



*ECOsysteM Spaceborne Thermal Radiometer
Experiment on Space Station*

ECOSTRESS Applications and Early Adopters

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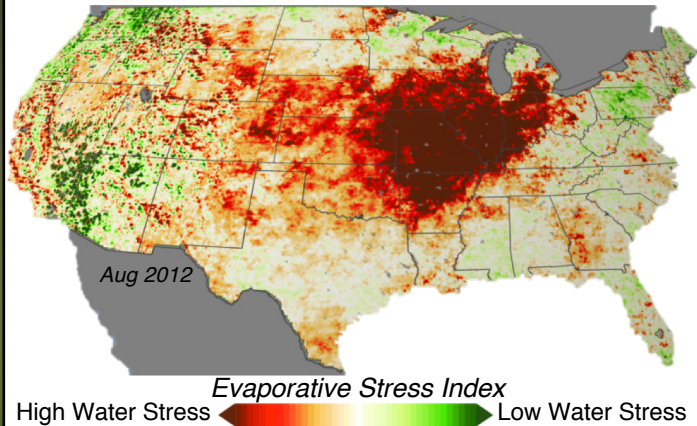
Jet Propulsion Laboratory, California Institute of Technology

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ECOSTRESS

ECOSTRESS is used to study plant health and water stress from the ISS, which has direct benefit for drought monitoring and agricultural applications.

Water Stress Threatens Ecosystem Productivity



Water stress is quantified by the Evaporative Stress Index, which relies on evapotranspiration measurements.



We have set up the ECOSTRESS Early Adopters program to explore the vast potential our mission has to support other science and applications efforts.

Goals of ECOSTRESS applications and Early Adopters

- Maximize NASA / taxpayer investments by increasing access, utility, and capacity to work with data earlier in the mission life cycle
- Understand how ECOSTRESS and ECOSTRESS-like data could be applied in both science and applications
- Use Early Adopter feedback to improve ECOSTRESS mission science and applications outcomes, such as through improving data quality and providing input / supporting development of custom tools, services, and short courses

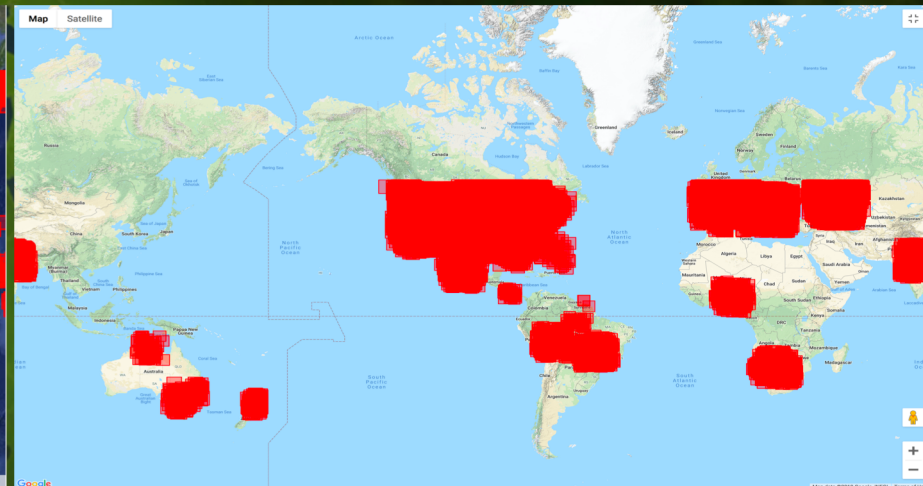
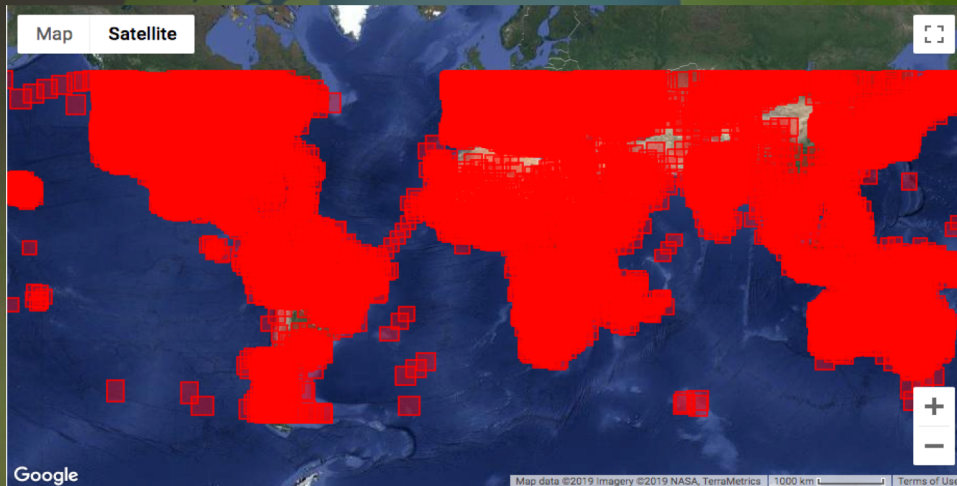


