

CITATION
CITATION INFORMATION
ORIGINATOR Yellowstone Ecological Research Center
TITLE
CASA Express for Wetlands and Mountains
EDITION 1.1
GEOSPATIAL DATA PRESENTATION FORM raster digital data

DESCRIPTION
ABSTRACT
This dataset was produced by the Ecological Forecasting Lab at NASA Ames Research Center and the Yellowstone Ecological Research Center (YERC) to develop model covariates to evaluate ecological and climatological processes. CASA Express, a scaled-down version of the Carnegie Ames Stanford Approach (CASA) was applied to produce a series of environmental covariates. This metadata file describes the outputs produced by CASA Express. For more information on CASA, please see <http://geo.arc.nasa.gov/sge/casa/index.html>. For more information about ongoing modeling work at YERC, please see <http://www.yellowstoneresearch.org/>.

PURPOSE
This Dataset was compiled for research and evaluation purposes only. This data is intended solely for use in modeling and users assume all risks in using this dataset.

TIME PERIOD OF CONTENT
TIME PERIOD INFORMATION
RANGE OF DATES/TIMES
BEGINNING DATE 2000-01-01
ENDING DATE 2010-12-31
CURRENTNESS REFERENCE
observed

STATUS
PROGRESS Complete
MAINTENANCE AND UPDATE FREQUENCY None planned

ACCESS CONSTRAINTS
Data must be obtained from YERC

USE CONSTRAINTS
Data is for modeling and assessment purposes only. Not for commercial use without written permission.

POINT OF CONTACT
CONTACT INFORMATION
CONTACT ORGANIZATION PRIMARY
CONTACT ORGANIZATION Yellowstone Ecological Research Center
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DATA SET CREDIT

Yellowstone Ecological Research Center
&
NASA Ames Ecological Forecasting Lab

Mail Stop 232-21

Moffett Field, CA 94035

[Hide Identification ▲](#)

Data Quality ►

LINEAGE

PROCESS STEP

PROCESS DESCRIPTION

MODIS enhanced vegetation index (EVI) values were scaled according to http://geo.arc.nasa.gov/sge/casa/Potter_2012_ClimCh.pdf and values were extracted for pixels containing greater than 90% of a single landcover for years 2000 through 2010 (more information about EVI values can be found at http://modis.gsfc.nasa.gov/data/dataproduct/pdf/MOD_13.pdf). Inverse Distance Weighted (IDW) method was used to interpolate EVI cell values. The interpolated data sets were then processed with the CASA express model to produce land cover specific results. These results were then scaled according to the percentage of the associated landcover within the pixel.

CASA Express, a scaled-down version of the CASA terrestrial ecosystem model developed by the NASA Ames Ecological Forecasting Lab (for more information see <http://geo.arc.nasa.gov/sge/casa/index.html>), was specifically modified to be used by YERC with pure pixel land cover inputs as well as the addition of an ablation equation to the snow calculations. Data inputs of monthly temperature, precipitation, solar radiation, elevation, soil texture, vegetation calibration value of 0.55 as recommended by Potter et al. 2012, and land surface inputs were used to create the outputs. Monthly temperature input data for years 2000 through 2010 was obtained from MODIS land surface temperature (ftp://neespi.gsfc.nasa.gov/data/s4pa//Land_Surface_Temperature/MOD11CM1N.005/GES_DISC_MOD11CM1N_V005_dif.xml). Monthly night and day temperature were averaged and converted to degrees Celsius. Precipitation from 2001 through 2010 was obtained from NCEP North American Regional Reanalysis (NARR) (http://coasterdata.net/documents/Metadata_Files/NCEP_NARR_Metadata.txt). Total precipitation each month was calculated using the 3 hour time steps. Precipitation data from 1999 through 2001 was from the GLDAS Noah Land Surface Model (http://modis.gsfc.nasa.gov/data/dataproduct/pdf/MOD_13.pdf). Solar radiation was modeled using the ESRI ArcGIS solar radiation model. Land Cover of the United States originated from the National Land Cover Database (NLCD) (more information about the NLCD data can be found at <http://extract.cr.usgs.gov/distmeta/servlet/gov.usgs.edc.MetaBuilder?TYPE=HTML&DATASET=NLCD06LANC>). Canada Land cover created using Circa 2000-Vector data are the result of vectorization of raster thematic data originating from classified Landsat 5 and Landsat 7 ortho-images, for agricultural and forest areas of Canada, and for Northern Territories (http://geodiscover.cgdi.ca/wes/CSWSearchClient/OWSResults/DisplayFullMetadata.jsp?id=F1E6A665-C15B-F64B-FC6D-4472BBA89F55&recordLocale=en_US&previewFormat=iso19139). The forest cover was produced by the Earth Observation for Sustainable Development (EOSD) project,

