JOURNAL OF GEOPHYSICAL RESEARCH, VOL. 111, D22S01, doi:10.1029/2006JD007366, 2006

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

Forrest G. Hall,[1] Eric Brown de Colstoun,[2] George J. Collatz,[3] David Landis,[2] Paul Dirmeyer,[4] Alan Betts,[5] George J. Huffman,[2] Lahouari Bounoua,[3] and Blanche Meeson[6]

Received 3 April 2006; revised 25 September 2006; accepted 23 October 2006; published 30 November 2006.

[1] We report herein the publication and evaluation of the International Satellite Land Surface Climatology Project (ISLSCP) Initiative II global interdisciplinary data record. The record consists of 52 data sets, with a common series in the 10-year period 1985 to 1996. Selected data series extend well beyond this period. All series are coregistered to a common grid and gap-filled for continuity using uniform procedures. We describe briefly the individual data sets within the collection; provide user guidance; and contrast, compare and evaluate those data sets containing similar parameters (land cover, NDVI, albedo, precipitation and near-surface meteorology). We also describe the process used to develop the Initiative II collection which involved a broad international scientific community focused on addressing a well-defined set of carbon, water and energy cycle questions within the context of a specific set of analysis tools. The communities that drove the definition of the Initiative II collection were investigators within the international scientific communities of the Global Energy and Water cycle Experiment, GEWEX, program (http://www.gewex.org/); the International Geosphere/Biosphere Program IGBP (http://www.igbp.kva.se); and the U.S. Global Change Research Program, USGCRP (http://www.usgcrp.gov/). Finally, we report usage statistics based on access and download of files from the ISLSCP Initiative II collection available at http://www.daac.ornl.gov.

Citation: Hall, F. G., E. Brown de Colstoun, G. J. Collatz, D. Landis, P. Dirmeyer, A. Betts, G. J. Huffman, L. Bounoua, and B. Meeson (2006), ISLSCP Initiative II global data sets: Surface boundary conditions and atmospheric forcings for land-atmosphere studies, *J. Geophys. Res.*, *111*, D22S01, doi:10.1029/2006JD007366.

1. Background

[2] The International Satellite Land Surface Climatology Project (ISLSCP) Initiative I data collection, a pilot project, produced the first interdisciplinary Earth Science collection of global data to support land-atmosphere exchange studies [*Sellers et al.*, 1996a]. Initiative I produced a 2-year data set spanning 1987–1988 and containing global, monthly, 1° spatial resolution fields of vegetation attributes, near-surface meteorology, atmospheric radiation and clouds, precipitation, river routing, runoff, soils, and snow/ice data. Each data series in the collection was peer reviewed, registered to a common grid, reprocessed to a common format, and carefully documented. The collection was published in a 5 CD set and distributed by the Goddard Space Flight Center (GSFC) Data Analysis and Archive Center (DAAC). Over 13,000 sets have been ordered from the DAAC and over 267,000 files have been downloaded. There are over 500 citations in the scientific literature supporting a wide variety of uses. Given the success and unique contributions of the ISLSCP Initiative I collection, it was recognized that such collections should be continued and expanded to at least 10 years to enable studies of interannual variability and to include newer state-of-the-art data sets needed to more fully address specific Earth science issues. Accordingly a follow-on effort led by National Aeronautic and Space Administration (NASA), involving a host of national and international partners, was initiated to produce the ISLSCP Initiative II collection, and fulfill the scientific community requirements.

1.1. ISLSCP Data Initiative Process

[3] It takes a community to build a data collection. A community focused on addressing a well-defined set of science questions using a well-defined set of models, analysis tools and data. The communities that drove the definition of the Initiative II collection were investigators within the international Global Energy and Water cycle Experiment, GEWEX, program (http://www.gewex.org/), the International Geosphere/Biosphere Program IGBP (http://www.igbp.kva.se), and the US Global Change Research Program, USGCRP (http://www.usgcrp.gov/). The

[1]University of Maryland Baltimore County, NASA Goddard Space Flight Center, Greenbelt, Maryland, USA.
[2]Science Systems and Applications Inc., NASA Goddard Space Flight Center, Greenbelt, Maryland, USA.
[3]NASA Goddard Space Flight Center, Greenbelt, Maryland, USA.
[4]Center for Ocean-Land-Atmosphere Studies, Calverton, Maryland, USA.
[5]Atmospheric Research, Pittsford, Vermont, USA.
[6]Ocean US, Arlington, Virginia, USA.

0148-0227/06/2006JD007366$09.00

Table 1. Science Foci of GEWEX and USGCRP/IGBP

GEWEX FOCI	USGCRP, IGBP FOCI
How are global precipitation, evaporation and the cycling of water changing?	What are the magnitudes and distributions of carbon sources and sinks on seasonal to centennial timescales, and what are the processes controlling their dynamics?
What are the effects of clouds and surface hydrologic processes on Earth's climate?	What are the magnitudes and distributions of ocean carbon sources and sinks on seasonal to centennial timescales, and what are the processes controlling their dynamics?
How are variations in local weather, precipitation and water resources related to global climate variation?	What are the effects on carbon sources and sinks of past, present, and future land use change and resource management practices at local, regional, and global scales?
What are the consequences of land cover and land use change for human societies and the sustainability of ecosystems?	How do global terrestrial, oceanic, and atmospheric carbon sources and sinks change on seasonal to centennial timescales, and how can this knowledge be integrated to quantify and explain annual global carbon budgets?
What are the consequences of climate change and increased human activities for coastal regions? How can weather forecast duration and reliability be improved?	What will be the future atmospheric concentrations of carbon dioxide, methane, and other carbon-containing greenhouse gases, and how will terrestrial and marine carbon sources and sinks change in the future?
How can predictions of climate variability and change be improved?	How will the Earth system, and its different components, respond to various options for managing carbon in the environment, and what scientific information is needed for evaluating these options?
How will water cycle dynamics change in the future?	

