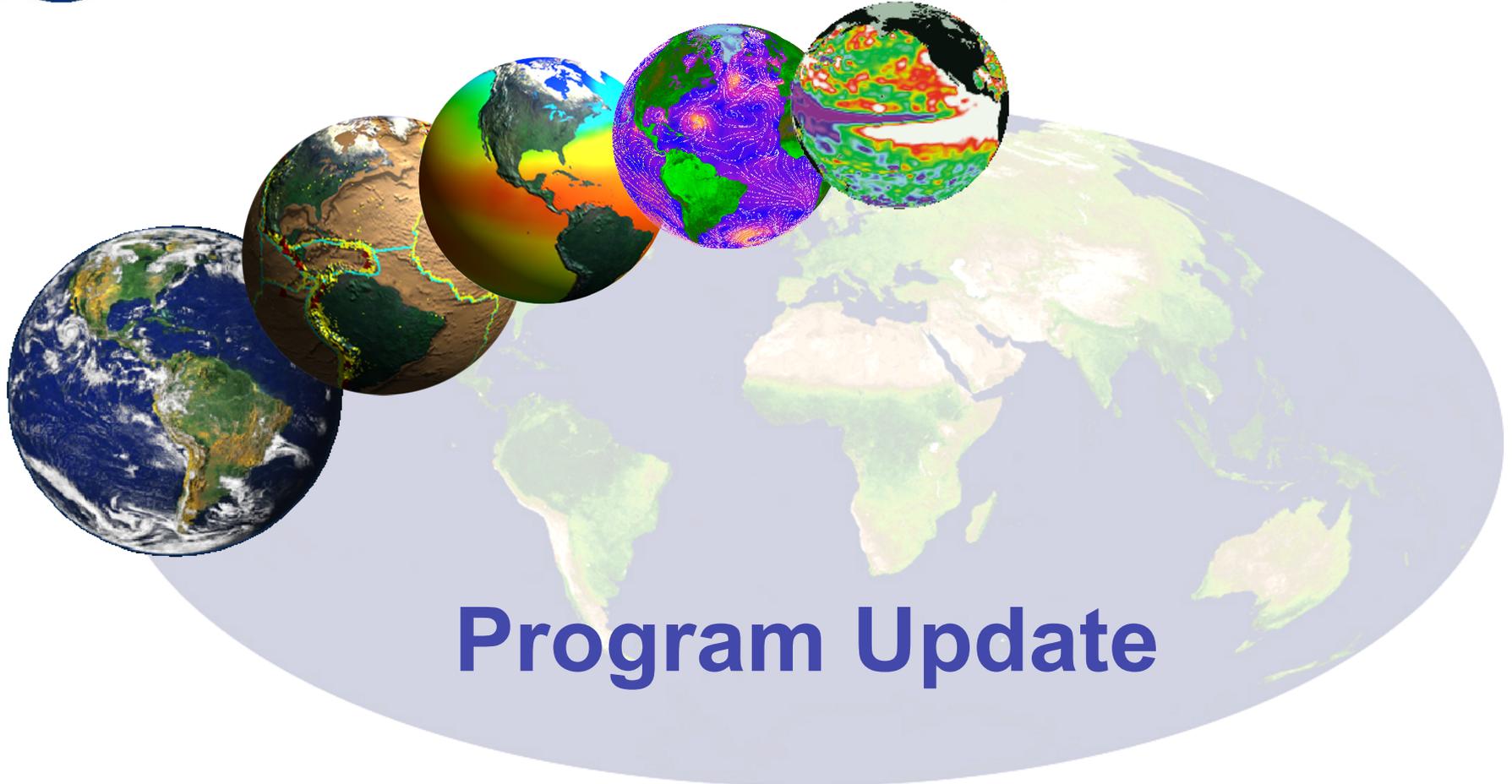




**2016 NASA Biodiversity and Ecological Forecasting Team Meeting**  
**Sheraton Silver Spring, 8777 Georgia Avenue, Silver Spring, MD**



