Global Solar and Meteorological Data for Agricultural Applications

David Westberg - Science Applications International Corporation, Hampton, VA, USA
d.j.westberg@larc.nasa.gov

James M. Hoell - Science Applications International Corporation, Hampton, VA, USA
(j.m.hoell@larc.nasa.gov)

Paul Stackhouse - NASA Langley Research Center, Hampton, VA, USA

William S. Chandler - Science Applications International Corporation, Hampton, VA, USA

Charles H. Whitlock - Science Applications International Corporation, Hampton, VA, USA

Taiping Zhang - Analytical Services and Materials, Inc., Hampton, VA, USA

Agricultural Decision Support Systems (DSS) typically require as input accurate environmental data. In general, the minimum environmental data required consist of solar radiation, air temperature, and precipitation. Ideally, these data would be available through a network of site specific ground-based monitoring stations. In reality, however, such networks seldom exist and when available their up-keep and reliability can be problematic. Moreover, solar radiation is often not measured thereby requiring modeled values to be generated based upon daily maximum/minimum air temperatures or historical climate data. The NASA Science Mission Directorate Applied Science Energy Management Program provides estimates of long-term meteorological conditions from assimilation models and surface solar energy fluxes derived from satellite observations. These data products are now available through the Prediction of Worldwide Energy Resource (POWER) project using a prototype web based information interface. POWER was initiated to improve upon existing datasets and to create new datasets from satellite observations and modeling products in support of US renewable energy, buildings, and agricultural industries. Solar and meteorological data products focused on the agricultural industry have been developed or are under development, and are available through a data archive portal at http://earth-www.larc.nasa.gov/power.

The agricultural data products currently available through the POWER portal consist of daily total surface solar radiation, daily averaged dew point temperature, daily maximum and minimum temperatures, and a climatologically averaged monthly precipitation on a global 1^0 latitude by 1^0 longitude grid. The solar data covers the time period from July 1, 1983 through 2004; the temperature parameters the time period from January 1, 1983 through 2004; and the monthly averaged precipitation is based upon data from July 1, 1983 – June 1993. This presentation will provide an overview of the POWER agricultural data products using examples and data quality assessment from comparison to ground based measurement networks.