CERES FLASHFlux Status: Progress toward Version 4A and New GIS-enabled Web Site

Low Latency Surface Radiative Fluxes and Meteorological Parameters for Research and Applications

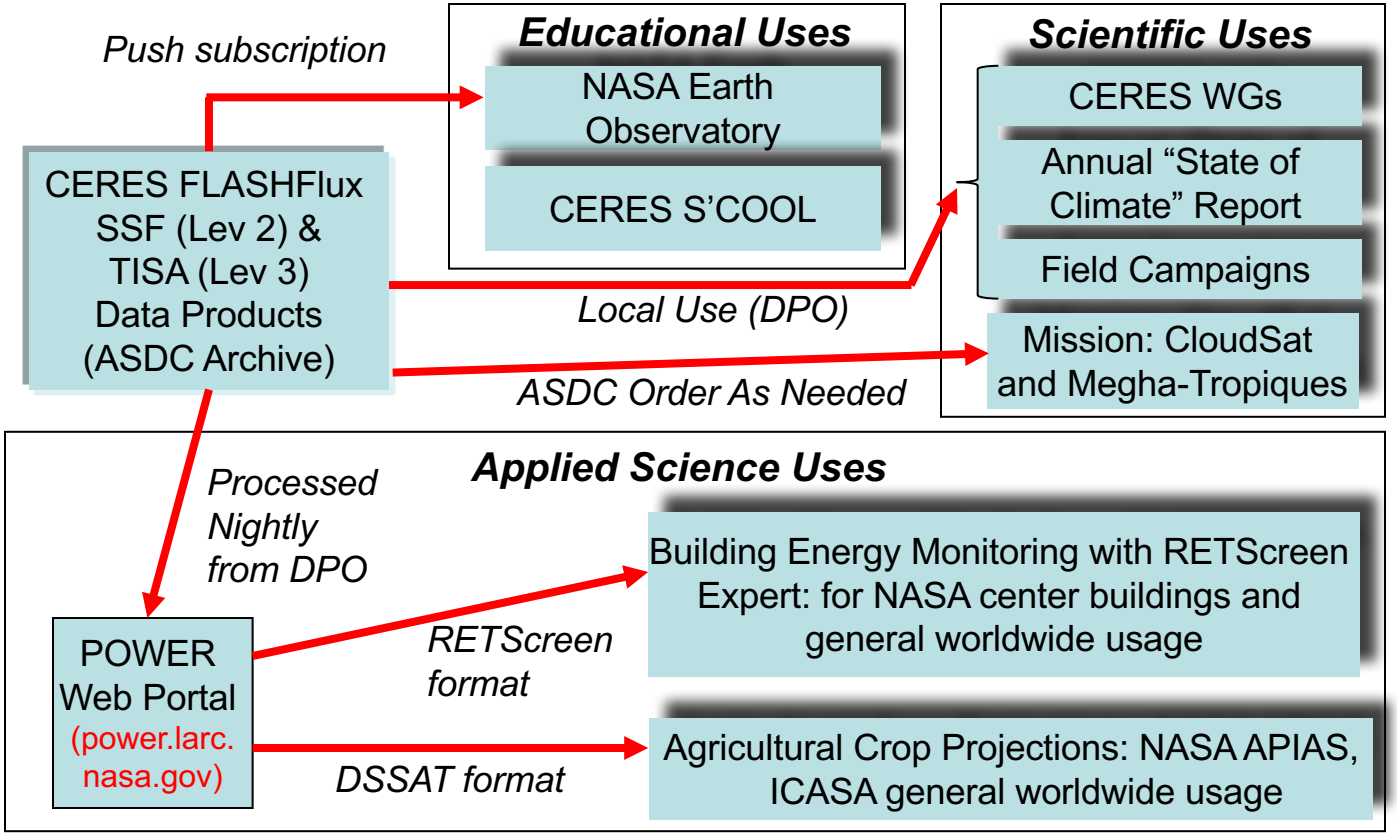
Paul Stackhouse, David P. Kratz, and Takmeng Wong, (NASA LaRC)

PC Sawaengphokhai, Shashi Gupta and Anne Wilber (SSAI)

