

EARTH SCIENCE
APPLIED SCIENCES

2021 Earth Science Applications Week Opening Plenary

August 9, 2021

EARTH SCIENCE APPLICATIONS WEEK 2021

W E L C O M E





OPENING REMARKS

Lawrence Friedl, Director
Applied Sciences Program





NASA EARTH SCIENCE PERSPECTIVES

Dr. Karen St. Germain, Director
Earth Science Division



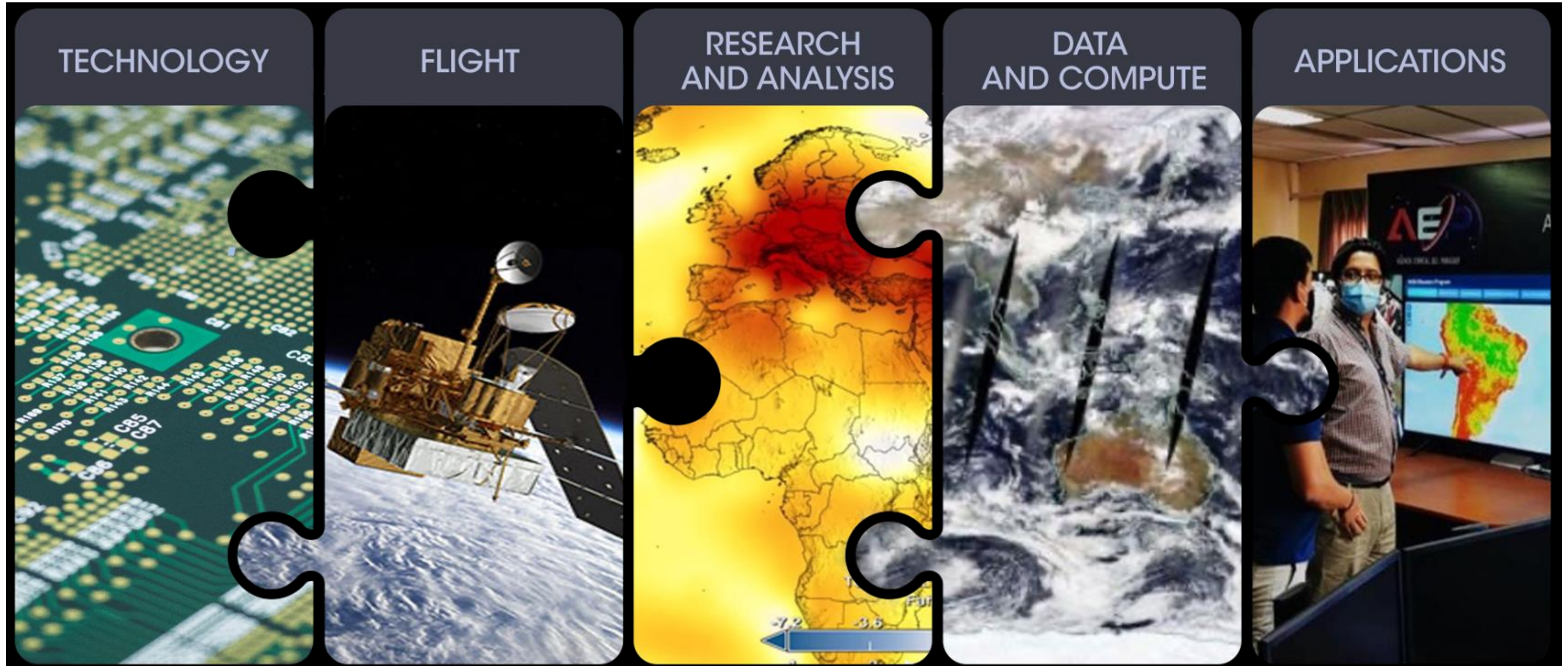


An Introduction to the NASA Applied Sciences

Dr. Emily Sylak-Glassman, Program Manager
Applied Sciences Program

- Develops, launches and operates NASA's fleet of Earth-observing satellites and instruments
- Develops and tests scientific technologies
- Supports research that advances knowledge of Earth
- Encourages innovative and practical uses of Earth observations and scientific knowledge

Advancing Earth System Science End-to-End



What We Do

- The Applied Sciences Program helps people apply insights from Earth science to benefit the economy, health, quality of life, and environment around the globe.
- We make financial and programmatic investments to generate creative solutions and lower the technical and institutional barriers to using Earth science information



AGRICULTURE



CAPACITY BUILDING



DISASTERS



ECOLOGICAL FORECASTING



HEALTH & AIR QUALITY



WATER RESOURCES



Capacity Building Program

We provide individuals and institutions with workforce development, training activities, and collaborative projects to strengthen understanding of Earth observations and expand their use around the world.



ARSET

empowers the global community through remote sensing trainings.



DEVELOP

addresses environmental issues & public policy through applying the lens of NASA Earth observations to community concerns.



SERVIR

supports developing countries in applying geospatial technology to environmental decision making.

How We Work

Our investments magnify the value of the Earth science information that NASA collects, disseminates and integrates with other Earth observations. From global to local scales, we bridge gaps between scientific findings and practical applications to expedite benefits.

USER-CENTERED

Greater emphasis on user-centered ways helps our project teams and partners be more successful in designing and developing sustainable, impactful solutions.

MARKET-ORIENTED

Market-oriented approaches incorporating user information enriches our work in existing areas and the pursuit of new ones.

COMMUNITY LEADING

Our personnel and project teams actively participate in and lead committees and working groups nationally and internationally.

