

\*\*\* Referee #1

Replies to **essdd-3-C130-2010.pdf**

### **Minor Comments (Tables and figures)**

Q-1: Table 3: Can you extend the ppl and erl in the table caption or a note? The table 3 can stay alone. Otherwise, people have to read the text to know their meanings.  
Follows an updated caption to table 3 (latex format)

A:

*\caption{Quality checks as defined in the BSRN guidelines. The lower physically possible ( $\textit{ppl}$   $S_{\textit{l}}$ ) and extremely rare ( $\textit{erl}$   $S_{\textit{l}}$ ) limits, and the corresponding upper bounds ( $\textit{erl}$   $S_{\textit{u}}$  and  $\textit{ppl}$   $S_{\textit{u}}$ ) are defined for the following radiative components: (G2) downwelling global shortwave measured by the pyranometer, (DIF) diffuse shortwave, (DIR  $\textit{bot}$ ) direct normal shortwave, (LWD) downwelling longwave, (LWU) upwelling longwave and (SWU) reflected shortwave radiations.  $S$  is the solar radiative flux at the top of the atmosphere defined by  $S = r_0^2 / r^2 S_a$ , being  $S_a = 1368 \text{ W/m}^2$  the solar constant at the mean earth-sun distance.  $\mu$  is the cosine of the solar zenith angle  $\theta$ . All values in  $\text{W/m}^2$ .}*  
*\vskip4mm \centering*

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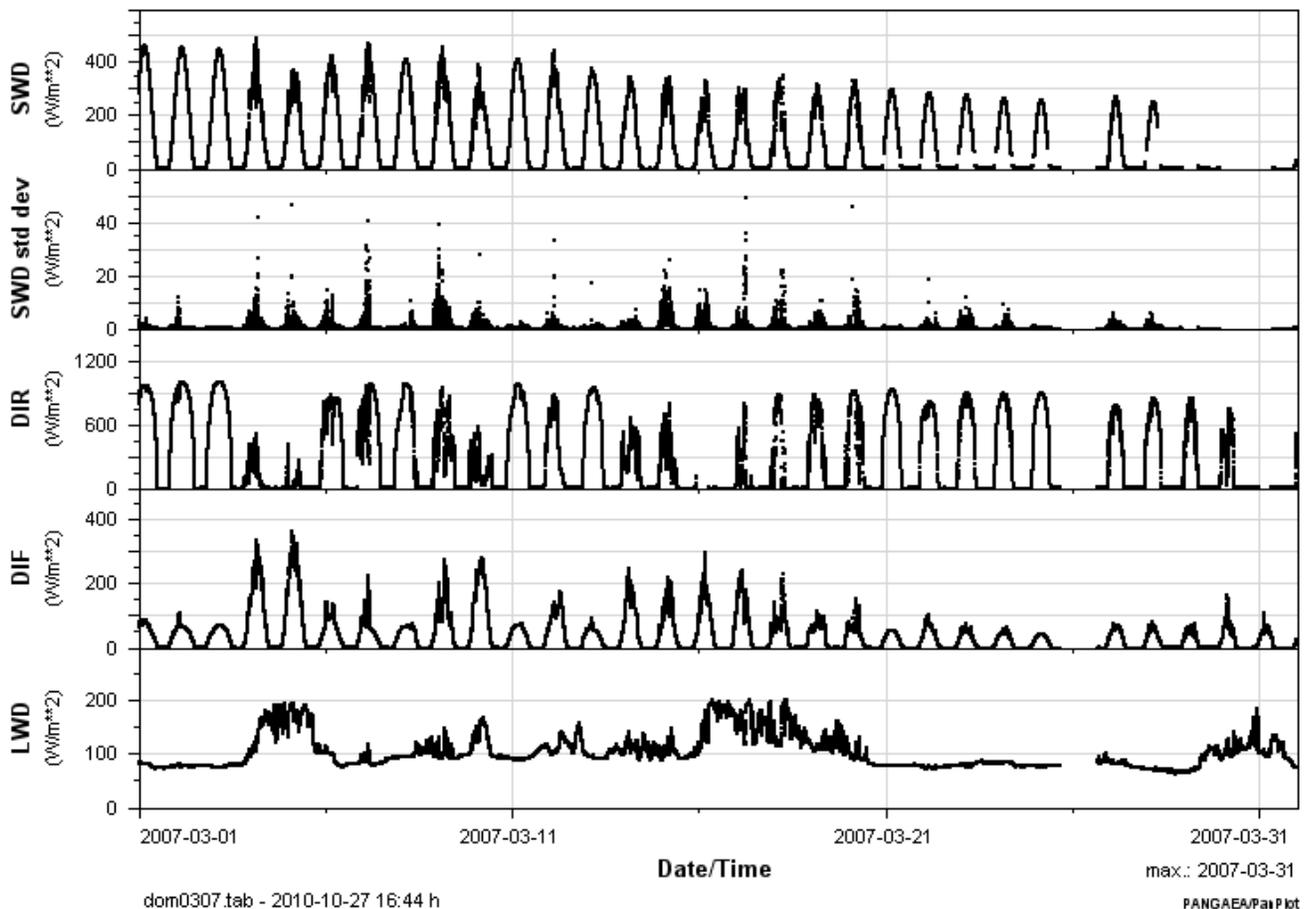
Q-2:

Figure 2. I found the min and max SWD values are almost the same as SWD, at least from your plot. If so, what is the purpose to plot the min and max SWD values in Figure 2? In the text, you also did not talk about the min and max SWD values. If they are not important, then remove them.

A:

Figure 2 aims to just report an example of the PanPlot tool developed for the data visualization of time series in the Pangea data format.

In the example reported, being the minimum and maximum not so different with respect the average value, the two lower panel could be removed. DIF/DIR/LWD are reported instead. The figure was modified as follow.



The following new caption will be also proposed (latex format)

*\caption{Example of PanPlot at work. It is free tool developed for time series visualization of data stored in PANGAEA archive format. In this example the downwelling components SWD, DIR, DIF and LWD, and the standard deviation of the global shortwave are shown for March 2007 at Dome C.}*

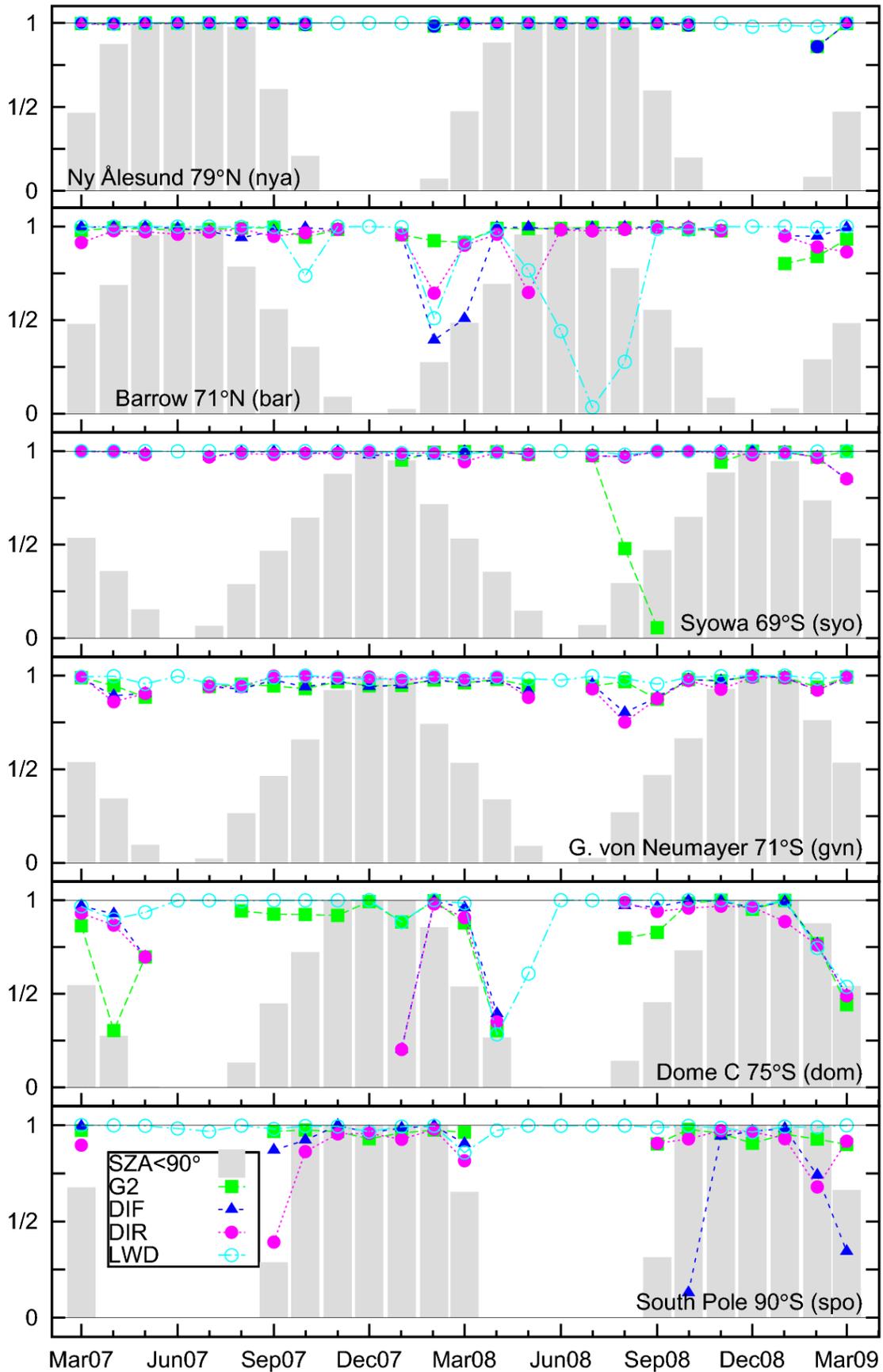
Q-3:

Figure 3. It looks like you used different software to plot Figure 3. Please keep the same as others. Also it is better to have either a title: Six BSRN stations over Polar regions? on the top of plot or in the Figure caption, you need to list (a) Concordia (dom), (b) South Pole (spo). . . . . (f). . . Do not assume people know these station names.

A:

Figure 3 was slightly modified according to both referees suggestions. The extended name of the stations is reported, top to bottom panel corresponds to decreasing latitude, the caption contains an explanation of the lack of some marker (lack of data for that month).

### Data availability of the six BSRN polar stations



With the following modified caption (latex format):

*\caption{ Monthly availability of the BSRN data for downwelling global shortwave G2 (squares), direct (filled circles), diffuse (triangles) and longwave downwelling (open circles) radiation components. The lack of a marker corresponds to lack of corresponding data. Fractions for shortwave components are calculated with respect to the daylight (SZA,  $<90^\circ$ ), while for longwave with respect to all-day. Gray squares indicate the daylight fraction for various months of the IPY measurement period from March~2007 to March~2009.}*

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Q-4:

Figure5. Again, what are erl l and ppl l ?

A:

Caption modified to include meaning of "erl" and "ppl":

*\caption{Downwelling Longwave to air temperature comparison. Horizontal lines represent the lower extremely rare limit  $\textit{erl}_{l}$  (upper one) and the lower physically possible limit  $\textit{ppl}_{l}$ . Curves represent the lower and the upper limits of downwelling longwave LWD to air temperature  $T_{a}$  comparison (see Table~\ref{tab:4}).}*