ECOSTRESS Science Data Products

PGE or <Source>	Product	Dimensions (cross x along x bands)			File Size (MB)	Description
L1B Rad	ECO1BRAD	5400	5632	6	939	Calibrated at-sensor radiances
L1B Geo	ECO1BGEO	5400	5632	1	1609	Geolocation tags, sun angles, and look angles, and calibrated, resampled at-sensor radiances
	ECO1BATT	12	52	1	0.5	Corrected spacecraft ephemeris and attitude data
	ECO1BMAPRAD	7636	7964	6	4224	Map projected calibrated at-sensor radiances and geolocation parameters of each pixel
L2	ECO2LSTE	5,400	5,632	5+W	536	Land surface temperature and emissivity
	ECO2CLD	5,400	5,632	1	67	Cloud mask
L3/4 Preprocessor	ECO3ANCQA	5,400	5,632	24	1609	24*16 bitmasks of L3/L4 ancillary data quality flags
L3/4 PT-JPL	ECO3ETPTJPL	5,400	5,632		671	Evapotranspiration retrieved from L2_LSTE using the PT-JPL Algorithm
	ECO4ESIPTJPL	5,400	5,632		268	Evaporative stress index generated with PT-JPL
	ECO4WUE	5,400	5,632		134	Water use efficiency
<from USDA>	ECO3ETALEXIU	3,000	3,000		99	Evapotranspiration generated by USDA using the ALEXI/DisALEXI Algorithm
	ECO4ESIALEXIU	3,000	3,000		119	Evaporative Stress Index generated by USDA with ALEXI/DisALEXI

Footprint of data
acquired

Footprint of products
delivered and currently
available



Early Adopters: implementation – the first EV to have an EA program

Get access (by submitting a form and acknowledging Charter)

Search and download data through NASA Earthdata

Community exchange and feedback through Slack, plus data guides and other references posted




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Data Acquisition Request

Early Access Science and Applications User

For archived data please refer to our [Land Processes Distributed Active Archive Center \(LP DAAC\)](#).

Members of the ECOSTRESS Early Adopter program are granted access to pre-release ECOSTRESS data (5-14). The goal of this EA program is to encourage use and feedback on the pre-release data to help the project improve the quality of the data and understand extent of use of ECOSTRESS data in research to applied sciences. We welcome submissions across all Earth science disciplines. Data will be made accessible to Early Adopters using the NASA Earthdata interface, with the support of LPDAAC. We have set up an ECOSTRESS Early Adopters slack channel to help with log-in instructions, discussion and feedback around ECOSTRESS data.

