



Radiative forcing over the conterminous United States due to contemporary land cover land use albedo change

C. A. Barnes (1) and D.P. Roy (2)

(1) SGT, Inc. Contractor to the U.S. Geological Survey (USGS), Sioux Falls, USA (barnes@usgs.gov), (2) GIScCE, South Dakota State University, Brookings, USA (david.roy@sdstate.edu)

Land cover and land use (LCLU) change affects Earth surface properties including albedo that impose a radiative forcing on the climate. Recently available satellite derived LCLU change data for the conterminous United States (CONUS) are used to study the impact of LCLU change from 1973 to 2000 on surface albedo and radiative forcing for 61 ecoregions covering 73% of the CONUS. Mean monthly broadband Moderate Resolution Imaging Spectroradiometer snow and snow-free albedo values are derived from decadal Landsat 60m LCLU classification maps located within ecoregions using a stratified random sampling methodology. These data and European Center for Medium-Range Weather Forecasts incoming surface solar radiation reanalysis are used to estimate ecoregion estimates of LCLU induced albedo change and surface radiative forcing. The results illustrate that radiative forcing due to contemporary LCLU albedo change varies geographically in sign and magnitude, with the most positive radiative forcing due to conversion of agriculture to other LCLU types, and the most negative radiative forcing due to forest loss, with snow modifying the results. At the ecoregion level this magnitude of radiative forcing is not insignificant, being similar in magnitude to global radiative forcing estimates due to LCLU change during the twentieth century.