

## Abstract

### Implementation of NLDAS, GridMET and Statsgo data layers on the Google Earth Engine

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The Google Earth Engine (EE) is a Google-created and Google-supported environment that supports intensive and rapid cloud-based computing of spatial information. Applications developed for Google include forest disturbance modeling and evapotranspiration (ET) mapping (via EEFlux). The EE system hosts the entire US collection of Landsat imagery dating to 1984 and the MODIS satellite image collection. Other data collections that are useful for ET mapping, weather and climate studies and ecological assessments are the North American Land Data Assimilation System (NLDAS) hourly gridded weather data collection, the GridMET bias corrected daily weather data system of Abatzoglou (2011), and the Statsgo soil data base of the USDA. The three of these data collections are available for the continental US (CONUS). The NLDAS and GridMET data collections contain all weather data parameters necessary to calculate the so-called reference (maximum) ET via the American Society of Civil Engineers (2005) Penman-Monteith equation for the tall (alfalfa) reference equation. Application software has been made available to make these calculations using solar radiation, wind speed, specific humidity and air temperature. The NLDAS collection of hourly weather data spans the 1970's to the present and was derived from large scale weather and atmospheric circulation models using assimilated ground data and atmospheric profile data. The GridMET data originate from the NLDAS data set, but have been aggregated to daily timesteps and bias corrected and down-scaled to 4 km using the PRISM weather data sets. The bias-correction has produced a more realistic weather data set at the local scale where cooling from evaporation from irrigation in western and Midwestern US regions tends to be reflected. The data collections can be accessed via the Earth Engine interface using Google-based Java-script. To date, applications of these data sets include evapotranspiration mapping via the Google EEFlux application, development of daily evaporation maps for bare soil surfaces, and reference ET maps for the CONUS. This work has been supported by Google, Inc.

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