Hydrol. Earth Syst. Sci. Discuss.,
doi:10.5194/hess-2016-668-AC1, 2017
© Author(s) 2017. CC-BY 3.0 License.

Hydrology and Earth System Sciences
Discussions
Open Access
EGU

Interactive comment on "A non-stationary stochastic ensemble generator for radar rainfall fields based on the Short-Space Fourier Transform" *by* Daniele Nerini et al.

Daniele Nerini et al.

daniele.nerini@meteoswiss.ch

Received and published: 13 February 2017

We would like to thank Prof. Pegram for the very encouraging comments to our manuscript and his corrections, which we readily included.

We hope that the conceptual simplicity of our contribution and the fact that it builds on an already widely established approach will help to arouse interest among the precipitation nowcasting community and foster new research in non-stationary stochastic generators.

With respect to the comment on the effect of the rain/no-rain transition on the slope of the Fourier spectrum, we have investigated the sensitivity of the spectral slope to

Printer-friendly version

Discussion paper

CC BY

the magnitude of the rain/no-rain transition. One such analysis is presented in Fig. 1, where four different settings were compared: with/without a step (i.e. 'Zeros = 0.0 dBZ' or 'Zeros = 8.5 dBZ') and with/without Gaussian smoothing (σ=2) of the edges (i.e. 'Filter = 2' or 'Filter = No'). The location of the scaling break was also optimized by maximizing the correlation coefficients of the two linear fits. It can be noticed how the spectral slope β1, which relates to the larger scales, is almost insensitive to the rain/no-rain transition. Instead, the spectral slope β2 largely depends on the magnitude of such transition. Such outcome was somewhat expected, as the discontinuity in the signal causes the rise in the energy of the higher frequency components (smaller scales) of the Fourier spectrum. In fact, if we ignore the effects of an additional filtering of the discontinuity (i.e. filter = No), it can be seen that β2 = -3.70 when the discontinuity is largest. Instead, β2 = -4.25 if the discontinuity is reduced by assigning the value of the threshold to all zero rain pixels. On this basis, we concluded that it is important to reduce the discontinuity of the rain/no-rain transition in order to limit an injection of variability at small scales which might be in fact artificial, as already highlighted in Bowler et al. (2006). This result is in line with what already included in our manuscript, but if you consider that a more in depth analysis like the one presented above is needed, we could certainly try to integrate Fig. 1 in the paper.

REVIEWER 1:

P9:26 remove 'an' P11:15 change 'cantering' to 'centring' P13:26 change 'on' to 'one' P16:17 change 'to' to 'in' P18 In axes of spectra, change 'wavelenght' to 'wavelength' P18:6 change 'comprised' to 'constrained' P22:18 change 'Such' to 'This' P23:1 change 'by' to 'using' P25:33 change 'are' to 'is'

ANSWER:

We included all the above corrections in the manuscript.

REFERENCES

CC BY

Bowler, N. E. H., Pierce, C. E., and Seed, A. W.: STEPS: A probabilistic precipitation forecasting scheme which merges an extrapolation nowcast with downscaled NWP, Q. J. Roy. Meteor. Soc., 132, 2127–2155, 2006.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., doi:10.5194/hess-2016-668, 2017.

Printer-friendly version

Discussion paper

CC BY

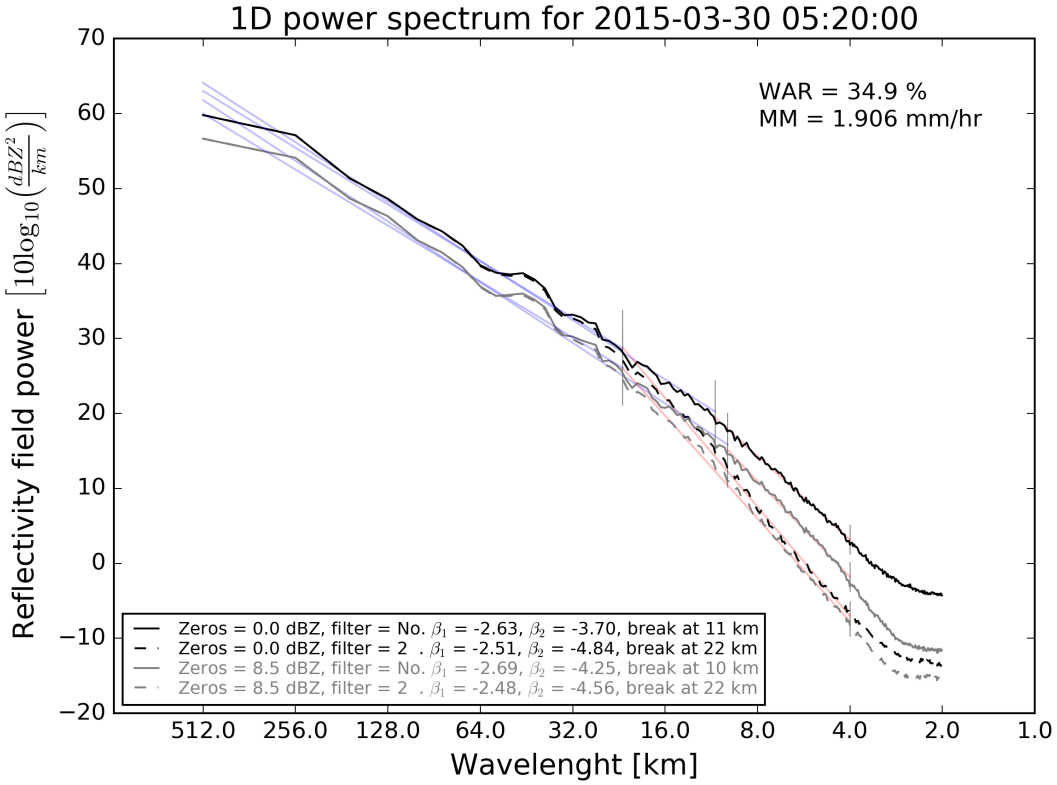

Fig. 1. Analysis of the sensitivity of spectral slopes β1, β2 and scale break to the strength of the rain/no-rain discontinuity.

Printer-friendly version

Discussion paper

CC BY