

Interactive comment on “A net decrease in the Earth’s cloud plus aerosol reflectivity during the past 33 yr (1979–2011) and increased solar heating at the surface” by J. R. Herman et al.

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This study reports on the 340 nm Lambertian Equivalent Reflectivity (LER) of the Earth, calculated from the upwelling radiances measured by the Nimbus-7 SBUV, seven NOAA SBUV/2, and AURA-OMI instruments. Being highly correlated with cloud and aerosol cover, the 340 nm LER is used to estimate changes in cloud and aerosol amounts associated with seasonal and interannual variability and climate change. The topic of this manuscript is of high interest. Beside the long-term observations (33 yrs), which are critical to establish a trend, the influence of the annual motion of the Intertropical Convergence Zone and of episodic El Niño Southern Oscillation ENSO on the LER

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time series is also studied. It is shown that there is a latitude dependent seasonal cycle of the LER time series, which is more complicated in the SH.

The new common calibration of the SBUV and SBUV/2 instruments, their similar observing characteristics, the huge data record from 1979 to present (19.2 million individual observations), and the space coverage (60°S to 60°N) make these time series very valuable. This work clarifies questions raised by inconsistencies between previous studies. The trend estimates show that there is a global net decrease in cloud plus aerosol reflectivity, most of the decreases occurring over land (largest in the US, Brazil, and Central Europe). The study reports also some increases over parts of India, China, and Indochina, or no change over Australia.

The methodology used in the manuscript is of high quality, the paper is concise and written well, and the conclusions are well-supported by the analysis. I support publication of this work by ACP.

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