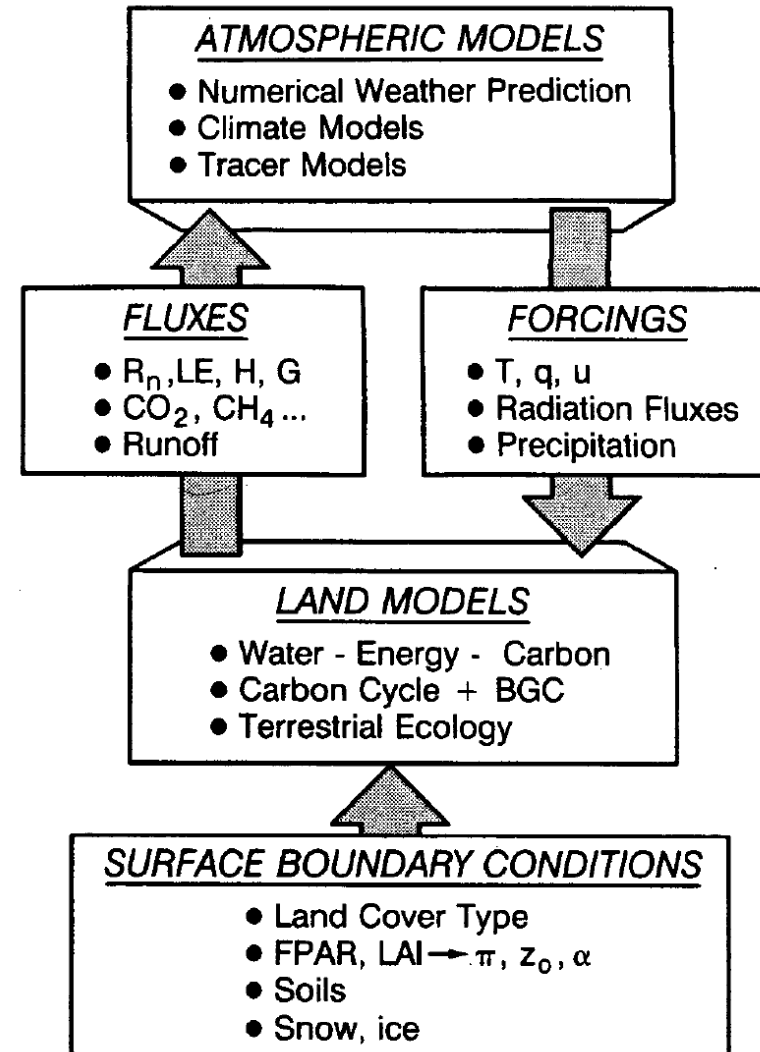
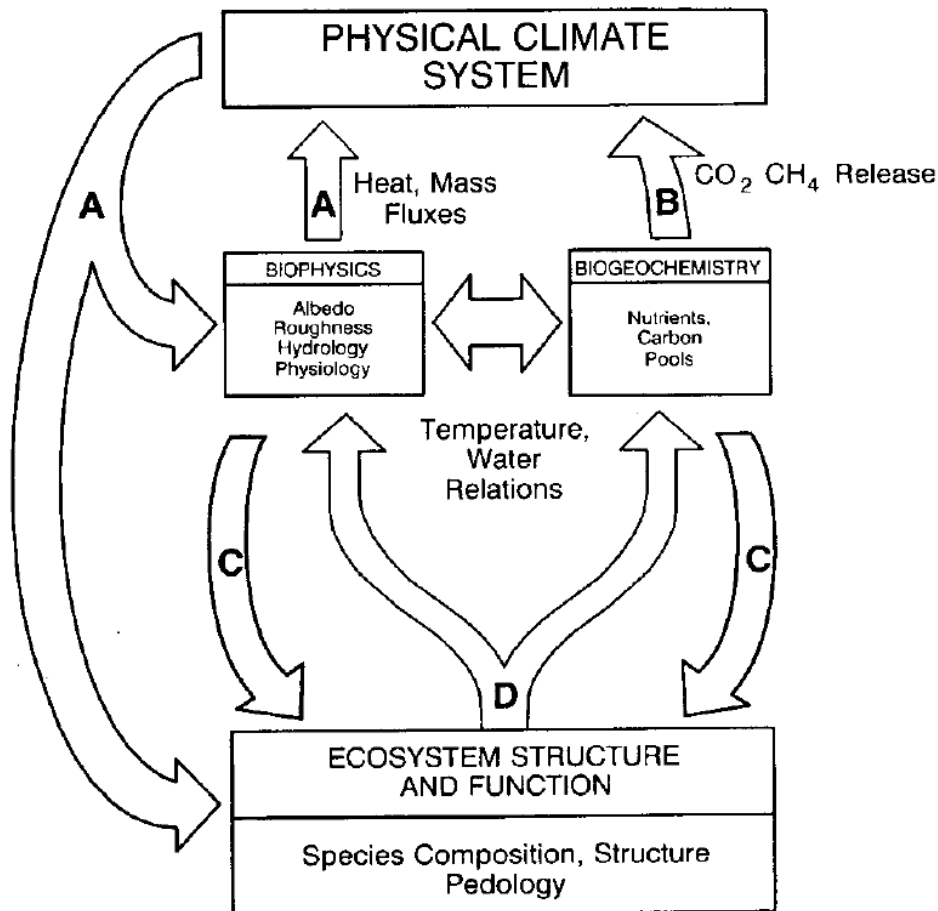


ISLSCP INITIATIVES I AND II



Remote sensing of the land surface for studies of global change: Models — algorithms — experiments

