'full_workflow.ipynb'". This does not exist in the folder, I believe the relevant file is called AtsMOS_workflow.ipynb I struggled to identify which mdf package was used. A requirements.txt file or similar to make it easier to install all dependencies would be helpful.

The documentation in the notebook, which the authors refer to in the manuscript, consists mainly of comments in the code. The comments have a variable level of explanatory detail. Some functions have minimal and not very instructive comments, (e.g.: "def get_random_random_function_function(): # says what it does, does what it says"), some have no comments (eg def contiML_XGB(full,f0,real)), some have detailed comments that explain what happens in the function. This might be reworked for consistency but, again, I am unsure what the journal standards are regarding code documentation.

This is a personal preference, doesn't matter for functionality and is likely not relevant for the review process, but I find the mix of plotting and processing functions in the very large main block of code hard to follow. I would suggest breaking this up into separate cells for different function types (e.g., plotting, core-processing, ...) and adding some more markdown explanations.

I think it would be helpful if the code could be linked more clearly to the workflow shown in Fig 1 and Fig 2 in the manuscript. I can see what is where but re-structuring the cells a bit and adding more markdown to clearly point out e.g. where selections are made (diamond shaped boxes in Fig 2) would probably help users find their way through it. The three modules mentioned in the manuscript (Section 2.1, loading and pre-processing, core-processing, post-processing) are not very clearly apparent as separate parts of the code. Rather, most functions are gathered in one long cell and they are called later on. As above - this does not affect functionality and may not be relevant for the review process, but I feel it might be re-organized somewhat to better match the text descriptions.

We appreciate your detailed feedback on the Jupyter notebook, and we will make these changes to improve its usability and alignment with the manuscript. The correct notebook is indeed "AtsMOS_workflow.ipynb," and we have updated the Readme file accordingly. In particular, we have removed some of the functions with fewer comments which are not necessary (were previously used for some tests), and added some additional comments throughout the jupyter notebook. We choose to keep the functions at the head of the code as several are used throughout in different sections, but we hope that the additional comments, combined with the ability to search through this code, will enable them to be linked up successfully. The most up-to-date code is available in the github and Zenodo repositories. Our objective is for this code to be easily re-usable by other researchers in their own field sites.

Thank you again for your constructive comments. We hope these revisions will significantly enhance the clarity and functionality of both the manuscript and the accompanying code, and that it is now ready for publication.