Jason Barnett, Booz-Allen-Hamilton

Tonya Davenport, Lindsay Parker and the Atmospheric Science Data Center Team (SSAI)

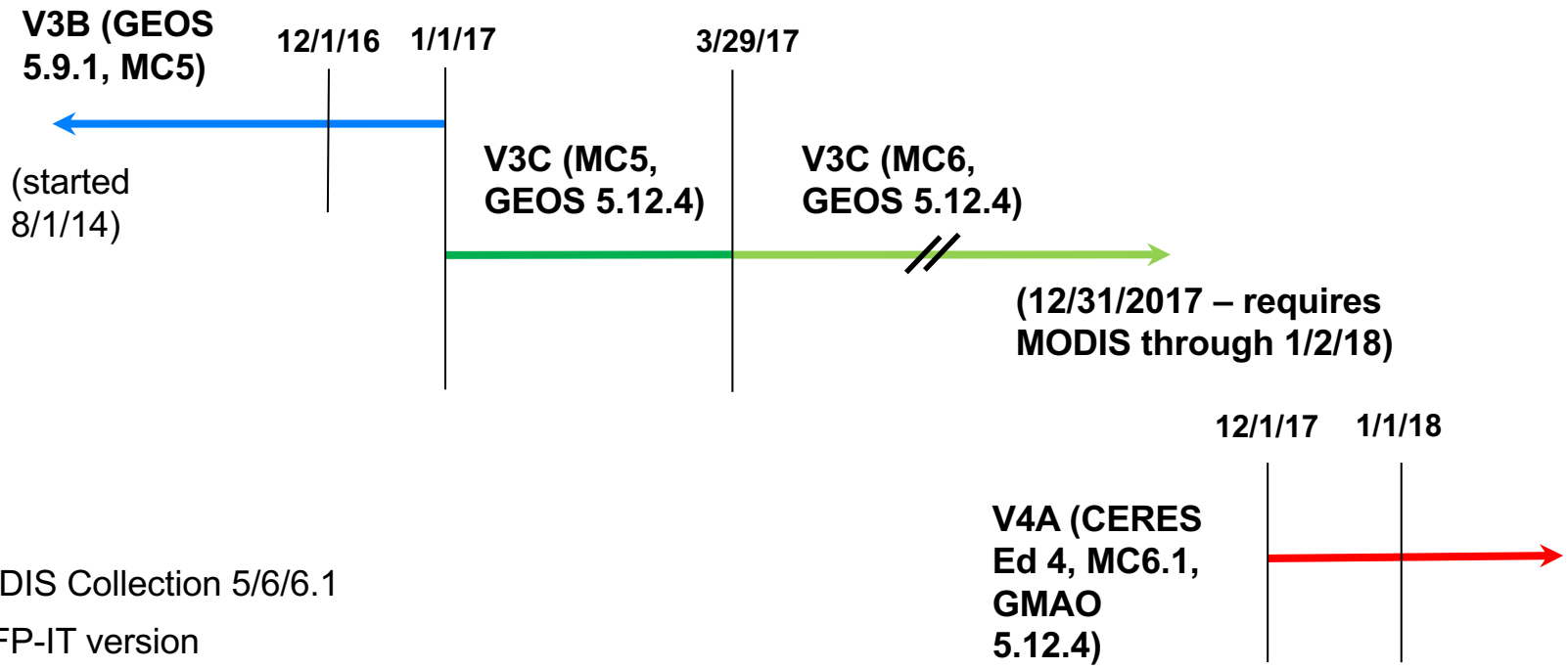
FLASHFLUX: Schematic of Current Uses



FLASHFlux v3C Status

- ***Production with v3C (MODIS C5/C6) (since Jan 1, 2017)***
  - Now uses FP-IT (GEOS 5.12.4) and MODIS Collection 6 (after March 28)
  - FLASHFlux TISA available via CERES subsetter, ASDC and specialized formats through POWER web portal (power.larc.nasa.gov) 5-6 days latency
  - Plan to continue production for 2017 while production adapted to MODIS C6.1
- ***Current Activities***
  - V3B v V3C and MODIS Coll. 5/6 differences evaluated
  - Validation for V3B, V3C-MC5, V3C-MC6
  - Development towards V4A => V4A through FLASHflux SSF being tested (uses MC6); adapt to MODIS Collection 6.1
- ***FLASHFlux Data Provision Through POWER:***
  - New POWER web portal in beta and nearly ready for release
  - Leverages OPeNDAP with both direct API and GIS-based Data Access Viewer
  - Multiple output formats supported => parameters aimed to specific usages