IMPACT-FOCUSED

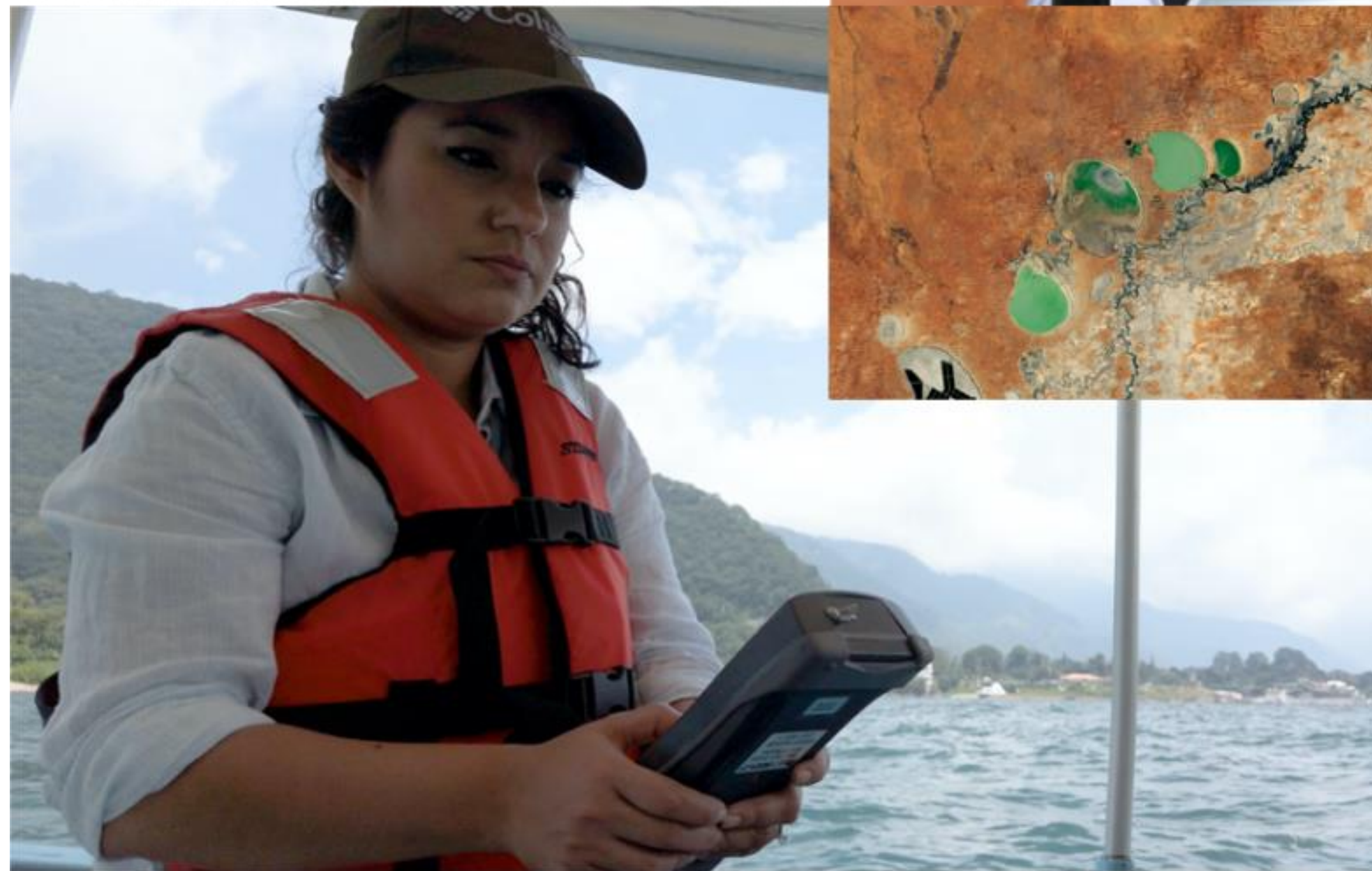
We place a high priority on substantial and lasting impacts – both our own and our communities. We continually assess our methods and outcomes, consider alternative approaches and remain agile.



We Are Excited You Are Here

- Thank you for joining us in this mission!
- We cannot wait to see how you're using Earth science information to improve life on our planet.

By working together with Earth science data and knowledge, we can find solutions to our planet's greatest challenges.

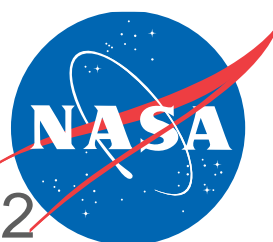
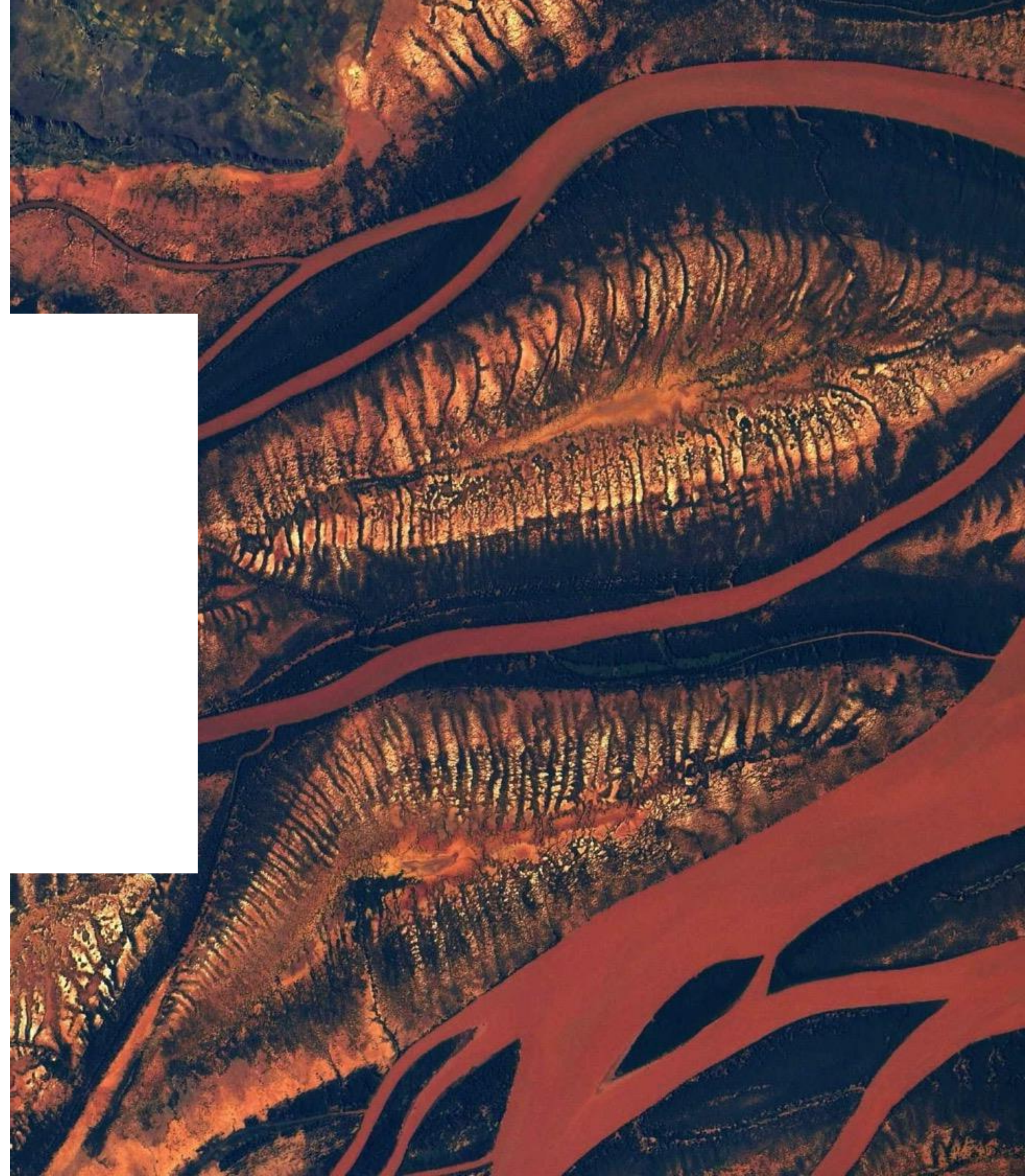




Thank You.