# **Program Update**

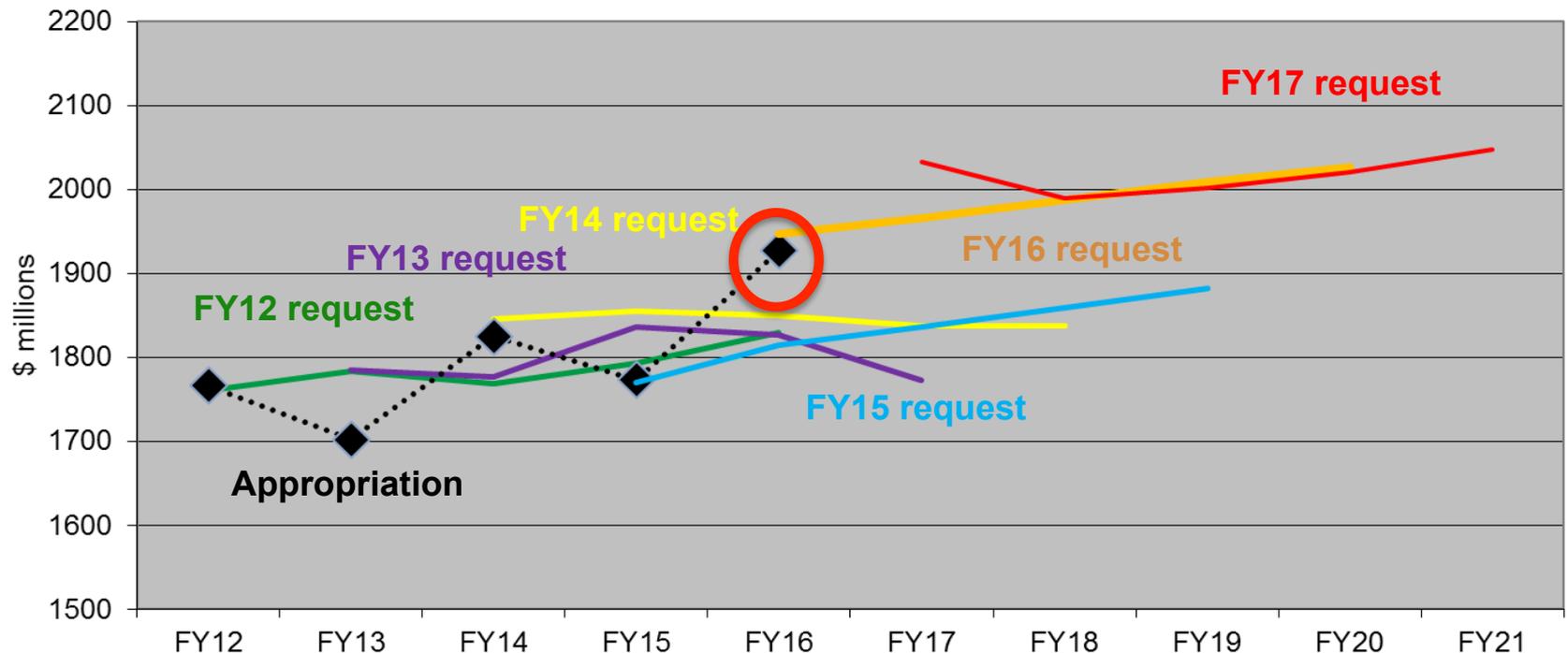
**Woody Turner**  
**Earth Science Division**  
**NASA Headquarters**

**May 6, 2016**

# ESD Budget: FY17 Request/Appropriation

ESD Total						
\$M	FY16 (op plan)	FY17	FY18	FY19	FY20	FY21
FY16 PBS	\$ 1,927	\$ 1,966	\$ 1,988	\$ 2,009	\$ 2,027	
FY17 PBS		\$ 2,032	\$ 1,990	\$ 2,001	\$ 2,021	\$ 2,048

- *ESD budget jumps significantly in FY17 – then becomes consistent with FY16 PBR for the out years*

