1. TITLE

1.1 Data Set Identification

ISLSCP II Monthly Snow-Free Albedo, 1982-1998, and Background Soil Reflectance

1.2 Database Table Name(s)

Not applicable to this data set.

1.3 File Name(s)

The files in this data set are named using the following naming convention:

snowfree_albedo_1d_YYYYmm.asc

where:

snowfree_albedo	identifies the snow free albedo data set.
1d	identifies the spatial resolution of the data set where **1d** stands for a spatial resolution of 1 degree in both latitude and longitude.
YYYY	is the four-digit year from 1982 to 1998.
mm	is the two-digit month from 01 to 12.

This data set also includes files that contain estimates of the reflectance of the soil/litter background in both visible and Near-Infrared wavelengths. These files are named **bkgrd_refl_vis_1d.asc** and **bkgrd_refl_nir_1d.asc**, respectively. Each of these files has two additional files associated with them that show the differences between the original land/water mask used with the data and the land/water mask used in this International Satellite Land Surface Climatology Project (ISLSCP) Initiative II Data Collection. Files named **bkgrd_refl_yyy_1d.dif** are called 'differences' files and contain any points that have either been added or removed from the original data because of a mismatch with the ISLSCP II land/water mask. Files named **bkgrd_refl_yyy_1d_changemap.asc** are ASCII gridded maps that show the differences between the land/water boundaries of the original soil/litter reflectance files and the ISLSCP Initiative II land/water mask. For all of these files "**yyy**" can denote either **nir** or **vis**. Note also that the differences files and "change" maps are not available for the snow-free albedo data set.

1.4 Revision Date of this Document

March 1, 2007

2. INVESTIGATOR(S)

2.1 Investigator(s) Name and Title

Donald A. Dazlich, Department of Atmospheric Science, Colorado State University.

2.2 Title of Investigation

Earth Observing System - Inter-Disciplinary Science project.

2.3 Contacts (For Data Production Information)

	Contact 1	Contact 2
2.3.1 Name	Dr. Donald A. Dazlich	Dr. Sietse O. Los
2.3.2 Address	Department of Atmospheric Science Colorado State University	Department of Geography University of Wales Swansea Singleton Park
City/St.	Fort Collins, CO	Swansea SA2 8PP
Zip Code	80523	
Country	USA	Wales, United Kingdom
2.3.3 Tel. No.	(970) 491-8585	44 (0) 1792 295144
Fax No.	(970) 491-8428	44 (0) 1792 295955
2.3.4 E-mail	Dazlich@atmos.colostate.edu	s.o.los@swan.ac.uk

	Contact 3 (ISLSCP II)
2.3.1 Name	Dr. Eric Brown de Colstoun
2.3.2 Address	NASA/GSFC Code 614.4
City/St.	Greenbelt, MD
Zip Code	20771
Country	USA
2.3.3 Tel. No.	(301) 614-6597
Fax No.	(301) 614-6695
2.3.4 E-mail	ericbdc@ltpmail.gsfc.nasa.gov

2.5 Data Set Citation

Dazlich, D.A. and S.O. Los. 2009. ISLSCP II Monthly Snow-Free Albedo, 1982-1998, and Background Soil Reflectance. In Hall, Forrest G., G. Collatz, B. Meeson, S. Los, E. Brown de Colstoun, and D. Landis (eds.). ISLSCP Initiative II Collection. Data set. Available on-line [http://daac.ornl.gov/] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A. doi:10.3334/ORNLDAAC/956

2.4 Requested Form of Acknowledgment

Users of the International Satellite Land Surface Climatology (ISLSCP) Initiative II data collection are requested to cite the collection as a whole (Hall et al. 2006) as well as the individual data sets. Please cite the following publications when these data are used:

Hall, F.G., E. Brown de Colstoun, G. J. Collatz, D. Landis, P. Dirmeyer, A. Betts, G. Huffman, L. Bounoua, and B. Meeson, The ISLSCP Initiative II Global Data sets: Surface Boundary Conditions and Atmospheric Forcings for Land-Atmosphere Studies, *J. Geophys. Res.*, 111, doi:10.1029/2006JD007366, 2006.