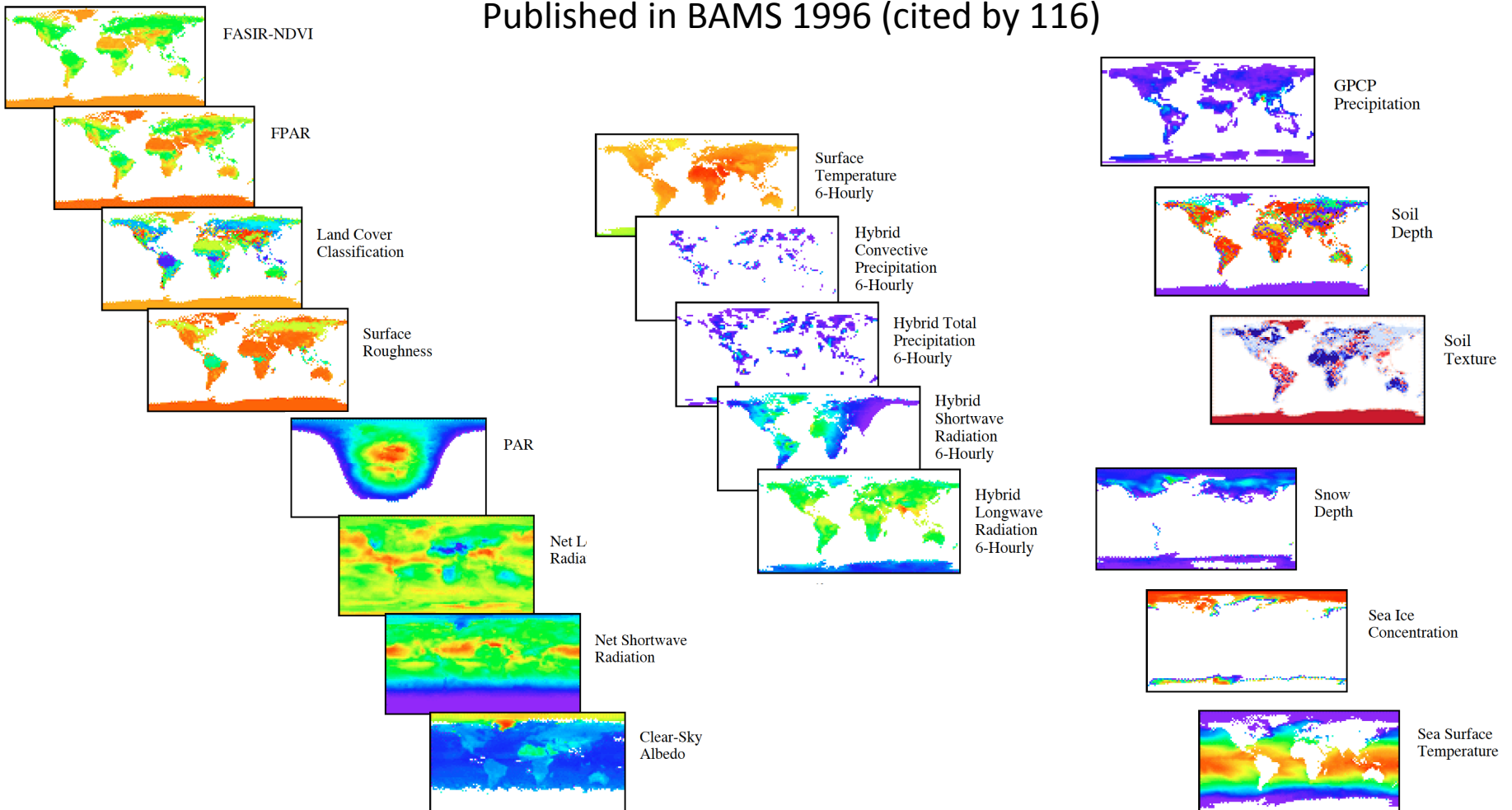
P.J. Sellers, B.W. Meeson, F.G. Hall, G. Asrar, R.E. Murphy, R.A. Schiffer, F.P. Bretherton, R.E. Dickinson, R.G. Ellingson, C.B. Field, K.F. Huemmrich, C.O. Justice, J.M. Melack, N.T. Roulet, D.S. Schimel, P.D. Try

- 240 scientists attending 23-26 June 1992
- A review of the state and direction of biosphere-atmosphere model development and an assessment of the data needs of the models.
 - range of timescales
 - energy-water-carbon (seconds to seasons);
 - carbon cycles and biogeochemistry (days to years);
 - ecological structure and function (years to millennia).
- Review of current satellite data algorithms and other global data sources.

The ISLSCP Initiative I Global Datasets: Surface Boundary Conditions and Atmospheric Forcings for Land-Atmosphere Studies

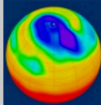
P. J. Sellers, B. W. Meeson, J. Closs, J. Collatz, F. Corprew, D. Dazlich, F. G. Hall, Y. Kerr, R. Koster, S. Los, K. Mitchell, J. McManus, D. Myers, K-J. Sun, and P. Try.

Published in BAMS 1996 (cited by 116)



ISLSCP I

- Datasets on the CD-ROMs
- Grouped under the following headings:
 - vegetation; hydrology and soils
 - snow, ice, and oceans
 - radiation and clouds; and near-surface meteorology.
- Datasets cover the period 1987-88
 - Most spatially continuous over the earth/s land surface.
 - Mapped to a common $1^{\circ} \times 1^{\circ}$ equal-angle grid.
 - Temporal frequency is monthly.
 - Some near-surface meteorological parameters available both as six-hourly values and as monthly means.



