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Interactive comment on "Global distribution of Earth's surface shortwave radiation budget" *by* N. Hatzianastassiou et al.

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1. Indeed, the results shown in this study were obtained by a simplified version of a much more complicated model, as explained in section 2, page 4551, lines 5-6. This is because the tendency is to have fast and flexible models for reproducing the distribution of SW radiation budget with reasonable accuracy. However, note that we also run a more sophisticated version of the model (spectral one), which needs, however, a much longer computing time. Preliminary comparisons between the results of the simplified broadband model and those of spectral one provide encouraging agreement. In addition, note that our model was also run in a higher spatial and time resolution, i.e. at 1°x1° latitude-longitude grid-cell level, and on a daily mean basis. Based on the availability of the model input data, this was done for the 10-year period from January

1985 to December 1995. The comparisons between our monthly mean DSR fluxes obtained at 2.5°x2.5° latitude-longitude resolution and the daily mean ones at 1°x1° resolution (downscaled to monthly means at 2.5°x2.5°) provided a good agreement. For 1.142.330 matched data pairs, there is a correlation coefficient of 98.5%, while the bias and RMS values are equal to 9.2 and 13.7 W m-2, respectively. This has been noted in the text, page 4550, line 7.

2. The sensitivity tests performed in this study are quite simple, as mentioned by the Referee. Nevertheless, we consider that for a model this is essential for evaluating the dependence of its computations of fluxes to the uncertainty of the various model input data. However, we recognize that in the future, more advanced sensitivity studies are also necessary, to meet more realistic changes/tendencies observed in our Earth-atmosphere climatic system. In these sensitivities, combined modifications of different physical model input parameters (surface and atmospheric ones) should be considered.

3. We have tried to reduce the length of the paper as much as possible. Dividing the paper in two parts is possible, but at the present stage it depends on the Editor's opinion.

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