Sellers, P.J., D.A. Randall, C.J. Collatz, J.A. Berry, C.B. Field, D.A. Dazlich, C. Zhang, and C.D. Collelo, 1996. A revised land surface parameterization (SiB2) for atmospheric GCMs. Part 1: Model formulation. *Journal of Climate*, 9, 676-705.

Sellers, P.J., S.O. Los, C.J. Tucker, C.O. Justice, D.A. Dazlich, G.J. Collatz, and D.A. Randall, 1996. A revised land surface parameterization (SiB2) for atmospheric GCMs. Part 2: The generation of global fields of terrestrial biophysical parameters from satellite data. *Journal of Climate*, 9, 706-737.

3. INTRODUCTION

3.1 Objective/Purpose

Biophysical Parameters derived from the FASIR-NDVI (Fourier Adjusted, Solar zenith angle correction, Interpolation, and Reconstruction of Normalized Difference Vegetation Index) data set developed for the ISLSCP Initiative II data collection for the months of January 1982 through December 1998 were used to calculate monthly mean surface albedos at 1 X 1 degree spatial resolution for vegetated land surfaces (Sellers et al, 1995b) for the wavelength interval from 0.4 to 3.0 μm. The instantaneous albedo is a function of the properties of the land surface and the solar zenith angle. The monthly mean albedo is an average weighted over time weighted by the incident radiation. NDVI data are used to generate the biophysical parameters leaf area index (LAI) and green fraction of vegetation (Greenness) used by the canopy radiative transfer model of the Simple Biosphere (SiB2) model (Sellers et al, 1995a), which computes the instantaneous albedo. This is coupled to the Colorado State University (CSU) General Circulation Model (GCM) (Randall et al, 1989) which integrates the SiB2 radiative transfer through time. The incident radiation for weighting the time-averaged albedo was provided by a previous run of the GCM using the atmospheric radiation parameterization of Harshvardhan et al (1987). The Harshvardhan parameterization estimates radiative transfer through the atmosphere in both the longwave and shortwave bands, including the effects of cloudiness and water vapor, carbon dioxide and ozone. The shortwave radiation distinguishes between the direct and diffuse components of the solar beam.

3.2 Summary of Parameters

Monthly average snow-free surface shortwave albedo for the period 1982-1998 is defined as the monthly average reflected radiation divided by the monthly average incident radiation. These radiative monthly averages are from hourly time steps of the SiB2 albedo parameterization and the prescribed incident radiation weighted by the cosine of the solar zenith angle. The data set also contains estimates of background soil reflectances in the Visible (0.4-0.7 μm) and Near-Infrared (NIR) (0.7-1.0 μm) wavelengths.

3.3 Discussion

The surface albedo is a significant physical parameter controlling the flux of energy at the interface between the Earth's surface and the atmosphere and must be prescribed in a General Circulation Model (GCM). It is a function of the reflectance of the underlying soil surface and of the vegetative canopy above. The extent and nature of the canopy varies widely not only with growing season, but year to year as it responds to interannual variations in the climate.

Satellite data provide a way to describe the seasonal and interannual variations in surface albedo. Solar radiation in the visible and near- infrared wavebands, reflected by the Earth's surface and collected by a remote sensing device, can be combined into a spectral vegetation index such as the Normalized Difference Vegetation Index (NDVI) and related to physical properties of vegetation. In particular, the physical vegetation parameters leaf area index, and green fraction of vegetation can be derived from NDVI. An updated version of the Simple Biosphere Mode (SiB), named SiB2 (Sellers et al, 1996a), can calculate the surface albedo for various spectral intervals (visible and near infrared) and incident beams (direct and diffuse) by combining NDVI derived LAI and Greenness with other biophysical parameters that are a function of a prescribed vegetation classification (surface background reflectance, transmittance and reflectance of woody and green canopy parts, and the Vegetation Cover fraction, VCOVER). VCOVER is indirectly a function of FASIR through LAI. A two-stream radiative transfer approximation is used through the canopy to compute the surface albedo.

The total-band all-beam surface albedo is an average of the above four components (visible band/direct beam, visible band/diffuse beam, near infrared band/direct beam, and near infrared band/diffuse beam) weighted by the incident radiation in each of those bands. These incident components vary with cloudiness and with solar zenith angle. Further, the albedo components are themselves a function of solar zenith angle. To get a monthly mean surface albedo requires the integration of the various instantaneous surface albedos over all times of day and the likely incident radiation. The GCM provides a means of integrating over the diurnal cycle.