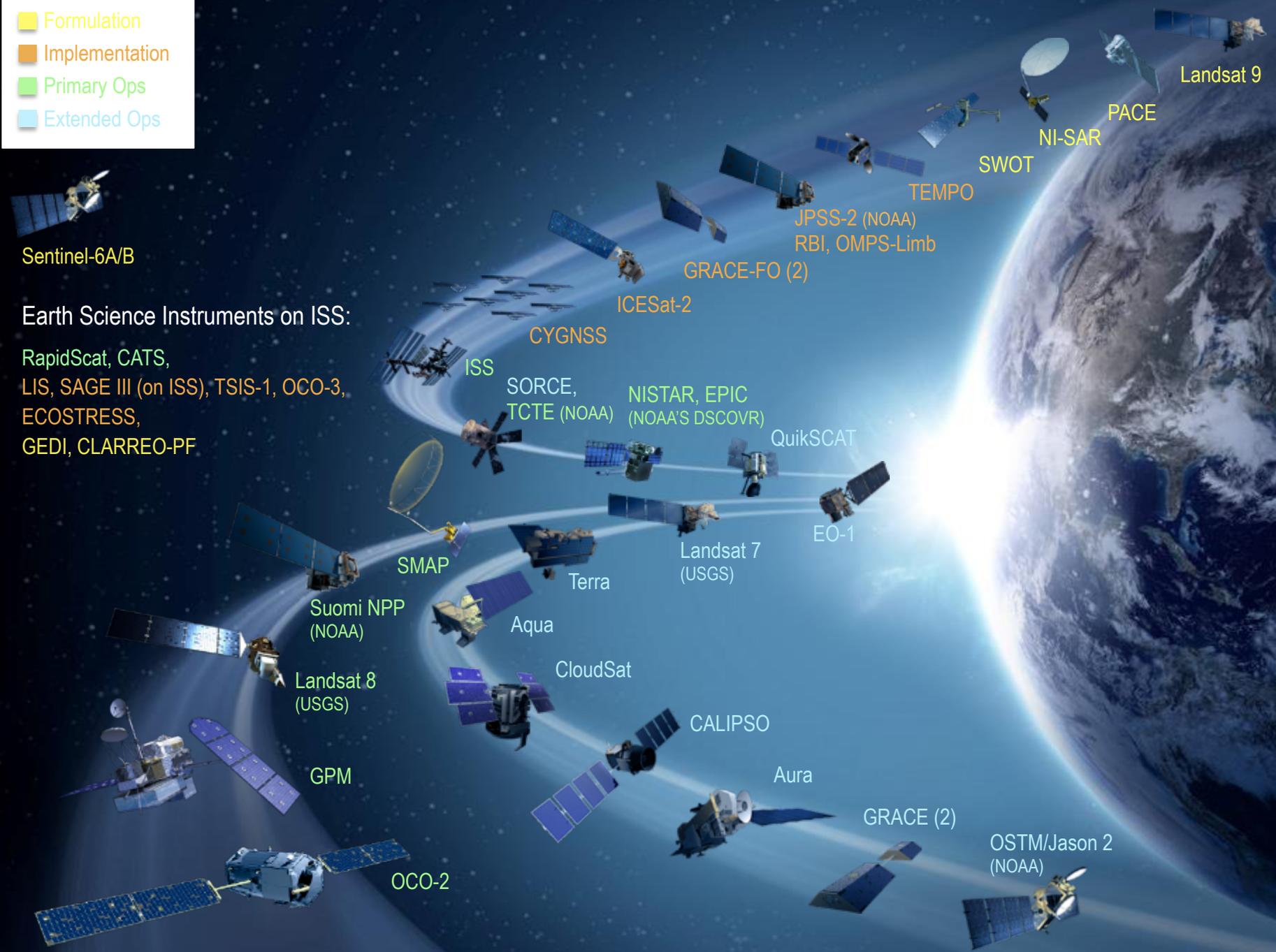


- Formulation
- Implementation
- Primary Ops
- Extended Ops

Sentinel-6A/B

Earth Science Instruments on ISS:

RapidScat, CATS,  
 LIS, SAGE III (on ISS), TSIS-1, OCO-3,  
 ECOSTRESS,  
 GEDI, CLARREO-PF



# Decadal Survey Round Two

## Earth Science and Applications from Space 2017 vs 2007

Base recommendations on realistic (not aspirational) budgets

Science based versus Mission based

Congressionally-mandated, independent cost appraisal & technical evaluation (CATE) for big ticket items

Consider “new space” ideas—new players, smaller and less costly platforms, constellations, hosted payloads

Improved consideration of international partners

# Agency Backdrop

## NASA

- Backlog of missions recommended in 2007 survey
- Increased responsibility—without commensurate budget increases—for “continuity” measurements

## NOAA

- Stabilize weather satellite portfolio & avoid gap in polar orbiters
- “Climate”-related missions/instruments moving to NASA
- Limited budget flexibility; direction to focus on core mission

## USGS

- Landsat-8 launched in February 2013
- New capabilities to Sustained Land Imaging Program
- Landsat-9 projected to be near-rebuild of L-8 for launch in 2023 (unless accelerated)
- Lifetime of Thermal IR Sensor on L-8 is of concern

# Study Panel Organization

## Matrix model

- Overarching Survey Committee
- Science Panels
- Cross-cuts (Applications, Innovation/Technology)
- Integrating Themes

## Community Input

- Request for Information (RFI #1) Fall 2015  
Role of space-based observations in addressing the key challenges and questions for Earth System Science in the coming decade
- RFI #1 => Science Panel Structure
- RFI #2 (responses due May 15<sup>th</sup>)  
Specific science and applications targets (i.e., objectives) to advance understanding of science themes/panels

# ESAS 2017 Science Theme Panels

## I. Global Hydrological Cycles and Water Resources

The movement, distribution, and availability of water and how these are changing over time

## II. Weather and Air Quality: Minutes to Subseasonal

Atmospheric dynamics, thermodynamics, chemistry, and their interactions at land and ocean interfaces

## III. Marine and Terrestrial Ecosystems and Natural Resource Management

Biogeochemical cycles, ecosystem functioning, biodiversity, and factors that influence health and ecosystem services

## IV. Climate Variability and Change: Seasonal to Centennial

Forcings and feedbacks of the ocean, atmosphere, land, and cryosphere within the coupled climate system

## V. Earth Surface and Interior: Dynamics and Hazards

Core, mantle, lithosphere, and surface processes, system interactions, and the hazards they generate

# ESAS 2017 Timeline

Fall 2015

- 1st RFI (Earth System Science objectives)

Winter 2015-2016

- Initial Steering Committee Meeting (Jan, 2016)
- Town Halls (AGU, AMS, Ocean Sciences)

Spring-Summer 2016

- Panel appointments in process
- 2nd RFI (science objectives): responses due May 15<sup>th</sup>
- Panel Meetings: 1<sup>st</sup> June 2016 (three over 2016)

Panel Outputs due to Steering Committee no later than January 2017

Pre-Publication Report approval no later than end July 2017

# ESAS 2017 Steering Committee

Dr. Waleed Abdalati, Co-Chair  
University of Colorado Boulder

Dr. Christopher B. Field  
Carnegie Institution for Science

Dr. Joyce E. Penner  
University of Michigan

Dr. Antonio Busalacchi, Co-Chair  
University of Maryland

Dr. Helen A. Fricker  
Scripps Inst. of Oceanography

Dr. Soroosh Sorooshian  
University of California, Irvine

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Mr. Steven J. Battel  
Battel Engineering

Dr. William B. Gail  
Global Weather Corporation

Dr. Graeme L. Stephens  
Jet Propulsion Laboratory

Dr. Stacey W. Boland  
Jet Propulsion Laboratory

Dr. Sarah T. Gille  
Scripps Inst. of Oceanography

Dr. Byron D. Tapley  
The University of Texas at Austin

Dr. Robert D. Braun  
Georgia Institute of Technology

Dr. Dennis L. Hartmann  
University of Washington

Dr. W. Stanley Wilson  
NOAA/NESDIS, Ret.

