

A Comparison of ERBE and AVHRR Longwave Flux Estimates(II)

Sung-Nam Oh

Global Environmental Information Res. Div.
KIST/System Engineering Research Ins.

Comparisons have been made between estimates of the outgoing long wave radiation at the top of the atmosphere derived from narrowband Advanced Very High Resolution Radiometer (AVHRR) and broadband Earth Radiation Budget Experiment(ERBE) scanning instruments. Four months of measurements are considered: April, July, and October, 1985, and January 1986. Instantaneous comparisons (i.e., colocated in space and time) are considered. In the former, regional, zonal, and global analyses are performed using colocated and coincident OLR estimates on a $2.5^{\circ} \times 3^{\circ}$ latitude/longitude scale. In general, the two data sets are found to be in reasonably good agreement, with the mean state and fundamental variability in time and space captured by the two sets of measurements. However, systematic biases are observed between the two data sets, particularly over the subtropical oceans, the daytime deserts, and over snow-covered surfaces at the high latitudes. The monthly global bias between the two data sets (ERBE minus AVHRR) is between -1 and 2 Wm^{-2} during daytime, and between 4 to 7 Wm^{-2} during nighttime, while the RMS differences range between 12 (June) and 15 (January) Wm^{-2} . Radiative transfer simulations show that these systematic errors may be attributed to limitations in the single-channel narrow-to-broad-band algorithm. Even though the results may be globally unbiased, regional biases result where particularly persistent conditions (e.g., trade-wind inversion, subsidence over deserts) prevail.

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