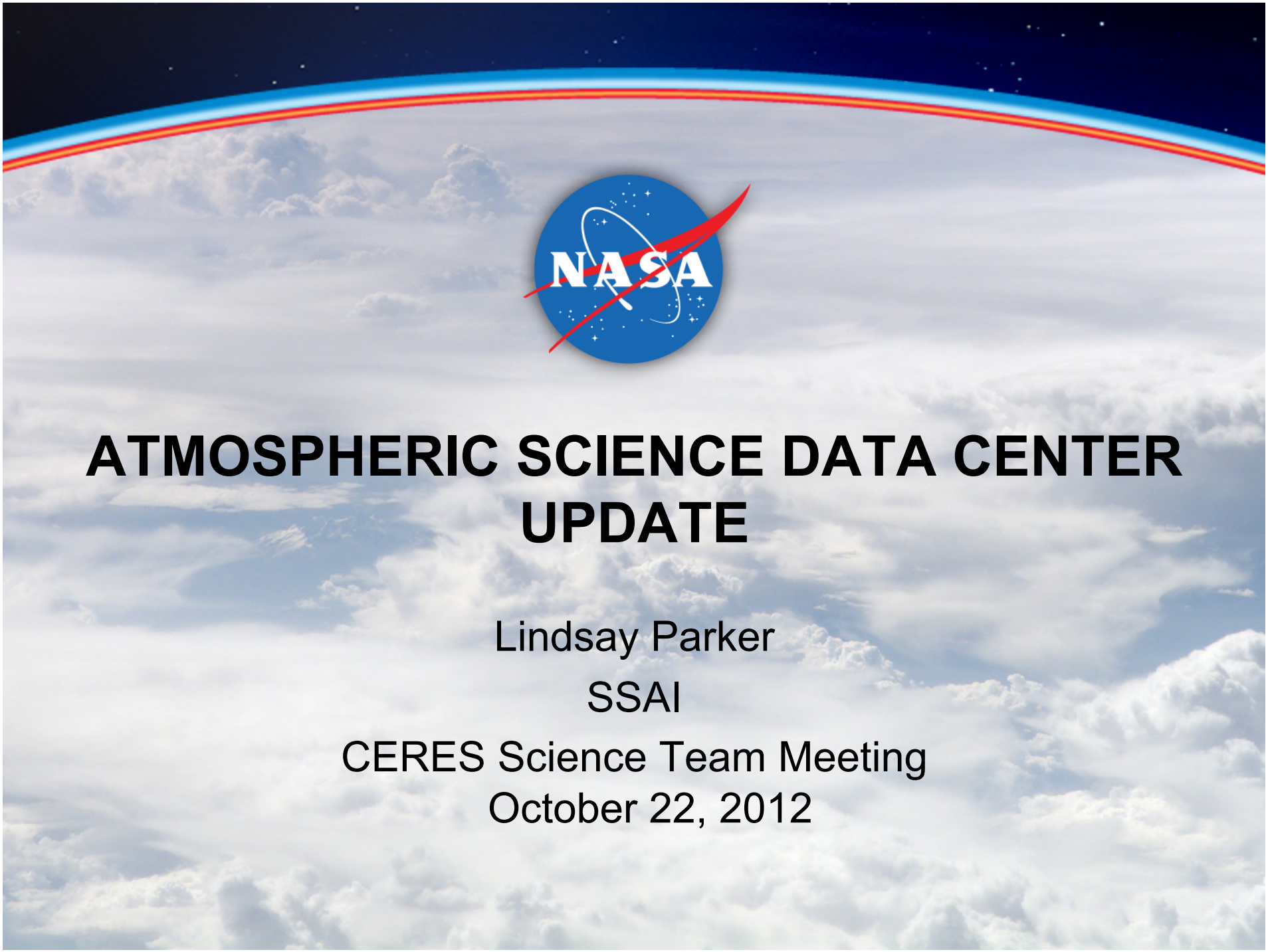


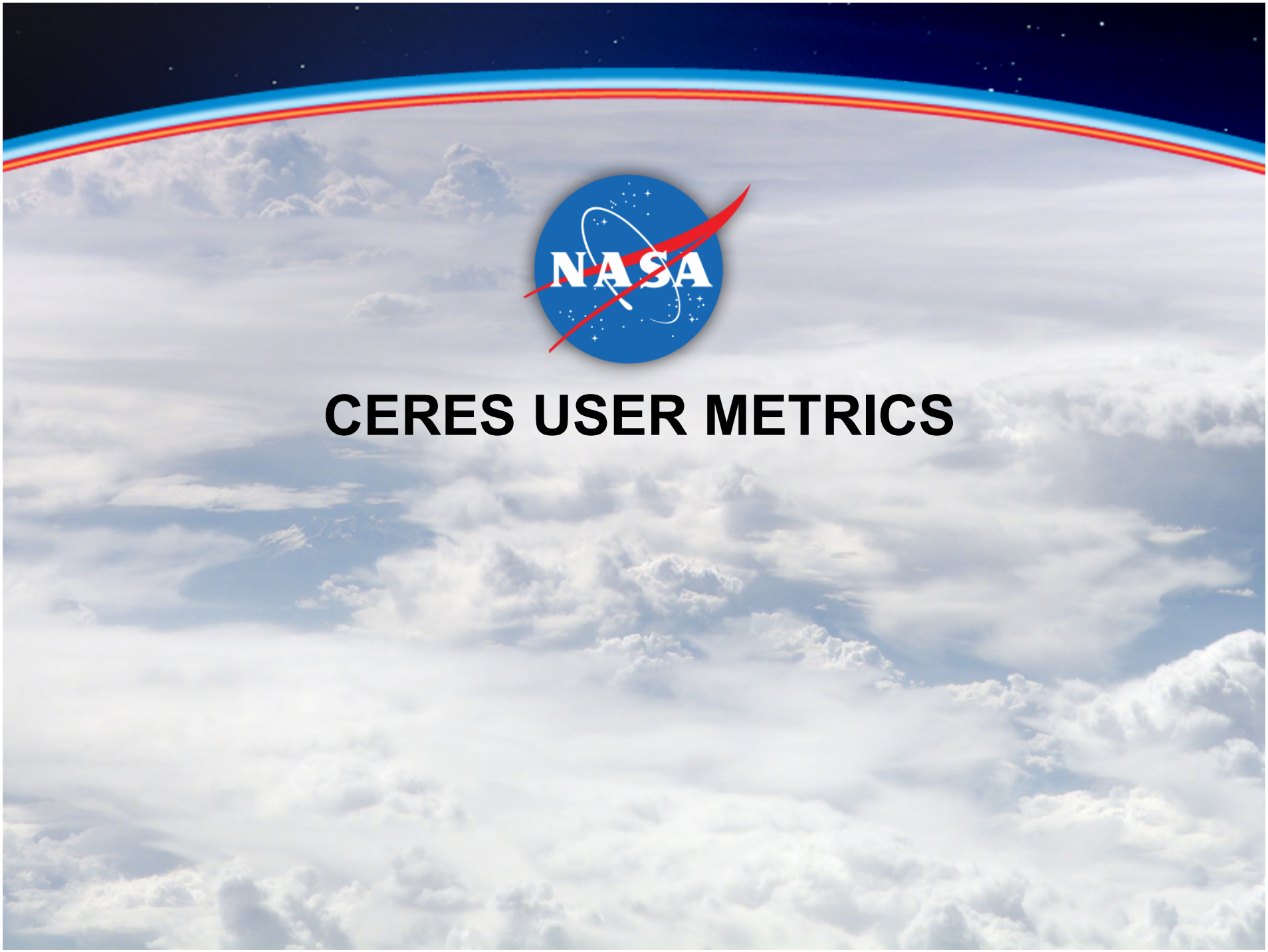
ATMOSPHERIC SCIENCE DATA CENTER UPDATE

Lindsay Parker

SSAI

CERES Science Team Meeting

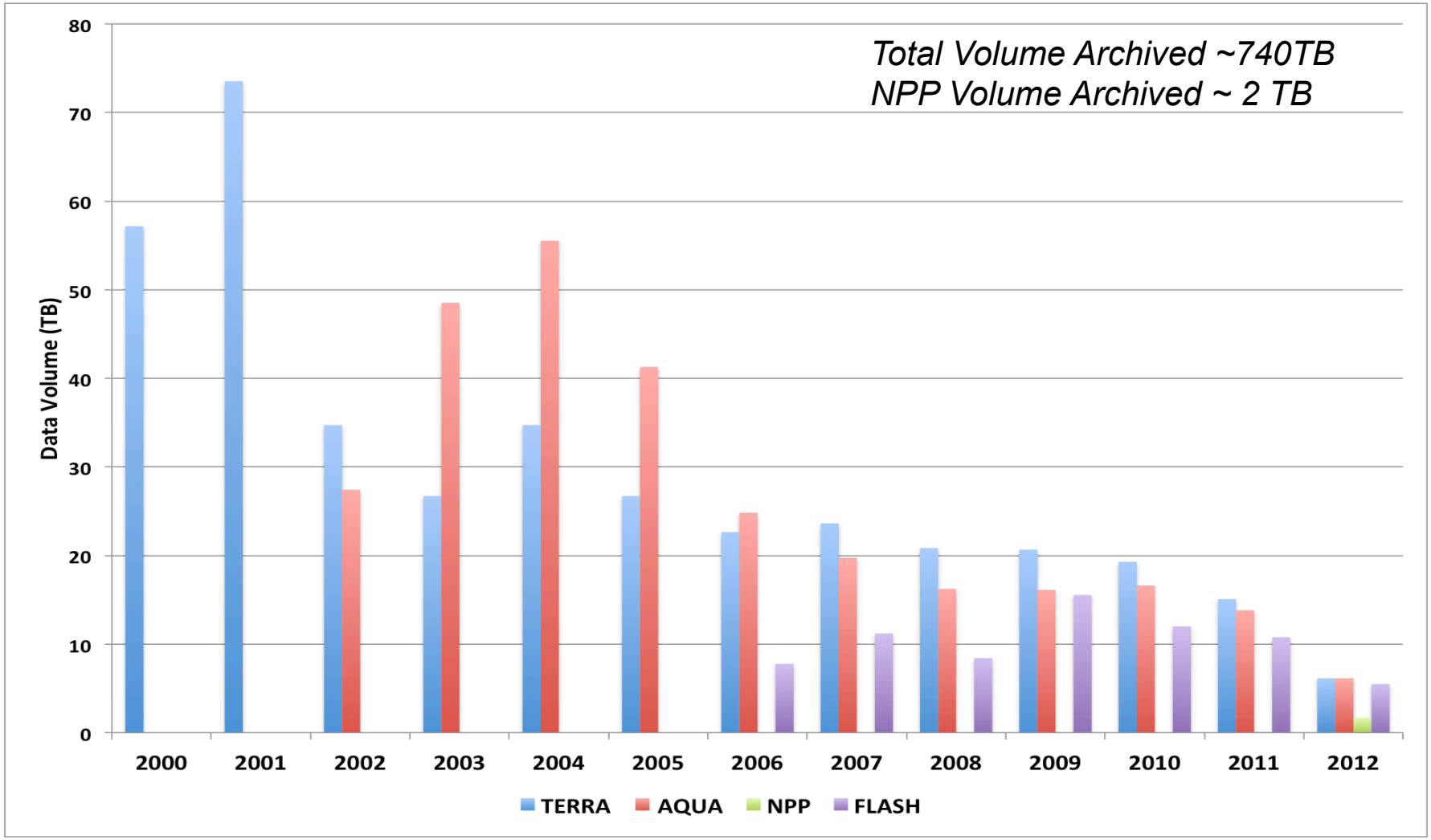
October 22, 2012



CERES USER METRICS

