Comment on tc-2022-64
Lander Van Tricht (Referee)

Referee comment on "Estimating degree-day factors of snow based on energy flux components" by Muhammad Fraz Ismail et al., The Cryosphere Discuss., https://doi.org/10.5194/tc-2022-64-RC2, 2022

Review “Estimating degree-day factors based on energy flux components”

The manuscript describes the possibility to estimate degree-day factors based on energy flux components. It studies in detail the contribution of each component as well as the variation (spatial, temporal, climate change). Consequently, the study is a valuable contribution in the context of calibrating DDF in temperature-index models to better represent melting. This is relevant given the importance of correctly calibrated models to assess (future) snowmelt.

The paper is well written, and the methods/formulations are clearly described. Further, the main ideas are very well presented in the introduction which ensures that the reader is immediately introduced in the topic and knows what the study focuses on. The study also contains an enormous number of references and (explanations of) parametrisations that sometimes make it read like a literature review, especially in the method section. The study is not particularly "innovative", but it does contribute to a better understanding of DDF and the implementation/calibration of these factors in models that can be used to determine snowmelt.

In conclusion, I think the study is worth publishing with some smaller (technical) revisions. Further, the authors may consider making the structure/division of method - results - discussion a bit clearer. Now it is not entirely clear what certain datasets are used for in this study (Brunnenkopfhütte, Upper Indus Basin, etc.). Furthermore, it could be an option to do an analysis with the hourly temperature data instead of just looking at the average, as this data is available from the meteorological station.

Specific comments