In addition, this data set for the ISLSCP Initiative II provides two fixed fields with estimates of the background (soil/litter) reflectances in visible and NIR wavelengths. The Initiative II specification of soil background reflectance resolves several of the problems in the Initiative I (one) data. In the Initiative I data the albedo of several short-vegetation biomes increased with LAI. This positive association between albedo and LAI was caused by the biome dependent specification of low soil background reflectance values. If slightly brighter leaves were added over the dark soil, the albedo of the land surface increased as a result. Earth Radiation Budget Experiment (ERBE) data showed a negative association between LAI and albedo (Los 1998). It was therefore concluded that the Initiative I albedo data needed to be improved by changing the soil background reflectance. Albedo values of this revised data set agree within 2 % with ERBE albedo in the tropics and are about 0-5 % lower in boreal forests. These latter values are more realistic as ERBE tends to overestimate the albedo of boreal forests (Betts and Ball 1997).

4. THEORY OF ALGORITHM/MEASUREMENTS

The CSU GCM (Randall et al, 1989) is a finite difference model with 4x5 degree horizontal resolution and 17 vertical levels. Features of the model include parameterized convection, solar and terrestrial radiation with diurnal cycle, planetary boundary layer, and SiB2 (Sellers et al, 1996a). The solar radiation fields of the GCM are produced using the parameterization of Harshvardhan et al (1987).

An updated version of SiB, named SiB2 (Sellers et al, 1996a), calculates the surface albedo for various spectral intervals (visible and near infrared) and incident beams (direct and diffuse) by combining NDVI derived parameters with other biophysical parameters that are a function of a prescribed vegetation classification. The radiation parameterization of the CSU GCM (Harshvardhan et al, 1987) computes the incident surface radiation in the bands where SiB2 defines the surface albedos. Weighted by the solar zenith angle, this model output can be used to integrate and average the surface albedo components from SiB over the diurnal cycle. The average is continued over a month with the solar declination angle updated daily to produce a monthly surface albedo.

5. EQUIPMENT

5.1 Instrument Description

This data set is derived from the FASIR-NDVI data set which in turn uses satellite data from the Advanced Very High Resolution Radiometer (AVHRR). Please refer to the documentation for the FASIR NDVI data set for information on the AVHRR sensor.

5.1.1 Platform (Satellite, Aircraft, Ground, Person)

See FASIR-NDVI documentation.

5.1.2 Mission Objectives

See FASIR-NDVI documentation.

5.1.3 Key Variables

See FASIR-NDVI documentation.

5.1.4 Principles of Operation

See FASIR-NDVI documentation.

5.1.5 Instrument Measurement Geometry
See FASIR-NDVI documentation.

5.1.6 Manufacturer of Instrument
ITT.

5.2 Calibration
Please refer to the documentation for the FASIR NDVI data set for calibration information on the AVHRR sensor.

5.2.1 Specifications
5.2.1.1 Tolerance
See FASIR-NDVI documentation.

5.2.2 Frequency of Calibration
See FASIR-NDVI documentation.

5.2.3 Other Calibration Information
See FASIR-NDVI documentation.

6. PROCEDURE

6.1 Data Acquisition Methods
Dr. Sietse Los provided the FASIR-NDVI derived biophysical parameter data needed to calculate the monthly snow-free albedo from January 1982 through December 1998. For a particular month, SiB2 was used to calculate the surface albedo components (reflectance) hourly as a function of the time varying input parameters LAI and Greenness, and permanent physiological parameters (background reflectance, and the canopy leaf and woody transmittances and reflectances) that are a function of the defined EROS Data Center (EDC) SiB land cover classification (also in this ISLSCP II collection), and the solar zenith angle. The surface and canopy are assumed to be snow-free. The albedo components are weighted by the cosine of the solar zenith angle and the fraction of incident radiation in the corresponding band. The albedo components are summed over one month with the one-hour time step using daily updated solar declination angles. These component sums are added and normalized to obtain the monthly mean surface albedo for the 1 X 1 degree area. The full procedure is described in Sellers et al. (1996a,b).

