Interactive comment on "The Niwot Ridge Subalpine Forest US-NR1 AmeriFlux site – Part I: Data acquisition and site record-keeping" *by* S. P. Burns et al.

Reply to Referee #1

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The comments by Referee 1 are greatly appreciated. We have listed the comments by Referee 1 below in italics, followed by our responses.

Referee Comment: *The manuscript is well written, rather descriptive but really welcome if we compare it to the usual content of classical scientific papers. I think it could be very useful for teams who conduct similar researches, technical developments and instrument deployments on the field, especially on forest ecosystems.*

Reply to Referee Comment: We thank Referee 1 for noting the positive aspects and objective of our manuscript. We hope that others pursuing similar research can find our experiences useful.

Under the category "Some very minor comments":

Comment 1: *Pragraph 3.4: Was it not possible to time-synchronize the computer (with NTP time server or GPS receiver as you mention) and then synchronize the data-loggers with it regularly? Easily configurable on relatively recent Campbell Sci. data loggers, I don't know if it is or was possible for oldest ones, e.g CR23X, CR10X, etc. It is easier to control others instruments and sensors (eg the solenoid valves of your system) when all dataloggers are time synchronized.*

Reply to Comment 1: This is a good question. When the CR3000 was on the tower and connected to a GPS (as described at the end of Sect. 3.4 in our manuscript) we attempted to use the CR3000 to control the FAST CR23X logger. Theoretically, this can be done by using the CR3000 to pulse the CR23X control port and run the CR23X program in "Table 3" (this procedure is described in the CR23X manual on p. 1-2, section 1.1.2 "Subroutines"). When attempting this change we had the expertise of Edward Swiatek from Campbell Scientific helping us. However, when we tried to make this change at the tower, it did not work. In the end, we decided it was not worth the effort to pursue this further.

A GPS can be directly attached to a CR23X logger to control the clock (see CR23X manual, Appendix B, B.6), however the code needed to read the GPS requires time to implement and therefore any program using the GPS can only be run at 1-second

intervals (making it unusable for the 10-Hz sampling).

Comment 2: *Paragraph 3.6: Do alarms exist in your system and alerting you in case of deviation of variables or something else critical?*

Reply to Comment 2: There are no alarms built into the current data system (this is a good idea). However, the cockpit window (shown in Fig. 3 of our manuscript) allows the user to set the y-limits for each individual variable box. If the limits are appropriately set, then it will be obvious when a variable is outside of a certain range because no time series will be in that box. Furthermore, though not shown in our example in Fig. 3, if no data are coming in for a certain variable then cockpit displays an "RIP" gravestone in the box for that particular variable.

Comment 3: *Since there is a lot of instruments and sensors, I nevertheless regret that there is no scheme of power distribution. How dataloggers and sensors are powered? How they are protected from overload currents?*

Reply to Comment 3: Power is often an issue at remote sites. However, the US-NR1 site has line-power so there is not too much to say about it. Some of the data loggers are powered by AC-to-DC power converters and some are powered by deep-cycle batteries coupled with "smart" battery maintainers. We have added some details about the data logger power source to Table 2 in the manuscript. We do not have any special protection from overload currents and use the CR23X as-is (for some info about the CR23X current overload protection, see p. 9-18 in the CR23X manual.)

Comment 4: *How do you manage sensor maintenance/replacement with minimizing impact on others.*

Reply to Comment 4: Our philosophy is that whenever a sensor is replaced, there should be a certain amount of overlap time between the new and old sensors. We plan to cover this topic in Part III of our series of papers, which will discuss the measurements, the data processing, and quality-control checks.