Atmospheric Measurement Techniques Discussions

Atmos. Meas. Tech. Discuss., referee comment RC1
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Comment on amt-2021-100

Andrew Black (Referee)

Referee comment on "Inpainting radar missing data regions with deep learning" by Andrew Geiss and Joseph C. Hardin, Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2021-100-RC1, 2021

This is an outstanding paper. The methods are valid, and presentation well in line with the greater computer vision inpainting literature. The paper clearly and compellingly expands computer vision inpainting into new meteorological applications. I have a few criticisms and questions, but they are meant only to clarify certain points in the conclusions and perhaps illustrate some of the authors comments.

130: Flips and rotations of images are used. Is there any way to quantify whether these add skill? Are there any downsides to flipping a meteorological image, thereby including physically impossible weather patterns in the training set?

335: The performance on blank space is dismissed as trivial. What about the performance on a sparsely speckled background? In real time radar applications, masks can be leaky due to atmospheric and instrumental variations. The CGAN's creativity in hallucinating weather patterns could pose risks if the presence of speckle or other faint, spurious data could trigger inpainting of weather patterns that do not exist.

410, 420, 455: The CGAN success should be discussed a little more. It has the poorest performance, underperforming all the non-NN techniques on certain metrics. Also, it's skill has risks as mentioned above. I know this is addressed a bit already, but I think the outstanding qualitative skill of the CGAN (while poor quantitative skill) requires a bit more discussion of the risks, how they might be addressed for applications, and some speculation on how to leverage the relative skills of the two novel techniques.