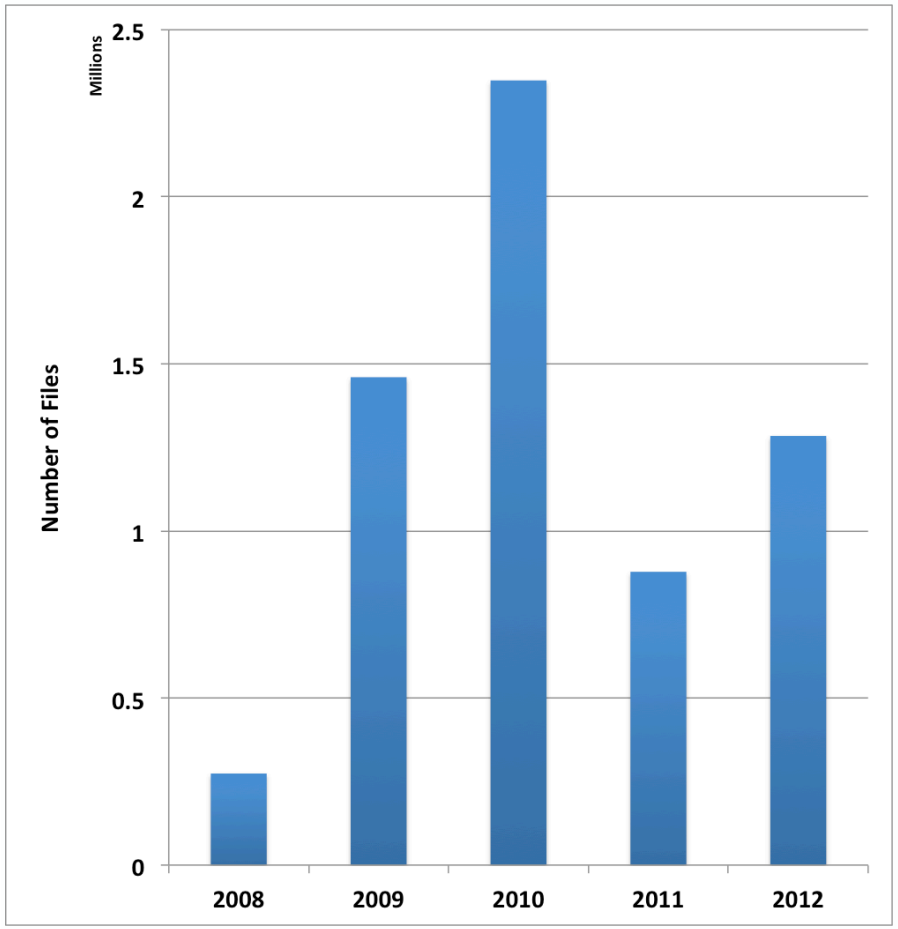
CERES and FLASHFlux Archive Volume

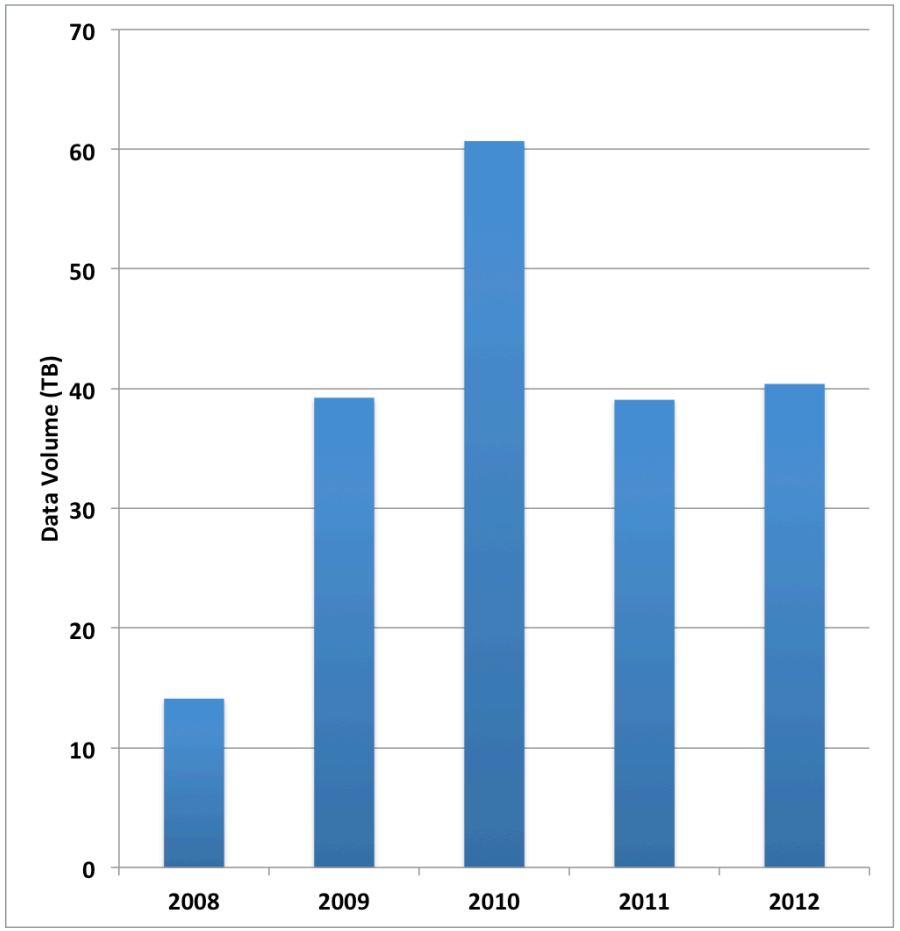
By Data Date through September 2012



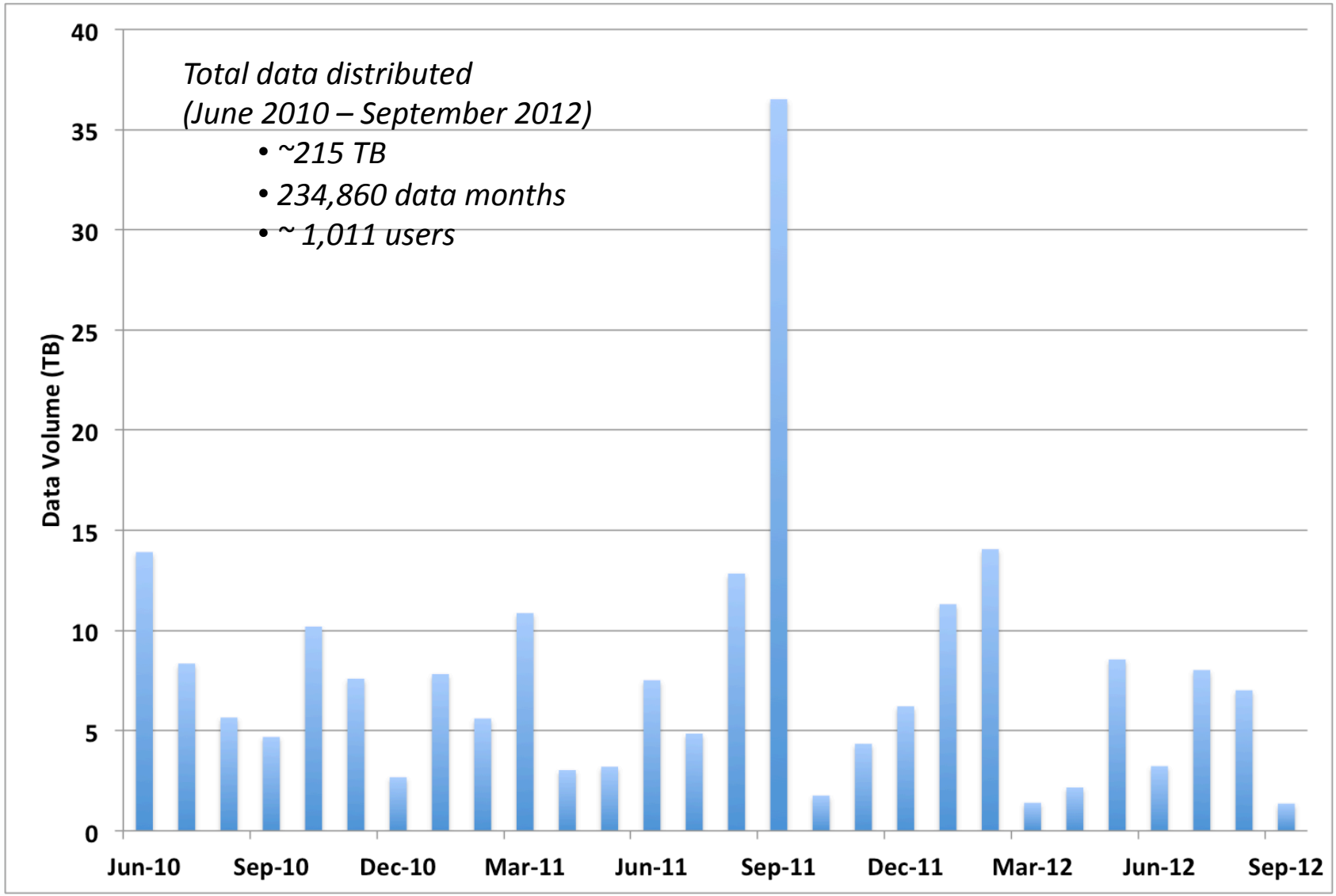
CERES Ancillary Data Archived

(September 2008 – September 2012)

