

Interactive comment on “Hydrological effects of the temporal variability of the multiscaling of snowfall on the Canadian prairies” by K. R. Shook and J. W. Pomeroy

Anonymous Referee #2

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1) The aim of this study is to downscale snowfall series that mimic the multifractal signature of the observed series, so that one can generate input to a hydrological model. Some sentences can be used to explain why the chosen strategy is the best, why the multifractal analysis is important and how the successful reproduction of multifractal features ensures a good downscaling. The paper have the appearance of being written in a hurry. As the topic is (still) strange to the community, one could use the opportunity to enlighten the colleagues. My feeling is that this paper is still not a complete product and I would like the following to be addressed:

2) What are the implications of the huge uncertainty in the estimate of β ?

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3) Why do you have section 3? how are the results used? Does figure 3 show that the data are not stationary? I am confused

Specific comments: 1280-line 7 “shows”-show 1280 | 8 The sentence is way too long, and I think “timing and quantity of snow accumulation and melt” should be addressed at physical processes, not at multiscaling parameters. The abstract could me made more clear

1281 | 3 I thought the statistical properties did differ, but could be scaled

1281 | 17. Both the terms “multifractal” and “multiscaling” are used. It would be nice if a decision could be made on which, or clearly explain the difference. The topic is elusive enough as it is without introducing further confusion trough terminology. The same goes for stationarity and (in)homogeneity, usually these two terms mean the same (in space and time). What is it here?

1283-| 9. Mystifying sentence The time series are stationary, but the temporal distribution is not? How can this be?

1284 | 3. A sentence can be added to explain intermittency. I think this (alpha) parameter is especially important to elaborate upon since it will probably change according to temporal scale and probably affect the other moments of the distribution (it is later shown to be correlated to the parameter of inhomogeneity). It would also be helpful is we could know what is “large” and “small” wrt these parameters. What is the relation between values of C1 and the claim that the series are stationary?

1284 | 9 reformulate the sentence “The extreme. . .”

1285 | 6 the comment “(32 being the closest power of 2)” is not very enlightening.

1285 | 13 “tenths” ????

1286 | 11. The PDF of cumulative snowfall and snow on ground. There may be many reasons to differences in PDF. Redistribution by wind, of course, but also perhaps melt-

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ing events??

1287 | 16. "By varying the distribution of η . . .". Is it possible to elaborate somewhat more here, since this is the place where the entire multifractal business is linked to the downscaling.

1288 | 27. The final part of the sentence starting with "To reduce . . ." is incomprehensible.

1289 | 20. should it be "multiscaling analysis"

1295- Figure legend "Wave number"- should it be wave length?

1291 | 17. I do not find this reference in the text.

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