Dr. Shuyi S. Chen  
University of Miami

Dr. Anthony C. Janetos  
Boston University

Steering Committee Staff  
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Dr. William E. Dietrich  
University of California, Berkeley

Dr. Everette Joseph  
University at Albany, SUNY

Dr. Arthur Charo, Study Director

Ms. Lauren Everett, Program Officer

Dr. Scott C. Doney  
Woods Hole Oceanographic Inst.

Dr. Molly K. Macauley  
Resources for the Future

Mr. Charles Harris, Research Associate

Dr. Michael Moloney, Director, Space Studies Board

# Ecological Forecasting

## ROSES 2016 A.46; Proposals due May 26, 2016

- *Remote Sensing as a Catalyst for Large-scale Conservation*
  - Proposals to this topic should identify and describe a conservation challenge dependent upon enhancing connectivity and/or biological movement at spatial scales sufficient for satellite remote sensing to have a positive impact.
- *Remote Sensing-based Approaches Simultaneously Promoting Biological Conservation and Energy Self-sufficiency or Food Security*
  - This topic seeks proposals that will provide Earth observations-based solutions that mitigate the negative impacts—or even promote positive impacts—from energy exploration and development or from food production on the conservation of biodiversity at the level of ecosystems, species, or genes. Proposals must include participation by both an energy or agribusiness corporation and a conservation group to develop and deploy Earth observations tools or products that further the sustainable use of natural resources through enhanced biodiversity conservation.
- *Managing Marine Ecosystems in a Time of Changing Climate through Better Forecasts*
  - time series of biological observations on the distribution and/or abundance of marine populations, species, or communities;
  - time series of climate observations; and
  - an interoperable modeling framework serving predictive climate model outputs as inputs to predictive ecological models, which also accounts for uncertainties.
- *Workshop Proposals: Using Earth Observations to Value Ecosystem Services*
  - NASA seeks proposals for a workshop (or possibly a series of workshops) that would characterize the state of practice, identifying key issues and opportunities, and provide approaches for Earth observation-based solutions to the challenge of valuing ecosystem services.

# **Interdisciplinary Research in Earth Science**

## **ROSES 2016 A.28; Proposals due September 29, 2016**

- Subelement 4: Life in a Moving Ocean
- How can the coupling of physical ocean current and ocean ecosystem data improve either: the ecosystem-based management of the ocean or our understanding of the organization of the dynamic biogeography of the marine realm?

# Utilization of Airborne Visible/Infrared Imaging Spectrometer – Next Generation Data from an Airborne Campaign in India

## ROSES 2016 A.31; Proposals due June 10, 2016

- 57 sites flown in India December 2015 to early March 2016:
  - Agriculture and soils
  - Wetland ecosystems
  - Mangrove ecosystems
  - Forest ecosystems
  - Coral reef ecosystems
  - Mineral exploration
  - Snow and glaciers
  - Urban studies
  - Biological oceanography
  - Coastal land use/land cover
  - River water resources and water quality
  - Clouds, atmosphere, and air pollution
  - Calibration studies

# Citizen Science for Earth Systems Program

## ROSES 2016 A.47; Proposals due July 21, 2016

NASA will support development of new research projects or enhancement of existing projects that use citizen science to advance scientific understanding of the Earth system related to biodiversity and conservation biology, atmospheric composition, water and energy cycle, and physical oceanography. Possible topics include, but are not limited to:

- Drought monitoring and mitigation
- **Biodiversity and conservation biology**
- Greenhouse gas monitoring
- Snow monitoring and runoff forecasting
- Atmospheric aerosol monitoring
- Surface water and sea level monitoring and forecasting
- Climatic and ecological impacts on groundwater

**Thank You**