The incident radiation fields are from a recent 10-year integration of the CSU GCM that includes the SiB2 parameterization and Sea Surface Temperatures prescribed for the years 1979 through 1988, as described by Randall et al (1996). Ten year means for each month were used in weighting the albedo calculation. This controls the partition of the solar radiation into its diffuse and direct components and its attenuation by cloud cover, which controls the weighting of the albedo components into a single monthly mean value.

6.2 Spatial Characteristics

6.2.1 Spatial Coverage

The coverage is global except for areas under permanent ice cover (e.g. Greenland and Antarctica) and some small islands. Data in files are ordered from North to South and from West to East beginning at 180 degrees West and 90 degrees North.

The calculation of surface albedo is made for all vegetated land points (no permanent ice cover), as defined by the EDC SiB land cover classification data set at 1 degree spatial resolution. Regions of polar night were assigned an albedo that is an average of the monthly values for the months immediately prior to and after the polar night period.

6.2.2 Spatial Resolution

The data are given in an equal-angle latitude /longitude grid that has a spatial resolution of 1 degree in both latitude and longitude.

6.3 Temporal Characteristics

6.3.1 Temporal Coverage

The data set spans the period from January 1982 through December 1998.

6.3.2 Temporal Resolution

Monthly mean. The background reflectances are time invariant fields.

7. OBSERVATIONS

7.1 Field Notes

Not applicable to this data set.

8. DATA DESCRIPTION

8.1 Table Definition with Comments

Not applicable to this data set.

8.2 Type of Data

8.2.1 Parameter/ Variable Name	8.2.2 Parameter/ Variable Description	8.2.3 Data Range	8.2.4 Units of Measurement	8.2.5 Data Source
1) Snow-Free Albedo Maps (*.asc)				
Snow-Free Albedo	Snow-free monthly surface albedo (albedo is the fraction of incident solar radiation reflected by surface)	Min = 0.0497 Max = 0.5656 Permanent Ice = -77 No Data Over Land = -88 Water = -99	[Unitless]*	FASIR Data set (This collection)
2) Soil/Litter Reflectance Maps (*.asc)				

Background Visible Reflectance	Visible background hemispherical reflectance is the fraction of incident visible (0.4-0.7 µm) radiation that is reflected by the soil/litter layer surface.	Min = 0.026 Max = 0.420 Water=-99	[Unitless]*	
Background NIR reflectance	NIR background hemispherical reflectance is the fraction of incident Near Infrared (0.7–1.0 µm) radiation that is reflected by the soil/litter layer surface.	Min=0.0358 Max=0.550 Water=-99	[Unitless]*	
3) Soil/Litter Differences Tables (*.dif)				
Lat	Latitude for the center of a cell. South latitudes are negative.	Varies with Wavelength	Decimal Degrees	Earth Grid
Lon	Longitude for the center of a cell. West longitudes are negative.	Varies with Wavelength	Decimal Degrees	Earth Grid
Data_Removed	Albedo value in each cell of the original file that did not match the ISLSCPII land/water mask, and was removed.	Varies with Wavelength	[Unitless]*	Original Data
Data_Added	Albedo value for each cell added to the original file because the ISLSCPII land/water mask indicated land, so an interpolated point was added.	Varies with Wavelength	[Unitless]*	Computed from nearest neighbours
Interpolation_ Level	The number of times the interpolation routine was run to get a value for this point. The higher the number, the less reliable the value is.	Varies with Wavelength	[Unitless]	Computed
4) Soil/Litter Change Maps (_changemap.asc)				
Point Changed	Differences between the ISLSCP II land/water mask and the original data: -1=ISLSCP II mask is water and original data is land	Min=-1 Max=1	See 8.2.2	Computed

	(data removed) 0=Data sets agree over land or water (data unchanged) 1=ISLSCPII mask is land and original data is water or missing (data added as -88)			

* Albedo and reflectance units are non-dimensional, a fraction between 0 and 1.