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International Satellite Land Surface Climatology Project (ISLSCP) Initiative I (ISLSCP I) Dataset



Dataset Collection

Publication State: Published
Publication Date: 1996-12-10
DOI Publication Date: No DOI

Datasets (9)

Details

Docs (10)

Comments (0)

ISLSCP - I, Volume 1: Hydrology and Soil data

OPEN DATA

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ISLSCP - I, Volume 1: Near-Surface Meteorology data

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ISLSCP - I, Volume 1: Radiation and Clouds data

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ISLSCP - I, Volume 1: Snow, Ice, and Oceans data

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ISLSCP - I, Volume 1: Vegetation data

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ISLSCP - I, Volume 2: Near-surface meteorological analyses

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ISLSCP - I, Volume 3: Near-surface meteorological analyses

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ISLSCP - I, Volume 4: Near-surface meteorological analyses

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ISLSCP - I, Volume 5: Near-surface meteorological analyses and Total and convective precipitation

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MORE INFO

Authors (17)

NASA Goddard Space Flight Center (NASA Goddard)

P.J. Sellers

B. Meeson

J. Closs

G. James Collatz

F. Corprew

D.A. Dazlich

F.G. Hall

Y. Kerr

R. Koster

Sietse O. Los

Karl L. Mitchell

J.M. McManus

D. Myers

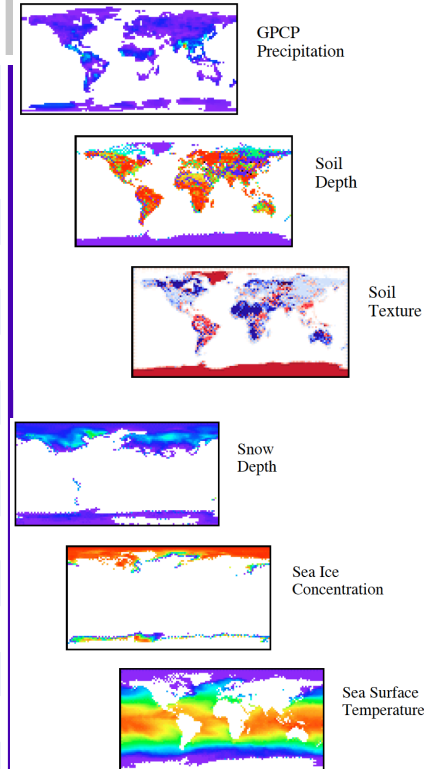
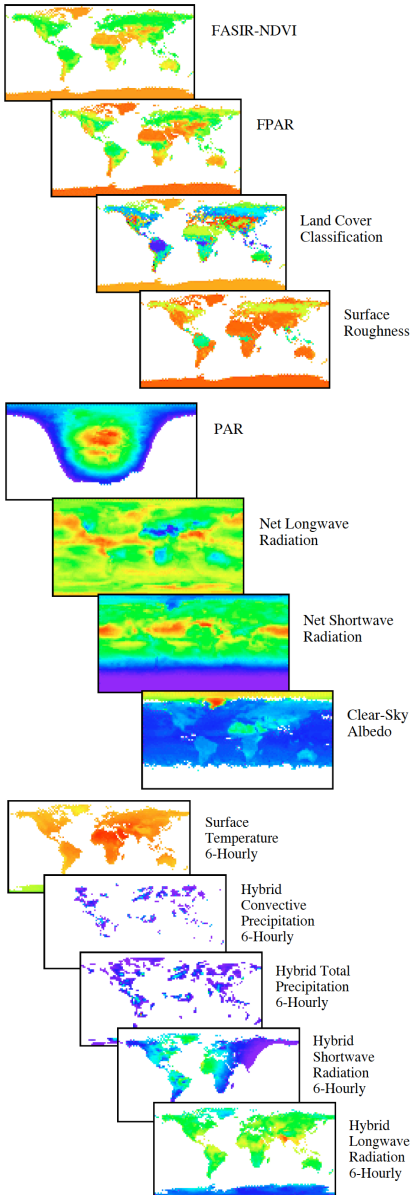
K. Sun

P. Try

GEWEX ISLSCP Project

Publishers (1)

NASA Distributed Active Archive Center (DAAC)



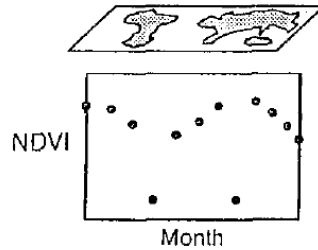
Status of Remote Sensing Algorithms for Estimation of Land Surface State Parameters

Forrest G. Hall, John R. Townshend,** and Edwin T. Engman**

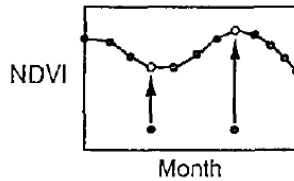
- Landcover Classification
- Soil Moisture
- Biophysical Algorithms

FASIR NDVI

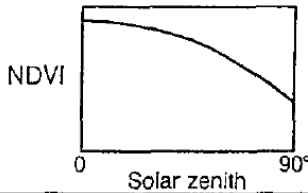
Composited
NDVI Data
1 x 1° Resolution
Global monthly fields



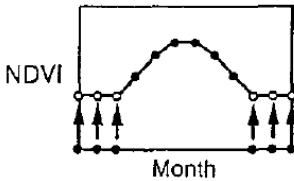
Fourier Adjustment



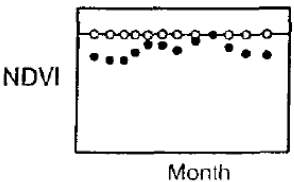
Solar zenith angle
correction



Interpolation
(Boreal forest)



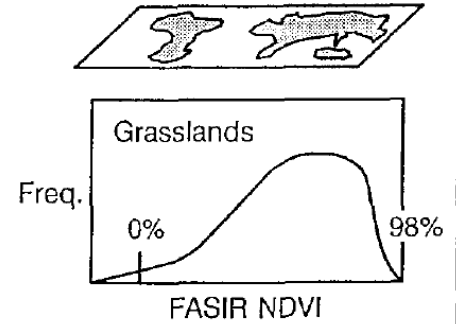
Reconstruction
(Tropical forest)