an initiative of the Canadian Forest Service (CFS) with the collaboration of the Canadian Space Agency (CSA) and in partnership with the provincial and territorial governments. The agricultural coverage is produced by the National Land and Water Information Service (NLWIS) of Agriculture and Agri-Food Canada (AAFC). Northern Territories land cover was realized by the Canadian Centre of Remote Sensing (CCRS).

Five experimental variables were produced, total Carbon Dioxide, Functional N2O, Functional NO, Functional NO3 surface drainage, Functional NO3 subsoil drainage. These variables should be approached with extreme caution as no validation has been performed on these variables and their results may be incorrect.

CASA Express outputs were combined to create a single output for each month from 2000 to 2010. The tiles were then mosaiced across North America. NPP results were validated using AmerifFlux tower flux sites (<http://public.ornl.gov/ameriflux/dataproducts.shtml>).

[Hide Data Quality ▲](#)

Spatial Data Organization ►

DIRECT SPATIAL REFERENCE METHOD Raster

RASTER OBJECT INFORMATION

RASTER OBJECT TYPE Grid Cell

[Hide Spatial Data Organization ▲](#)

Spatial Reference ►

HORIZONTAL COORDINATE SYSTEM DEFINITION

PLANAR

MAP PROJECTION

MAP PROJECTION NAME Geographic Coordinate System

LONGITUDE OF PROJECTION CENTER -150

LATITUDE OF PROJECTION CENTER 65

FALSE EASTING 0

FALSE NORTHING 0

PLANAR COORDINATE INFORMATION

PLANAR COORDINATE ENCODING METHOD

COORDINATE REPRESENTATION

ABSCISSA RESOLUTION 0.1 to 0.00418

ORDINATE RESOLUTION 0.1 to 0.00418

PLANAR DISTANCE UNITS degrees

GEODETTIC MODEL

HORIZONTAL DATUM NAME WGS 1984

[Hide Spatial Reference ▲](#)

Entities and Attributes ►

DETAILED DESCRIPTION
ENTITY TYPE
ENTITY TYPE LABEL NPP
ENTITY TYPE DEFINITION
Net Primary Productivity (g C/m²/month)
ENTITY TYPE DEFINITION SOURCE CASA Express

DETAILED DESCRIPTION
ENTITY TYPE
ENTITY TYPE LABEL Soil Moisture
ENTITY TYPE DEFINITION
Three soil moisture fields will be generated for each month corresponding to the three soil layers (surface soil organic layer (1), top mineral soil layer (2), and lower mineral subsoil layer (3)). (cm)
ENTITY TYPE DEFINITION SOURCE CASA Express

DETAILED DESCRIPTION
ENTITY TYPE
ENTITY TYPE LABEL PET
ENTITY TYPE DEFINITION
Potential Evapotranspiration (cm/month)
ENTITY TYPE DEFINITION SOURCE CASA Express

DETAILED DESCRIPTION
ENTITY TYPE
ENTITY TYPE LABEL Water Stress Term (W)
ENTITY TYPE DEFINITION
Amount of water stress applied for the year
ENTITY TYPE DEFINITION SOURCE CASA Express

