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Interactive comment on "Local models reveal greater spatial variation than global grids in an urban mosaic: Hong Kong climate, vegetation, and topography rasters" *by* Brett Morgan and Benoit Guénard

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Dear Anonymous Referee 2,
Thank you very much for reviewing the manuscript and providing your feedback. Below we provide point to point responses (AC) to your comments (RC), as well as changes in the manuscript (CM). Page and line numbers refer to those in the submitted manuscript. We also provide a pdf supplement showing tracked changes, new citations, figures, and an appendix added to the original manuscript.

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Discussion paper

On behalf of the authors,
Brett Morgan

RC - Referee comment **AC** - Author comment **CM** - Change in the manuscript

RC2.01 This study aims to produce a high resolution (30 m raster) data set of climate and environmental variables for the Hong Kong region. Unfortunately, I find the manuscript to be confusing, showing an overall disconnection between sections. The manuscript focuses on a large but incomplete description of the variables included in the data set, and does not address the main conclusion stated in its title ("Local models reveal greater spatial variations than global grid in an urban mosaic").
AC2.01 Changes addressing these concerns have been made throughout the manuscript. In our modifications, we attempted to make the manuscript more cohesive, with more explanation of how the various data are related. This included completion of the methods section with more detailed descriptions of variables. We have added Figure S1, a flow chart which we hope illustrates connections between sections as well as the data provided. We have altered the title to make it more informative and better reflect the focus of the manuscript.
CM2.01 Title: New 30 m resolution Hong Kong climate, vegetation, and topography rasters indicate greater spatial variation than global grids within an urban mosaic

RC2.02 The introduction section discusses the application of "Species distribution modeling (SDM)" and how this type of analysis is affected by the spatial resolution of the environmental data employed. However, this introductory discussion seems to be irrelevant within the context of the manuscript, as SDM is rarely mentioned again throughout the text. Abbreviations such as NDVI are used throughout the abstract and introduction but are not explained until the later sections of the methods section.
AC2.02 We agree that the omission of meaningful discussion of SDM implications was an oversight. We have added this in Section 4.4 Value and Utility, including how the results will benefit SDM studies and why this improvement in our knowledge is much

needed. We have clarified the meaning of NDVI in the abstract and introduction.
CM2.02 Page 1, Line 7: The data include topographic variables, Normalized Difference Vegetation Index, and interpolated climate variables based on weather station observations.
Page 2, Line 21: For example, vegetation measures like the Normalized Difference Vegetation Index (NDVI) in fragmented forests are unlikely to be relevant if the grain size is much larger than the forest patch size, because each grid cell will be a single averaged value.

RC2.03 In the method section each of the topographic and climate variables, as well as remote sensing products are mentioned. However, it seems to me that each of the subsections focuses on irrelevant details, and there is no clear descriptive explanation of a) what these variables are? b) why were they chosen? and c) how were they processed?
AC2.03 We have modified the various methods subsections where this information was missing, adding more description of the meaning of each variable and stating that variables were chosen based on the availability of source data, as well as their expected utility in SDM research. We have added Appendix 1, which provides definitions of all climate and topography variables for easy reference. We have also added Figure S1, which shows the general raster workflow, helping explain how variables were processed.
AC2.03 Page 4, Line 8: The variables developed were selected based on their utility in environmental research, especially SDM, as well as the availability of appropriate source data.

RC2.04 The results and discussion section is also vague and difficult to read. There is no clear distinction between the validation data set/model and the novel data/model analysis produced by this study. The figures lack explanation within the main text, and it is hard to see how they convey the results of the study.
AC2.04 In the results and discussion section, we have reorganized much of the

content including merging research limitations into one section, and adding discussion of the results in light of potential SDM applications. We added sentences at the end of the paragraph describing cross-validation procedures, to clear up the distinction between the validation and final rasters produced. We have added additional figure references in the text, and we would welcome suggestions on how the figures could better convey the results.

CM2.04 Page 6, Line 17: This cross-validation procedure was used only to produce these validation measurements. The finalized monthly climate rasters described above were trained using all available data.

RC2.05 Overall, I believe this manuscript needs substantial revisions, and perhaps a reassessment of the scientific goals that it is trying to communicate.

AC2.05 We believe we have fixed the main problem, which was that the previous manuscript title was misleading regarding the main scientific goals. Other sections of the manuscript have been modified to reflect this, and more detail and explanation has been added to improve clarity.

Please also note the supplement to this comment:
https://www.earth-syst-sci-data-discuss.net/essd-2018-132/essd-2018-132-AC2-supplement.pdf

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