For further questions, please contact
Emily Sylak-Glassman at
eglassman@nasa.gov

<https://appliedsciences.nasa.gov/>



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Celebrating 20 Years of NASA's Applied Sciences

Teresa Purello & Monica Namu, NASA Interns
Applied Sciences' Capacity Building Program

Legislation allows NASA to "extend benefits of space to the community"

1958

Applied Sciences Program officially created

2001

Capacity Building Program created as ASP focus and adopts DEVELOP (et. 1998), SERVIR (et. 2005), and ARSET(et. 2009)

First weather satellite TIROS 1 launches

1960

Applied Sciences Program adopts focus areas

2007

Project Applications Program created

2016

Indigenous Peoples Pilot founded under CBP

Landsat 1 launches

1972

Landsat data becomes public

2008

Applied Sciences Week goes virtual

2017

2020

Climate-centric architecture plan created

2010

Earth Science Applications Week

2021

Earth System Sciences Committee established

1983



1958 - 2001

TIROS 1 – First Weather Satellite

- Launched April 1, 1960
- First television image from space



[Credit: NASA](#) First television image from space

Landsat 1



[Credit: NASA](#)

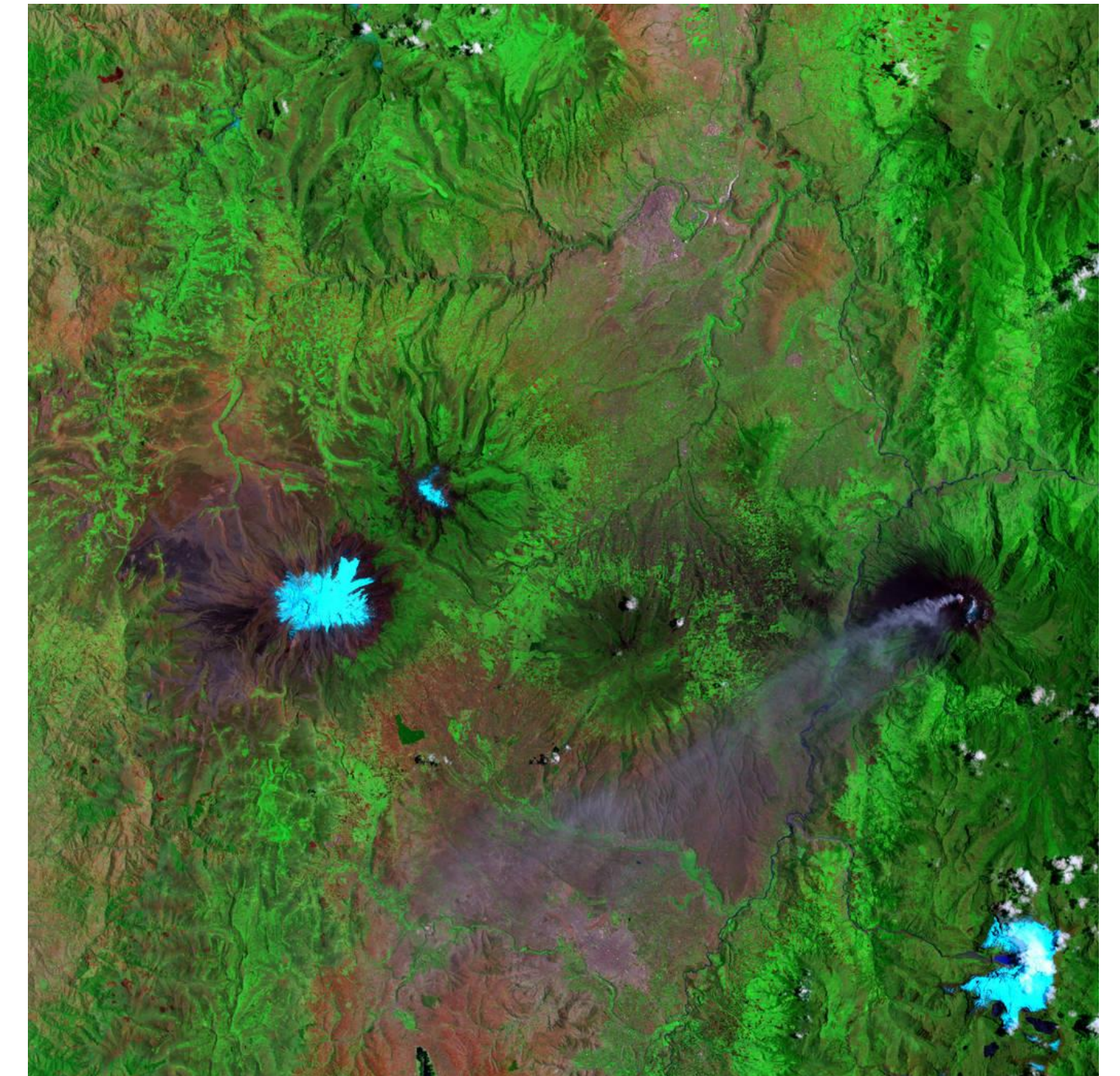
Scientists viewing Landsat imagery in 1972



[Credit: NASA](#)

Landsat Satellites

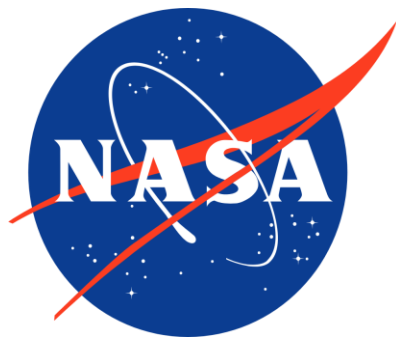
- Landsat 1 launched July 23, 1972
- Landsat 7 launched April 15, 1999



[Credit: NASA](#) Landsat 7 image from 7/16/01 of Ecuador's Mount Chimborazo

Between 1960 – 2001, applied sciences at NASA were done on a demand basis with universities and local governments