8.3 Sample Data Record

The first few records of the differences file named **bkgrd_refl_nir_1d.dif** are shown below. The file contains some header information and then the data in tabular form.

```
ISLSCP II Differences for file 'bkgrd_refl_nir_1d.asc'.
Contains Lat-Lon coordinates and data for each point in the original file
that differed from the ISLSCP II Land/Sea mask, and thus was removed.
Points added using interpolation are listed at the bottom of this file.

Lat,Lon,Data_Removed
83.5,-34.5,0.5500
82.5,-62.5,0.5500
82.5,-25.5,0.5500
82.5,-24.5,0.5500
82.5,-23.5,0.5500
81.5,-25.5,0.5500
80.5,-66.5,0.5500
79.5,-19.5,0.5500
```

8.4 Data Format

All of the files in the ISLSCP Initiative II data collection are in the standard ARC GIS ASCII GRID format. The file format consists of six lines of header information followed by numerical fields of varying length, which are delimited by a single space and arranged in columns and rows. All values in these files are written as real numbers. Water bodies are assigned the value of –99 while missing data are over land are assigned the value of -88. Permanent Ice is assigned the value of –77 on the Snow-Free albedo fields. The files in this data set contain exactly 360 columns by 180 rows.

The soil/litter reflectance ASCII map files (with the extension of ".asc") have all had the ISLSCP II land/water mask applied to them. All points removed from the original files are stored in "differences" files (with the extension ".dif"). These ASCII files contain the Latitude and Longitude location of the cell-center of each removed point, and the data value at that point. At the bottom of these files are also a list of all points added to the file through "nearest neighbor averaging" interpolation (see Section 9.2.3), where the land/water mask indicated land but there was no data in the original file. There is also a column called "Interpolation_Level" that contains the number of times the interpolation routine was run to get a value for that point. The higher the number, the less reliable the value is. There is one ".dif" file for each ASCII map file.

The "change map" files show the results of applying the land/water mask to the original soil/litter reflectance files, as a viewable ASCII map: all points added (positive number, containing the "Interpolation_Level", see above), all points unchanged ("0"), and all points removed ("-1"). There are no differences files or change maps for the Snow-Free albedo fields.

All files are gridded to a common equal-angle lat/long grid, where the coordinates of the upper left corner of the files are located at 180 degrees W, 90 degrees N and the lower right corner coordinates are located at 180 degrees E, 90 degrees S. Data in the files are ordered from North to South and from West to East beginning at 180 degrees West and 90 degrees North.

8.5 Related Data Sets

This snow-free albedo data set is based on the 17-year data set of biophysical parameters derived from the FASIR-NDVI data set. Both of these data sets are also included in this ISLSCP II data collection. The biophysical parameters include monthly total and green Leaf Area Index (LAI), fraction of photosynthetic active radiation absorbed by the vegetation canopy (FAPAR), roughness length, zero plane displacement, and fixed maximum vegetation (canopy) cover fraction. The EROS Data Center (EDC) global land cover classification product using the Simple Biosphere (SiB) legend was used in the production of this data set. Finally, the ISLSCP II data collection contains multiple albedo data sets, each with specific temporal and/or spatial attributes. Other albedo data sets in this collection include an albedo product for February and July 1995 from the Advanced Very High Resolution Radiometer (AVHRR), a 5-year AVHRR albedo climatology produced by NOAA-NESDIS (National Environmental Satellite Data and Information Service), and coarse scale albedos from the Earth Radiation Budget Experiment (ERBE). Users should refer to the overview document for albedo as well as Hall et al. (2006) for a more in depth discussion of these products.

9. DATA MANIPULATIONS

9.1 Formulas

9.1.1 Derivation Techniques/Algorithms

A two-stream model described in Sellers (1985) and Sellers et al (1996a) was used to calculate surface reflectance.

9.2 Data Processing Sequence

9.2.1 Processing Steps and Data Sets

A full description of the models and procedures used can be found in Sellers (1985), Sellers et al., (1996a, b) and some results are discussed in Randall et al., (1996). In summary, the following data are inserted into the two-stream radiative transfer model.

- Soil/background reflectance, these fields are also in this ISLSCP II data set.
- Leaf area index (LAI), derived from the NDVI data, also in the ISLSCP II data collection.
- Canopy greenness factor, derived from the NDVI data, also the ISLSCP II data collection.

The LAI and canopy greenness factor data are combined with land cover dependent optical and meteorological data in SiB2 to estimate the density, geometrical arrangement and spectral properties of canopy phyto-elements. These and the soil/background information are used by the SiB2 two-stream model to calculate the direct beam and diffuse, visible and near-infrared radiation transfer within the canopy soil system. Canopy reflectances are weighted by the incoming fluxes, as calculated by the model of Harshvardhan et al. (1987), and summed to provide an estimate of surface albedo.

