



NASA Earth Exchange

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NASA EARTH EXCHANGE (NEX).



OVERVIEW

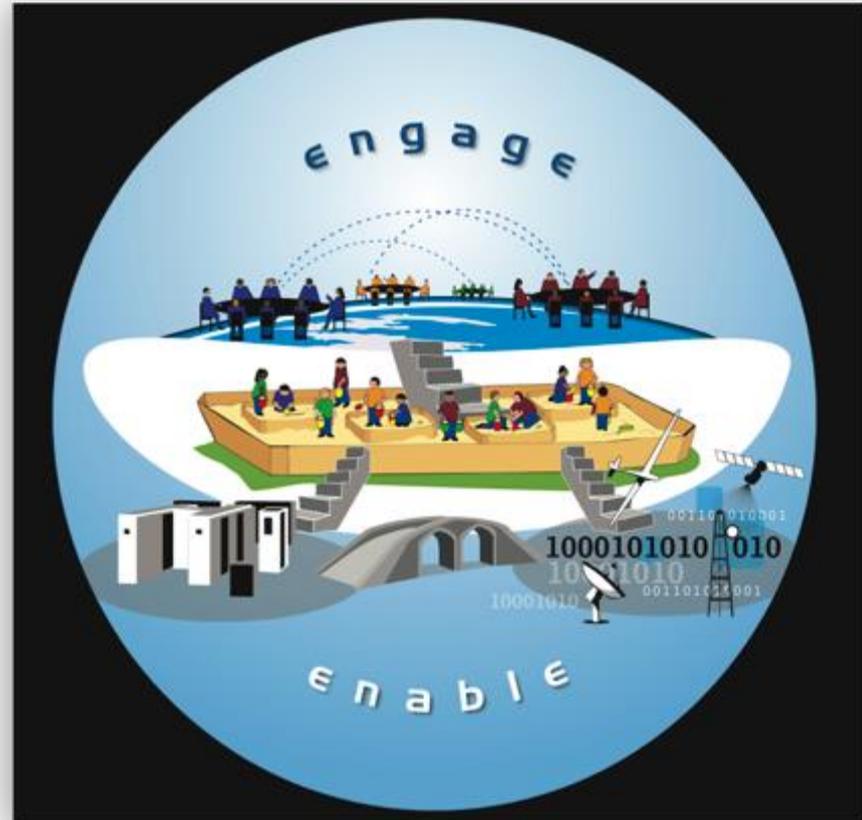
VISION

To provide “**science as a service**” to the Earth science community addressing global environmental challenges

GOAL

To improve efficiency and expand the scope of NASA Earth science technology, research and applications programs

+ **NEX** is virtual collaborative that brings scientists and researchers together in a knowledge-based social network and provides the necessary tools, computing power, and data to accelerate research, innovation and provide transparency.



Engage

Network, share & collaborate
Discuss & formulate new ideas
Portal, Virtual Institute

Enable

Rapid Access to data & storage
Access to computing
Access to knowledge/ workflows



Portal

- Web Server
- Database Server
- 503 Registered Members

Sandbox

- 96-core server, 264GB memory, will have 320 TB storage
- 48-core server, 128 GB, 163 TB storage

HPC

- 720-core dedicated queue + access to rest of Pleiades
- 181 users
- 1.3 PB storage
- Pleiades supercomputer
 - 5.34 Pflops peak
 - 217,000 cores
 - 9 PB

Data (800 TB – constantly increasing)

- Landsat (>2M scenes)
- MODIS
- TRMM
- GRACE
- ICESAT
- CMIP5
- NCEP
- MERRA
- NARR
- GLAS
- PRISM
- DAYMET
- NAIP
- Digital Globe
- NEX-DCP30
- WELD