2001 - 2011



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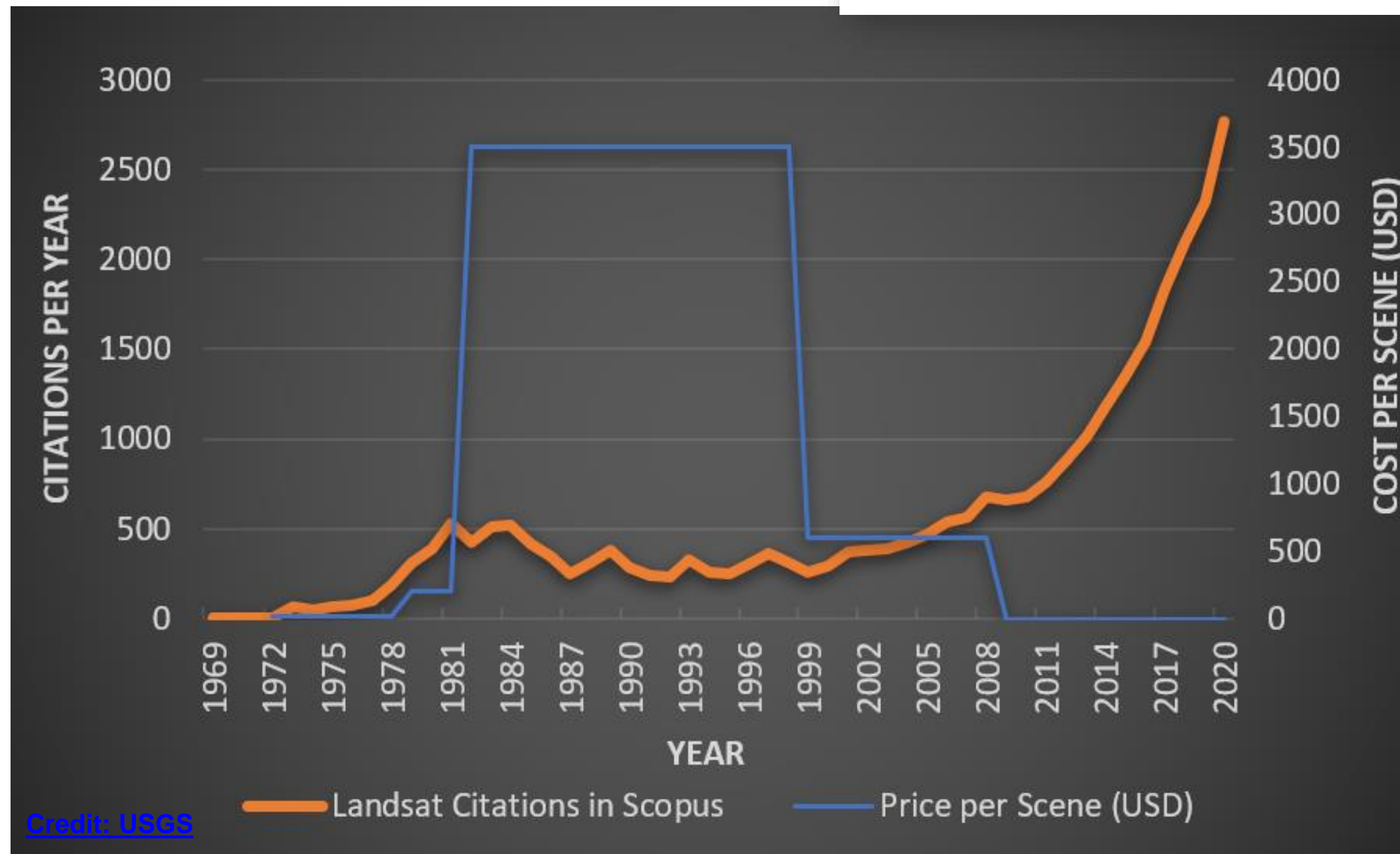
ASSESSMENT OF THE NASA APPLIED SCIENCES PROGRAM

Committee on Extending Observations and Research Results to
Practical Applications: A Review of NASA's Approach
Geographical Sciences Committee
Board on Earth Sciences and Resources
Division on Earth and Life Studies

NATIONAL RESEARCH COUNCIL
OF THE NATIONAL ACADEMIES

THE NATIONAL ACADEMIES PRESS
Washington, D.C.
www.nap.edu

- The Applied Sciences Program was officially created in 2001
- Original focus areas: Agricultural Efficiency, Air Quality, Aviation, Carbon Management, Coastal Management, Disaster Management, Ecological Forecasting, Energy Management, Homeland Security, Invasive Species, Public Health, and Water Management
- Led to more partnerships with federal agencies and a top-down applications approach
- The Program was reviewed in 2007
- Landsat data became available to the public in 2008



2011 - 2021

Currently funded areas:

Capacity Building Program,
Disasters, Ecological Forecasting,
Food Security and Agriculture,
Health and Air Quality, and Water
Resources

Other areas:

Urban Development,
Transportation and
Infrastructure, and Energy



Capacity Building Program created in 2011
Adopted DEVELOP (et.1998),
SERVIR (et.2005), and
ARSET (et.2009)
Indigenous Peoples Pilot
created in 2017

Over the past 10 years,
ASP has become more
involved in the planning
stages of Earth Science
missions



Happy 20th Anniversary!

EARTH SCIENCE APPLICATIONS WEEK 2021





NASA Research & Analysis Coastal Applications

Dr. Laura Lorenzoni, Program Scientist
Ocean Biology & Biogeochemistry Program

Coastal-Related Research

Research funded mainly through

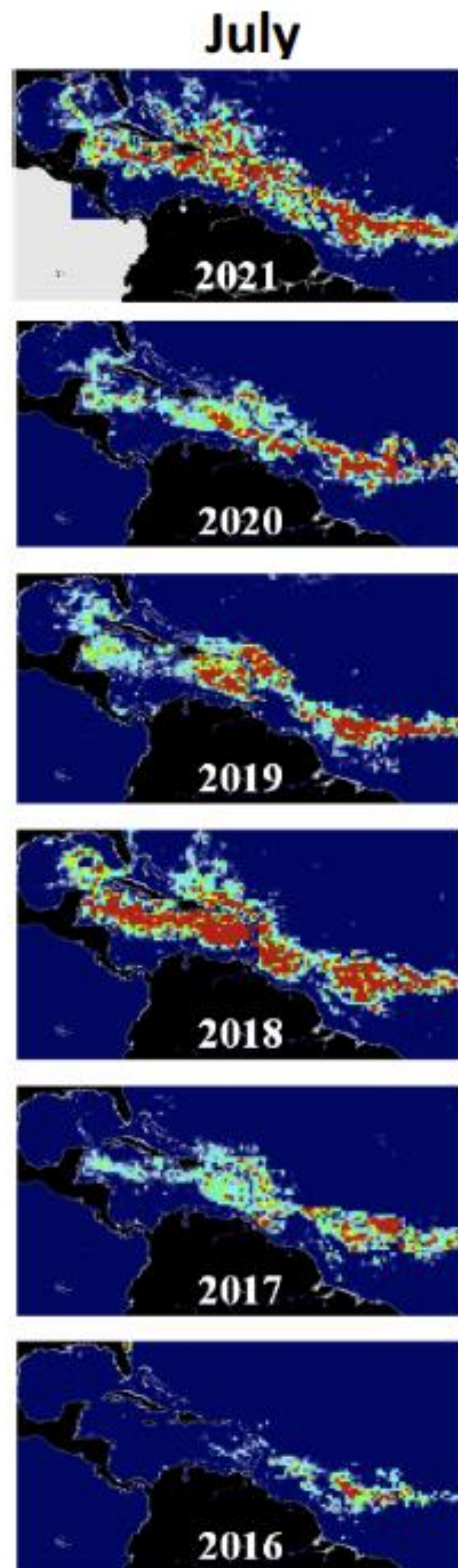
- Core OBB
- Core PO
- Terrestrial Hydrology
- Biodiversity
- RRNES
- IDS
- CCS
- T/A/SNPP
- Ecological Forecasting
- Water Resources and Agriculture Research
- Disasters
 - Coastal hazards