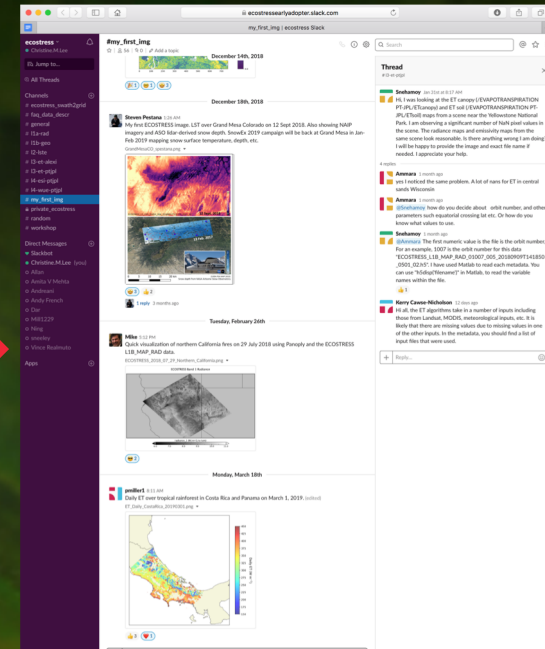
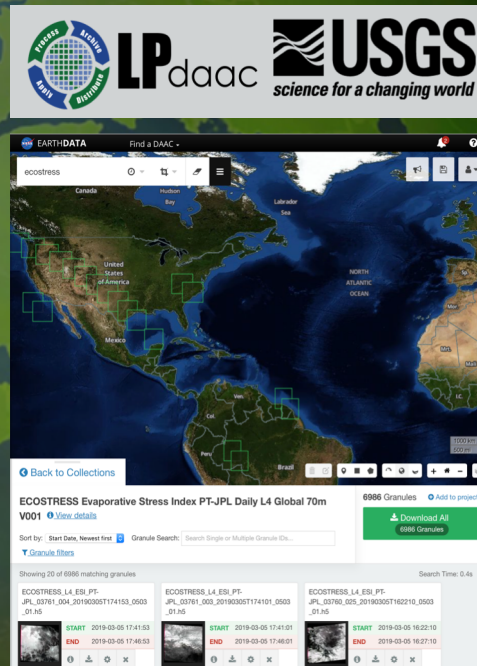
For additional resources see [Early Adopters](#)

Please perform the following steps:

- Obtain an Earthdata account [https://urs.earthdata.nasa.gov](#). You will need the user ID to complete the form below.
- Read the "Early Adopter" charter "READ ME" you will be asked to concur below.
- Complete the form below

***Required fields**

Contact Information and affiliation	
First Name*	<input type="text"/>
Last Name*	<input type="text"/>
Email Address*	<input type="text"/>
Telephone Number*	<input type="text"/>
Country*	<input type="text"/>
Affiliation*	<input type="text"/> (used to schedule your access to the ECOSTRESS data)
EarthData User ID*	<input type="text"/>
Concur with charter*	<input type="checkbox"/> I have read and concur with the charter.
<p>If you are interested in using ECOSTRESS data for a science or applications project, please fill-out the remaining form below</p>	
Project Title*	<input type="text"/>
Project Research	<input type="checkbox"/> Applied/Research <input type="checkbox"/> Operational
Type of Project*	<input type="checkbox"/> Operational/Commercial Use <input type="checkbox"/> Other, please describe: <input type="text"/>
Primary Area of Study*	<input type="text"/> Primary Area <input type="checkbox"/> If other: <input type="text"/>
<p>Please provide the following in your project.*</p> <ul style="list-style-type: none"> <input type="checkbox"/> Outline <input type="checkbox"/> Objective <input type="checkbox"/> Background <p>Maximum of 3 pages (approximately 4000 ASCII characters) (If unsure please enter "N/A")</p>	

