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Interactive comment on "Year-to-year correlation, record length, and overconfidence in wind resource assessment" *by* Nicola Bodini et al.

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Response to Referee 3

RC3: In the title, abstract, and throughout the whole manuscript "record length" has been used. In my opinion, it would be more appropriate to replace this with "segment length", since in all experiments long term time series (62 or 42 years) have been used, splitted into different segment lengths.

Authors: We actually distinguish between "record length" and "segment length," and use the two terms to indicate different things in our paper. We already use "segment length," as the referee suggests, in our text with regard to Figure 7, where we split

the data sequence. In other places we use the term "record length" to mean the uninterrupted sequence of years immediately preceding the prediction. Although when we refer to short "record lengths" we are clearly not using all the data, we believe this usage speaks most clearly to the important question in wind resource-assessment practice of the minimum historical record needed to achieve a desired level of certainty.

RC3: P.7 l.16 Please state that the "annual averaged" wind speed data u_i have been used.

Authors: We have revised the sentence immediately following Equation (4) to read,

> where the w_i are the normalized data-availability weights of the annual averaged wind-speed data u_i, and j indicates the sample size (length in years of the data segment over which IAV is calculated).

RC3: P.8 l.14 It would be helpful to state explicitly that the first 42 year data has been used and not the first 42 j's of the 62 year sample.

Authors: We are not sure we understand the referee's suggestion, but have revised the text in the hope of making our meaning more explicit. It now reads :

> To evaluate how P50 estimation performance depends on record length, we calculated, for each selected station ($\ell = 1, \ldots, 60$ or, for the low-trend subset, $\ell = 1, \ldots, 30$), the weighted mean $\hat{\mu}_{j,l}$ of the immediately preceding j annual capacity factors ($j = 1, \ldots, 42$), and then counted the (weighted) number of the final 20 years having a capacity factor exceeding $\hat{\mu}_{j,l}$. For example, $\hat{\mu}_{5,11}$ signifies a P50 estimate predicting years 43 to 62 of station 11's performance, the estimate calculated as the resource-level average

over years 38–42.

RC3: P.8 l.11 Wouldn't it be more appropriate to use the P50 instead of the mean value, since the distribution of the annual wind speeds of the original data is not normally distributed. From Fig. 6c is seems that the mean wind speed in the 42 year chronological data set increases with increasing j, but the P50 value would not necessarily increase.

Authors: If non-normality (or more essentially, non-zero skew) of the distribution of original annual wind speeds were significant, it would create systematic bias in the red trace in Figure 6(c). The data used to calculate the red trace have exactly the same 62 values for each station as the data for the blue trace; only their order for a given station is different–thus the distributions are exactly the same. The fact that the red trace exhibits no significant bias or trend (i.e. that it varies slightly but randomly around the intended value of 50%) means that no such skew is present. Therefore, the trend in the blue trace could arise only from the ordering of the data, not from its distribution. Thus, a P50 prediction calculated from the historical median rather than the historical mean would exhibit the same trend.

RC3: P.9 l.9: Isn't the data sample of the first at least 5 j's (number of values inside a distribution) too small to make second moment statistics?

Authors: The text on p. 9 near line 9 refers to bias in the P50 estimate. The P50 estimate is a first-moment statistic (sample mean). Its bias is calculated by averaging P50 error from each of 60 stations. If we correctly understand what the referee is referring to, we believe 5 year's data from 60 stations is sufficient to evaluate bias.