What is it about coasts? Location, location, location

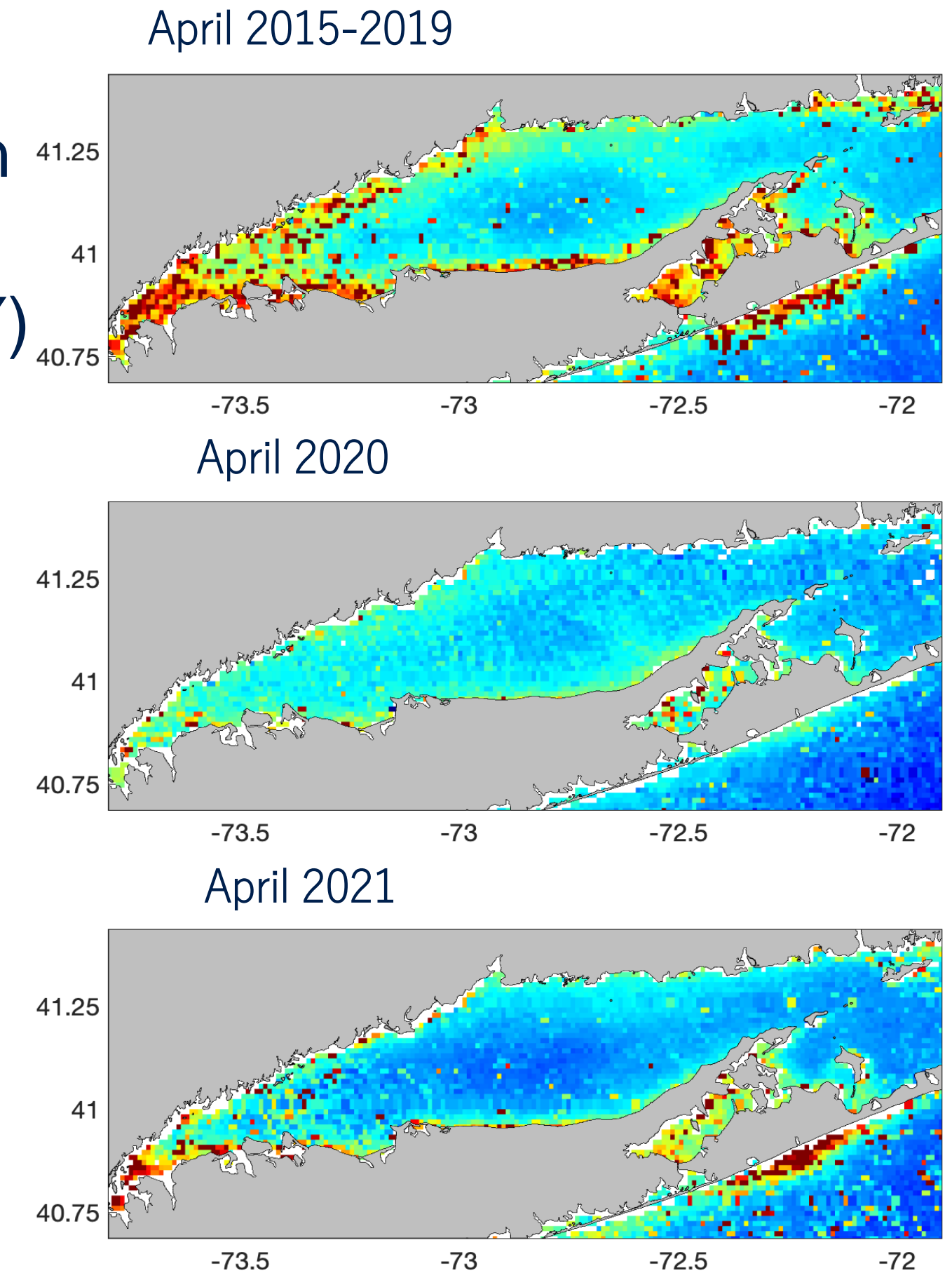
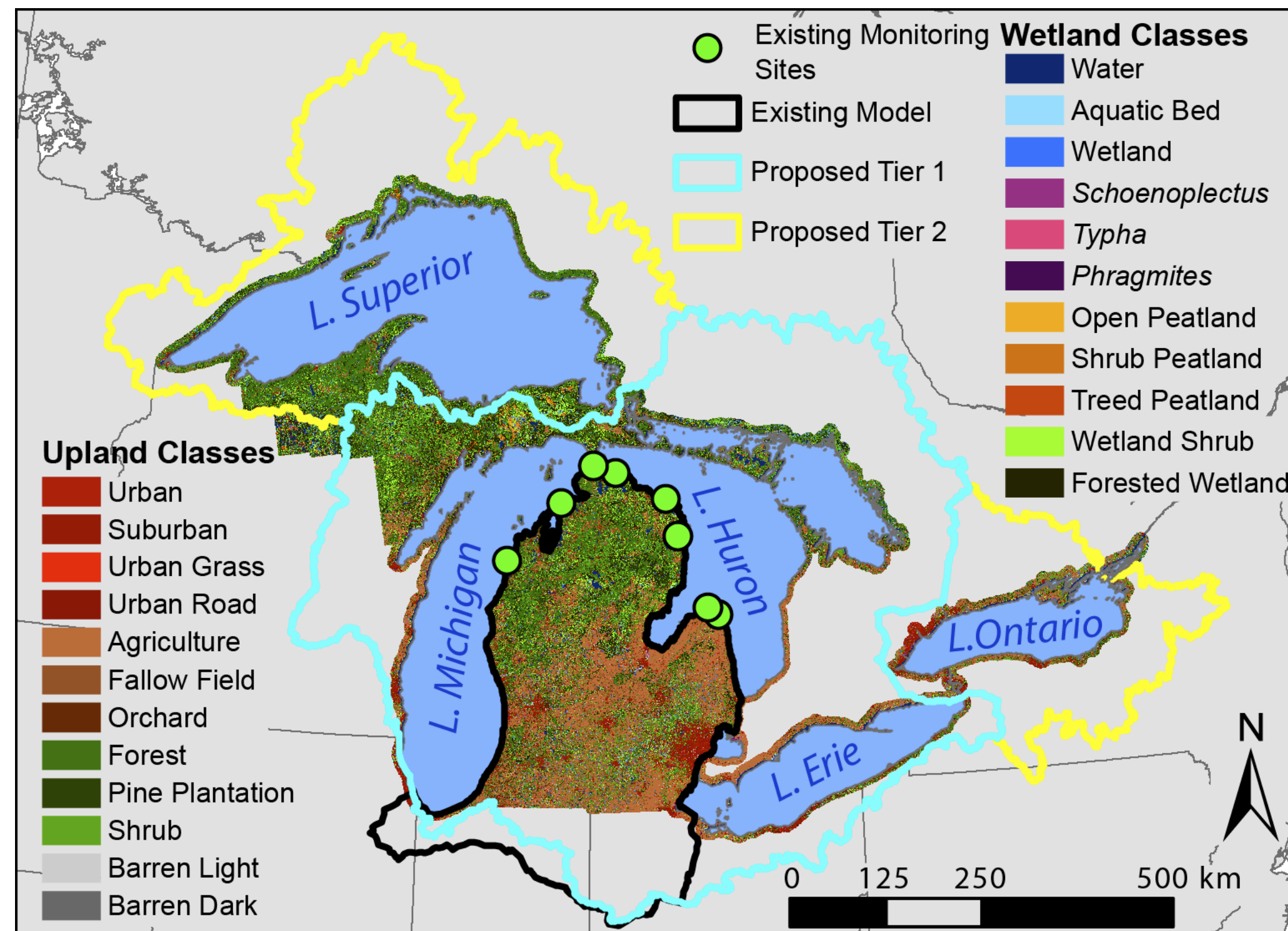


What is it about coasts? Location, location, location



- Sargassum Belt (C. Hu, USF)
- Land/water interface classifications in the Great Lakes Basin (L. Bourgeau-Chavez, MTRI)