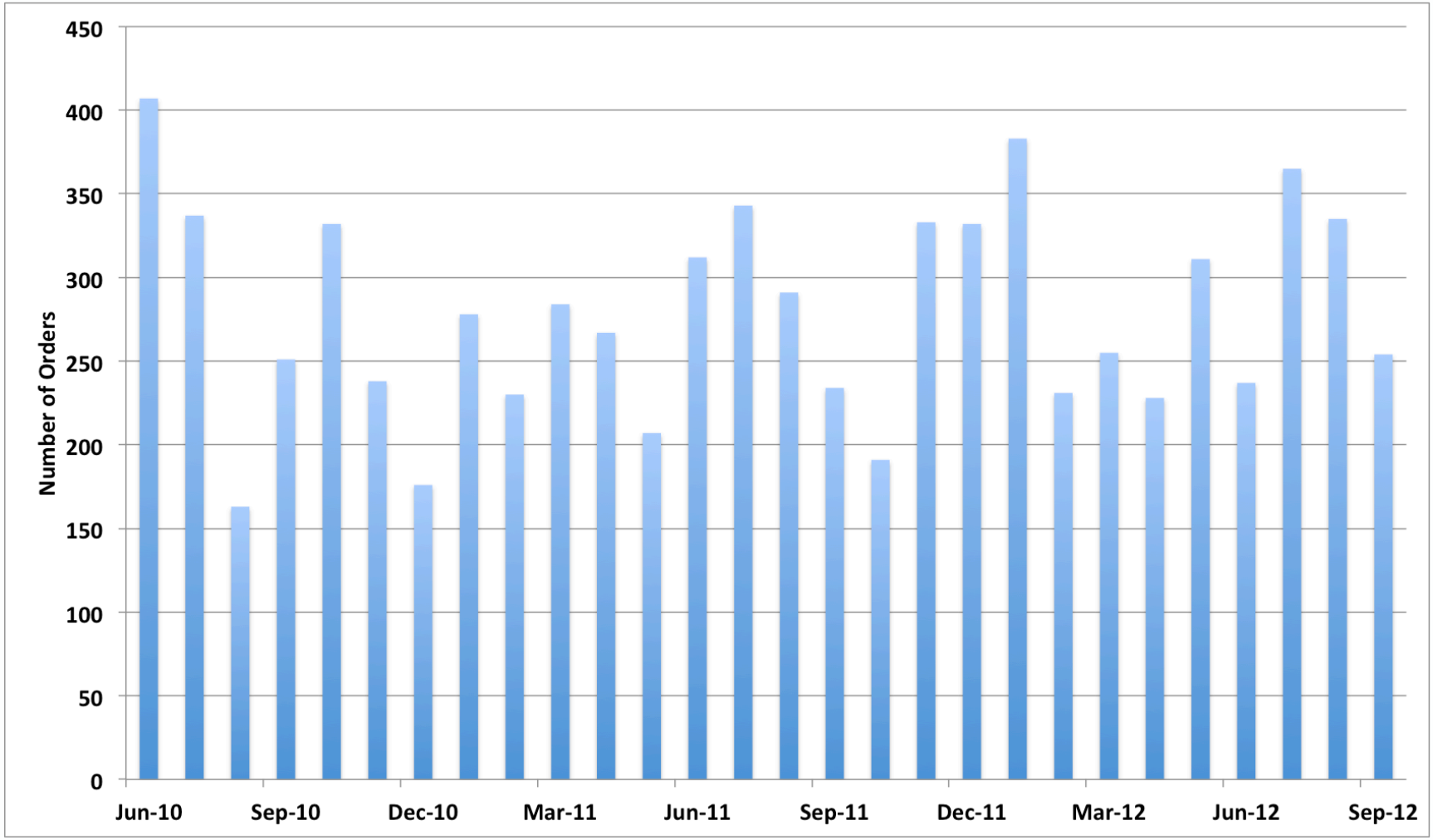




CERES Data Distribution

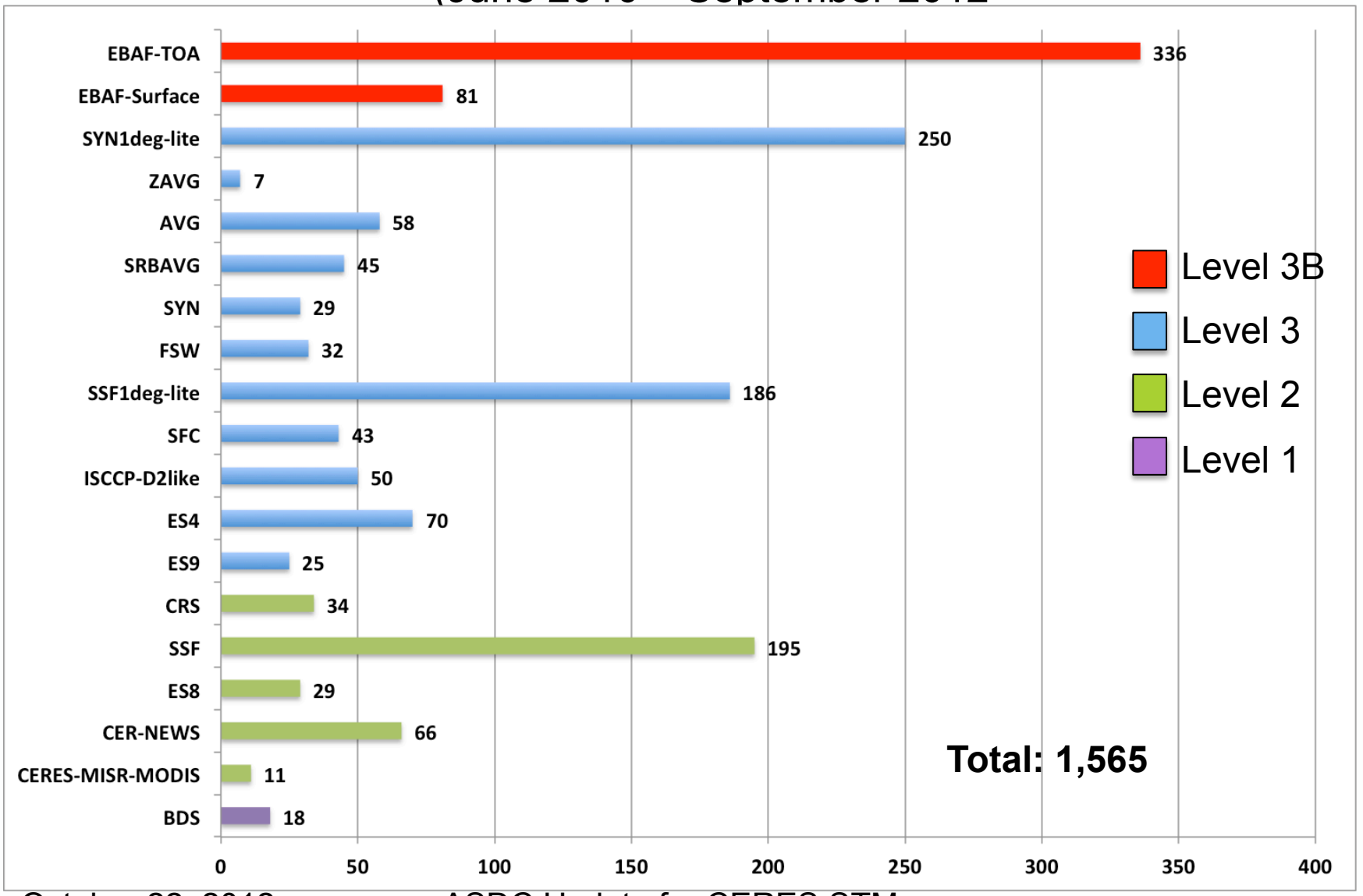


CERES Data Orders
(June 2010 – September 2012)

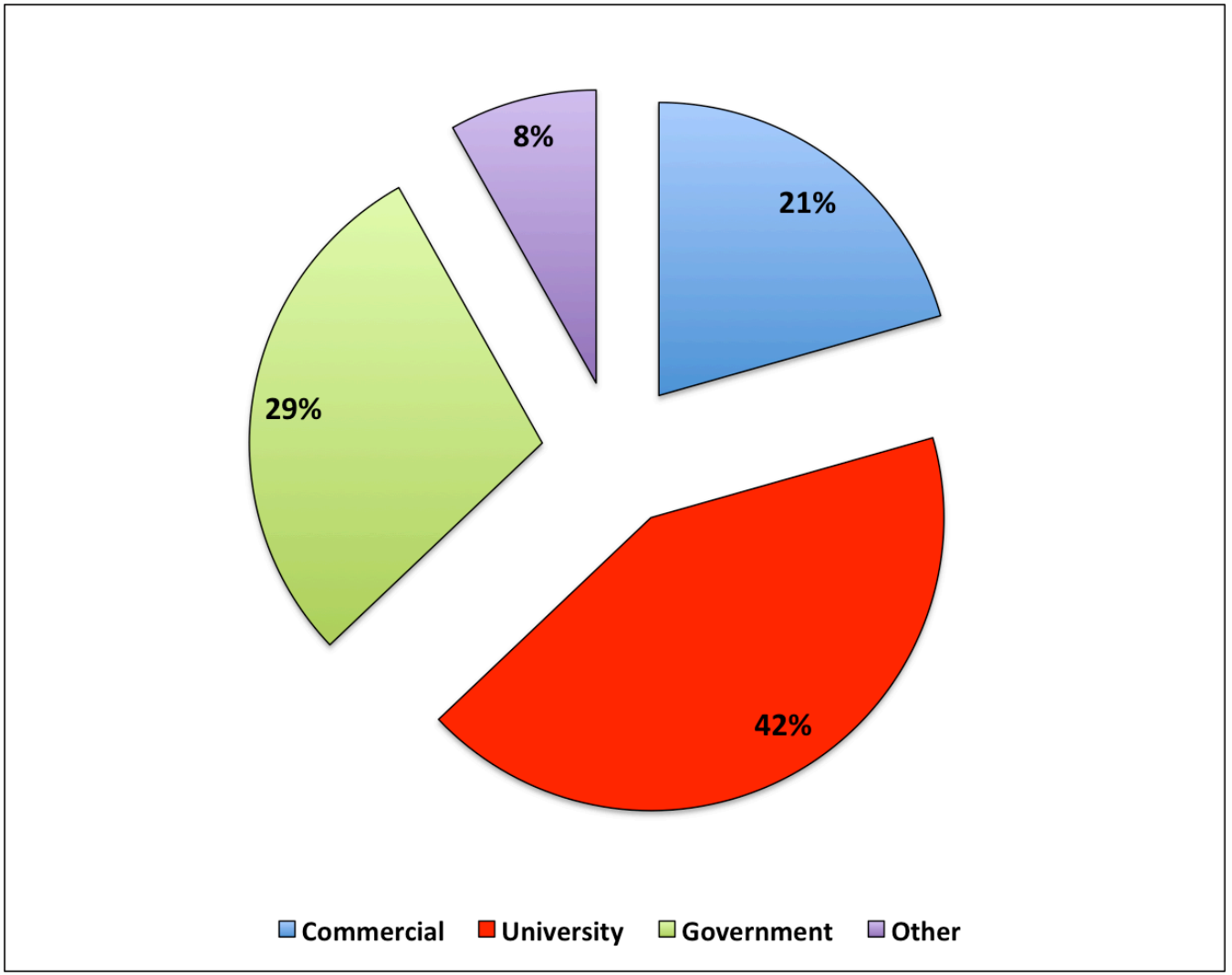


