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MONITORING EARTH ALBEDO FROM LANDSAT

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A technique has been developed for extracting ground albedo from LANDSAT data. Initial application to Central Kansas indicates a trend of increasing ground albedo superimposed on seasonal variations. The measured albedo apparently is associated with drought. The results suggest that LANDSAT data can be used as an input to global climatic prediction models which depend on ground albedo information.

The technique for obtaining the albedos uses a doubling radiative transfer model with scaling approximation. Reflectivities are extrapolated beyond the LANDSAT MSS spectral region based on categorization of the scene into ground classes using the original LANDSAT data. The extrapolation factors have been derived from empirical signatures. The proportions of ground classes are determined from supervised classification when more than one class is present. A cloud detection algorithm is used to remove the cloud contaminations from LANDSAT measurements.

The shortwave radiation measurements with low spatial resolution from weather satellites such as Nimbus III and Nimbus 6 had been used to calculate earth albedo in synoptic scale. Because of LANDSAT's much higher spatial resolution, its measurements are particularly useful in calculating the total area of each climatic system, monitoring natural and anthropogenic impact on the earth's surface, and preparing a detailed albedo atlas.