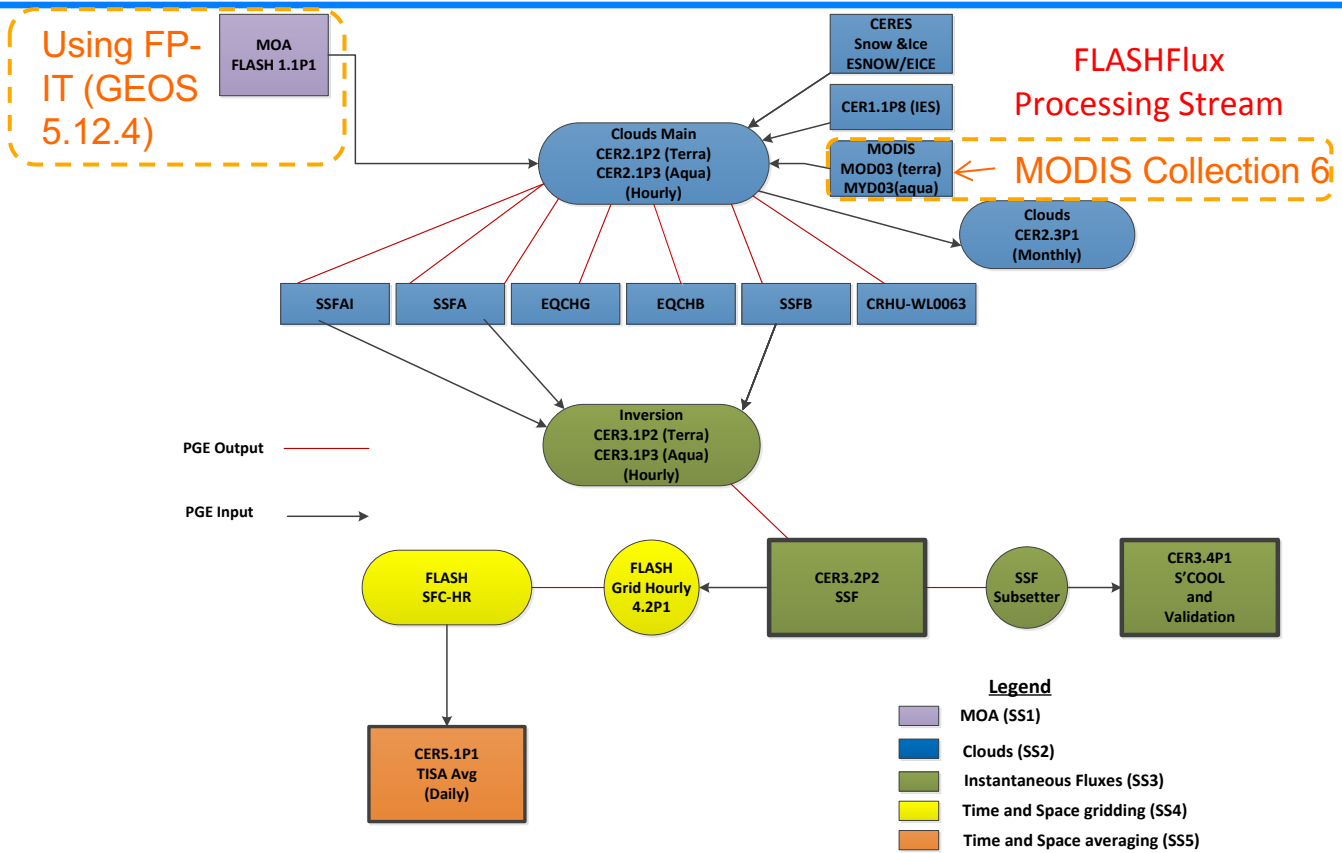
FLASHFlux Versions



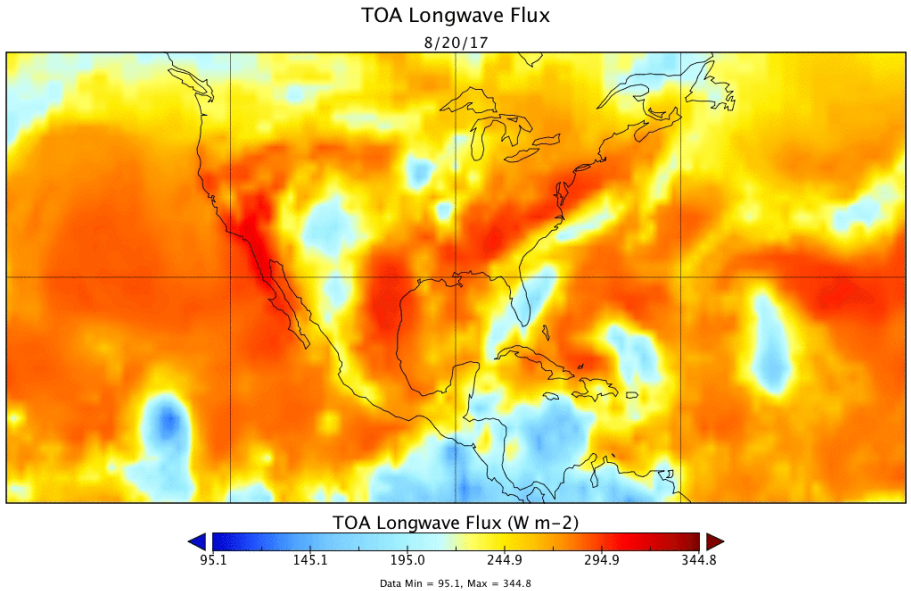
MC = MODIS Collection 5/6/6.1