- COVID impacts on WQ (Grunert & Tzortziou, CCUNY)



Adaptation vs. Resilience



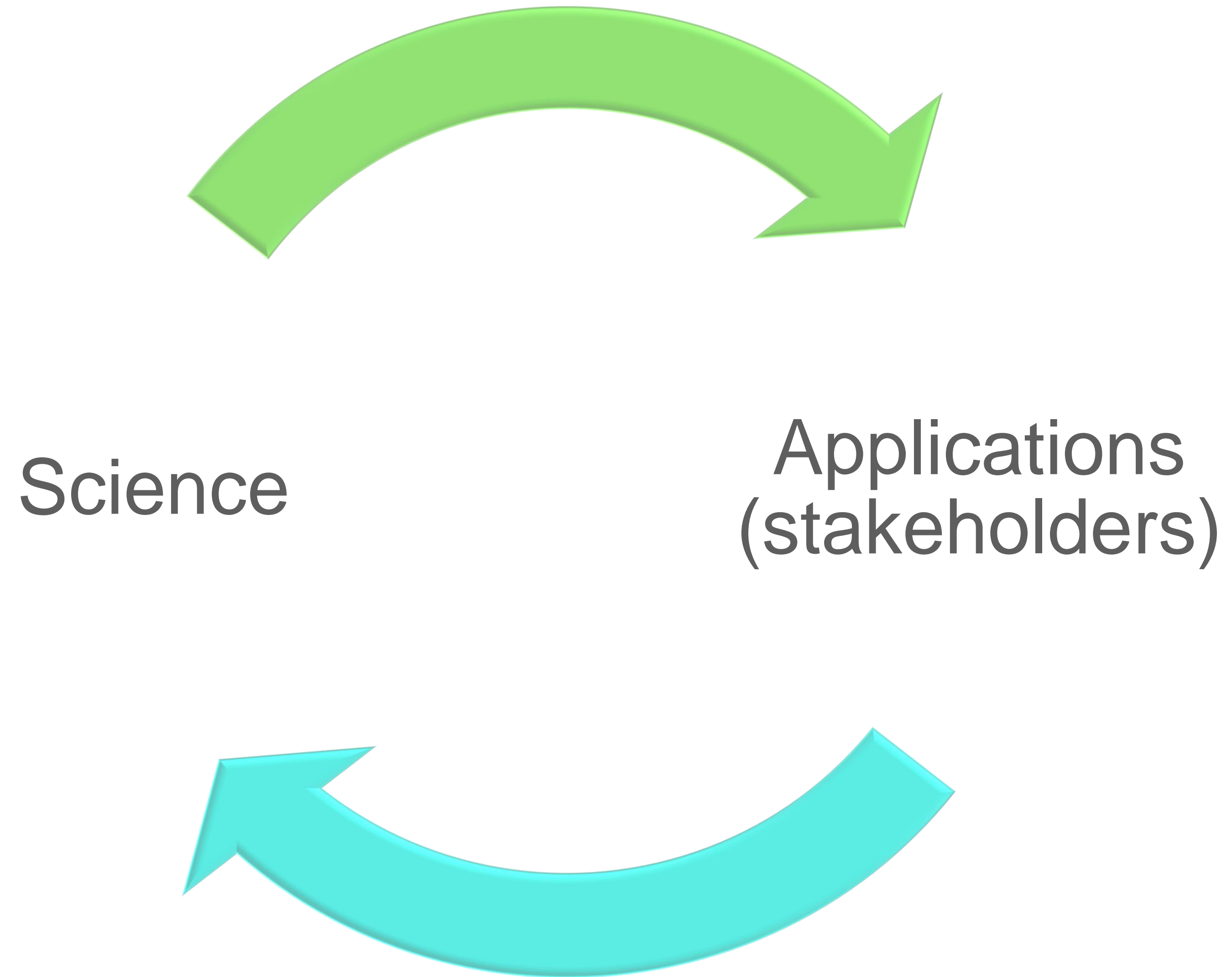
Resilience: capacity of a system to absorb disturbance and reorganize while undergoing change so that it still retains essentially the same function, structure, identity, and feedbacks (Walker et al., 2004)

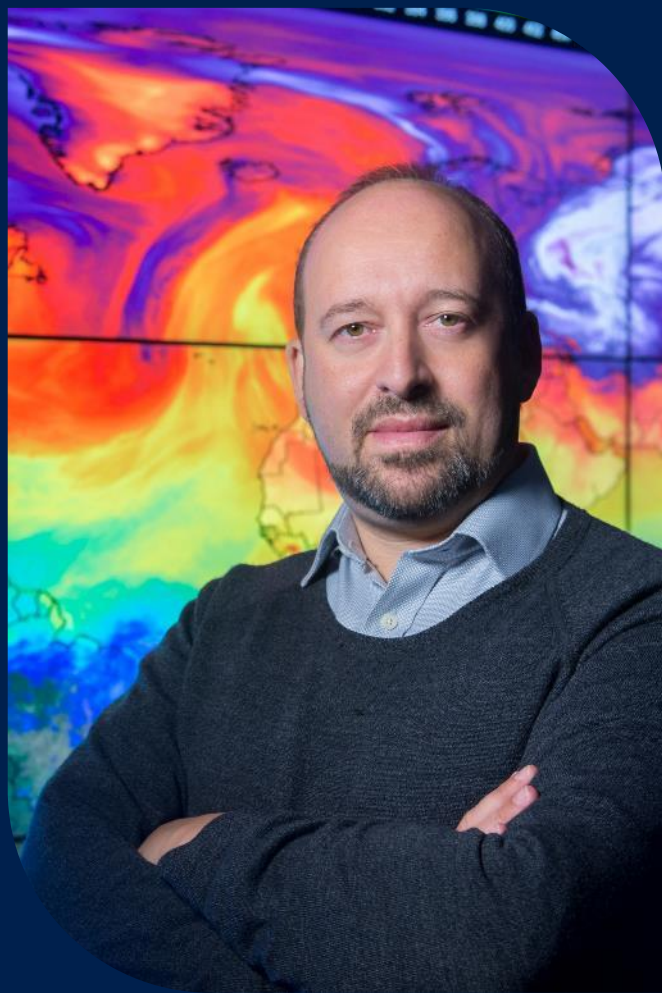
Adaptation: Ability to adjust to change.

Science informs/underpins actions.

