Snow density plays a critical role in the estimation of snow water equivalent (SWE). Predicting a temporally and spatially variant snow density is not trivial and is usually assume constant for SWE estimates. This study presents a geographically and temporally weighted neural network (GTWNN) model to predict daily snow density across China. This work relies on empirical relations with influencing variables and machine learning algorithm, to predict density over time and space. This work proposes a great way to map snow density over China, but further clarifications are needed before publications.

In general, no physical understanding of snow density with influencing variable was explored or used in the modelling. This method relies purely on empirical relations. Not those empirical relations cannot be used but perhaps adding a bit more physical understanding in the variables selection or using a physical model at the regional scale could improve this work.

Specific comments:

L52-56 This paragraph needs more on how topography and vegetation influence snow density. It might also be also useful to define the scale a which these processes operate relative to this work.

L71 This is true but maybe used them at the regional scale to add a physical basis of energy exchange in the snowpack.

L90 It is stated “to understand how the influencing variables affect snow density estimation”. How was this address in the study?

L120 More is needed here on how the topographic parameters were estimated. Was the mean of all pixels at 30m resolution used to estimate the elevation? Could the standard deviation or other statistical parameters of sub pixel variability be used?

Section 3.2 It is not clear how the model is evaluated… against ground observations? It says in the objectives that daily snow density mapping is achieve by integrating satellite, ground and reanalysis data. One or two sentences are needed here to clarify which is used for what and how the model is trained and validated.

Figure 4 Again, how was it trained and validated. Can you define the dataset percentage used for training and validation? Was it trained on some years and evaluated on the remaining years and same for the region?

Section 4.2.3 Other methods than Pearson correlation factor can be used to investigate the importance of influencing variables. This only indicates a correlation. I would suggest using a permutation importance-based method or an impurity importance from a tree classifier. Maybe it would give better insight on the variables.

Section 4.3.2 What does this section adds to the manuscript. Does it relate to the objectives? Also, most of the influencing variables come from the ERA-5 reanalysis dataset. Does it affect the results?

Line 363 It is stated that weak correlations exist between snow density and the influencing variables chosen for the predictive model. Could a physical snowpack model (ISNOBAL, CROCUS or SNOWPACK) be used for the 4 different regions (not all pixel) to try to add a physical base to the prediction that is mostly empirical through weak correlations at the moment?

Line 389 The GTWNN can deal with spatiotemporal heterogeneity but how about temporal and spatial transferability of the model in the training/validation?

Line 402 How would that be achieved? Using a physical model?