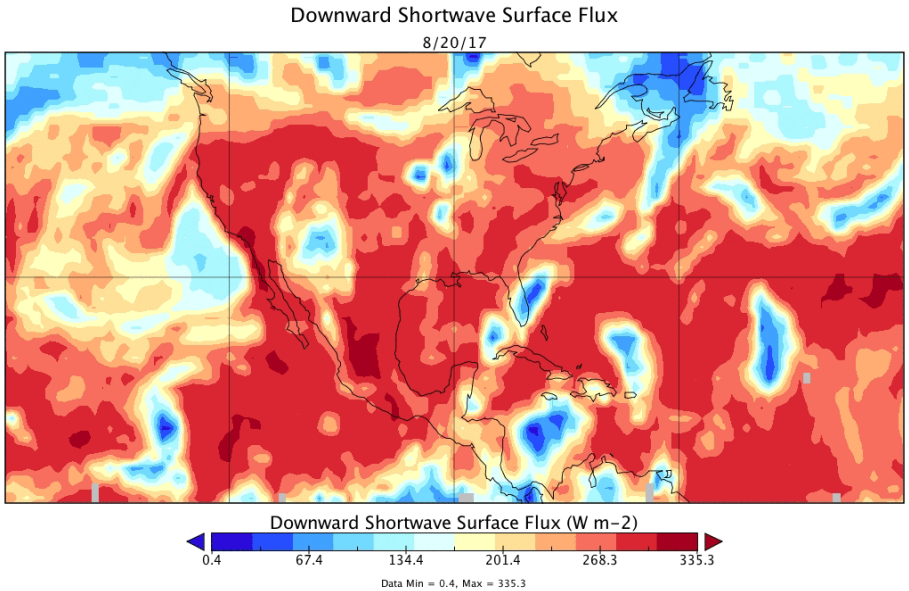
GEOS = FP-IT version

Current v3C Production System

