GOES DATA TO ESTIMATE THE EVOLUTION OF EFFECTIVE RADIUS AT CLOUD TOPS

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The evolution of the effective radius of convective cloud tops can be studied by using a sequence of radiative properties of channels 2 (3.9 µm) and 4 (10.7 µm) from GOES. It has been shown that the reflection function at a water (or ice) absorbing channel in the near-infrared is primarily a function of cloud particle size. Lindsey and Grasso (2008) developed an algorithm to compute the albedo. This algorithm uses the total radiance of channel 2, the solar irradiance, and the equivalent black body emitted by thermal radiation at 3.9 µm for a cloud at temperature; and this temperature is estimated with cloud-top brightness temperature of channel 4. Lindsey-Grasso's algorithm uses albedo, the solar zenith angle, scattering angle, and look up tables from radiate transfer to estimate the effective radius of convective cloud tops. A threshold brightness temperature from channel 4 is used to locate the pixels where the convective core can occur. The matrix that contains the convective core is transformed into a vector of brightness temperature and the contiguous pixels in the vector are the possible elements of a convective core. The centroids of two consecutive images at time of the same convective cell are used to estimate the cloud motion vector. Since the GOES imageries are provided at every 15 minutes, the speed and direction of the displacement of each pixel can be estimated. The cloud motion vector is used to identify the tracking of the advected pixels and to study the possible evolution of effective radius.