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The Cryosphere Discussions

Interactive comment on "Strong degradation of palsas and peat plateaus in northern Norway during the last 60 years" *by* Amund F. Borge et al.

Anonymous Referee #2

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I read through the manuscript several times with great interests. The authors have done a thorough job by documenting changes in palsas and peat plateau in northern Norway. The work will be very valuable for palsas and permafrost studies in the Arctic. I do have some concerns and suggestions about the current version of the manuscript.

Major concerns:

1). Potential error analysis: There are several places in the work which could produce substantial errors. First, the 10 m diameter threshold. By ignoring all palsas less than 10 m in diameter could produce potentially significant errors. The authors have four in-situ sites, they should their in-situ data to evaluate how much error it may bring out. Second, the authors just use one same person to delineate the boundaries of palsas for each study site. Yes, it will be very consistent but not necessarily the lowerest in

errors. To digitize any data and information from paperwork into computer, it usually requires two persons to do the same work separately, then use a program to check each other. If both agree, pass, if not, go back and check the original paper version to reduce the human error to the minimum. If it did by the same one person as stated in this study, the potential error is unknown. The authors should seriously consider the issue.

2). The authors should provide more in-situ information, such as at a specific site or a specific palsa, what is happened and/or happening? If palsas disappeared, peat materials are still there. And also geomorphologically, what it looks like when palsa is gone. I believe that not all of them become thermokasrt ponds or lakes.

3). The authors indeed provide information about MAAT, changes in air temperature and precipitation in the study sites and the region as a whole. The authors do not provide the specific vaules for the changes in air temperature and precipitation. I hope in the revised version, this imformation will be provided. The most importanty, the authors rarely mention about snowfall and snow cover data and information. In the Arctic and Subarctic discontinuous and sporadic permafrost zones, the combination of peat layer and snow cover is often more important than air temperature in terms of permafrost presence or obsence. Changes in peat layer in a short period of time (60 years as in this study) may be very unlikely, changes in snowfall and snow cover conditions may be possible. Indeed, the authors state in the text that precipitation increased, but how much is it snowfall? What is snow cover variations? etc.

4). Some concepts are confusing: degradation of palsas, lateral erosion of palsas, and disappearance of palsa: By "degradation of palsas", we may understand it refers to the processes on the way or at the end; by "disappearance of palsas", it definitely refers to the end of palsas, and by "the lateral erosion of palsas", it is not clear it refers to lateral shrinking in size or materials are transported away. This may need to be clarified.

5). Use the results from four sites to expand to the entire Finnmark, it is kind of skep-

tical. What is the total area of these four sites? What is the percentage fraction of the total area of these four sites to the whole Finnmark?

Some minor comments:

1). p.1, line 29 to p.2, line 1: The authors state "The permafrost temperature in palsas is thus relatively warm", the description is not precise, temperature iself cannot be warm or cold, it can be high or low. Permafrost can be warm or cold. Just a reminder.

2). p. 2, lines 19-20: same comments above.

3). p.4., the authors mentioned about winter and summer, please be specific, which months are referring to in terms of winter and summer, this is important in the Arctic and Subarctic sine the cold season is so long. Also, when you discuss about precipitation, what is the fraction of snowfall? when you discuss about changes in precipitation, what is the fraction of changes in snowfall? This information is very important for the potential readers to understand what is going on.

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