

Comment on **essd-2021-439**

Anonymous Referee #1

Referee comment on "Retrogressive thaw slumps along the Qinghai–Tibet Engineering Corridor: a comprehensive inventory and their distribution characteristics" by Zhuoxuan Xia et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-439-RC1>, 2022

This manuscript presents an important study on a comprehensive inventory of retrogressive thaw slumps (RTSs) along the Qinghai-Tibet Engineering Corridor (QTEC). An iteratively semi-automatic method with manual inspection were utilized to ensure the reliability of results, which should be very difficult to validate due to the lack of field evidence. The manuscript is well prepared, I suggest it should be a good study after addressing the following comments. Links between RTSs and geographic environment and environmental changes require further analysis to help reader understand mechanisms behind the distribution characteristics.

(1) It is suggested to provide a table list of the data and the purpose.

(2) It is better to add place names such as Wudaoliang, Beiluhe in Figure 5. It is found that most RTSs are distributed over the region between Chumar River and Beilu River. Is that related to the initial training data (300 RTSs in the Beilu River basin)

(10.1016/j.rse.2011.04.022)? Since it is very difficult to do a validation, is that possible to do another experiment with sparsely distributed training samples along the QTEC?

(3) Microwave remote sensing has complementary information to the optical images and is sensitive to the water content in soils (10.1016/j.rse.2020.111680). Sentinel-1, which is a C-band SAR since 2014, can be a good data source to identify RTSs (10.1002/2015JF003599). It is suggested to use this kind of microwave data or include them in the future work.

(4) It is very interesting to further discuss why the RTSs are concentrated in the Beilu River region. The authors have mentioned several influencing factors including topography, hydrology, soil properties, vegetation cover and human activities. It is suggested to number these outlined contents. The RTSs are one of the major components of freeze-thaw erosion and should be related to the water and heat dynamics of permafrost (10.1002/2013JF002930). Therefore, its occurrence might be correlated with the number of freeze-thaw cycles (10.1002/hyp.7930) and the phase changed water content (10.1109/TGRS.2010.2051158). From your discussions, it is still not very clear why the RTSs are concentrated in the Beilu River region. A deeper analysis with controlling factors might be needed rather than a documentation presented here.