This data set for ISLSCP II also includes improved estimates of the VIS/NIR soil background reflectances. The specification of soil background values is different for deserts and for vegetated areas. This was also the case for the Initiative I data:

Deserts: Soil background reflectance in deserts was calculated from AVHRR channel 1 and 2 data that were processed by the Pathfinder II proof-of-concept software (Vermote et al 1997). Channel 1 and 2 data were corrected for sensor degradation, ozone absorption, rayleigh scattering, water vapor absorption, and aerosol scattering and absorption (Vermote et al 1997). The AVHRR red and near infrared data were extrapolated from the AVHRR spectral bandwidth to the full visible and broad band values. The extrapolation used a regression based on several libraries of ground measured soil spectra.

Vegetated areas: Soil background reflectance over vegetated areas is assumed to be first order dependent on land cover type, thus one expects darker soils over densely vegetated areas and brighter soils over bare areas. Actual soil type is of less importance to the calculation of soil reflectance for this data set. The reflectance values were estimated as the average of:

- a linear relationship between maximum annual NDVI and soil organic carbon and an exponential relationship between soil organic carbon and soil reflectance. The relationship is sensitive for low NDVI values only, and saturates quickly for intermediate to high NDVI values.
- reflectance of leaf litter. Leaf litter optical properties were biome dependent and were estimated from data provided by Asner et al (1998).

The philosophy is similar to the one used for ISLSCP Initiative 1, where soil background reflectance was estimated from land cover type. We prefer using the NDVI, since its value provides a more direct estimate of photosynthetically active biomass than that from land cover type.

9.2.2 Processing Changes

None.

9.2.3 Additional Processing by the ISLSCP II Staff

The ISLSCP Initiative II staff has processed the soil/litter background reflectance files to match them exactly to the land/water boundaries of the ISLSCP II land/water mask. Points that were water on the ISLSCP II mask but land on the original data have been removed but have been stored in the ‘differences’ files for users who may be interested in them. Points over land in the ISLSCP II mask but with no data in the original data have been added by nearest neighbor averaging. In some limited cases multiple runs of the nearest neighbor averaging routine were necessary in order to successfully fill in a particular point. We have also included the level of interpolation in the differences tables. All points that have been added or removed have been listed in the differences files with the ".dif" extension and a change map has been generated that shows the spatial distribution of these points. For the snow-free albedo data set, permanent ice points have been masked in as with a value of –77 in all months in order to match the processing done on all of the other FASIR data sets as well as the Global Inventory Monitoring and Modeling Studies (GIMMS) NDVI data set.

9.3 Calculations

See Sellers (1985), Sellers et al., (1996a,b).

9.3.1 Special Corrections/Adjustments

See references in Section 9.3.

9.4 Graphs and Plots

The performance of the two-stream model (using in situ parameters rather than satellite data inputs) is assessed in Dorman and Sellers (1989) for a few site-specific studies. Sellers et al. (1996b) and Randall et al. (1996) reproduce and discuss global fields.

10. ERRORS

10.1 Sources of Error

The calculation procedure assumes that the fraction of incident radiation in each band does not change with time of day. It is also assumed that the magnitude of the incident radiation varies with time of day according to the cosine of the zenith angle. In fact, due to diurnal variations in cloudiness, there can be large diurnal variations in the partition of incident radiation among the bands and large deviations in magnitude from the assumed weighting by the cosine of the zenith angle.

To evaluate the magnitude of the errors due to these assumptions, the surface albedo calculated for this method at 4x5 degrees resolution using 1987 NDVI data were compared to those actually computed from a CSU GCM simulation using the same data. The maximum difference in surface albedo was 3%, or 18% of the mean albedo. the RMS difference was 1%, and there was no systematic error.

Error is also introduced due to the fact that GCM output is used to prescribe the radiation fields rather than real data. While data is not available to validate the partition of the radiation, the CSU GCM has been used successfully in several studies of the Earth's radiation budget (Randall et al, 1996; Harshvardhan et al, 1987). Data have been compared with results from the BOReal Ecosystem Atmosphere Study (BOREAS), the Amazon, and the First ISLSCP Field Experiment (FIFE). Compared to the ERBE data, the ISLSCP initiative II data have lower values over densely vegetated areas, however, the ISLSCP initiative II values are closer to values measured in field campaigns.

