

**CLIVAR Workshop:
“Evaluation of Reanalyses – Developing an Integrated Earth System Analysis
(IESA) Capability”**

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Invited Abstract Title: *Using Reanalysis Data for Applications in Energy Efficiency and Renewable Energy*

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Long-term reanalysis data sets provide consistent set of meteorological parameters that are useful for societal applications that rely upon such parameters but have difficulty locating and collecting data from in situ surface measurements. These surface measurements may be inconsistent with each other, vary in their calibration, lack in spatial coverage and contain data gaps. This talk provides many examples of how the bundling of meteorological parameters including additional satellite analysis of solar energy fluxes has shown to be extremely valuable to the energy community to help optimize renewable energy systems and increase energy efficiencies. This is achieved using both the long-term historic time series but also on a near-real time basis.

NASA's POWER project, or the Prediction of the Worldwide Energy Resources project, synthesizes and analyzes data on a global scale. The primary source data for the POWER project are NASA's World Climate Research Project (WCRP)/Global Energy and Water cycle Experiment (GEWEX) Surface Radiation Budget (SRB) project (Release 3.0) and the Global Modeling and Assimilation Office (GMAO) Goddard Earth Observing System (GEOS) assimilation model (V 4.0.3). More recently, MERRA (Modern Era Retrospective-Analysis for Research and Applications) and more real-time data sets using GEOS 5 and CERES (Clouds and Earth's Radiant Energy System) FLASHFlux (Fast Longwave and SHortwave radiative Fluxes) are being used.

Users of the POWER products access the data through NASA's Surface meteorology and Solar Energy (SSE, Version 6.0) website (<http://power.larc.nasa.gov>). Over 200 parameters are available to the users. The spatial resolution is 1 degree by 1 degree now and will be finer later. The data covers from July 1983 to December 2007, a time-span of 24.5 years, and are provided as 3-hourly, daily and monthly means. The meteorological data parameters such as minimum, maximum, daily mean temperature and dew points, relative humidity and surface pressure are systematically validated against the National Climate Data Center (NCDC) data and other local networks. The solar parameters are evaluated against measurements

from the Baseline Surface Radiation Network (BSRN) archive, and also against the National Solar Radiation Data Base (NSRDB).

As of this date, there have been over 18 million web hits and over 4 million data file downloads of the SSE web portal. SSE feeds data directly into Decision Support Systems including RETScreen International clean energy project analysis software that is written in 36 languages and has greater than 260,000 users worldwide. Users find these data very useful in the feasibility stage of the design of projects integrating renewable energy and/or clean energy technologies into new or existing building systems. Other examples include the derivation of climate zones for buildings (a project that is now using MERRA data sets) and providing global solar and meteorological data products within a week for use in energy forecasts. The data sets, data quality and the various uses of the data sets for energy projects will be discussed.