Models/ Tools/ Workflows

Model Codes

- GEOS-5
- CESM
- WRF
- RegCM
- VIC
- BGC
- CASA
- TOPS
- BEAMS
- Fmask
- LEDAPS
- METRIC



ROSES-Awarded Projects Currently Supported on NEX



PI	Title	Program	PM
1 Jetz	Integrating Global Species Distributions, Remote Sensing Information and Climate Station Data	BIOCLIM	Woody Turner
2 Hansen	Using NASA Resources to Inform Climate and Land Use Adaptation	BIOCLIM	Woody Turner
3 Morissette	Using the USGS Resource for Advanced Modeling to Connect Climate Drivers to Biological Responses	BIOCLIM	Woody Turner
4 Goward	North American Forest Dynamics (NAFD) Phase II	CCE	Diane Wickland
5 Zhang	Carbon monitoring and ecosystem feedbacks	CCE	Diane Wickland
6 Huang	Role of Forest Disturbance and Regrowth in the US Carbon Budget	CCE	Diane Wickland
7 Williams	Translating Forest Change to Carbon Emissions/Removals Linking Disturbance Products, Biomass Maps, and Carbon Cycle Modeling	CMS	Diane Wickland
8 Hurr	High-Resolution Carbon Monitoring and Modeling: Continuing Prototype Development and Deployment	CMS	Diane Wickland
9 Ganguly	Reducing Uncertainties in Satellite-derived Forest Aboveground Biomass Estimates Using a High-resolution Forest Cover Map	CMS	Diane Wickland
10 Barker	Enhanced Data-driven Decision Support for Highly Invasive Vectors	ASP Health	Brad Doorn
11 Tabor	An Integrated Fire Monitoring and Forecasting System for Improved Forest Management in the Tropics	ASP Fire	Lawrence Friedl
12 Verdin	Followed Area Mapping for Drought Impact Reporting and Decision Making	ASP Water	Brad Doorn
13 Melton	Mitigation of Drought Impacts on Agriculture through Satellite Irrigation Monitoring and Management Support	ASP Water	Brad Doorn
14 Moghaddam	Airborne Microwave Observatory of Subcanopy and Subsurface (AIRMOSS)	ESSP	Frank Peri
15 Thenkabail	Global Cropland Area Database (GCAD30) through Landsat and MODIS Data Fusion	MEaSURES	Lucia Tsoussi
16 Roy	Web-Enabled Landsat Data	MEaSURES	Lucia Tsoussi
17 Nemani	National Climate Assessment Support	NCA	Jack Kaye
18 Nemani	Semi-Automatic Science Workflow Synthesis for High-End Computing on the NASA Earth Exchange	AIST	Michael Little
19 Votava	Improving Access to Large-Scale Data and Computational Infrastructure	ACCESS	Curt Tilmes
20 Huang	Assessment of North American Industrial Forests: Disturbances, Biomass Extraction, and Growth Vigor	LCLUC	Garik Gutman
21 Jain	Land Cover and Land Use Changes and Their Effects on Carbon Dynamics in South and South East Asia	LCLUC	Garik Gutman
22 Boschetti	Prototyping Global Industrial Forest Mapping, a Landsat Spatio-Temporal Approach	LCLUC	Garik Gutman
	NEW		



NASA Satellite Irrigation Management Support: Mapping Crop Water Requirements to Assist Growers in Optimizing Water Use



PROJECT TEAM: NASA Ames Research Center, California Dept. of Water Resources, Western Growers Association, California State University, Univ. of California Cooperative Extension, Desert Research Institute, USDA Ag. Research Service, USGS, Booth Ranches, Chiquita, Constellation Wines, Del Monte Produce, Dole, E & J. Gallo, Farming D, Fresh Express, Pereira Farms, Ryan Palm Farms



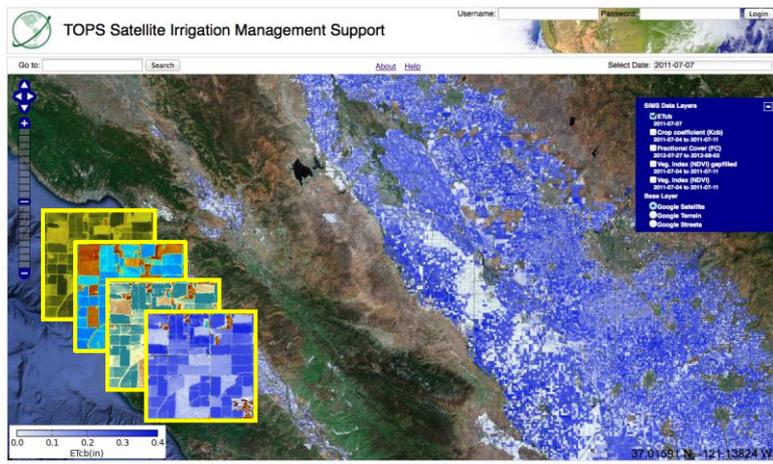
Terra Satellite



Landsat 8



California's agricultural sector produced \$46.4b In 2013



NASA SIMS web and mobile data services puts irrigation demand across 8 million acres of farm land directly into the hands of farmers and water managers