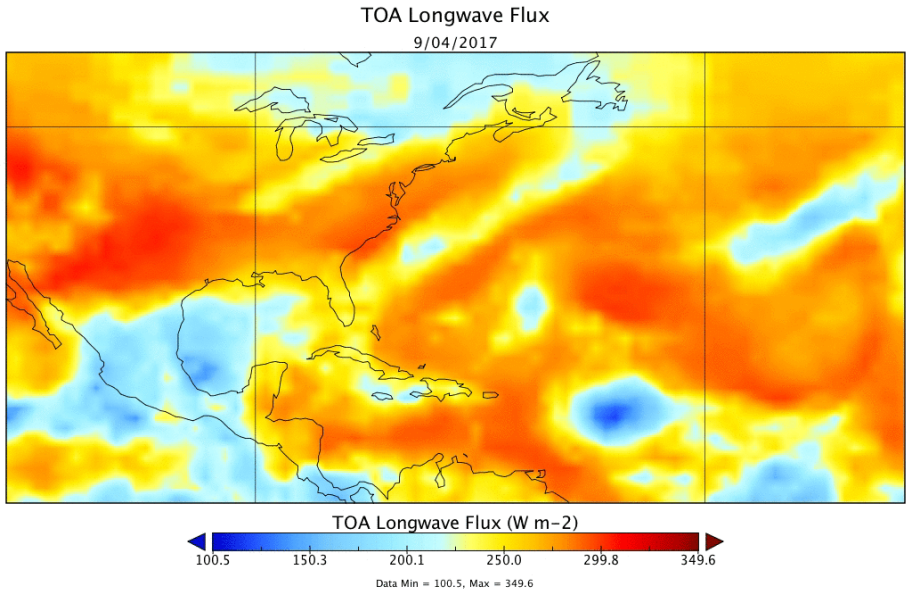


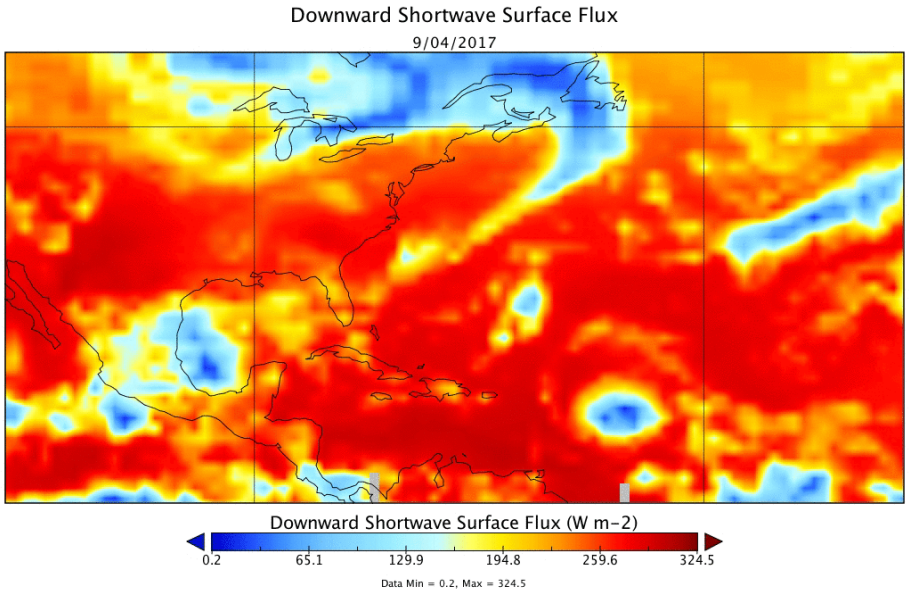
Hurricane Harvey



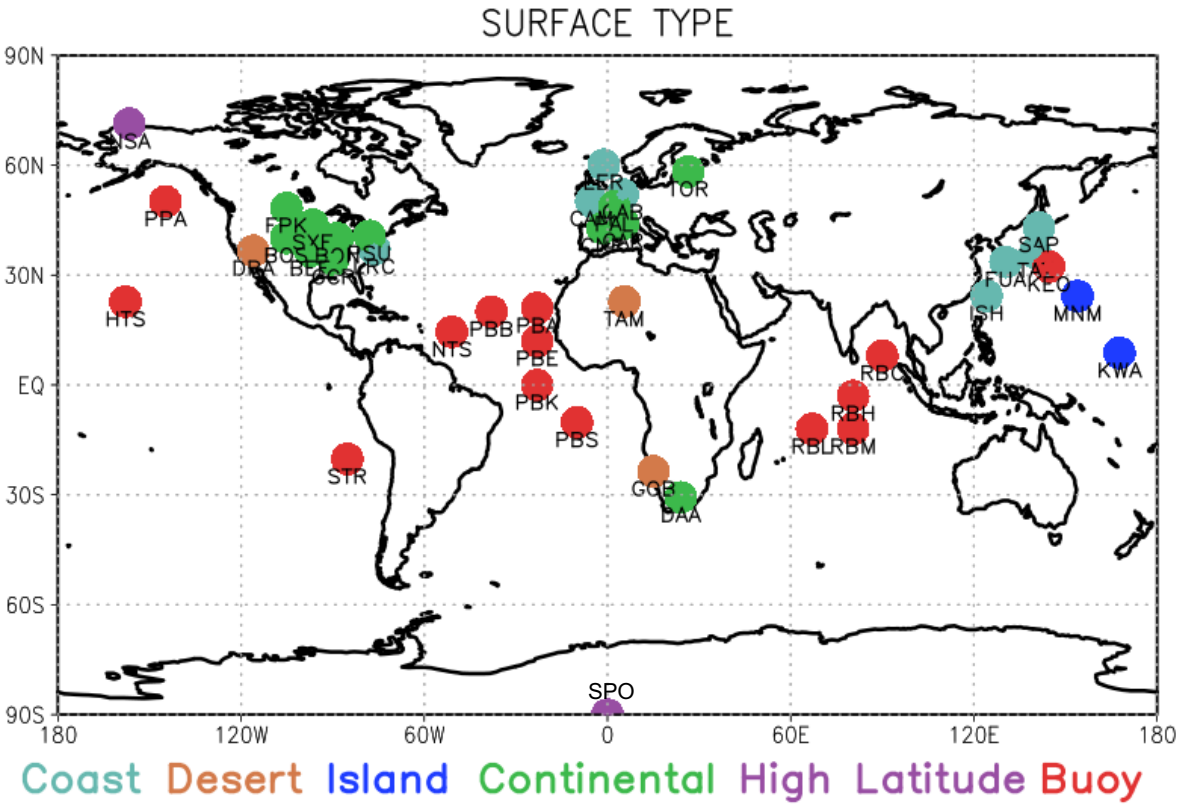


