

SPN1 global radiation compared to K&Z Rlw.in

November 4, twh.

The FLR radiometers were not cleaned as often as the radiometers outside the crater and the upfacing pyranometer had periods of several days when it was contaminated with bird droppings while the SPN1 reportedly was not. The question arises, how well did the SPN1 measure global incoming shortwave radiation?

I begin with a comparison of the SPN1 global radiation to Rsw.in from the K&Z CM21 at NEAR.

I need a latitude and longitude for editing the solar radiation data by sun angle.

Cannot currently access the GPS lat/lon, so use those measured by Oncley at the end of the project. This is not all that critical for FLR and NEAR.

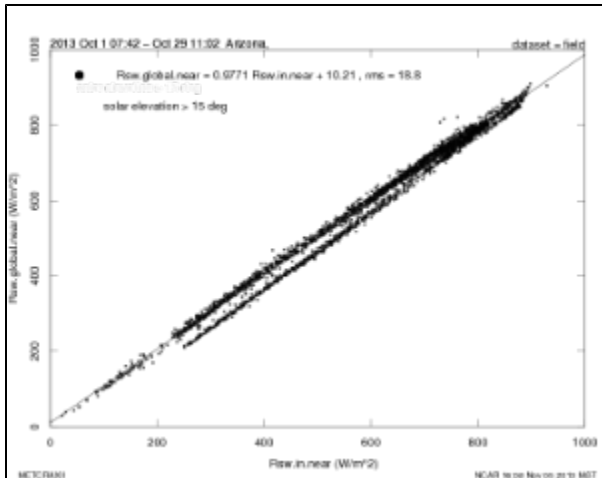
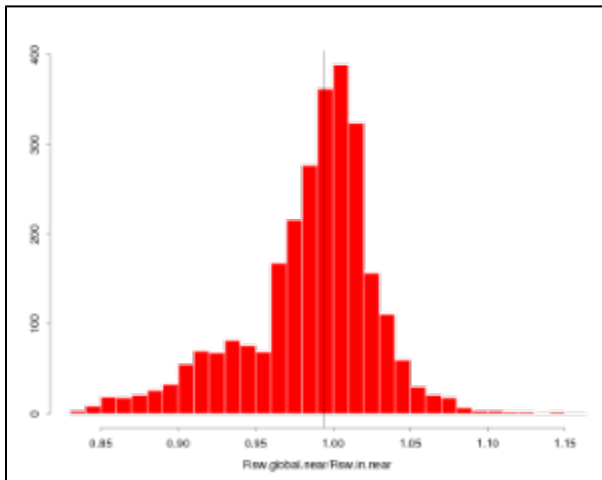
For the FLR radiation stand, SPO measured

latitude = 35d 01.680' = 35.028

longitude = 111d 01.353' = -111.05588

Then

At NEAR, select data with sun elevation greater than 15 degrees (this limit is not critical). The median ratio of Rsw.global/Rsw.in = 0.9938. I note, however that there is hysteresis in the plot of Rsw.in.global versus Rsw.in. This is consistent with the observation that the up-facing radiometers at NEAR were not perfectly leveled because of problems with the radiometer mounting device.



At FLR we select data with sun elevation greater than 20 degrees (to clear the sidewalls). The median ratio of Rsw.global/Rsw.in = 1.0358, which is perhaps higher because the bird droppings obscured Rsw.in at times. I conclude that Rsw.global could be used as a reasonable surrogate for Rsw.in during those times. Rsw.in.flr data were deleted from Oct 14-20 when the residuals from a linear fit of Rsw.global.flr vs Rsw.in.flr exceeded 20 W/m², as indicated by the highlighted data in the right-hand plot below. After deleting that Rsw.in.flr data, the linear fit changed slightly to $R_{sw.global.flr} = 1.029 R_{sw.in.flr} + 1.07$ W/m².