NDVI → FPAR, Leaf Area Index

FASIR NDVI

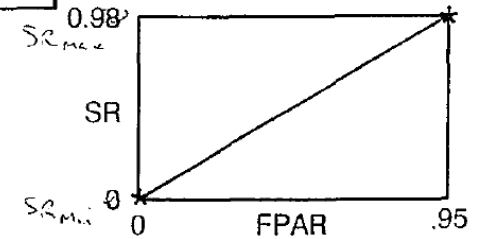
Calculate
Endpoints for each
vegetation type



NDVI → SR → FPAR

$$SR = \frac{1 + NDVI}{1 - NDVI}$$

FPAR ∝ SR



FPAR → Leaf Area

Exponential and
linear relationships

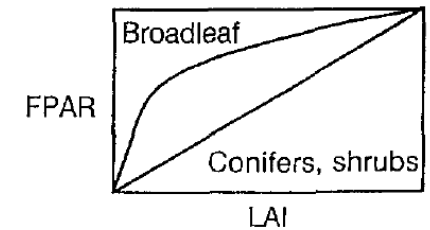
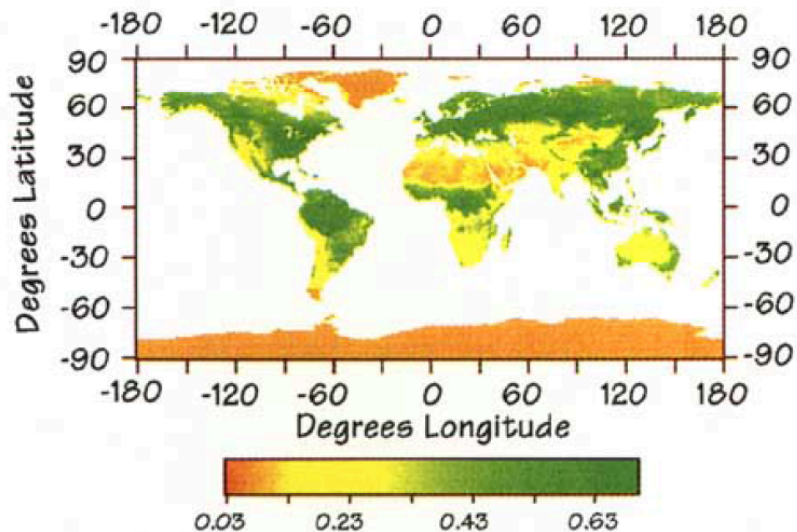
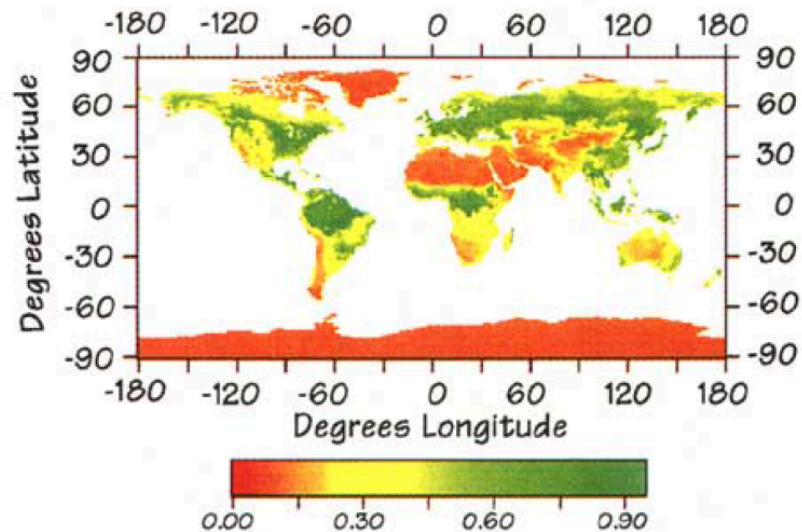


Figure 2.

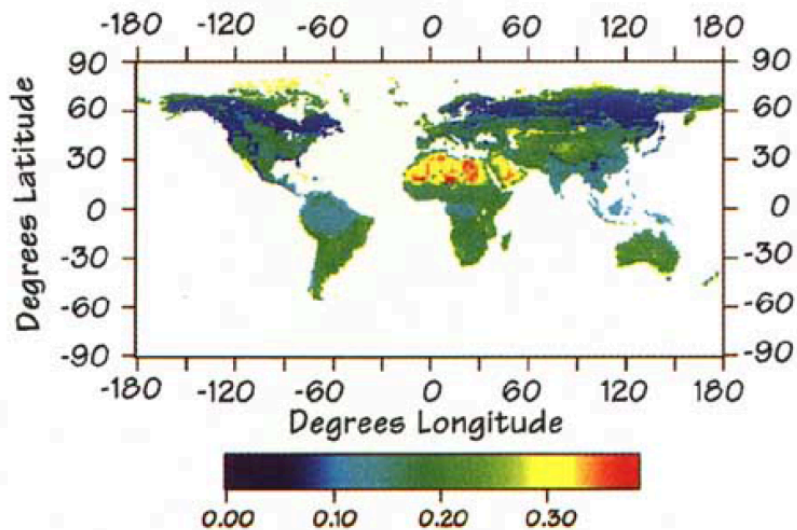
a. NASA/GSFC Monthly FASIR-NDVI
July 1987



