

Interactive comment on “Vertical profiles of wind gust statistics from a regional reanalysis using multivariate extreme value theory” by Julian Steinheuer and Petra Friederichs

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We thank the reviewer for his/her helpful comments. Your suggestions are greatly appreciated and lead to an improvement of the article. In the following we respond point-by-point (in italic) to your comments (in normal font).

Anonymous Referee #2

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The authors present a novel approach to modelling hourly peak wind speed using a generalized extreme value (GEV) distribution with height and time dependent parameters. These GEV parameters are functions of several covariates from the COSMO-REA6 reanalysis. The presented results are convincing and the paper is well written. There are only minor inaccuracies requiring clarification:

Thanks!

P2,L44-46. Ensemble model output statistic is often referred as non-homogeneous regression, so I don't see any reason for treating the two notions here separately.

You are right. We changed the sentence accordingly. It now reads:

44-46: "Probabilistic methods employ non-homogeneous regression, e.g., Thorarinsdottir and Johnson (2012) for wind gusts, and Lerch and Thorarinsdottir (2013), Scheuerer and Möller (2015), or Baran and Lerch (2015) for wind speed."

P4,L85. I don't see the reason of formulating Gnedenko's theorem. I would just cite it and define the GEV distribution.

We agree with you and the first reviewer and removed the theorem. Instead we now just give the definition of the GEV:

83-86: "The asymptotic cumulative distribution function (cdf) G is defined by

$$G(y; \mu, \sigma, \xi) = \exp \left(- \left[1 + \xi \left(\frac{y-\mu}{\sigma} \right) \right]^{-1/\xi} \right) \xi \neq 0$$

$$= \exp \left(- \exp \left[- \left(\frac{y-\mu}{\sigma} \right) \right] \right) \xi = 0,$$

on $\{y : 1 + \xi(y - \mu)/\sigma > 0\}$, where $-\infty < \mu < \infty$, $\sigma > 0$ and $-\infty < \xi < \infty$. The parameters are denoted as location for μ , scale for σ , and shape for ξ ."

P4,L105. What do the authors mean by "generalized height".

We agreed that this was misleading. We now use the term 'normalized height' and added its definition:

101-102: "where $\eta \in [0, 1]$ is a normalized height equal to 1 at 250 m and 0 at 10 m height."

P10,L271. Please clarify the sentence "We conclude ... " as something seem to be missing here.

The word model is missing.

270-271: "We conclude that the Legendre model represents an appropriate model for all layers."

Typos:

P2,L47. "In order to generate" instead of "In order generate"

Thanks!

P3,L78. "We pre-select" instead of "We pre-selection"

Thanks!

P5,L138. "All scores are evaluated" instead of "All scores are evaluation"

Thanks!

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P7,:181. "COSMO" instead of "COMSO"

Thanks, so we changed here (and lines before, where we made the same mistake).

P11,L33. "therefore" instead of "therefor"

Thanks!

P26,Figure 11. In the legend I would write "30% neutral (b), and 11% unstable (c) cases.

Yes, '(c)' is missing here, so we changed:

Figure 11: "According the LI, the data are classified in 53 % stable (a), 36 % neutral (b), and 11 % unstable cases (c)."

Interactive comment on Nonlin. Processes Geophys. Discuss., <https://doi.org/10.5194/npg-2019-60>, 2019.

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