

***Interactive comment on* “Global distribution of Earth’s surface shortwave radiation budget” by N. Hatzianastassiou et al.**

Anonymous Referee #2

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This is a very long paper describing the monthly mean shortwave radiation budget at the Earth’s surface for a period of 17 years (from 1984 to 2000).

The study is based on the use of a very simple shortwave radiative transfer model, which is described in Section 2. It is perhaps worthwhile to apply a more advanced model (or, at least, to compare the results with results obtained when a more advanced model is used; by the way this is also stated in one of the conclusions stated by the authors in Section 7). Also the spatial resolution used in this paper is rather crude.

The input data for the model were received from the National Centers for Environmental prediction – National Center for Atmospheric Research (NCEP-NCAR) and the Euro-

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pean Centre for Medium Range Weather Forecasts (ECMFM) as well from some other sources: the TIROS Operational Vertical Sounder (TOVS) and the Global Aerosol Data Set (GADS). The input data are discussed in Section 3.

Model results are presented and discussed in Section 4. The results are visualized by using many plots. Several conclusions about trends and relationships have been drawn. It is stated that some of the relationships obtained by using the model are in agreement with several well-known physical phenomena that took place in the time-period under consideration (as, for example, the El Niño event in 1986–1987).

Several sensitivity tests are described in Section 5. The purpose with these tests is to explain the dependence on the Shortwave Radiation budget on several key parameters. The tests are very simple: the chosen key parameter was reduced by 10% and the results were compared with the basic scenario (with the case where no changes of the key parameter under consideration is made). No attempt to study possible correlation of several key parameter is made. Perhaps, the authors should carry out more advanced sensitivity tests in the future. However, even the simple sensitivity tests are leading to several valuable conclusions, which are presented and discussed in Section 5.

Comparisons with surface site measurements are given in Section 6. The authors used two well-known data sets of measurements: the Baseline Surface Radiation Network (BSRN) and the Global Energy Balance Archive (GEBA). Scatter plots are used to demonstrate the fact that the model provides reasonable results.

The results obtained in this study are summarized in Section 7 (it is wrongly stated in the manuscript that the number of the section is 6). The authors summarized here the results from the validation test. Also some comparisons with other studies are given in this section.

The authors have a long reference list. Results from similar studies can be found by using these references.

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My only concern is that this paper is very long. The authors could try to reduce the length of the paper (in the present situation, I am afraid that many people will not read the paper only because it is too long). Alternatively, the material can be divided into two papers: the first one describing the model and the input data needed to run the model, the other describing the results and the conclusions.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 4545, 2005.

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