

Reply

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In response to Dr. Liou's first question, we would like to point out that we do not assume cirrus clouds are isotropic scatterers. All results in our paper are based on Eq. (1) where measurements are corrected for anisotropy as mentioned in the text. Eq. (8) was used at the beginning of the cirrus discussion *merely to illustrate* one approach to the cirrus problem favored by several earlier investigators. However, our use of Eq. (8) for illustration, together with the footnote references to Brennen and Bandeen (1970, hereafter referred to as BB) and Sikula and Vonder Haar (1972, hereafter referred to as SV) giving additional details on the spectral albedo determination technique, does make it difficult for the reader to clearly understand our anisotropic correction. Those references, BB and SV, show that the spectral albedo a_{old} (also called spectral directional reflectance r_{old}), determined using Eq. (1) and plotted as the ordinate in Fig. 8, is determined from

$$a_{\text{old}} \equiv r_{\text{old}} = \chi \pi \rho_{\text{old}},$$

where

$$\rho_{\text{old}} = \frac{M_s}{H_s \cos \zeta}$$

As noted in our paper, M_s is measured spectral radiance and H_s spectral solar irradiance. We use ζ for solar zenith angle and χ as the anisotropic factor of BB, SV and Raschke *et al.* (1973). Thus our a_{old} and Liou's (1973) $r(\mu_0)$ are the *same* parameters.

We overlooked the *difference* in particle sizes used in the visible and infrared calculations by Liou (Liou, 1973; Liou, 1974) despite some personal communication with him during the course of our research. Thus, he makes a valid point which may explain a portion of the discrepancy he notes in Fig. 8. Perhaps he would care to perform the necessary coherent theoretical calculations to assess the actual magnitude of albedo-emissivity changes arising from the use of different particle sizes.

With regard to Dr. Liou's comment concerning our use of Dr. Hunt's results, recent personal communication (1977) with Hunt has assured us that our use of his data is correct. We appreciate Dr. Liou's comments on the cirrus cloud part of our paper. More cirrus research is definitely required. We also re-emphasize the more far-reaching application of the overall bispectral method.

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