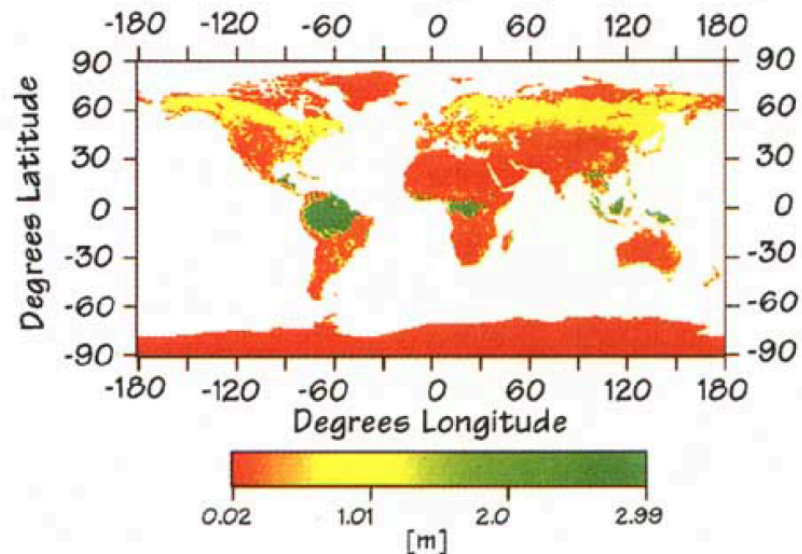
b. NASA/GSFC Monthly FPAR
July 1987



c. CSU, NASA/GSFC Monthly Snow Free Albedo
July 1987



d. NASA/GSFC Monthly Surface Roughness
July 1987



FPAR
Leaf Area Index



Albedo
Surface roughness, Z_0
Photosynthesis, transpiration

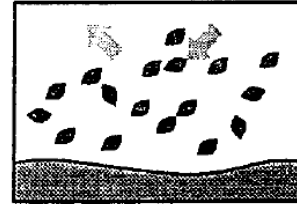
Albedo

Leaf area index



Reflectance \Rightarrow Albedo

Two-stream model



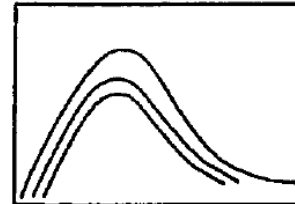
Surface Roughness, Z_0

Leaf area index



Aerodynamic properties

$\frac{Z_0}{h}$



LAI

First-order closure model

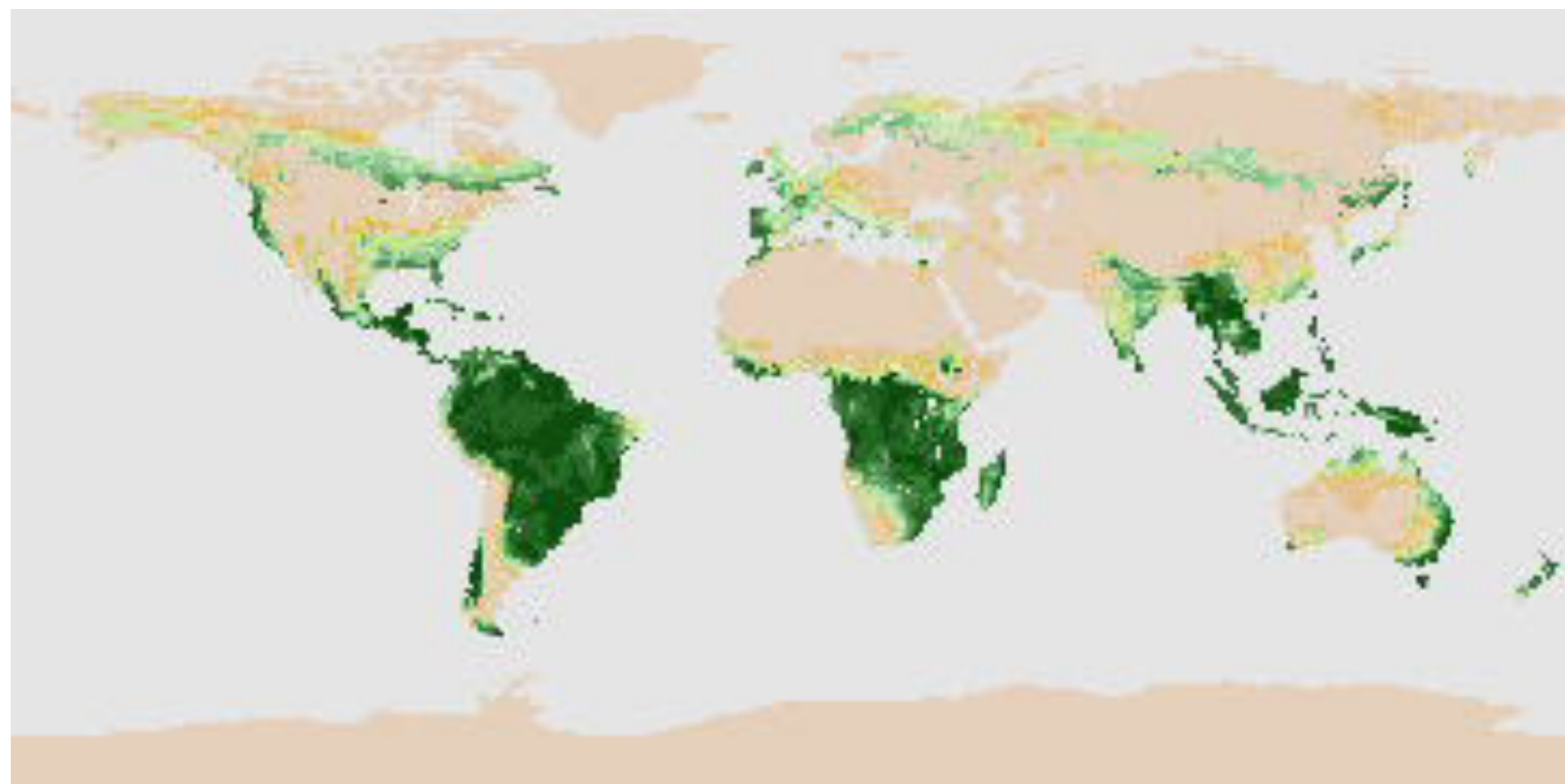
Photosynthesis, transpiration

FPAR \Rightarrow Canopy PAR
use parameter, π

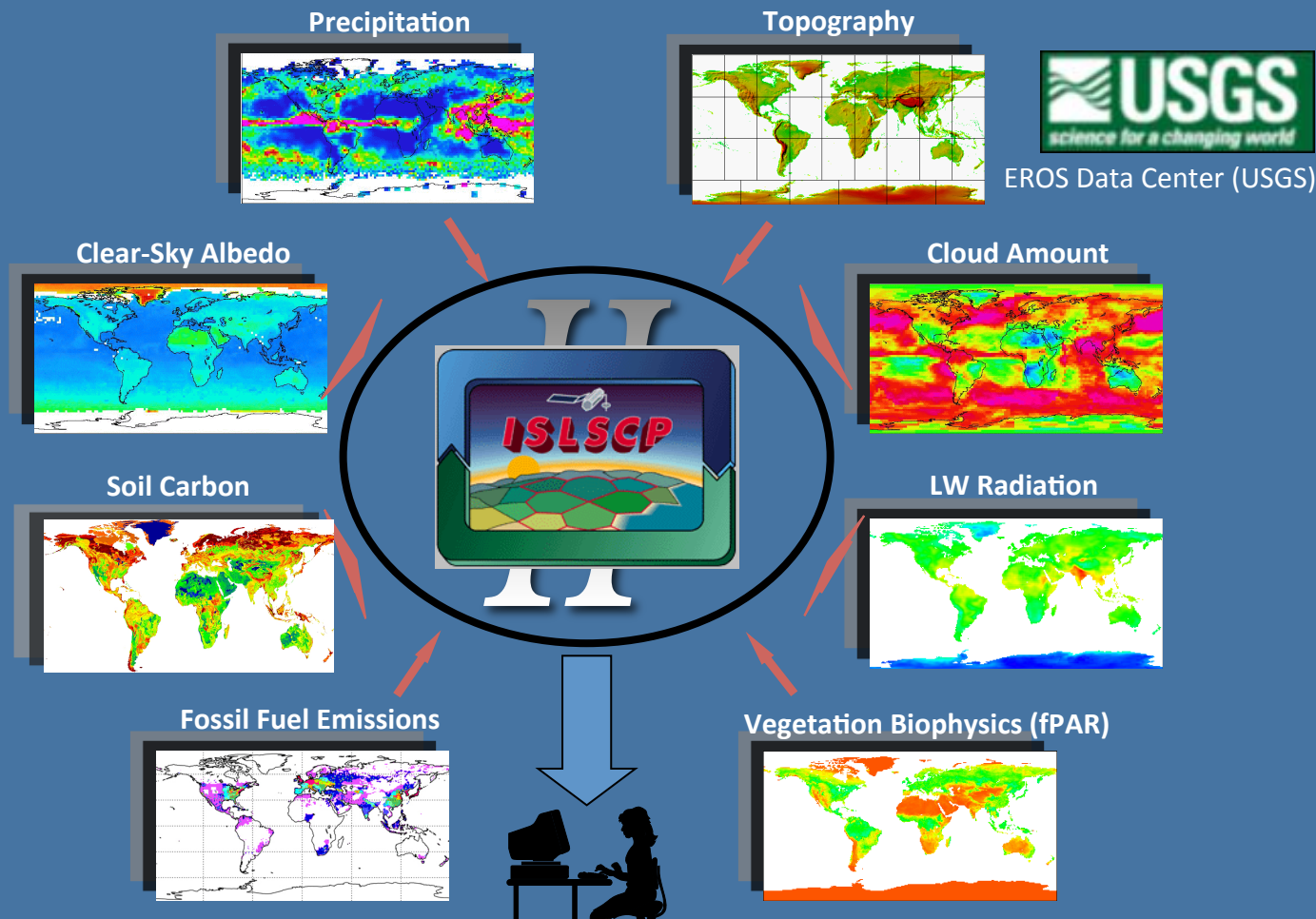
$A_c, g_c = f [\dots] [\dots] [\pi]$

$$\pi = \frac{\text{FPAR}}{\bar{k}}$$

Electron transport/Enzyme kinetics



ISLSCP INITIATIVE II



ISLSCP II expands upon the ISLSCP I collection:

- ➔ Spatial resolution is 1/4, 1/2, and 1 degree.
- ➔ Temporal resolution covers 10-year period from 1986 to 1995.
- ➔ New data sets added (e.g. Carbon modeling data sets).



Science Working Group

- ❖ Pavel Kabat, DLO Winand Staring Centre (ISLSCP II Chair)
- ❖ Paul Try, GEWEX
- ❖ Ichtiaque Rasool, University of Paris VI
- ❖ Randy Koster, NASA/GSFC (Modeling requirements)
- ❖ Carbon: Scott Denning, Colorado State Univ., Dick Olson, Oak Ridge National Laboratory