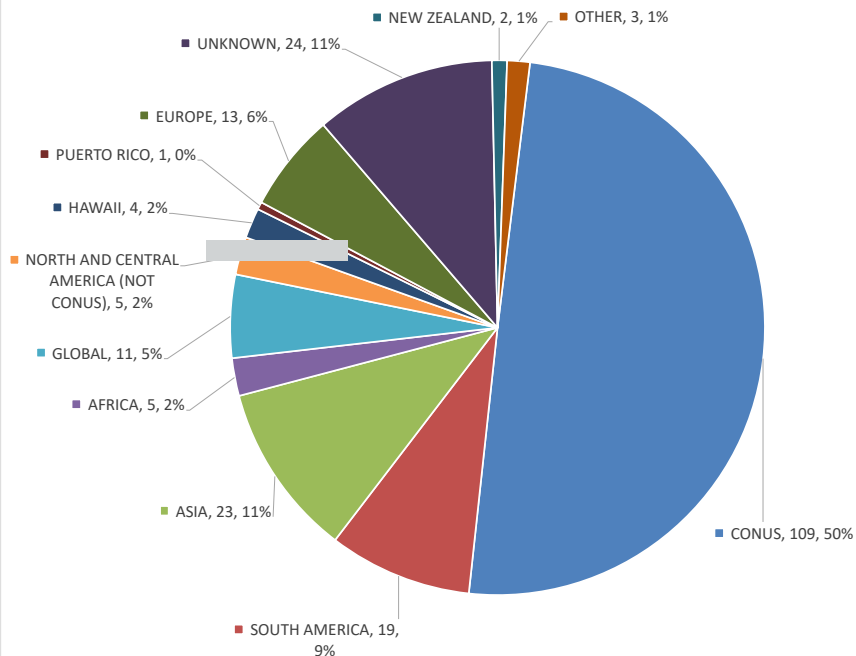


The logo for BECOSTRESS features a stylized green leaf on the left, with a brown root system and a red thermometer-like sensor inserted into the soil. To the right of the graphic, the word "BECOSTRESS" is written in a large, white, serif font.

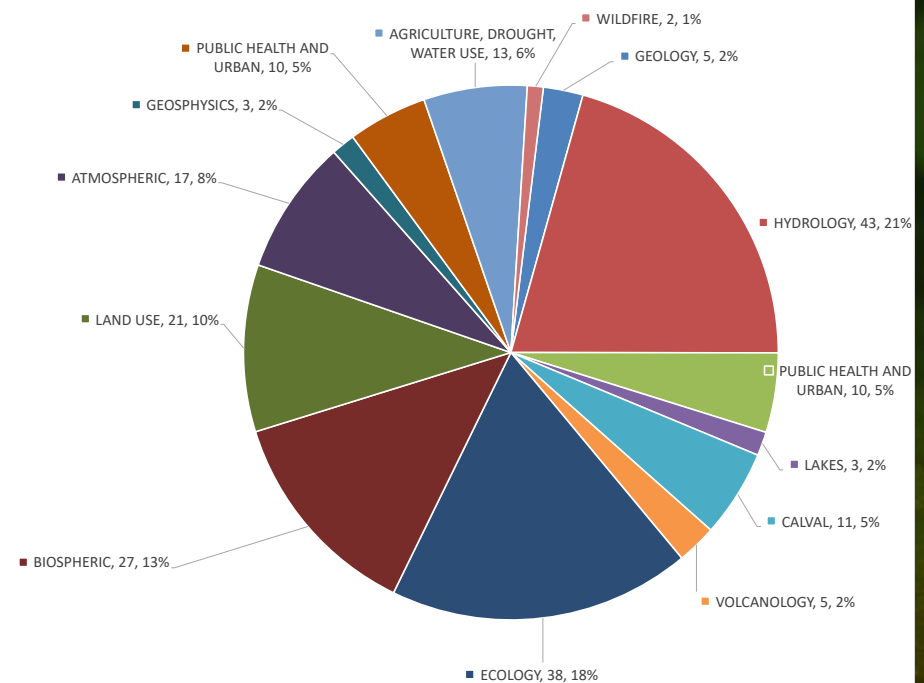
Early Adopters Stats

- Received our 202nd submission to Early Adopters as of Mar 20 2019 morning
- 80 of the submissions were self-classified as “Applied Sciences” likely lower limit

EARLY ADOPTER AREAS OF GEOGRAPHIC INTEREST - # LOCATIONS DOCUMENTED
= 219 (202 EARLY ADOPTER SUBMISSIONS), 199 UNIQUE INDIVIDUALS