DETAILED DESCRIPTION
ENTITY TYPE
ENTITY TYPE LABEL EET
ENTITY TYPE DEFINITION
Estimated Evapotranspiration (cm/month)
ENTITY TYPE DEFINITION SOURCE CASA Express

DETAILED DESCRIPTION
ENTITY TYPE
ENTITY TYPE LABEL SNOW
ENTITY TYPE DEFINITION
Monthly snow water equivalent (cm)
ENTITY TYPE DEFINITION SOURCE CASA Express

DETAILED DESCRIPTION
ENTITY TYPE
ENTITY TYPE LABEL Snow Melt
ENTITY TYPE DEFINITION
Average amount of melting snow (cm)
ENTITY TYPE DEFINITION SOURCE CASA Express

DETAILED DESCRIPTION
ENTITY TYPE
ENTITY TYPE LABEL Snow Pack
ENTITY TYPE DEFINITION
Current amount of snow accumulation for the year (cm)
ENTITY TYPE DEFINITION SOURCE CASA Express

DETAILED DESCRIPTION

ENTITY TYPE
ENTITY TYPE LABEL Drainage
ENTITY TYPE DEFINITION Amount of water draining from the plant rooting zone (cm H₂O/month)
ENTITY TYPE DEFINITION SOURCE CASA Express

DETAILED DESCRIPTION

ENTITY TYPE
ENTITY TYPE LABEL FN2O
ENTITY TYPE DEFINITION
THIS IS AN EXPERIMENTAL VARIABLE, NOT RECOMMENDED FOR USE
g FN2O m⁻² month⁻¹
ENTITY TYPE DEFINITION SOURCE CASA Express

DETAILED DESCRIPTION

ENTITY TYPE
ENTITY TYPE LABEL FNO
ENTITY TYPE DEFINITION
THIS IS AN EXPERIMENTAL VARIABLE, NOT RECOMMENDED FOR USE
g FNO m⁻² month⁻¹
ENTITY TYPE DEFINITION SOURCE CASA Express

DETAILED DESCRIPTION

ENTITY TYPE
ENTITY TYPE LABEL Total CO₂
ENTITY TYPE DEFINITION
THIS IS AN EXPERIMENTAL VARIABLE, NOT RECOMMENDED FOR USE
g C m⁻² month⁻¹
ENTITY TYPE DEFINITION SOURCE CASA Express

DETAILED DESCRIPTION

ENTITY TYPE
ENTITY TYPE LABEL FNO₃ Surface
ENTITY TYPE DEFINITION
THIS IS AN EXPERIMENTAL VARIABLE, NOT RECOMMENDED FOR USE
g FNO₃ m⁻² month⁻¹
ENTITY TYPE DEFINITION SOURCE CASA Express

DETAILED DESCRIPTION

ENTITY TYPE
ENTITY TYPE LABEL FNO₃ Drainage
ENTITY TYPE DEFINITION
THIS IS AN EXPERIMENTAL VARIABLE, NOT RECOMMENDED FOR USE
g FNO₃ m⁻² month⁻¹
ENTITY TYPE DEFINITION SOURCE CASA _Express

DETAILED DESCRIPTION

ENTITY TYPE
ENTITY TYPE LABEL Annual NPP
ENTITY TYPE DEFINITION
Total annual NPP (g C/m²/year)
ENTITY TYPE DEFINITION SOURCE CASA Express

DETAILED DESCRIPTION

ENTITY TYPE
ENTITY TYPE LABEL Leaf Litter
ENTITY TYPE DEFINITION

Average amount of leaf litter (g C/meter²/month)
ENTITY TYPE DEFINITION SOURCE CASA Express

[Hide Entities and Attributes ▲](#)

Metadata Reference ►

METADATA DATE 2013-02-05
METADATA CONTACT
CONTACT INFORMATION
CONTACT ORGANIZATION PRIMARY
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METADATA STANDARD NAME FGDC Content Standards for Digital Geospatial Metadata
METADATA STANDARD VERSION FGDC-STD-001.1-1999