- ❖ Vegetation: Sietse Los, Ruth DeFries, Univ. of Maryland, Alan Strahler, Boston Univ.
- ❖ Radiation/Clouds: Paul Stackhouse (NASA/Langley)
- ❖ Near-surface Meteorology: Alan Betts, Pedro Viterbo (ECMWF), Glenn White (NCEP), Paul Dirmeyer, Center for Ocean-Land-Atmosphere Studies (COLA), .
- ❖ Socioeconomic: Marc Levy, Deborah Balk, Socioeconomic Data and Applications Center (CIESIN)
- ❖ Snow/Ice: Richard Armstrong, National Snow and Ice Data Center, Univ. of Colorado.
- ❖ Topography/Soils/Runoff: Kris Verdin USGS/EROS Data Center, Balasz Fekete, Univ. of New Hampshire.
- ❖ Precipitation: George Huffman (SSAI) Arnold Gruber (NOAA)



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University



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The International Satellite Land Surface Climatology Project, Initiative II (ISLSCP II)

Overview



The International Satellite Land Surface Climatology Project, Initiative II (ISLSCP II) Project was part of the [Global Energy and Water Experiment \(GEWEX\)](#) and was responsible for

addressing land-atmosphere interactions, process modeling, data retrieval algorithms, field experiment design and execution, and the development of global data sets. The ISLSCP II data set collection contains about 50 comprehensive data sets over the 10 year period from 1986 through 1995 focused on land cover, hydrometeorology, radiation, and soils.