Students work hand in hand with growers to validate the system and quantify benefits

For more information, contact forrest.s.melton@nasa.gov, or visit <https://c3.nasa.gov/water/projects/1/>

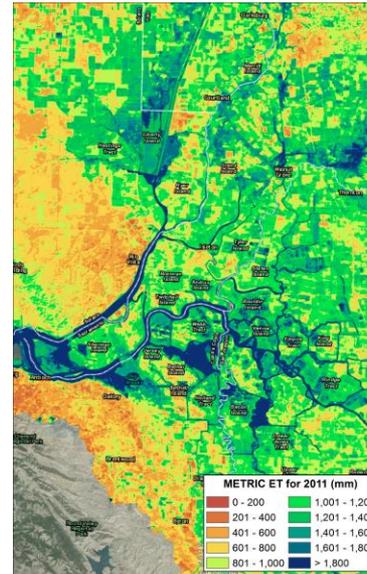


Mapping Crop Consumptive Use (ETa) with METRIC on the NASA Earth Exchange

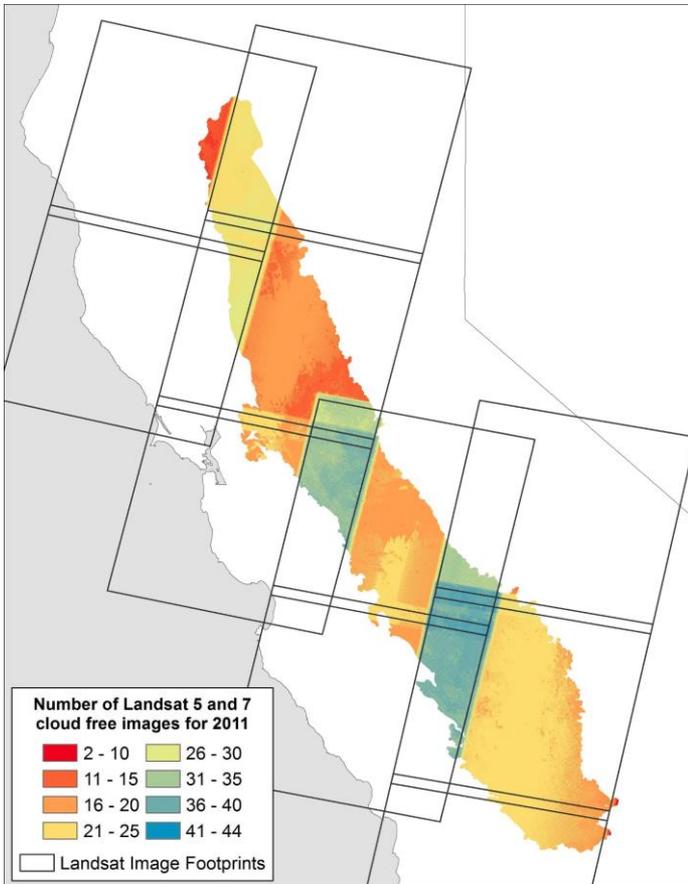
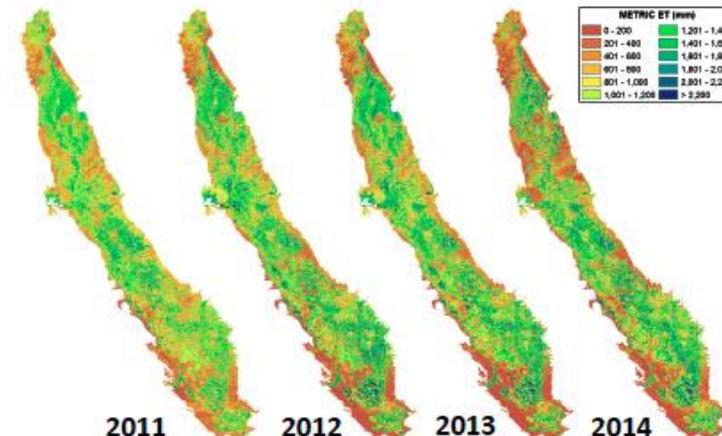
PROJECT TEAM: Desert Research Institute, NASA Ames Research Center, California State University Monterey Bay

- Fully automated, python-based implementation on NEX
- Testing Monte Carlo based simulation for hot-cold pixel calibration
- Validating against surface flux measurements collected in CA

California Delta ETa, 2011



Central Valley ETa, 2011-2014



Landsat Scenes over the California Central Valley