

Interactive comment on “A Synthesis of Three Decades of Eco-Hydrological Research at Scotty Creek, NWT, Canada” by William Quinton et al.

Anonymous Referee #1

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This is in general an excellent and important paper that summarizes key insights into the functioning of discontinuous permafrost hydrological systems in western Canada, based on a 20 year field research programme. There are a few issues of clarity that need to be addressed; P2 Line 18 discusses precipitation and stream gauging networks with reference to figure 2. The expectation is of a map that shows gauging sites, but this is missing. P3 section 2. This is a paper about hydrological functioning, but no basic data are provided to introduce the climate context for the basin. We need a brief summary of the climatic setting and precipitation characteristics, and a sentence or so on the flow regime. P3 line 2 delete ‘through this process’. It’s not clear what this process is and the phrase is in any case unnecessary. P4 line 9 delete comma P4 Line 13 maybe ‘primary hydraulic function’ - there are many functional aspects of these systems P5 line 2 insert

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comma after 2003) P5 Lines 14, 16, 17 – too many ‘unique’s – poor English. P6 line 4 ‘total porosity decreases by 10%’ - please be specific, is this a 10% decrease in the porosity value, or is the porosity expressed as a percentage changing by 10? There is a use of undefined terminology here – what is meant by water storage coefficient, and active porosity? How is active porosity different from drainable porosity? How is a decrease of ‘only 10%’ consistent with a ‘rapidly decreasing’ storage coefficient? P6 Line 18 k is loosely defined here as permeability. Presumably intrinsic permeability is what is meant. P9 line 25 retained rather than detained P10 line 5 delete comma after 2003, insert comma after ‘that’ p10 line 30 the SFASH model p12 line 20 insert comma after plateaus, In the latter case. . . . P16 line 7 what precisely is meant by a composite hydrograph? Is this the mean over the period, or something different? P16 line 28 what precisely is meant by ‘soil moisture’ here? It’s difficult to see how total moisture would increase if porosity decreases. P17 Summary Please summarize conclusions for basin storage. Only flows are discussed. P18 the paper ends quite abruptly. We need a section of reflection here. After such extensive field work over a long period, what are the outstanding gaps in knowledge and primary requirements for future work?

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