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Biogeosciences Discussions

Interactive comment on "Analyzing the major drivers of NEE in an alpine Mediterranean shrubland" *by* B. R. Reverter et al.

Anonymous Referee #1

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Overall manuscript is well-written and useful. It reads clearly, tasks are focused and answered in a concise step-by-step manner.

The only major comment I have is on the magnitude of the sensor surface heating correction (Burba et al., 2008). The correction seem to be computed incorrectly, and seems to be off by a factor of two or three, or so. From the weather conditions, the yearly correction for the studied climate should be on the order of 40-80 g C m-2.

Authors report annual budget change of nearly 200 g C m-2, even though their Mediterranean alpine winter environment seem to be considerably warmer than those reported in Burba et al (2009), and in recent conference presentations by Massman (2009-2010). In the latter two studies the correction amounted to less than 90-100 mg C m-2 for maize and soybean fields in Nebraska(Burba et al, 2008), and to about 200

mg C m-2 (Massman, 2009-2010) for extremely cold and very high elevated mountain environment of Rocky Mountains in Wyoming.

Other multiple studies (Grelle and Burba et al., 2007, Jarvi et al., 2009, Hirata et al, 2010)also found negligible effects of the correction in warmer weather, and imply yearly budget corrections between zero (warm and moderate) weather and 50-100 g C m-2 (colder weather).

It looks like there is a mathematical error somewhere in the calculations of the correction in the reviewed manuscript. Perhaps, daytime and nighttime equations are swapped, or sensor was strongly inclined and calculations need to be adjusted.

The same correction for the latent heat flux seem to be overestimates by several folds as well. For the wost physically possible conditions on Earth, the surface heating correction for ET would be around 0.5-2% of hourly flux. And ET is generally a one-way flux. So, in the worst possible, extremely cold case the ET budgets should be different by 0.2-2.0%. And in practical reality for studied climate, they should not differ by more than fraction of 1%.

Authors may want to consider double-checking the calculations of the correction for CO2 and H2O, and test those by looking at hourly fluxes on coldest days with frozen soil, and make sure that these fluxes are very minimal after the correction.

This is the reason I would recommend major revision. Other parts of the paper and conclusions will stay substantially the same.

Minor comments:

page 3 lines 10-12: the sentence seems unclear;

page 5 lines 9-11: it is unclear how 20 Hz data were collected as 5-second averages. Averaging time series at 5 seconds would have effectively bring all fluxes to near-zero.

Interactive comment on Biogeosciences Discuss., 7, 671, 2010.