Number of Users by Product

(June 2010 – September 2012

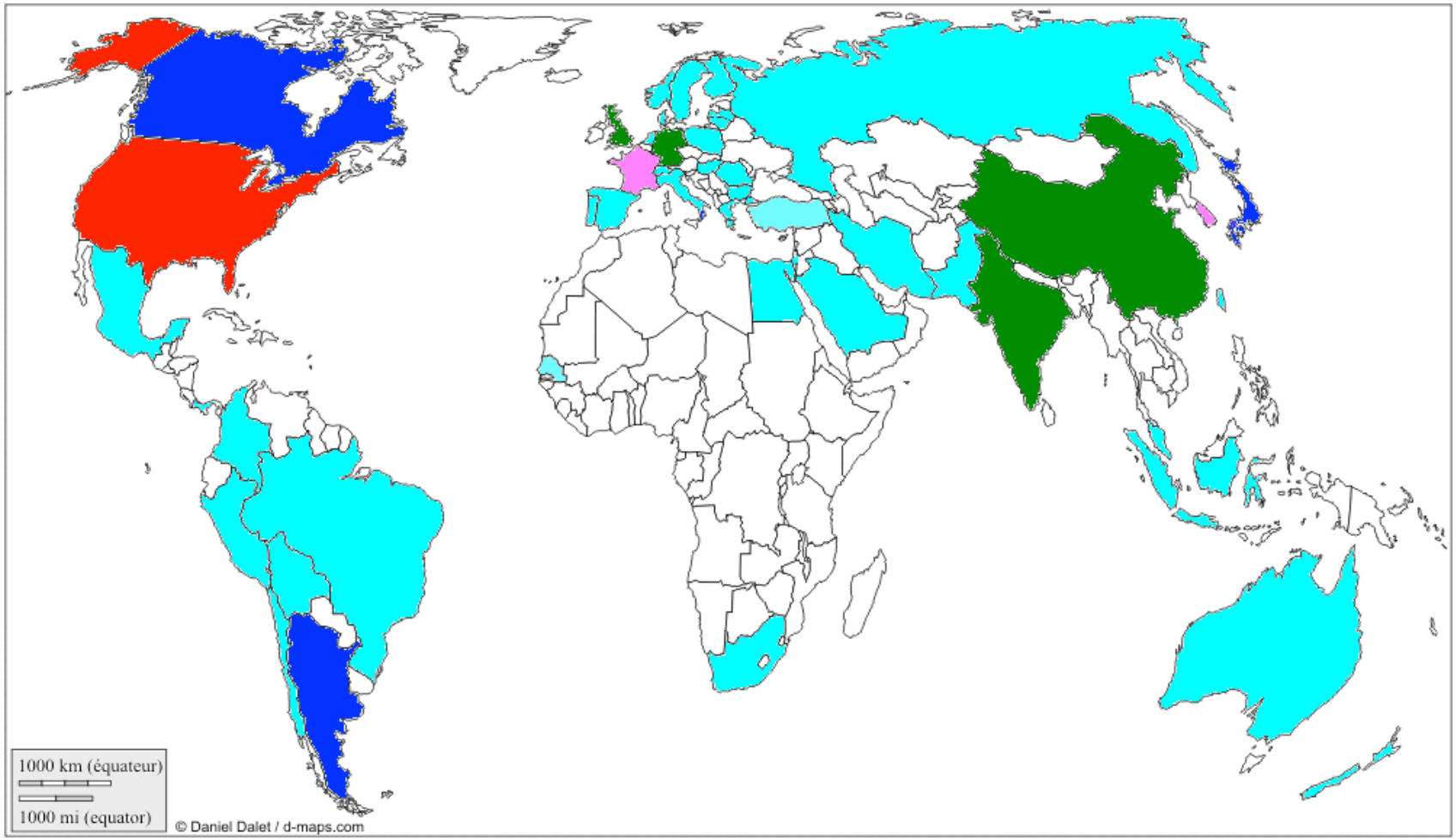


CERES Customer Affiliation



CERES Data Users

Number of Customers (June 2010 – September 2012)