The ISLSCP II data were acquired from a number of U.S. and international agencies, universities, and institutions, then co-registered to equal-angle grids of one, one-half, and one-quarter degree resolution and reformatted into a common ASCII format.

The ORNL DAAC ISLSCP II Data archive includes data products from the following categories:

- Ancillary data
- Carbon
- Hydrology and Soils
- Near Surface Meteorology
- Radiation and Clouds
- Snow, Sea Ice, and Oceans
- Socioeconomics
- Vegetation

ISLSCP_II Resources

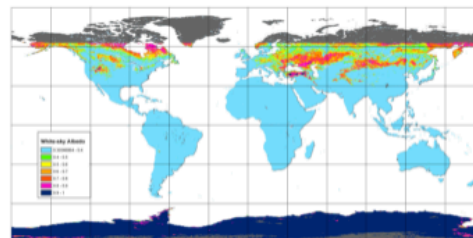
The following ISLSCP II resources are maintained by the ORNL DAAC:

- [The First ISLSCP Field Experiment \(FIFE\) Project](#)
- [The First ISLSCP Field Experiment \(FIFE\) Follow-On Project](#)

Get ISLSCP II Data

Find and order data sets:

- [See list of data sets and download data](#)
- [Retrieve ISLSCP_II data by HTTP browse](#)
- [Search ISLSCP II data \(Mercury\)](#)



Global Map of White-Sky Albedo

ISLSCP Initiative II (ISLSCP II) Data Sets

ISLSCP II: The International Satellite Land-Surface Climatology Project

All ISLSCP II data sets are available FREE of charge.

51 ISLSCP II data sets are available online.

- ↓ 1 Ancillary Data
 - ↓ 11 Carbon
 - ↓ 9 Hydrology and Soils
 - ↓ 4 Near Surface Meteorology
 - ↓ 2 Radiation and Clouds
 - ↓ 3 Snow, Sea Ice, and Oceans
 - ↓ 2 Socioeconomics
 - ↓ 19 Vegetation
- = 51 total ISLSCP II data sets

Near Surface Meteorology (4 data sets)

<input checked="" type="checkbox"/> Near Surface Meteorology ISLSCP II data set	Published
* ISLSCP II Climate Research Unit CRU05 Monthly Climate Data	2011-06-13
* ISLSCP II CRU05 Climate Time Series for Global Land Areas, 1986-1995	2011-06-13
* ISLSCP II ECMWF Near-Surface Meteorology Parameters	2014-06-05
* ISLSCP II Reanalysis Near-Surface Meteorology Data	2014-06-16

Radiation and Clouds (2 data sets)

<input checked="" type="checkbox"/> Radiation and Clouds ISLSCP II data set	Published
* ISLSCP II Cloud and Meteorology Parameters	2012-04-12
* ISLSCP II Surface Radiation Budget (SRB) Radiation Data	2013-12-11

Snow, Sea Ice, and Oceans (3 data sets)

<input checked="" type="checkbox"/> Snow, Sea Ice, and Oceans ISLSCP II data set	Published
* ISLSCP II Global Sea Ice Concentration	2010-07-26
* ISLSCP II Northern Hemisphere Monthly Snow Cover Extent	2010-07-26
* ISLSCP II Sea Surface Temperature	2010-07-26

Socioeconomics (2 data sets)

<input checked="" type="checkbox"/> Socioeconomics ISLSCP II data set	Published
* ISLSCP II Global Gridded Gross Domestic Product (GDP), 1950-2000	2010-04-19
* ISLSCP II Global Population of the World	2010-04-19

Carbon (11 data sets)

<input checked="" type="checkbox"/> Carbon ISLSCP II data set	Published
* ISLSCP II Air-Sea Carbon Dioxide Gas Exchange	2014-03-12
* ISLSCP II Atmospheric Carbon Dioxide Consumption by Continental Erosion	2011-07-01
* ISLSCP II Carbon Dioxide Emissions from Fossil Fuels, Cement, and Gas Flaring	2011-07-01
* ISLSCP II Carbon Dioxide Flux at Harvard Forest and Northern BOREAS Sites	2011-09-21
* ISLSCP II EDGAR 3 Gridded Greenhouse and Ozone Precursor Gas Emissions	2011-07-01
* ISLSCP II Global Primary Production Data Initiative Gridded NPP Data	2011-07-01
* ISLSCP II Global River Fluxes of Carbon and Sediments to the Oceans	2011-09-21
* ISLSCP II GlobalView: Atmospheric CO2 Concentrations	2012-08-24
* ISLSCP II GlobalView: Atmospheric Methane Concentrations	2012-08-24
* ISLSCP II GPPDI, Net Primary Productivity (NPP) Class B Point Data	2011-09-21
* ISLSCP II IGBP NPP Output from Terrestrial Biogeochemistry Models	2011-09-21

Hydrology and Soils (9 data sets)

<input checked="" type="checkbox"/> Hydrology and Soils ISLSCP II data set	Published
* ISLSCP II Gauge-Based Analyses of Daily Precipitation over Global Land Areas	2011-03-07
* ISLSCP II Global Gridded Soil Characteristics	2011-05-05
* ISLSCP II Global Precipitation Climatology Centre (GPCC) Monthly Precipitation	2011-02-25
* ISLSCP II Global Precipitation Climatology Project Version 1, Pentad Precipitation	2011-03-07
* ISLSCP II Global Precipitation Climatology Project Version 2, Monthly Precipitation	2011-03-07
* ISLSCP II HYDRO1k Elevation-derived Products	2011-05-05
* ISLSCP II River Routing Data (STN-30p)	2011-05-05
* ISLSCP II Total Plant-Available Soil Water Storage Capacity of the Rooting Zone	2011-05-05
* ISLSCP II UNH/GRDC Composite Monthly Runoff	2011-02-25

