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Interactive comment on "Assessing the simulated soil thermal regime from Noah-MPLSM v1.1 for near-surface permafrost modeling on the Qinghai-Tibet Plateau" *by* Xiangfei Li et al.

Anonymous Referee #2

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It's my pleasure to review gmd-2020-142 "Assessing the simulated soil thermal regime from Noah-MP LSM v1.1 for near-surface permafrost modeling on the Qinghai-Tibet Plateau" by Li et al. The authors evaluate the performance of Noah-MP in simulating soil temperature on a permafrost site over the Tibetan Plateau. There are many additional work need to be done before this paper can be accepted. 1. I note that there is a paper recently published by the same author to improve the performance of Noah-MP simulations on the same site. It will be interesting the authors firstly add their improvements, and then design more numerical experiments to test the uncertainties of different parameterization options. Since one additional site, soil moisture and snow measurements are available, the authors are suggested to also use these measure-

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ments to test the Noah-MP's performance. For the frozen soil, the soil moisture and soil temperature are fully coupled, which are also affected by the snow process, so it's also important to evaluate the performance of Noah-MP in simulating these variables. 2. Since the snow process is also important for permafrost soil temperature simulations, it's suggested to also consider the impact of ALB and SNF options. 3. It's also suggested to evaluate the performance of Noah-MP for frozen (e.g. October-April) and thawed (e.g. May-September) soil conditions separately. Because it's very strange to me that the impact of RUN is so important for the soil temperature simulations. 4. Detailed information is needed for the following descriptions "The soil 164 hydraulic parameters, including the porosity, saturated hydraulic conductivity, hydraulic potential, the Clapp-Hornberger parameter b, field capacity, wilt point, and saturated soil water diffusivity, were determined using the pedotransfer functions proposed by Hillel (1980), Cosby et al. (1984), and Wetzel and Chang (1987), in which the sand and clay percentages were based on Hu et al., (2017). In addition, the simulation depth was extended to 8.0 m to cover the active layer thickness of the QTP. The soil column was discretized following the default scheme in CLM 5.0 (Lawrence et al., 2018)."

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