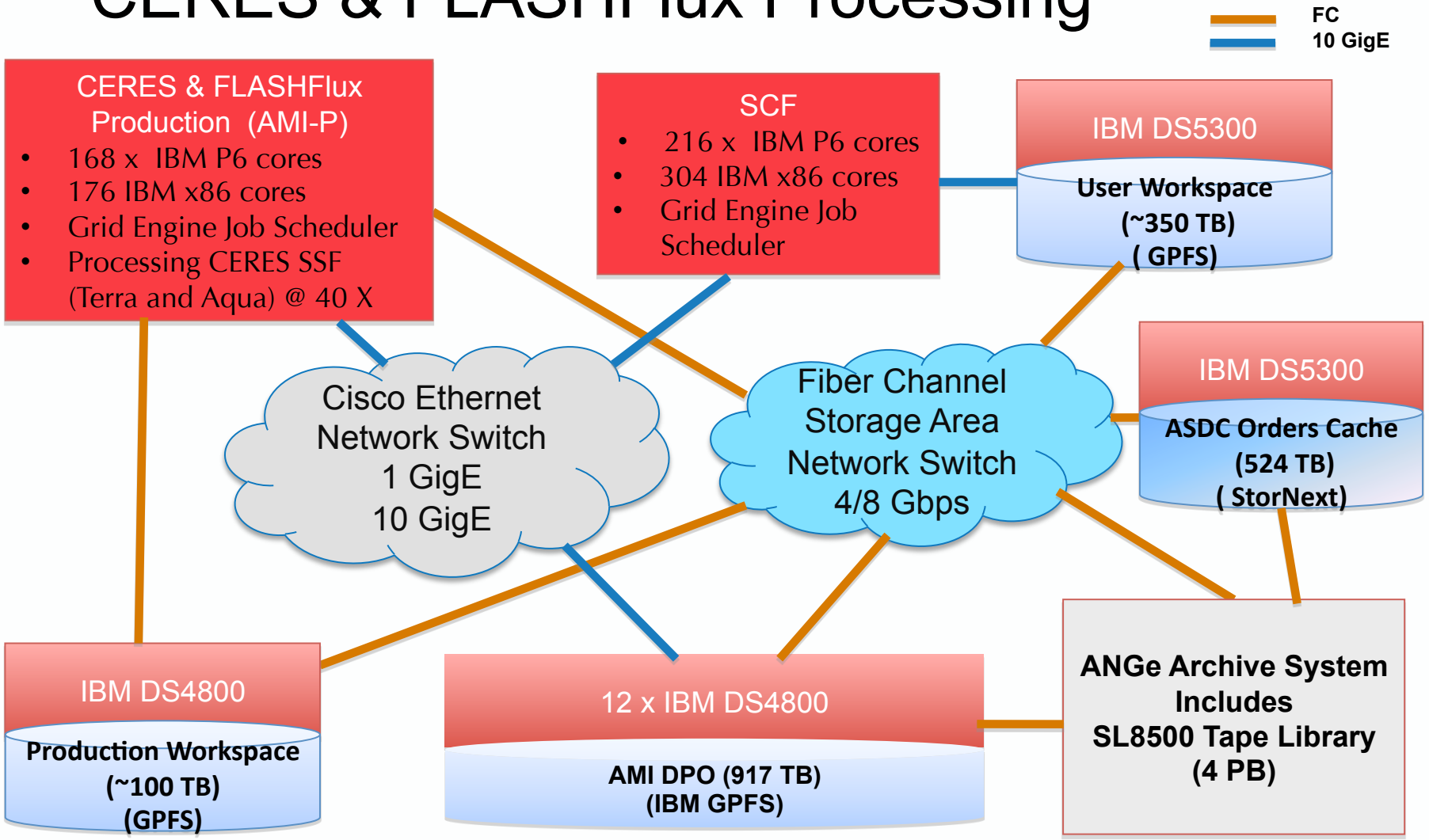
1-10 | 11-20 | 21-30 | 30-40 | >400


NASA
CATALYST

ASDC Fully Engaged in CATALYST

- Supporting the application of software engineering practices to effort
  - Requirements development and management
  - Operational concept documentation
  - Schedule with Gantt chart with critical path
  - Test plans and test cases
- Ensuring the AMI system is stable and consistent
  - Including AMI-P
- Focus on collaboration
  - Recognize that everyone is working toward the same goal
  - Share information as much as possible
  - Work collaboratively to address issues as they arise

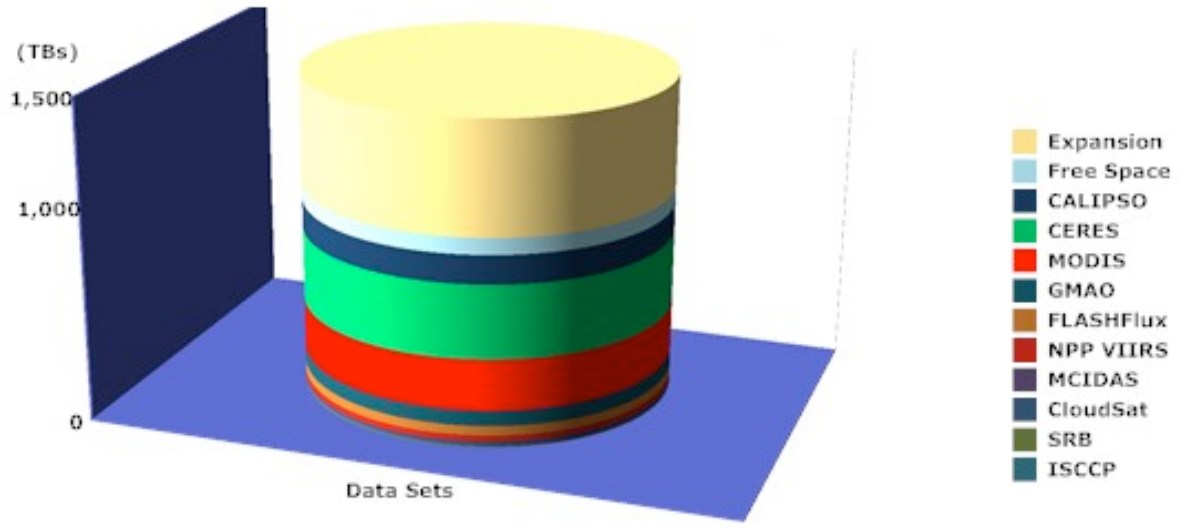
CERES & FLASHFlux Processing



Disk-based Storage Improvements

AMI Data Products Online (DPO) disk cache provides unprecedented access to many science data sets

