

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 #1

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For the purpose of downscaling monthly timeseries of snowfall, the paper addresses the scaling properties of sub-monthly series. The data are determined to be weakly multifractal, with significant trends in that property through the century. Scaling properties are important in areas where snow accumulation and melt is affected by wind redistribution. There, the fractal properties of snowfall significantly affects the simulation of peak snow accumulation.

This is a very concisely written paper that deserves publication in HESS with only minor revision.

In revising, the authors should consider the following points:

C86

a) I somewhat missed the reality check. If recorded snow accumulation data exist, they should be considered for comparison. If not, that fact should be mentioned.

b) It is unclear why multifractality is so important. The data are only weakly multifractal, so why not try a simpler monofractal approach first and see how it performs wrt. snow accumulation?

c) The spectrum is so noisy that one would think estimating the fractal parameters involves large uncertainty. This needs further commenting.

Further minor details:

1281, 17: I think the term 'disadvantage' is somewhat inappropriate.

1282, 1: A figure of snowfall observations may be helpful here.

1283, 9: It is not the frequency distribution that is stationary or not.

1283, 11: Which parameters were chosen for the spectral estimate (windows, chunk length,...)?

1254, 14: Perhaps simply refer to the cumulative distribution function.

1286, 25: It is mentioned that the CRHM does not need any calibration. How are the parameters mentioned on p1288, 12, determined?

1286, 27: Perhaps start an extra section for the downscaling.

1287, 2: A Figure may be helpful here.

1288, 25: Shook and Pomeroy (2010) should at least be accepted, no?

1289, 6: For comparison, a very simple downscaling, such as a constant snowfall, may be instructive.

1296: "Fraction of dataset" should be explained. (Does it mean time?)

1302: Legends are unreadable.

C87

1303: Figure should mention SWE (not snowfall).

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 1279, 2010.