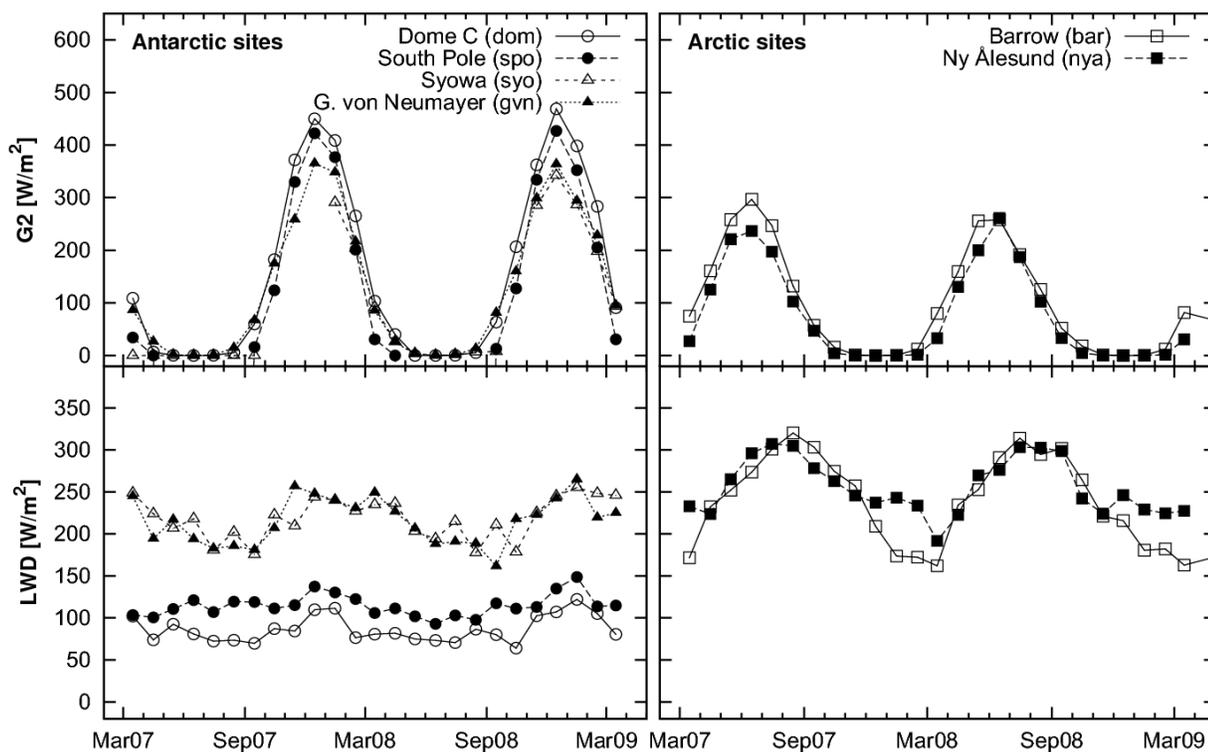
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Q-5:

Figure 6. After comparing the BAR and NYA results with our current and published paper, they are close to each other. Therefore, it is necessary to cite the following paper in the paper and compare your Figure 6 with their Figure 2.

A:

Figure 6 slightly modified (extended station name, and correction of Y-labels) and citation to Dong et al., 2010 added with this comments at the end of text: “*The SWD and LWD monthly averaged time patterns relative to Barrow site, appear to be consistent with a 10-year climatology recently given by \citet{Dong10}.*”



*Monthly means of global downwelling shortwave G2, and downwelling longwave radiation LWD for the Antarctic (left) and Arctic stations (right).*

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**Additional comments:**

Q-1: Page 260. Section 1 Introduction. Lines 14-16. “. . . , shaping the main characteristics of the **earth’s** climate.”

A: Was corrected accordingly to referee comment

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Q-2: Page 266. Section 3 Instruments and Methods. Lines 26-29. First part of statement is talking about availability % of each parameter for each station, then you say “..( that for BSRN requirements has to be greater than  $-4 W/m^2$  ).” What does this  $-4 W/m^2$  value mean? How does this  $-4 W/m^2$  value relate to the availability of shortwave data? A little confusing.

A: Sentence was reformulated as follows:

*"Some stations does not provide nighttime values related to SW radiation components, flagging those in the archive data file. Hence, the fraction of shortwave available data was not reported during polar nights, although most sites report a valid number that could be used to check for some residual offset*

*presented by pyrhemometers and pyranometers, being values greater than  $\$- \$4 \backslash, W / m \$ ^ {2} \$$  satisfactory for BSRN requirements (Tab. \ref{tab:3})"*

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Q-3: Page 267. Section 4 Data Availability and Quality Test. Lines 13-14. Grammatical suggestion: Restate sentence as follows.... For each station, the root mean square for **the** pair with global 2 greater **than** +50 W/m<sup>2</sup> was calculated.

A: corrected accordingly to referee comment

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Q-4: Fig. 3. Where is the red availability box for Oct 2008 at syo and why is there no red line connecting the red boxes from Sep 2008 – Nov 2008, when there is the presence of daylight in Oct 2008 as indicated by the background grey bar?

A: Added this sentence to Figure 3 caption: *"The lack of a marker means the lack of corresponding data."*