scientific foci of these organizations are defined in terms of specific sets of science questions (Table 1). To address these questions quantitatively, the community has developed both an analysis framework and data requirements to feed and validate its elements (Figure 1). The Initiative II data collection was defined and developed by this community, meeting in regular twice-yearly workshops (Figure 2). The process was coordinated by the ISLSCP Initiative II staff located at the Goddard Space Flight Center and guided by a science working group (Figure 2) through monthly teleconferences. The GSFC staff coordinated the project but also developed the FASIR-NDVI data set with associated biophysical parameters for the period 1982–1998. The staff organized and coordinated the first Initiative II workshop in October of 1999 and each six months there after, culminating in an Initiative II data evaluation workshop in May of 2005.

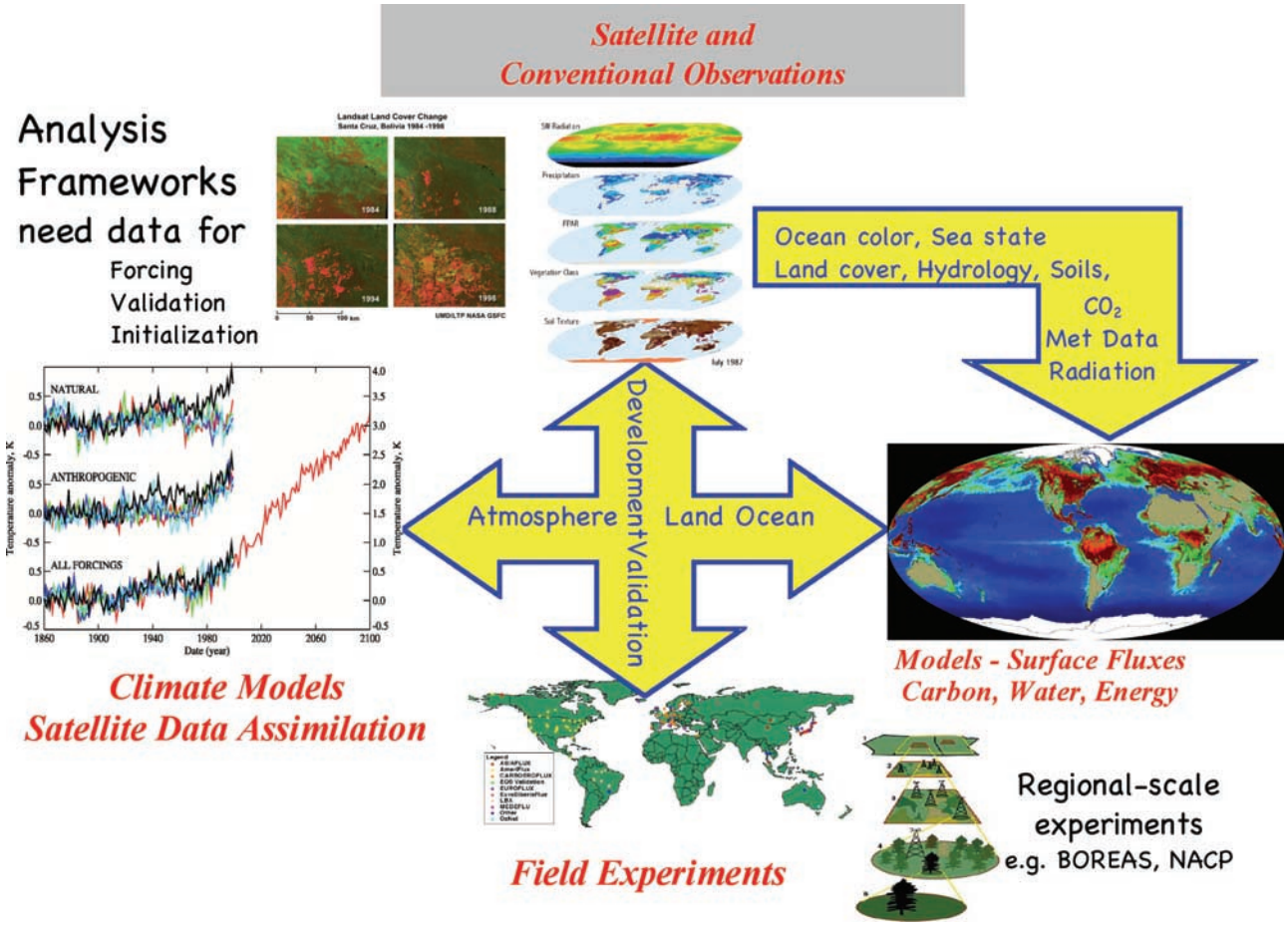

Figure 1. Analysis framework for GEWEX and IGBP/BAHC.