

## A Climatological Analysis of MODIS Global Land Surface Shortwave Broadband Albedo

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The land surface shortwave albedo is the ratio of up-welling to down-welling solar radiation at the surface, and it impacts surface net radiation and also plays a central role in global and regional climate modeling.

In this study, we analyze the regional and global land surface shortwave broadband albedo from Moderate Resolution Imaging Spectroradiometer (MODIS) for 2000 through 2008. The statistical results are obtained using MODIS land surface albedo (MCD43C3) and land cover (MOD12C1) datasets, and Global Energy and Water-cycle Experiment (GEWEX) downwelling surface radiation data. The results include all nine-year shortwave Black-Sky (BSK) and White-Sky (WSK) albedo signatures for global, Northern Hemisphere (NH), Southern Hemisphere (SH) for 16 International Geosphere-Biosphere Program (IGBP) ecosystem surface types. Each of them has a discernible signature. For example, the global annual average BSK albedo is  $0.32 \pm 0.002$ , and the annual NH BSK albedo is  $0.24 \pm 0.002$ .

We also analyze the seasonal variations for 16 IGBP ecosystem land cover types and their latitudinal dependence. For example, the global and SH albedo have their peak values in the winter and lower values in the summer, which is consistent to our expectation due to the presence of snow. Comparison of global anomalies shows a small decrease of  $\sim 0.01$  during these years.

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