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Interactive comment on "Sedimentological characteristics of ice-wedge polygon terrain in Adventdalen (Svalbard). Environmental and climatic implications for the Late Holocene" *by* M. Oliva et al.

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The authors acknowledge the valuable comments and ideas proposed by the reviewer. We have modified the manuscript to accommodate these ideas.

Concerning the specific comments:

Page 1199, line 24. The authors mention the "silty loess layers" without reference to the percentage of silt or other characteristic like provenance of material, and in the next unit speak only about "aeolian silts". It is interesting define if they can be defined as

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loess or not. The loess cover thick is mentioned in page 1205, line 3. Authors speak now about loess accumulation and loess deposition during LIA, not aeolian deposition.

OK. We have restructured this part and clearly separated the results from the interpretation, describing only the grain size data in the results section and the interpretation of these data in the following section. We have also introduced the first reference in the area defining these deposits as loess (Bryan, 1982).

. . ."The changing fluvial activity in Adventelva river during the last millennia may have entailed variations on the deflation processes reaching ADD.4 since this fluvial braided system constitutes the source of the uppermost sediments of this sequence, which are interpreted as loess based on their particle size. Bryant (1982) already described these deposits as loess.". . ..

Regarding the comparison between Svalbard and other areas, it is true that the timing in both regions is different, but most of these areas (central Europe, Siberia, many areas in China) at that time (Pleistocene) was affected by conditions similar to those existing in Svalbard during the Little Ice Age, with periglacial conditions and widespread permafrost. Therefore, we understand that processes, as analogues, are comparable.

We introduce the new proposed reference referring to Iceland during the LIA (Jackson et al., 2005).

"In other areas of the high North Atlantic region loess deposition was also more intense during the LIA, such as in Iceland between 0.6 and 0.1 ka cal BP (Jackson et al., 2005)."

Page 1204, line 6-8. As authors say, it seem the most convincing theory to explain the stratrigraphic differences, but in the next paragraph say that it is possible are related to climate changes by other regional proxies. The connection between a geomorphologic setting, very active and changing, and the general climatic evolution it is not easy, and the first hypothesis is more evidenced by authors than the second one. Climate changes, in the sense pointed, towards a less humid one, also implies more contrasted

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variations in the alluvial fan and the fluvial braided system.

We have modified the sentence introducing the limitations of our findings. It is true that in this very dynamic setting it is difficult to infer the climate signal, but the fact that other proxies point towards a climate shift at this time may be indicative that, at least in some degree, the climate element is present. However, we have modified the sentence in order to introduce these limitations. Indeed, the role of local topography is broadly discussed in subsection 5.2.

Page 1206, line 25. It is true, but at local scale in the studied case the fluvial changes occur in a braided system. Relations between local winds and fluvial changes are difficult to establish at local scale. As it is important for author's deductions it could be more hardly discussed. At this sense, changes and evolution of the braided and fan system over recent times could support information on this subject.

Ok, it is true. We introduce new sentences to reinforce the idea that changes in braided systems through time can affect sedimentation dynamics in the area.

"Changes in wind strength and/or direction are very likely the responsible for the different grain size transport in loess environments (Zech et al., 2008). This pattern is even more significant in braided systems, where variations in fluvial dynamics through time may condition changes on the size of the particles mobilized and subsequently deposited in the surrounding areas."

Concerning the technical corrections:

All proposed changes have been changed, except one:

- Page 1207, Line 23. References must be ordered by date. The guidelines for authors in this journal say the following: "Co-author papers: first alphabetically according to the second author's last name, and then chronologically within each set of co-authors", therefore, we leave it like this.

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Interactive comment on Solid Earth Discuss., 6, 1191, 2014.