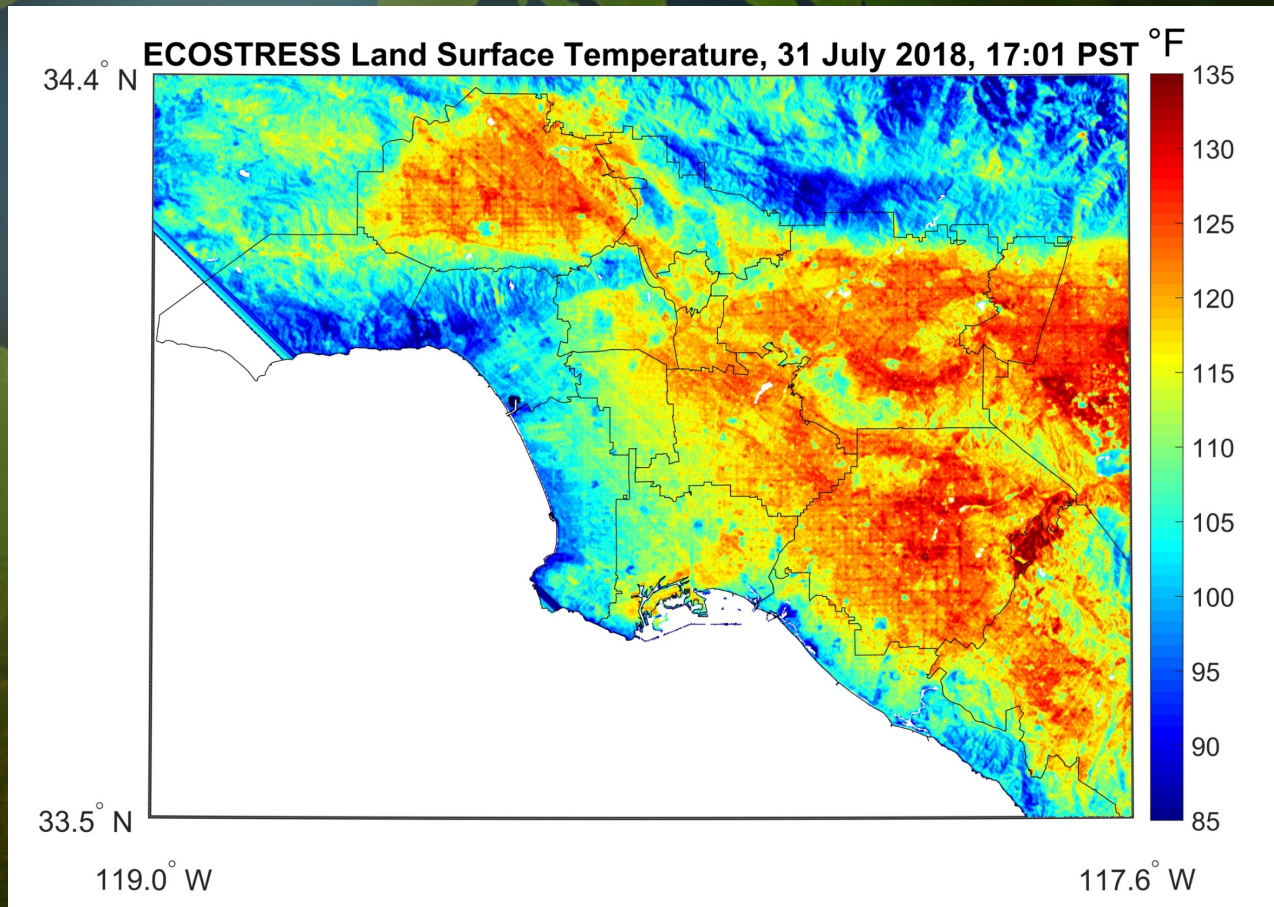
EARLY ADOPTER DISCIPLINES/EXPERTISE (208 DOCUMENTED)



Mapping urban heat stress in Los Angeles County

Team: JPL, UC Santa Barbara, Los Angeles County Sustainability Office,
Los Angeles County Department of Public Health

Objective: Integrating ECOSTRESS data into an on-going project to develop a high spatial and temporal resolution tool for assessing urban heat maps in urban areas.



Evapotranspiration products for state water planning in New Mexico

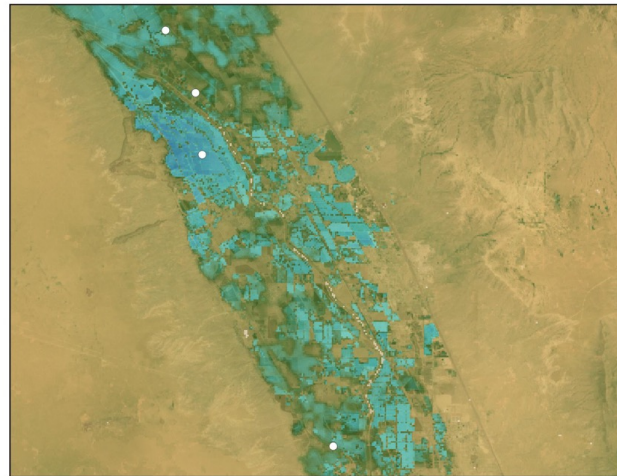
Team: JPL, WWAO, NMOSE (New Mexico Office of the State Engineer)

Integrating ECOSTRESS data into an on-going project to develop an operational evapotranspiration pipeline for the NM Office of the State Engineering for several decision-making and planning activities, including state water use planning.

