

## ***Interactive comment on “Long-term global distribution of earth’s shortwave radiation budget at the top of atmosphere” by N. Hatzianastassiou et al.***

### **Anonymous Referee #2**

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This paper presents an exhaustive description of the data and procedures necessary to compute the outgoing solar radiation for the period from 1984-1997. It is a tremendous effort to do this, and the authors have been very conscientious in trying to take as much into account as possible. The spatial and temporal variation of the reflected solar radiation is captured reasonably well, but some discrepancies with direct measurements from ERBE are as large as  $40\text{Wm}^{-2}$ . It is not clear what the article contributes to general knowledge, except for the rather interesting time series of globally averaged reflected solar radiation. This time series, must be somewhat uncertain and it is extremely difficult to quantify these uncertainties.

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The time series of global and hemispheric mean reflected solar radiation show some interesting variations on the order of 2-4 Wm<sup>-2</sup>, but one wonders to what extent the long-term trends can be trusted, given that the input data are uncertain themselves. The ISCCP data, for example, are based on vicariously calibrated narrowband measurements from meteorological satellites whose orbits and calibrations vary during the period of interest (e.g. Klein and Hartmann, 1993). Some of the most serious calibration changes have been adjusted for in the latest ISCCP data sets, but it is probably not possible to remove them all.

When comparing simple seasonal and latitudinal variations as in Figs. 5, 7 and 8, it would be helpful to see how the calculated values compare with observations from ERBE. Some of these plots show things that are very commonplace and mostly driven by insolation variations, so that such a complicated modeling process is probably not necessary to guess what the curves should look like.

It seems that Figs 7a and 8a show things that can be calculated from simple astronomical formulas and need not be shown here.

Klein, S. A. and D. L. Hartmann, 1993: Spurious changes in the ISCCP data set. *Geophys. Res. Lett.*, 20, 455-458.

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