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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Errors and adjustments for single-Alter shielded and unshielded weighing gauge precipitation measurements from WMO-SPICE" *by* John Kochendorfer et al.

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This is a much needed paper that addresses a very important problem in meteorology, climatology and hydrology: dealing with gauge undercatch from all-weather gauges in operations around the world. The paper is well written and nicely builds upond the published literature on the subject. It makes use of a unique dataset carefully gathered during the SPICE project. I strongly recommend its publication. I however do have a few comments that I would like to see addressed before the paper is published in HESS.

My most important comment is that the results may not be readily applicable, because of the authors' decision to derive transfer functions that require 30 minute data. Sub-

hourly data is not easily accessed in real-time, and can be very difficult if not impossible to obtain for archived data. Even hourly data is hard to obtain. And when it is accessible, it is often not quality controlled at this frequency. The authors are strongly encouraged to discuss how their method could be applied to data that is only available at lower frequencies (hourly, three-hourly, six-hourly, twelve-hourly and daily).

The authors acknowledge that significant uncertainty remains after bias correction on the precipitation amount, even if the method does a reasonable job of controlling the bias. The authors should ideally communicate this uncertainty by publishing, together with the transfer function, an estimate of the standard error of the catch efficiency, as was done for example by Fortin et al. (2008), Hydrol. Proc.

Using the method proposed in this paper by the authors, I hope that bias-corrected precipitation data can soon be used in an optimal manner by land-surface data assimilation systems in cold regions. Such systems are routinely used to initialize land-surface, meteorological and hydrological forecasting systems. However, in a data assimilation system it is crucial to accurately estimate the standard error of the observations. Information on the standard error of the catch efficiency is obviously crucial for this purpose. This is why I strongly recommend that the authors propose an estimate for the standard error of the catch efficiency together with the transfer functions.

Minor comments:

Equation (2) The equation is incorrect. Wind speed is proportional, not approximately equal to $log[(z-d)/z_0]$. It should be mentioned that this equation assumes neutral stability conditions.

Section 2.2.6 The authors need to better justify lumping together data from the Pluvio and Geonor gauges.

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