Pecan orchard
and NMSU
ground sites in
Las Cruces, NM

Initial ECOSTRESS Acquisitions
over New Mexico State University

2018-09-04 09:10 UTC-7.1



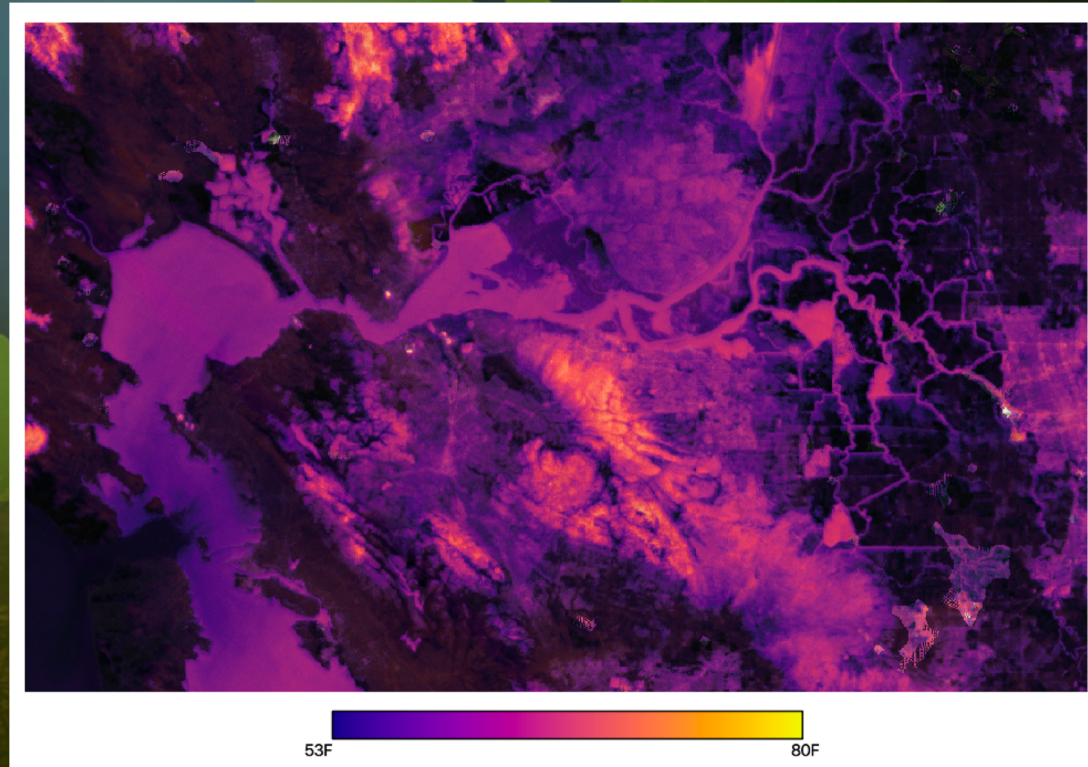
0.00 $\text{g H}_2\text{O s}^{-1} \text{m}^{-2}$ 0.27

• NMSU Ground Observation Tower

Monitoring water quality in California water supplies and smelt access to food-rich waters

Team: JPL, UCMerced, 34N, USGS, CDWR

Objective: Apply ECOSTRESS data to help map water temperature in Suisun Marsh and adjacent areas to monitor control gate actions in the SF Bay Delta, California.



Observations from Early Adopters

- Uses of ECOSTRESS data extend considerably beyond agricultural and drought vulnerability applications and over 50% of early adopters want to apply data in regions outside of CONUS
- Considerable interest in early version of ECOSTRESS data, with nearly 200 unique individuals who currently have access (EAs have downloaded over 49,000 scenes as of early March 2019, 38 TB of data)
- Feedback from Early Adopters have helped the ECOSTRESS team better understand performance and quality of data products in different regions
- Partnership with LP DAAC was essential to support EA program
- Look forward to working with you, and possibility of integrating into future NASA Earth science efforts, such as the Surface Biology and Geology Designated Observable identified in the Decadal Survey



LPdaac



THANK YOU, EARLY ADOPTERS!

