The Global Land Data Assimilation System

Rasmus Houborg, Matthew Rodell, Hiroko Beaudouing, Ben Zaitchik
Hydrological Sciences Branch, NASA Goddard Space Flight Center, Greenbelt, MD

FORCING FIELDS

GLDAS uses base forcing from global operational weather forecast models such as, NCEP, ECMWF, and NASA-Goddard 3D Data Assimilation System (DNS). The GLDAS simulation domain is consistent with observation-based datasets of radiation and precipitation from various sources.

GLDAS runs its land surface models using a vegetation-based tiling approach to simulate variability between the scale of the model grid and the CLM4.5 (20 km grid) and the MODIS data products (4 km grid).

PARAMETER INPUTS

Parameter inputs to the land surface models include land cover, soil moisture, snow, and initial land surface properties. These parameters are derived from satellite data, models, and in situ observations.

DATA AVAILABILITY AND VISUALIZATION

A variety of datasets are available through the GLDAS website, including daily and monthly mean data, as well as time series data for specific locations.

INCORPORATING IRRIGATION EFFECTS

The irrigation algorithm developed for the Noah land surface model includes an irrigation routing scheme that simulates the impact of irrigation on the land surface.

SURFACE RUNOFF SCHEMES

The runoff routing scheme calculates the surface runoff from the land surface model outputs, considering the influence of precipitation, evapotranspiration, and soil water balance.

SUGAR CROPPING IN CANADA

The model parameters used for sugar cropping in Canada are based on the best available data, including crop yield and irrigation requirements.

DYNAMIC LAI IMPLEMENTATION

The dynamic LAI (leaves per area index) is implemented in GLDAS to simulate the temporal and spatial variability of vegetation growth and senescence.

The model outputs from GLDAS are used for various applications, including water resource management, carbon cycle studies, and climate change assessments.

The variability in model results is due to differences in input data, model parameters, and assumptions, which can lead to uncertainties in the model predictions.

The GLDAS data products are widely used in the scientific community and provide a valuable resource for understanding the global land surface system.