

Interactive comment on “Influence of urbanization on permafrost: a case study from Mohe County, northernmost China” by W. B. Yu et al.

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GENERAL COMMENTS The manuscript presents interesting permafrost degradation data related to the urbanization of Mohe County in the northernmost China. The topic is very interesting and rare reported recently. Nine experimental set-up and observation sites are impressive. With the increase of population in cold regions, the Influence of urbanization on permafrost has really been becoming increasingly significant. The study adopts the compositive approach including GPR, drilling, and observation, to address some important issues between permafrost variations and urbanization. It also extends the study of permafrost science at northeast China. However, authors did not well organize the manuscript so that it reads confusing. The English is also necessary to be greatly improved. So, I think that the paper must go through a major revision

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to reach publishing stage. I hope these comments can prove useful to the authors to enhance the scientific understanding and impact of the manuscript during the revision stage. 1. The data in ABSTRACT is confusing; maybe it is due to poor English expression, so that some key messages are missing. Try to improve it. 2. Some references in INTRODUCTION are not exact and not in consistent with the REFERENCES list, e.g. Hinkle et al., 2003, and please check and correct them. 3. I suggest separating SITE DESCRIPTION and METHODOLOGY into three parts as REGIONAL CONDITIONS, STUDY SITES, and FIELD METHODS AND DATA ACQUISITION. I also suggest removing some sentences those describe the sites and boreholes in RESULTS and ANALYSIS to the STUDY SITES. So that, the structure might be better and well-defined than before. 4. I am not sure that DISCUSSIONS and CONCLUSIONS are good, in generally they are not repeated description, but discussing for scientific question. Please improve it. SPECIFIC COMMENTS 4328P Line 11, what mean of “The permafrost in the undisturbed area is 1.65–2.0 m”? depth of the permafrost table or permafrost thickness? Line 10-11, I noticed the permafrost information in the edge of urban area and in the undisturbed area, but did not find how about of permafrost in the urban area. Line 23-24, on Qinghai-Tibet Plate of China, railway has also been paying more attention, as it is influenced by the permafrost degradation. 4329P Line 4-5, heat island showed also very significant at some supporting complexes, such as maintenance stations, parking lots, and residential areas on QTP. See reference J. Cent. South Univ. Technol, Lin et al., 2011, 1462p. 4330P Line 2, I did not find any information on geology in this part. Please add it. Line 16, is there a period between July and Percentage? Line 18-19, snow is a very important factor in high-latitude that impacts the permafrost state. A reference is necessary, or data from which weather station’s? 4331P Line 3, it should be eight sites at the urban area (in fig. 2), not nine sites, and one site is very far. Line 11-12, the information on how the thermistors were install is not detailed, this should be presented, including spacing, any protecting, and the frequency of data collection, etc. Because they are related to judge if these data are right. The accuracy should be ± 0.01 ? Line 20-21, I suggest to add a new part

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STUDY SITES or SITES DESCRIPTION, remove some sentences that describe sites in RESULTS and ANALYSIS into it, it makes including some information on site and drilling borehole at each site. Line 22-23, like this sentences are not the results and also repeat with METHODOLOGY part. 4332P Line 4, maybe fig.3? because value is 0.071 at site 4, not 0.075. Line 10, 63 cm should be the increased thaw depth? Site I or H? Line 16-19, from table 1, there are GPR survey at sites A-E and G, why no analysis for other sites except Site A and D? Line 30, Captial Site A. Thaw depth is different between Site A and E, 2m is not same as 3.1m. 4333P Line 1, no any place show the Site I? Should be Site H? Line 16, 4m is measurement or calculation? Line 25, should be infer not guess. 4334P Line 7, why there is a great increase of temperature? From permafrost to no permafrost? please check data. Table 1, this table is too simple, I suggest to add some information on each site. Figure 1, please add the source of weather data in caption (which weather station or downloading website). Figure 2, show the position of boreholes at each site with black point. Figure 3 and 4, the words at coordinate is not clear. Figure 5, I suggest to add a profile with nine sites strata to contrast the difference at permafrost and ground ice. And ticks mark should be in coordinate axes, not zero. Figure 6, why are there a reverse at about 0.5 m depth? and ticks mark is necessary at Y-coordinate. why just the temperature in Oct. 2013, not other date? Maybe a temperature envelope is well at each site. Figure 7, how many depth of borehole? why three boreholes showed two profiles at Fig.7?

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