Reply on RC1
Stephen Burt

Author comment on "Measurements of natural airflow within a Stevenson screen" by
Stephen David Burt, Geosci. Instrum. Method. Data Syst. Discuss.,
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I thank Mike for his helpful comments on the draft, both in general and the two specific
points made -

The first, regarding the lag of the wet bulb behind the dry bulb in rapidly changing
temperatures, relates to my Figure 8, a hypothetical comparison of two sensors where the
response time of one (the wet bulb) is much slower than the other (the dry bulb). For
simplicity only response time differences were considered, deliberately disregarding latent
heat changes and conduction through the wet bulb muslin. The effects suggested in my
Figure 8 are not uncommon although they are of course transient, and tend only to be
noticed in terms of Twet > Tdry when the humidity is high (Twet close to Tdry even before
the step change) and when the change is sufficiently rapid and of sufficient magnitude.
Not surprisingly, close examination of short-period logger data (1 min or less) reveals
more instances than are evident from, for example, daily or manual hourly observations
by a human observer. Even where Twet does not exceed Tdry, an increase in humidity
(RH, where calculated from dry- and wet-bulb readings) relative to, say, an adjacent
capacitance sensor can easily be ascribed to the drop in temperature. Careful comparisons
of RH measurements from adjacent sensors (capacitance sensor against Tdry/Twet RH)
during abrupt changes in temperature often show a short-term relative increase in the
latter, although of course capacitance sensors are inherently less responsive anyway at
high RH. But such relative differences can be found in the observational record. In any
case, it is easy to explain minor differences - say to +/- 0.2 K - as being within
instrumental calibration tolerance, and thereby disregarded.

With regard to Mike's second point, relative accuracy of low-speed airflow measurements,
the comment is fair and I will happily include this in the revised paper if it is duly accepted
for publication.

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10 January 2022