Use of MODIS BRDF/Albedo, Vegetation Fraction, Type, and Snow in Global and Regional Models
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1. Introduction

Overall goal of our MODIS project: Integration of remote sensing data with global climate models.
Data: MODIS, CERES, GOES, AVHRR, In-situ
Models: NCAR, NCEP, GMAO
Progress: Represented by 7 peer-reviewed papers:

2. Albedo/BRDF data

- Evaluated the monthly averaged albedo from NCAR CCSM2 using the MODIS white-sky albedo.
- Reformulated the MODIS BRDF algorithm to develop a new parameterization of land surface albedo for land modeling and remote sensing.

3. Maximum Snow Albedo

- Using global MODIS BRDF/albedo, land cover, and NBAR data, we created a new maximum snow albedo database at 0.05\degree resolution which is higher than the resolution of the current dataset used in the NCEP NOAH model (1\degree).
- Maximum snow albedo dataset reflects global vegetation characteristics.

4. Green Vegetation Fraction

- Generated the global green vegetation fraction (GVF) data using MODIS NDVI data.
- Compared with AVHRR-based data over the continental United States.
- Examined the impact of new MODIS GVF data on surface processes over North America using the NCEP NOAH land model. The largest differences between the GVF dataset currently used by the NOAA model and the new MODIS GVF dataset occur in winter and for thee-dominated vegetation classes.
- The greatest impact of the new GVF data on the surface energy and water balance is seen during the summer when the transpiration is increased by more than 10 W/m^2 on average for most vegetation types and the July averaged daily transpiration rate is increased by up to 50 W/m^2 for evergreen needleleaf sites.

The Weather Research and Forecasting(WRF) model is used to test the sensitivity of near-surface energy components to the new maximum snow albedo dataset. The albedo dataset is converted to a resolution of 0.144\degree using simple averaging. The model is initialized with ETA model output and run for 24 hours beginning 00Z 10 Feb 2005 at 4km resolution. Results below indicate differences up to 0.5\degree C in 2-meter temperature and also more than 5 W/m^2 changes in sensible heat flux (not shown) over snow-covered regions.