What to protect/neglect depends on understanding the system, and its use (cannot be isolated)

The Loop





NASA CLIMATE

Dr. Gavin Schmidt, Senior Climate Advisor
NASA

WEEK AT A GLANCE

MON AUG 9 – 12:00PM – 3:00PM EDT

Opening Plenary

EO User Panel

Community Social

TUES AUG 10 – 12:00PM – 4:15PM EDT

Ecological Forecasting

Disasters

Afternoon Symposium

WED AUG 11 – 12:00PM – 4:15PM EDT

Water Management

Food Security

Afternoon Symposium

THUR AUG 12 – 12:00PM – 3:00PM EDT

Health & AQ

Closing Plenary

DEVELOP Social





**END
USER
PANEL**

EARTH OBSERVATIONS USER PANEL DISCUSSION



Moderator

**Dr. Nicole
Ramberg-Pihl**
NASA DEVELOP



Panelist

**Milagros
Becerra**
Amazon
Conservation



Panelist

**Nikki
Tulley**
Navajo Nation



Panelist

**Tanner
Yess**
Groundwork Ohio
River Valley



Nikki Tulley, M.W.R

Ph.D. Candidate, University of Arizona

nikkitulley@email.arizona.edu





Climate Engine



Drought Severity Evaluation Tool

Project Team:

Amber McCullum (BAERI/NASA Ames Research Center)

Carlee McClellan (NN DWR)

Justin Huntington (DRI)

Britta Daudert (DRI)

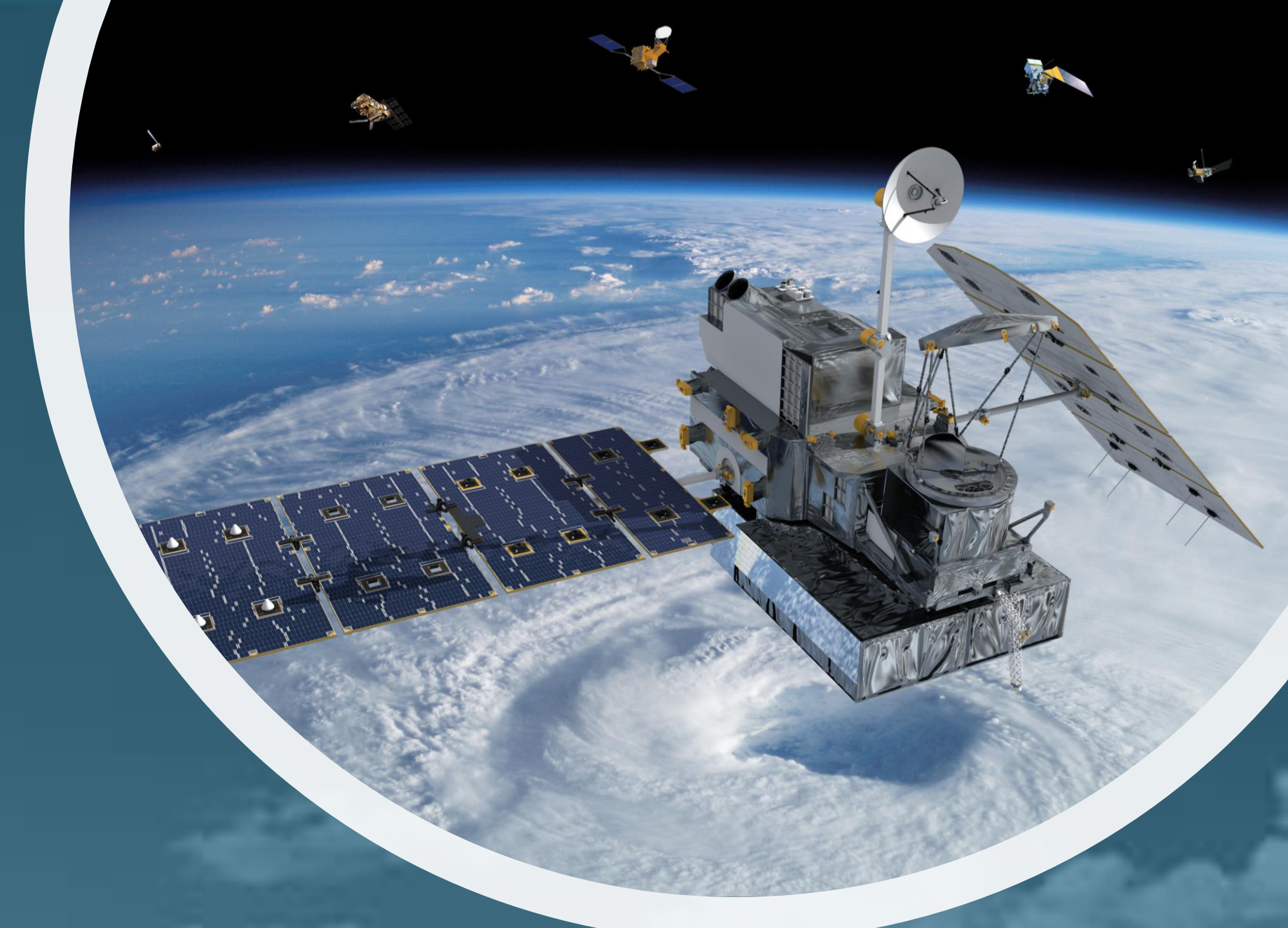
Nikki Tulley (University of Arizona)

DSET Website Link

<https://app.climateengine.org/dset>

Space connection to Navajoland

- Culture context of Indigenous relationship to land
- Preexisting knowledge system
- Communication mechanisms



Source: CDC.gov



DSET Overview

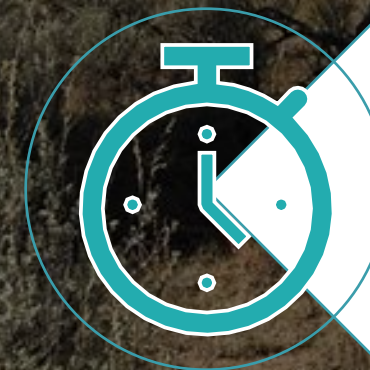
- A collaboration of Sovereignty and Science for the Navajo Nation
- NASA Western Water Applications Office (WWAO)
- Co-developed with the Navajo Nation Division of Water Resources (N.N. DWR), and the Desert Research Institute (DRI)



