

***Interactive comment on “Spatial variation in soil active-layer geochemistry across hydrologic margins in polar desert ecosystems” by J. E. Barrett et al.***

**Anonymous Referee #2**

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Interesting paper and having an almost closed system, it provides a very good way to study water movement and its effect on soil development. The effect on the pattern ground along the boundaries of the streams and lakes needs to be discussed as the water movement is an integral part of the pattern ground as it decreases as you move away from the water source. Does the pattern ground change the way the water moves within the gradient from the stream or lake. Pattern ground is the most oblivious feature observed along water sources and how it changes is a major feature of soil development. Similar patterns are also seen along the faces of glacier coming down into the dry valleys where is not oblivious stream flows just melt waters.

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A discussion of the water chemistry would be useful to show how levels of salts that are in the water. Many of the lakes if are in closed non-drained basins and the level of the lakes has flocculated over time, how does this effect the soil development and salt concentrations. The lakes tend to have higher salt concentrations and this may well effect the salt distribution in the soils at the lake margins. Also knowing the salts in the rivers will help show if the salts are moving into the system from upstream or the movement is the salts in the material along the streams

This work can give a lot of understanding to soil development, as there is very little inputs other than the water either running or in the lakes because of the limited precipitation. Any living organism in the soil is there because of the water and other than in areas where there are birds there are no external inputs.

This is a good area to gain a much better understanding of the effects of water on soil development and this paper will contribute to the better understanding of soil development.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 3725, 2009.