Important to have the Right Data at the Right Place at the Right Time

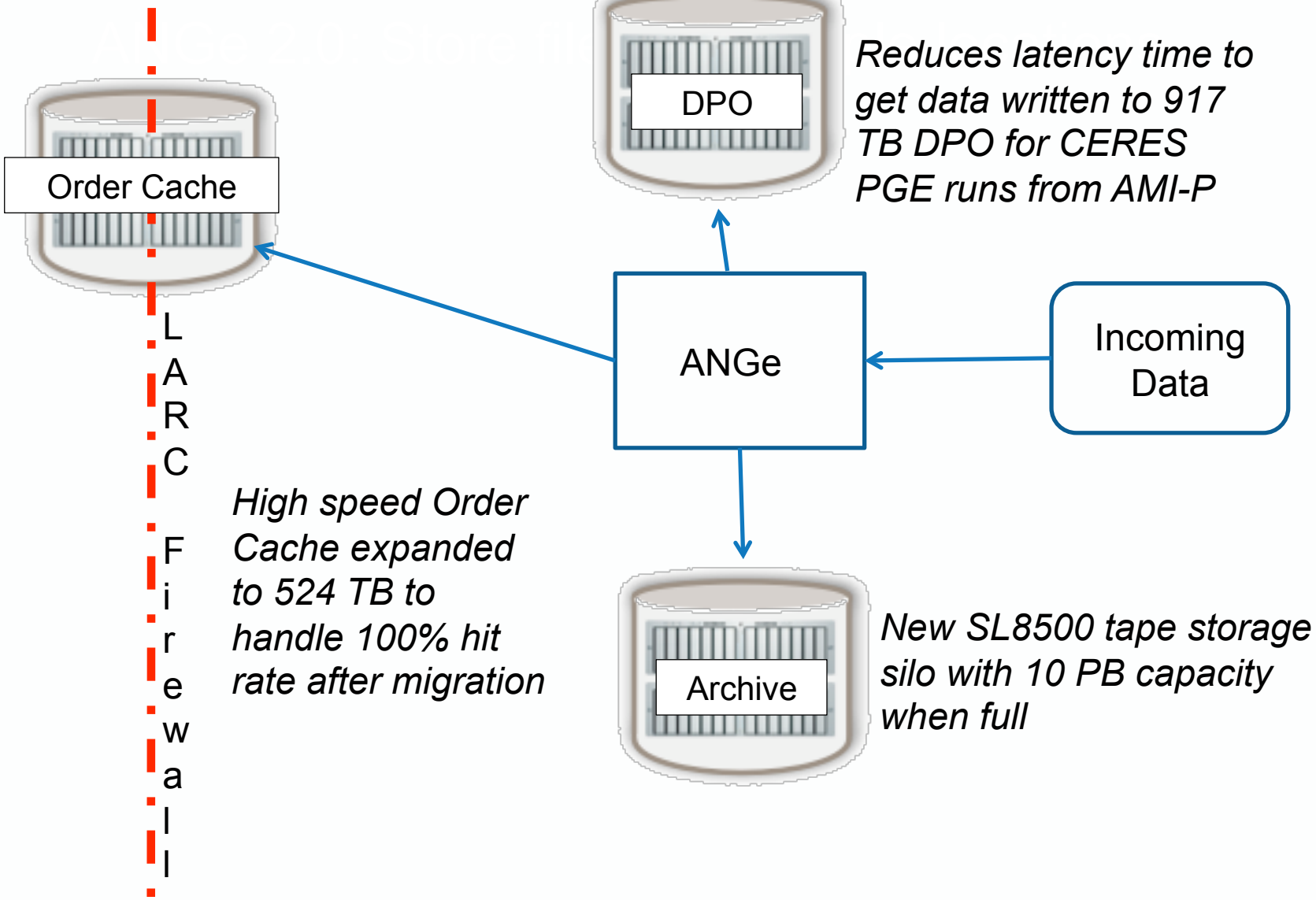


AMI DPO: Data Stored = 840 TB Store (+34 million files)

- Directly Accessible by ASDC Data Production & SCF Interactive & Compute servers
- Available to Users desktop systems over LaRC campus network and VPN
- Very long reprocessing campaigns possible without staging data from tape archive

Retirement of SGI Origin 3800 “warlock”
128 CPUs: 88 GB RAM

DATA ACCESS ENHANCEMENTS


DPO
Reduces latency time to get data written to 917 TB DPO for CERES PGE runs from AMI-P
Order Cache
ANGe
Incoming Data
LARC Firewall
High speed Order Cache expanded to 524 TB to handle 100% hit rate after migration
Archive
New SL8500 tape storage silo with 10 PB capacity when full

Subsetting

Approach

- Capability to subset data requested by the ASDC User Working Group and ASDC users
- The ASDC responded with an architecture that
  - Provides a common back-end framework supporting for services for multiple products
  - Provides a flexible environment that handles product specific differences on a case by case basis
    - Will not force a “one size fits all solution” or complex design
  - Allows customers to provide their own user interface (UI) if they prefer to define the user’s experience based on their customer relationship

Subsetting

Progress:

Project	Products	Collaboration	Status
CALIPSO	L1 and L2 Lidar data	UI produced by project; maintained by ASDC	Available
CERES	L2 SSF data	UI produced and maintained by project	Available
TES	L2 and L3 data	UI produced and maintained by ASDC	Available
MOPITT	L2 and L3 data	UI produced and maintained by ASDC	Under development
MISR	TBD	TBD	Future initiative to refresh the current subsetter

CERES LANDING PAGES

eosweb.larc.nasa.gov

CERES Data and Information

The Clouds and the Earth's Radiant Energy System (CERES) is a key component of the Earth Observing System (EOS) program. The CERES instruments provide radiometric measurements of the Earth's atmosphere from three broadband channels. The CERES missions are a follow-on to the successful Earth Radiation Budget Experiment (ERBE) mission. The first CERES instrument (PFM) was launched on November 27, 1997 as part of the Tropical Rainfall Measuring Mission (TRMM). Two CERES instruments (FM1 and FM2) were launched into polar orbit on board the EOS flagship Terra on December 18, 1999. Two additional CERES instruments (FM3 and FM4) were launched on board EOS Aqua on May 4, 2002. The newest CERES instrument (FM5) was launched on board the Suomi National Polar-orbiting Partnership (NPP) satellite on October 28, 2011.

Documentation, Tools, Imagery, Quick Data Links

Data Products

Level 3B

Spatially (1°x1° lat/lon regional, 1° zonal, global) and temporally (monthly, climatological, etc.) averaged fluxes where the TOA net flux has been energy balanced.

Data Product	Description	Details and Ordering
EBAF	TOA clear-sky (spatially complete) fluxes, all-sky fluxes, and cloud radiative effect (CRE) along with associated computed surface fluxes where the TOA net flux is constrained to the ocean heat storage.	EBAF

Level 3

Spatially (1°x1° lat/lon regional, 1° zonal, global) and temporally (daily, monthly, etc.) averaged fluxes and clouds.

Processing Stream	Description	Details and Ordering
SYN1deg	CERES geostationary (GEO) enhanced temporally interpolated TOA fluxes, MODIS and 3-hourly GEO cloud properties, MODIS aerosols, and computed TOA, surface and in-atmospheric (profile) fluxes consistent with the observed TOA fluxes, clouds and aerosols.	SYN1deg
SSF1deg	CERES constant meteorology temporally interpolated TOA fluxes, MODIS clouds and aerosols.	SSF1deg
ISCCP-D2like	CERES-MODIS and GEO cloud properties stratified by ISCCP cloud types and in the similar D2 format.	ISCCP-D2like
FLASHFlux	Near real-time daily averaged CERES observed TOA fluxes, parameterized surface fluxes, and MODIS clouds to be used only until CERES SSF1deg products become available. Not of climate quality or to be appended with any other CERES dataset.	FLASHFlux TISA
ERBElike	TOA fluxes using algorithms identical to those used by ERBE.	ERBElike Level 3

Level 2

Instantaneous footprint-level (20km nominal) fluxes and cloud properties.

Processing Stream	Description	Details and Ordering
CRS	Computed TOA, surface and in-atmospheric (profile) fluxes using the MODIS clouds and aerosols on the SSF.	CRS
SSF	CERES observed TOA fluxes, MODIS clouds and aerosols, and parameterized surface fluxes.	SSF
CERES-MISR	MISR radiances associated with along-track CERES SSF data.	CERES-MISR
CCCM	CALIPSO/CloudSat cloud and aerosols collocated with nadir-view CERES fluxes and clouds. Not for climate studies such as deriving a trend.	CCCM
FLASHFlux	Near real-time availability of CERES observed TOA fluxes, parameterized surface fluxes, and MODIS clouds and aerosols in the Level2 SSF format to be used only until CERES SSF products become available. Not of climate quality or to be appended with any other CERES dataset.	FLASHFlux SSF
ERBElike	TOA fluxes using algorithms identical to those used by ERBE.	ERBElike Level 2

Level 1B

CERES instantaneous footprint-level (20km nominal) ephemeris and instrument level data.

Data Product	Description	Details and Ordering
BDS	CERES geolocated and calibrated TOA filtered radiances.	BDS

ATMOSPHERIC SCIENCE DATA CENTER

CERES EBAF Data Products

General Information

- **Description**: Energy Balanced and Filled (EBAF)
- **Level 3B**: Spatially (1°x1° lat/lon regional, 1° zonal, global) and temporally (monthly, climatological, etc.) averaged fluxes where the TOA net flux has been energy balanced.

