Community Comment:

Dear authors,
very interesting approach! This is just one question/comment from selectively reading the preprint.

Whereas the relation between penetration bias and radar parameters (coherence, amplitude) is well know and understood (which makes it powerful for AI-based penetration bias corrections, such as yours), I find it a clever idea to include environmental parameters for an additional performance gain. As far as I understand, you use only current environmental parameters within 15 or 30 days of the TanDEM-X acquisition. This has a clear relevance, for instance about snow wetness, as you describe and discuss.

However, since the penetration is clearly related to the firn properties below the surface (e.g. stratigraphy, presence of refrozen melt layers, grain sizes, ...), I'm wondering if the environmental parameters of the recent few years might be actually more relevant than only the current ones within 30 days of the SAR acquisition. The environmental parameters of the past few years could be a good proxy for the subsurface firn structure/properties that determine signal penetration.
What's your take on this? Did you explore using environmental parameters from the previous years? An implementation of this probably triggers a couple of further questions, so I guess this might be something for future research. I still would be interested to hear a comment about this from you.

Best regards,
Georg Fischer

Reply: Thank you, Dr. Georg Fischer, for your thoughtful comments and valuable feedback on our preprint. The penetration depth of SAR signals is highly dependent on the current snow surface properties, which are known to be highly dynamic. We have not tested the impact of environmental parameters in the past few years, but we reserve to work on this in future studies.