JGR ATMOSPHERES 2006 V111, D22

ISLSCP Initiative II global data sets: Surface boundary conditions and atmospheric forcings for land-atmosphere studies

Forrest G. Hall, Eric Brown de Colstoun, George J. Collatz, David Landis, Paul Dirmeyer, Alan Betts, George J. Huffman, Lahouari Bounoua, Blanche Meeson

First Published: 27 November 2006 Vol: 111, D22S01
| DOI: 10.1029/2006JD007366

Evaluation of ISLSCP Initiative II FASIR and GIMMS NDVI products and implications for carbon cycle science

Forrest Hall, Jeffrey G. Masek, G. James Collatz
First Published: 23 November 2006 Vol: 111, D22S08
| DOI: 10.1029/2006JD007438

Comparison of ERA40 and NCEP/DOE near-surface data sets with other ISLSCP-II data sets

Alan K. Betts, Mei Zhao, P. A. Dirmeyer, A. C. M. Beljaars

Evaluation of the Second Global Soil Wetness Project soil moisture simulations: 1. Intermodel comparison

Zhichang Guo, Paul A. Dirmeyer
First Published: 22 November 2006 Vol: 111, D22S02
| DOI: 10.1029/2006JD007233

Evaluation of the Second Global Soil Wetness Project soil moisture simulations: 2. Sensitivity to external meteorological forcing

Zhichang Guo, Paul A. Dirmeyer, Zeng-Zhen Hu, Xiang Gao, Mei Zhao

Sensitivity of surface climate to land surface parameters: A case study using the simple biosphere model SiB2

Lahouari Bounoua, Jeffrey Masek, Yves M. Turre

Evaluation of ISLSCP Initiative II satellite-based land cover data sets and assessment of progress in land cover data for global modeling

Eric C. Brown de Colstoun, Ruth S. DeFries, John R. G. Townshend

Other Publications Citing ISLSCP II

- Production and analysis of GSWP-2 near-surface meteorology data sets M Zhao, PA Dirmeyer - 2003 - www.w.monsoondata.org
- The effect of driving climate data on the simulated terrestrial carbon pools and fluxes over North America, C Garnaud, L Sushama... - International Journal of climatology, 2014
- Evaluation of the Second Global Soil Wetness Project soil moisture simulations: 2. Sensitivity to external meteorological forcing Z Guo, PA Dirmeyer, ZZ Hu, X Gao et al. - Journal of Geophysical Research, 2006.
- A simple method to estimate actual evapotranspiration from a combination of net radiation, vegetation index, and temperature, K Wang, P Wang, Z Li, M Cribb et al. JGR 2007.
- Effect of mosaic representation of vegetation in land surface schemes on simulated energy and carbon balances, R Li, VK Arora - Biogeosciences, 2012.
- Climatological basin-scale Amazonian evapotranspiration estimated through a water budget analysis, HN Karam, RL Bras - Journal of Hydrometeorology, 2008.
- GSWP-2: Multimodel analysis and implications for our perception of the land surface PA Dirmeyer, X Gao, M Zhao, Z Guo... - BAMS, 2006
- Impact of interactive vegetation phenology on the Canadian RCM simulated climate over North America C Garnaud, L Sushama, D Versegny - Climate Dynamics, 2015
- Assessing a satellite-era perspective of the global water cycle CA Schlosser, PR Houser - Journal of climate, 2007
- Evaluation of soil moisture in the NCEP-NCAR and NCEP-DOE global reanalyses C.H. Lu, M Kanamitsu, JO Roads et al. AMS, 2005
- Improving the quality of simulated soil moisture with a multi-model ensemble approach
- Z Guo, PA Dirmeyer, X Gao et al. - RMS 2007
- Comparison of ERA40 and NCEP/DOE near-surface data sets with other ISLSCP-II data sets
- AK Betts, M Zhao, PA Dirmeyer, JGR 2006

ISLSCP II citations of 21,000 from ISLSCP II publications search.

- Fischer et al. (2008). Global estimates of the land–atmosphere water flux based on monthly AVHRR and ISLSCP-II data, validated at 16 FLUXNET sites
- Feng F et al. (2016) An Empirical Orthogonal Function-Based Algorithm for Estimating Terrestrial Latent Heat Flux from Eddy Covariance, Meteorological and Satellite Observations.
- R. Wania et al. (2013) Present state of global wetland extent and wetland methane modelling: methodology of a model inter-comparison project.
- Kramer R.C. (2015) Degradation in carbon stocks near tropical forest edges
- Tian H. et al. (2014) History of land use in India during 1880–2010: Large-scale land transformations reconstructed from satellite data and historical archives.
- Davie, J.C.S. et al. (2013) Comparing projections of future changes in runoff from hydrological and biome models in ISI-MIP.
- Hamadudu, B.H. et al. (2016) Hydropower Production in Future Climate Scenarios; the Case for the Zambezi River.
- Kujanpää J. et al. (2015) Operational surface UV radiation product from GOME-2 and AVHRR/3 data.
- Zhichang, G. et al. (2006) Evaluation of GSWP-2 Soil Moisture Simulations, Part I: Inter-model comparison.
- Gusev, E.M et al (2005) Modeling the components of heat and water balance for the land surface of the globe.
- Ji-Woo Lee et al (2014). Future Changes in Surface Runoff over Korea Projected by a Regional Climate Model under A1B Scenario.
- Murray S. J. et al (2011). Evaluation of global continental hydrology as simulated by the Land-surface Processes and eXchanges Dynamic Global Vegetation Model

- MODEL INTERCOMPARISONS
- GLOBAL RUNOFF
- GLOBAL FOREST COVER
- GLOBAL FIRE EMISSIONS
- CARBON MODELING

Number of Publications