EBAF Level 3B Data Products

Temporal Resolution	Data Product Information	Description	Spatial Resolution	Release Date	Temporal Coverage	Order Data
Monthly	EBAF-TOA	Monthly and climatological averages of TOA clear-sky (spatially complete) fluxes, all-sky fluxes, and cloud radiative effect (CRE), where the TOA net flux is constrained to the ocean heat storage.	Regional Zonal Global	**Dec 2011** (Ed2.6r)	03/2000 - 12/2011	netCDF netCDF subset
	EBAF-Surface	Monthly and climatological averages of computed surface clear-sky and all-sky fluxes (up/down) consistent with the CERES EBAF-TOA fluxes.	Regional Zonal Global	**May 2012** (Ed2.6r)	03/2000 - 02/2010	netCDF netCDF subset

EBAF Level 3B Parameters

TOA Fluxes (Net balanced)	Cloud Radiative Effect	Surface Fluxes	In-Atmospheric Fluxes (N/A)	Cloud Properties (N/A)	Aerosols (N/A)	Auxillary Data (N/A)
• SW (0-5µm) • LW (5-100µm) • Net (0-100µm) • Solar Incoming	• SW (0-5µm) • LW (5-100µm) • Net (0-100µm)	• SW - Up • LW - Up • SW - Down • LW - Down • Net SW • Net LW • Net Total				

CERES EBAF-TOA Data Sets

General Information

- **Description**: Energy Balanced and Filled (EBAF) TOA: Monthly and climatological averages of TOA clear-sky (spatially complete) fluxes, all-sky fluxes, and cloud radiative effect (CRE), where the TOA net flux is constrained to the ocean heat storage.
- Detailed CERES EBAF TOA Product Information
- **Level 3B**: Spatially (1°x1° lat/lon regional, 1° zonal, global) and temporally (monthly, climatological, etc.) averaged fluxes where the TOA net flux has been energy balanced.
- **File Format**: The CERES EBAF-TOA data products are written in netCDF format. (Information on netCDF)
- **Processing**: Processing Level Details
- EBAF Documents and Sample Software
- EBAF Parameters

Available Data Products

Temporal Resolution	Data Set Name	Order Data	Release Date	Temporal Coverage (Monthly)	Spatial Resolution	File Format
Monthly	CERES_EBAF-TOA_Edition2.6R	Order CERES_EBAF-TOA	Dec 2011	03/2000 - 12/2011	Regional Zonal Global	netCDF

Documentation and Sample Software

Data Set	Quality Summary	Description/Abstract	Sample Software
Terra, Aqua	• EBAF-TOA Ed2.6r Quality Summary (PDF)	• EBAF-TOA Description/Abstract	• Readme EBAF-TOA • Read Package EBAF-TOA

EBAF-TOA Level 3B Parameters

TOA Fluxes (Net balanced)	Cloud Radiative Effect	Surface Fluxes	In-Atmospheric Fluxes (N/A)	Cloud Properties (N/A)	Aerosols (N/A)	Auxillary Data (N/A)
• SW (0-5µm) • LW (5-100µm) • Net (0-100µm) • Solar Incoming	• SW (0-5µm) • LW (5-100µm) • Net (0-100µm)					

CERES SYN1deg Level 3 Data Products

General Information

- **Description**: Computed TOA, surface and in-atmospheric (profile) fluxes consistent and along with the CERES GEO-enhanced temporally interpolated observed TOA fluxes and clouds, MODIS & 3-hourly GEO cloud properties and MODIS aerosols.
- **Level 3**: Spatially (1°x1° lat/lon regional, 1° zonal, global) and temporally (daily, monthly, etc.) averaged fluxes and clouds.

SYN1deg Level 3 Data Products

Temporal Resolution	Data Product Information	Comments	Spatial Resolution	Release Date	Temporal Coverage	Order Data
Monthly	SYN1deg-Month		Regional Zonal Global	**Aug 2012** (Edition3A)	3/2000 - 11/2011	HDF Month
Monthly 3-Hourly	SYN1deg-M3Hour		Regional Zonal Global	**Aug 2012** (Edition3A)	3/2000 - 11/2011	HDF M3Hour
3-Hourly	SYN1deg-3Hour		Regional	**Aug 2012** (Edition3A)	3/2000 - 11/2011	HDF 3Hour

SYN1deg Level 3 Data Products - Previous Versions

Please refer to SYN1deg Level 3 Data Products - Previous Versions for available AVG/ZAVG, SRBAVG, SYN, FSW, and TRMM data.

SYN1deg Level3 Parameters

TOA Fluxes (observed and computed)	Surface Fluxes (computed)	In-Atmospheric Fluxes (computed)	Cloud Parameters (MODIS & GEO)	Aerosols (MODIS MOD04 & MATCH)	Auxiliary Data (GMAO GEOS)
• Shortwave Flux (0-5μm) • Longwave Flux (5-100μm) • Window-region Flux (8-12μm) • Downwelling UVA and UVB Fluxes • Downwelling PAR Flux	• Shortwave Flux - Up • Longwave Flux - Up • Window-region Flux - Up • Shortwave Flux - Down • Longwave Flux - Down • Window-region Flux - Down • Shortwave Direct/Diffuse Fluxes • UVA and UVB Fluxes • PAR Direct/Diffuse Fluxes	• Shortwave Flux - Up • Longwave Flux - Up • Window-region Flux - Up • Shortwave Flux - Down • Longwave Flux - Down • Window-region Flux - Down	• Cloud Area Fraction • Cloud Effective Pressure • Cloud Effective Temperature • Cloud Particle Phase • Liquid Water Path • Ice Water Path • Liquid Particle Radius • Ice Particle Diameter • Cloud Visible Optical Depth	• MATCH Total Aerosol Visible Optical Depth at 0.55μm • MODIS Aerosol Optical Depths over Land and Ocean	• Surface Type Percent Coverage • Skin Temperature • Precipitable Water • Column Ozone

CERES SYN1deg Data Sets

General Information

- **Description**: CERES geostationary (GEO) enhanced temporally interpolated TOA fluxes, MODIS and 3-hourly GEO cloud properties, MODIS aerosols, and computed TOA, surface and in-atmospheric (profile) fluxes consistent with the observed TOA fluxes, clouds and aerosols.
- Detailed CERES SYN1deg Product Information
- **Level 3**: Spatially (1°x1° lat/lon regional, 1° zonal, global) and temporally (daily, monthly, etc.) averaged fluxes and clouds.
- **File Format**: The CERES SYN1deg data products are written in HDF format. (Information on HDF)
- SYN1deg Documents and Sample Software
- SYN1deg Parameters

Available Data Products

Temporal Resolution	Data Set Name	Order Data	Release Date	Temporal Coverage	Spatial Resolution	File Format
Monthly	CER_SYN1deg-Month_Terra-Aqua-MODIS_Edition3A	Order Month_Terra-Aqua-MODIS_Edition3A	Aug 2012	Jul 2002 - Nov 2011	Regional, Zonal, Global	HDF
	CER_SYN1deg-Month_Terra-MODIS_Edition3A	Order Month_Terra-MODIS_Edition3A		Mar 2000 - Jun 2002		
Monthly 3 Hour	CER_SYN1deg-M3Hour_Terra-Aqua-MODIS_Edition3A	Order M3Hour_Terra-Aqua-MODIS_Edition3A		Jul 2002 - Nov 2011		
	CER_SYN1deg-M3Hour_Terra-MODIS_Edition3A	Order M3Hour_Terra-MODIS_Edition3A		Mar 2000 - Jun 2002		
3 Hour	CER_SYN1deg-3Hour_Terra-Aqua-MODIS_Edition3A	Order 3Hour_Terra-Aqua-MODIS_Edition3A		Jul 2002 - Nov 2011	Regional	
	CER_SYN1deg-3Hour_Terra-MODIS_Edition3A	Order 3Hour_Terra-MODIS_Edition3A		Mar 2000 - Jun 2002		

Documentation and Sample Software

Data Set	Quality Summary	Description/Abstract	Data Products Catalog (PDF)	Sample Software
Terra+Aqua, Terra	• SYN1deg Ed3A Quality Summary (PDF)	• SYN1deg Description/Abstract	• DPC_SYN1deg-3Hour_R5V1 • DPC_SYN1deg-M3Hour_R5V1 • DPC_SYN1deg-Month_R5V1	• Readme R5-922 • Read Software R5-922

SYN1deg Level3 Parameters

TOA Fluxes (observed and computed)	Surface Fluxes (computed)	In-Atmospheric Fluxes (computed)	Cloud Parameters (MODIS & GEO)	Aerosols (MODIS MOD04 & MATCH)	Auxiliary Data (GMAO GEOS)
• Shortwave Flux (0-5µm) • Longwave Flux (5-100µm) • Window-region Flux (8-12µm) • Downwelling UVA and UVB Fluxes • Downwelling PAR Flux	• Shortwave Flux - Up • Longwave Flux - Up • Window-region Flux - Up • Shortwave Flux - Down • Longwave Flux - Down • Window-region Flux - Down • Shortwave Direct/Diffuse Fluxes	• Shortwave Flux - Up • Longwave Flux - Up • Window-region Flux - Up • Shortwave Flux - Down • Longwave Flux - Down • Window-region Flux - Down	• Cloud Area Fraction • Cloud Effective Pressure • Cloud Effective Temperature • Cloud Particle Phase • Liquid Water Path • Ice Water Path • Liquid Particle Radius • Ice Particle Diameter • Cloud Visible Optical	• MATCH Total Aerosol Visible Optical Depth at 0.55µm • MODIS Aerosol Optical Depths over Land and Ocean	• Surface Type Percent Coverage • Skin Temperature • Precipitable Water • Column Ozone