10.2 Quality Assessment

The performance of the two-stream model (using in situ parameters rather than satellite data inputs) is assessed in Dorman and Sellers (1989) for a few site-specific studies. Sellers et al., (1996b) and Randall et al., (1996) reproduce and discuss global fields. The use of satellite data for the input parameters to the two-stream model has resulted in more realistic time-space variation in these parameters (Los et al 1994).

10.2.1 Data Validation by Source

See above.

10.2.2 Confidence Level/Accuracy Judgment

See above. Background Albedo values of this revised data set agree within 2 % with ERBE albedo in the tropics and are about 0-5 % lower in boreal forests. These latter values are more realistic as ERBE tends to overestimate the albedo of boreal forests (Betts and Ball 1997).

10.2.3 Measurement Error for Parameters and Variables

See above.

10.2.4 Additional Quality Assessment Applied

The ISLSCP II staff has checked the data for consistency against the ISLSCP II land/water mask.

11. NOTES

11.1 Known Problems with the Data

The NDVI data set reflects global patterns of vegetation, however, serious errors may be present in the data set that could limit the validity of conclusions, especially for specific locales.

11.2 Usage Guidance

The NDVI data set reflects global patterns of vegetation, however, serious errors may be present in the data set that could limit the validity of conclusions, especially for specific locales.

11.3 Other Relevant Information

Dorman and Sellers (1989) and Sellers et al., (1989) published results using the two-stream model where all the input parameters were obtained directly or indirectly from in situ measurements, leaf area index, greenness, soil reflectance, vegetation optical properties, etc.

In the snow-free albedo fields in this data collection, the model was forced using satellite data to define leaf area index, canopy greenness factors and soil reflectance, as described in Sellers et al., (1996a,b) and Randall et al., (1996). It is argued in their publications that these albedo fields should be a considerable improvement over the previous ones published in Dorman and Sellers (1989).

12. REFERENCES

12.1 Satellite/Instrument/Data Processing Documentation

None.

12.2 Journal Articles and Study Reports

Asner GP, Wessman CA, Schimel DS, Archer S, 1998, Variability in leaf and litter optical properties: Implications for BRDF model inversions using AVHRR, MODIS, and MISR, *Remote Sensing of Environment*, 63: (3) 243-257.

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13. DATA ACCESS

13.1 Contacts for Archive/Data Access Information

The ISLSCP Initiative II data are archived through the Oak Ridge National Laboratory (ORNL) DAAC for Biogeochemical Dynamics at http://daac.ornl.gov.

13.2 Archive Identification

13.2 Contacts for Archive

E-mail: uso@daac.ornl.gov
Telephone: +1 (865) 241-3952

13.3 Archive/Status/Plans

The ISLSCP II data are archived at the ORNL DAAC. There are no plans to update these data.

14. GLOSSARY OF ACRONYMS

AVHRR	Advanced Very High Resolution Radiometer
BOREAS	BOReal Ecosystem Atmosphere Study
CSU	Colorado State University
DAAC	Distributed Active Archive Center
DISC	Data and Information Service Center
DVD	Digital Video Disk
EDC	EROS Data Center
EOS	Earth Observing System
ERBE	Earth Radiation Budget Experiment
FASIR	Fourier Adjusted, Solar zenith angle correction, Interpolation, and Reconstruction of NDVI
FIFE	First ISLSCP Field Experiment
FPAR/Fapar	Fraction of Absorbed Photosynthetically Active Radiation
GCM	General Circulation Model
GES	Goddard Earth Sciences
GIMMS	Global Inventory Monitoring and Modeling Studies
GSFC	Goddard Space Flight Center
IDS	Inter disciplinary Science
ISLSCP	International Satellite Land Surface Climatology Project
LAI	Leaf Area Index
NASA	National Aeronautics and Space Administration
NDVI	Normalized Difference Vegetation Index
NIR	Near Infrared
NOAA	National Oceanographic and Atmospheric Administration
ORNL	Oak Ridge National Laboratory
RMS	Root Mean Square
SiB	Simple Biosphere Model