**Electronic Supplementary Material to:**
The Performance of Downward Shortwave Radiation Products from Satellite and Reanalysis over the Transect of Zhongshan Station to Dome A, East Antarctica*

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**Fig. S1.** Scatter plots of the daily downward shortwave radiation (a) ERA5-Land, (b) ERA5, (c) MERRA-2, (d) CERES, and (e) ICDR products against all automatic weather stations measurements of the transect from Zhongshan station to Dome A, East Antarctica. The correlation coefficient (R), root-mean-square deviation (RMSE), mean Bias, and Mean Absolute Error (MAE) are also shown in the subplots. The red lines are the regression lines and the dotted black lines represent the 1:1 line (the reanalysis and satellite products were not resampled).

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Fig. S2. Taylor diagram showing the performance of the evaluated products including ERA5-Land (red), ERA5 (purple), MERRA-2 (blue), CERES (yellow), and ICDR (black) as compared to the site measurements in (a) spring, (b) summer, (c) autumn, and (d) annually across all available years. The angular coordinate represents the correlation coefficient (R), the distance from the origin denotes the normalized standard deviations and the distance from the point (REF) describes the root-mean-square error.
Fig. S3. Influence of LCC (low cloud cover) on the downward shortwave radiation derived from ERA5-Land, ERA5, CERES, MERRA-2, and ICDR products at the Zhongshan, Panda 100, Panda 300, Panda 400, Taishan, Panda 1100, and Kunlun stations during 2020. The box-and-whisker plots in five evenly intervals are overlaid in each panel.
Fig. S4. Influence of TWV (total column water vapor) on the downward shortwave radiation derived from the ERA5-Land, ERA5, CERES, MERRA-2, and ICDR products at the Zhongshan, Panda 100, Panda 300, Panda 400, Taishan, Panda 1100, and Kunlun stations during 2020. The box-and-whisker plots in five evenly spaced intervals are overlaid in each panel.
Method: The supplementary content on Bilinear Interpolation

To better assess the applicability of satellite and reanalysis radiation data in this Antarctic section based on the characteristics of satellite and reanalysis data, this study adopts the bilinear interpolation method. This interpolates the gridded data of reanalysis and satellite radiation onto the positions of ground-based measurement sites for spatiotemporal alignment. The calculation method and schematic diagram for bilinear interpolation are presented below.

We assume \( P(x, y) \) as a point to be interpolated in the Cartesian coordinate system (as shown in Fig. S4), \( Q_{11}(x_1, x_1), Q_{12}(x_1, x_2), Q_{21}(x_2, x_1), Q_{22}(x_2, x_2) \) representing the four surrounding points. Initially, a linear interpolation is performed along the x-axis to obtain the target intermediate point along the x-axis, denoted as \( R_1(x, y_1) \). This process can be described by the formulas:

\[
f(R_1) = \frac{x_2 - x}{x_2 - x_1} f(Q_{11}) + \frac{x_1 - x}{x_1 - x_1} f(Q_{21}) .
\]

\[
f(R_2) = \frac{x_2 - x}{x_2 - x_1} f(Q_{12}) + \frac{x_1 - x}{x_1 - x_1} f(Q_{22}) .
\]

Based on the interpolated intermediate point \( R_1(x, y_1)R_2(x, y_2) \) obtained through interpolation along the x-axis, a subsequent linear interpolation along the y-axis yields the final point \( P(x, y) \). The linear interpolation concerning the y-axis can be described as follows:

\[
f(P) = \frac{y_2 - y}{y_2 - y_1} f(R_1) + \frac{x_1 - x}{x_1 - x_1} f(R_2) .
\]

Combining the aforementioned two linear interpolations, a single bilinear interpolation can be integrated into the following form:

\[
f(x, y) = \frac{f(Q_{11})}{(x_1 - x_2)(y_1 - y_2)} (x_2 - x)(y_2 - y) + \frac{f(Q_{12})}{(x_1 - x_2)(y_1 - y_2)} (x_1 - x)(y_2 - y) + \frac{f(Q_{22})}{(x_1 - x_2)(y_1 - y_2)} (x_2 - x)(y - y_1) .
\]

Fig. S5. Influence of TCO (total column ozone) on the downward shortwave radiation derived from the ERA5-Land, ERA5, CERES, MERRA-2, and ICDR products at the Zhongshan, Panda 100, Panda 300, Panda 400, Taishan, Panda 1100, and Kunlun stations during 2020. The box-and-whisker plots in five even intervals are overlaid in each panel.