Free Web Application



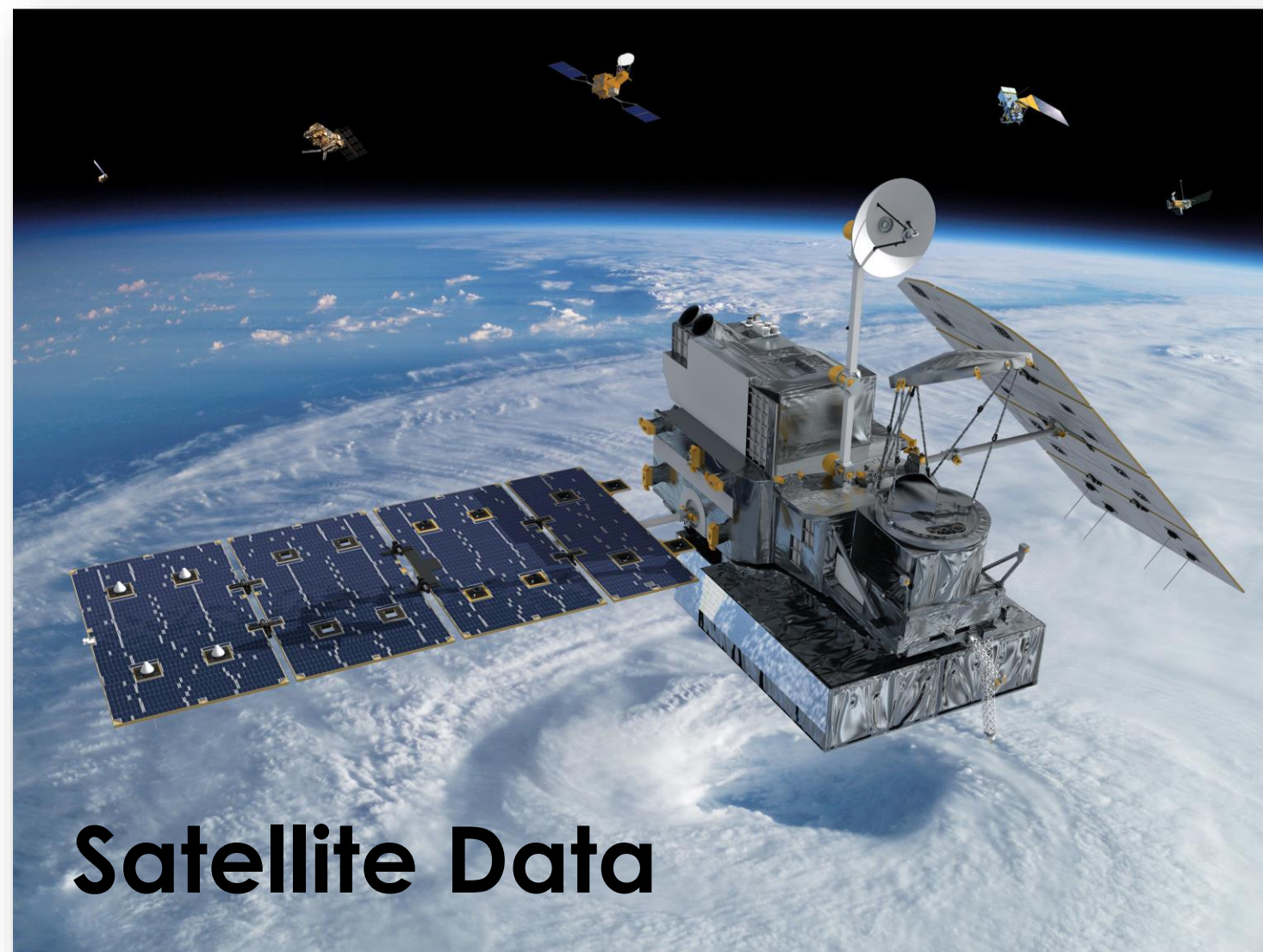
User Friendly



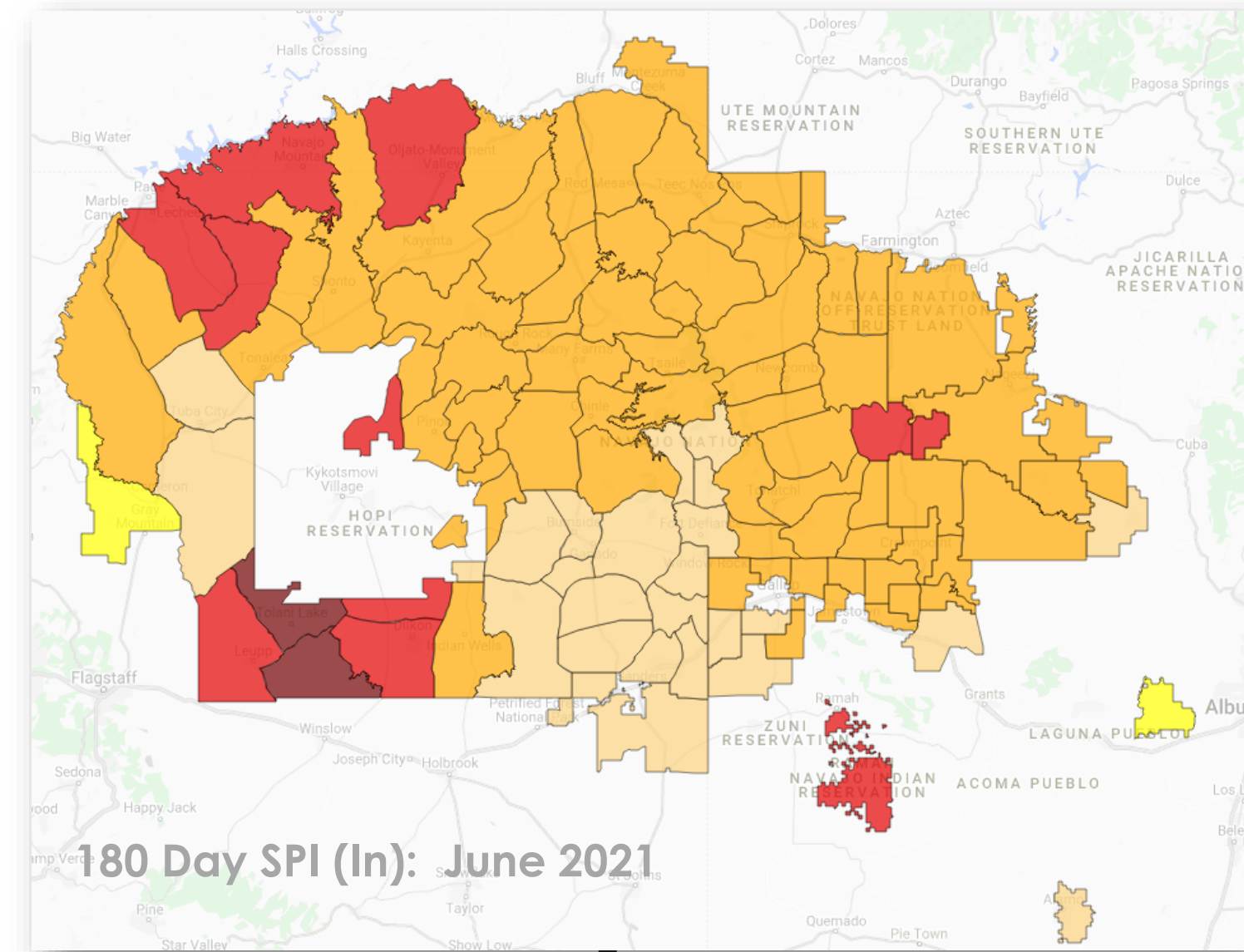
Time & Storage Saver



Analyzing & Visualizing
Data made easier



Satellite Data



180 Day SPI (In): June 2021

Navajo
Rain
Gauge
Data

Modeled
Data and
Drought
Indices

A screenshot of the 'Climate Engine Drought Severity Evaluation Tool' web interface. The interface includes a left-hand sidebar with configuration options for visualization (Raster), variable (Precipitation), computation (4800 m resolution), and time period (1981-01-01 to present). The main area shows a map of the Navajo Nation with county boundaries overlaid. The title 'Drought Severity Evaluation Tool' is prominently displayed at the bottom of the map area.

Drought Severity Evaluation Tool

EARTH OBSERVATIONS USER PANEL DISCUSSION



Moderator

**Dr. Nicole
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NASA DEVELOP



Panelist

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Becerra**
Amazon
Conservation



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Panelist

**Tanner
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Groundwork Ohio
River Valley



NEXT UP

JOIN US FOR THE APPLICATIONS COMMUNITY SOCIAL ON WONDER

www.wonder.me/r?id=8mmf45-idi6s



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THANK YOU!

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