Sky brightness during eclipses: a review

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Abstract

This paper is abstracted from the introductory section of “Sky Brightness During Eclipses: A Compendium from the Literature,” AFCRL-TR-74-0363, Special Reports 180, Air Force Cambridge Research Laboratories, Hanscom AFB, Massachusetts 01731. This report should be consulted for fuller details and tables.

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S. M. Silverman and E. G. Mullen, "Sky brightness during eclipses: a review," Appl. Opt. 14, 2838-2843 (1975). This paper is abstracted from the introductory section of "Sky Brightness During Eclipses: A Compendium from the Literature," AFCRL-TR-74-0363, Special Reports 180, Air Force Cambridge Research Laboratories, Hanscom AFB, Massachusetts 01731. This report should be consulted for fuller details and tables. Here are some notes on the eclipse, including sky brightness measurements. My wife and I brought along the trusty 3.5 inch Mak used on several previous eclipses and large binocs to view the eclipse. These turned out to be ideal because the boat was a bit more pitchy and roly than a previous eclipse cruise and because the coronal streamers were so smooth and extended. Along with the visual effort, I also made sky brightness and temperature measurements. The eclipse lasted a total of 6 minutes 42.3 seconds, we are told, longest until the year 2132. Temperature dropped from a high of 96F to 84F during the eclipse. Sky brightness readings in magnitude per square arcsecond were as follows:

- Zenith sky radiance during totality decreased by a factor of 10(4) from the normal day sky value.
- The distribution of sky intensity with angle on the celestial hemisphere was approximately symmetrical about the local zenith, with this point having the minimum intensity value.
- The spectral distribution of zenithal diffuse skylight shifted toward the blue during totality, but the horizon reddened.
- The polarization ratio P decreased from a normal day value of 0.45 to 0.04. There is evidence that the distribution of polarization ratio is strongly affected by variations in surface albedo. The major