CERES SYN1deg Level 3 Data Products Previous Versions

General Information

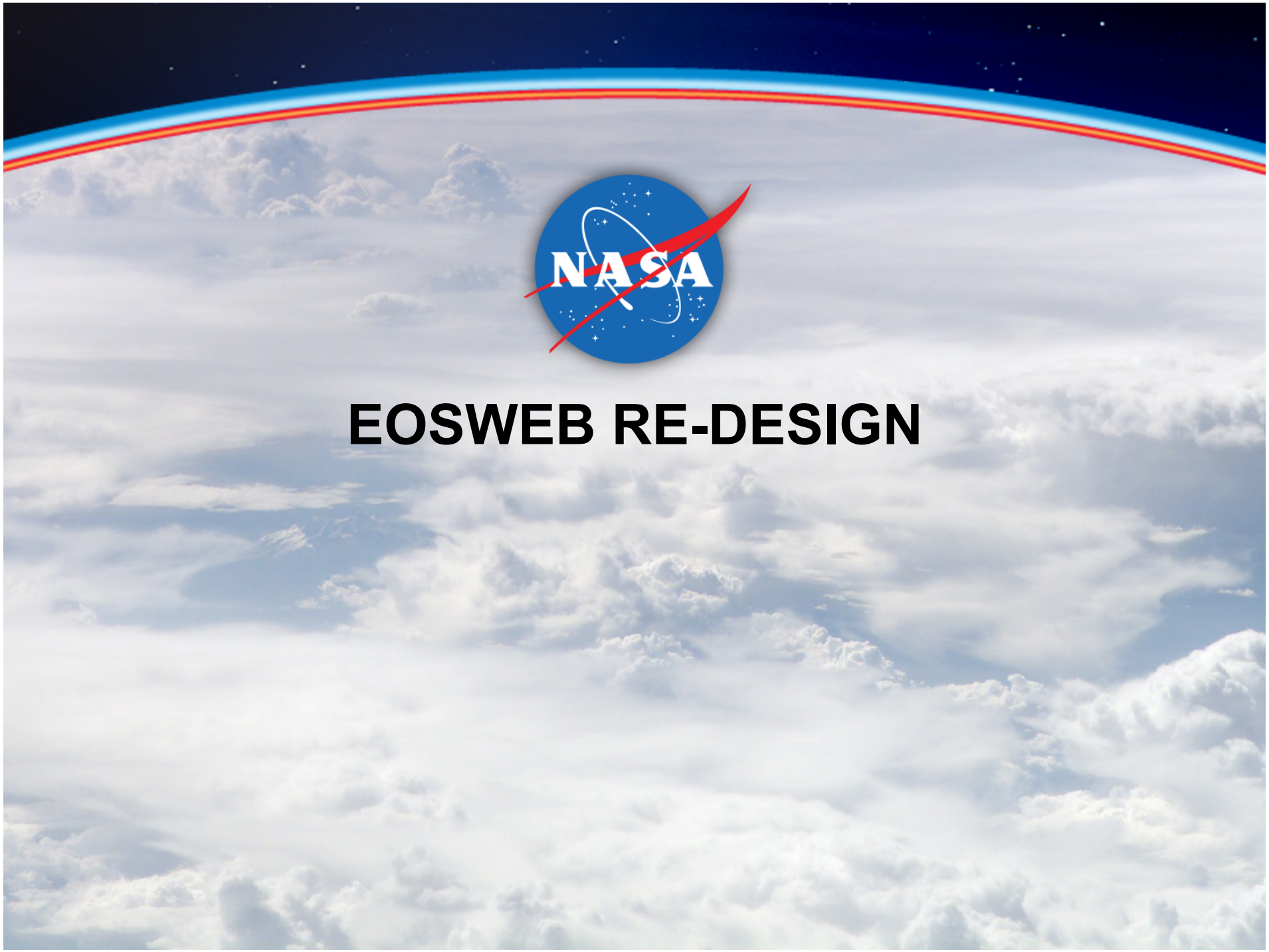
- **Description**: Computed TOA, surface and in-atmospheric (profile) fluxes consistent and along with the CERES GEO-enhanced temporally interpolated observed TOA fluxes and clouds, MODIS & 3-hourly GEO cloud properties and MODIS aerosols.
- **Level 3**: Spatially (1°x1° lat/lon regional, 1° zonal, global) and temporally (daily, monthly, etc.) averaged fluxes and clouds.
- **Processing**: Processing Level Details

SYN1deg Level 3 Data Products - Previous Versions

Release Date	Data Product Information	Comments	Temporal Resolution	Spatial Resolution	Temporal Coverage	Order Data
Feb 2009 (Edition2)	AVG/ZAVG		Monthly Monthly 3-Hourly	Regional Zonal Global	**Aqua:** 7/2002 - 10/2005 **Terra:** 4/2000 - 10/2005	HDF AVG/ZAVG
	SRBAVG	Also contains constant meteorology temporally interpolated TOA fluxes (same as those found in the SSF1deg product) and parameterized surface fluxes. Does not contain computed fluxes.	Monthly Monthly Hourly	Regional Zonal Global	**Aqua:** 7/2002 - 10/2005 **Terra:** 3/2000 - 10/2005 **TRMM:** 1/1998 - 8/1998, 3/2000	HDF SRBAVG
	SYN		3-Hourly	Regional	**Aqua:** 7/2002 - 10/2005 **Terra:** 3/2000 - 10/2005	HDF SYN
Sep 2010 (Edition2)	FSW	Regional averages of instantaneous footprint computed fluxes [TOA, surface, and in-atmospheric (profile)], associated TOA observered fluxes, and cloud parameters only for the hours of satellite overpass (from CRS level2 product).	Hourly (Instantaneous Gridded)	Regional	**Aqua:** 7/2002 - 12/2007 **Terra:** 3/2000 - 6/2010 **TRMM:** 1/1998 - 8/1998, 3/2000	HDF FSW

SYN1deg Level 3 Data Products - Current Versions

Please refer to SYN1deg Level 3 Data Products for the latest available data.



EOSWEB RE-DESIGN

EOSWEB Re-design Effort

Goal

- Deploy a web site that provides users with an “easy to use” interface that provides
  - Data information
  - Data ordering
  - Tools/Services
  - Easy access to external sites
- Improve the sustainability and maintainability by ASDC staff and science content providers
- Modernize ASDC site using current technologies
- Collaborate with stakeholders to ensure we are meeting the needs of our user community (instrument scientists, modelers, decision makers)

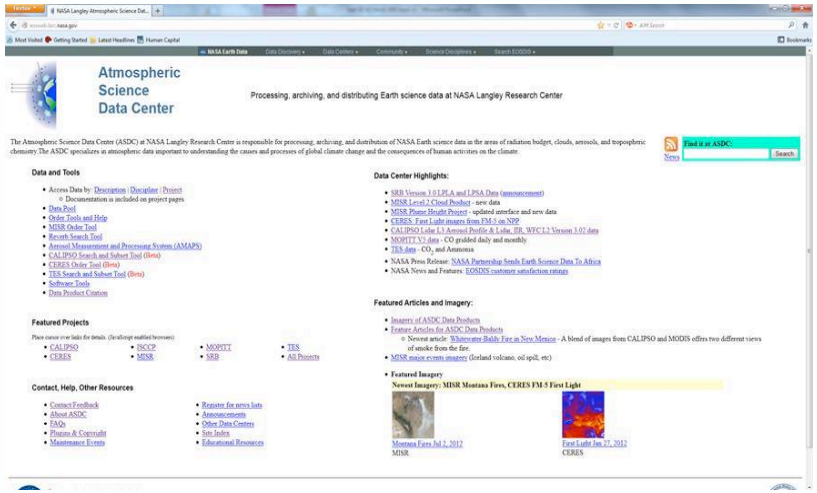
EOSWEB Re-design Effort

Status

- Drupal 7 used for Content Management System – modular and easier to maintain
- Significant work has been completed to improve look, feel, and basic navigation of ASDC website
  - Incorporated features and best practices from ESDIS, other DAACs, and other modern sources and technologies
  - Prototype pages developed to further refine requirements
- Aggressive effort to engage user community to meet customer needs and expand the customer base
  - ASDC User Working Group to be heavily engaged in providing input to ASDC website design
  - Users interested in participation in the re-design should contact John Kusterer (john.m.kusterer@nasa.gov) or Jennifer Perez (jennifer.l.perez@nasa.gov)

EOSWEB Refresh

- Contrast of “Current” versus “New”



Current Design

Draft of New Design

Conclusion

- Continual increase in CERES archive and distribution of products worldwide
- CERES has moved most processing to AMI-P
  - 10 Instrument PGEs
  - 7 ERBE-like PGEs
  - 2 RegridMOA PGEs
  - 4 Clouds PGEs
  - 1 SARB PGEs
  - 1 Synoptic SARB PGE
  - 3 TISA Averaging PGEs
  - 2 TISA Gridding PGEs
  - 4 Inversion PGEs
- CATALYST collaborative effort proceeding effectively
- Subsetting efforts are progressing
- Effort to improve the user experience for those visiting ASDC data pages is underway