Hurricanes Irma, Jose and Katia

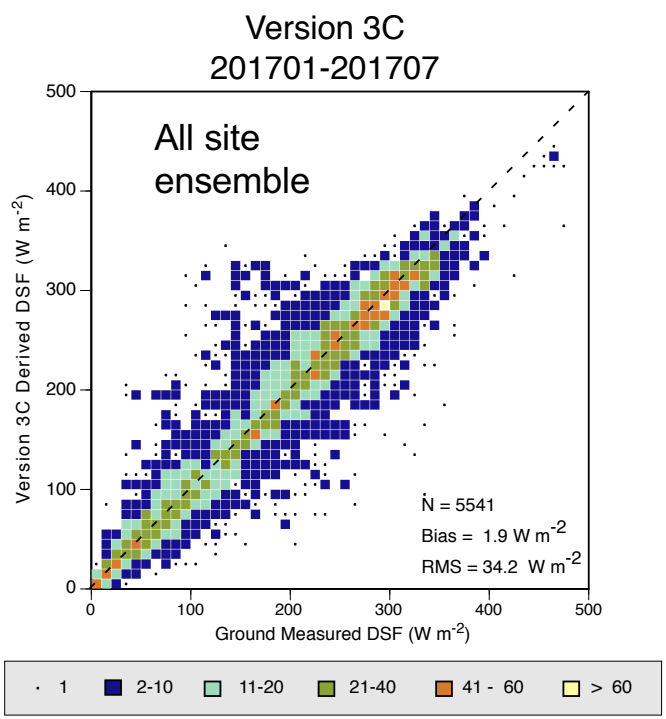




Validation Sites 1/2017 –7/2017



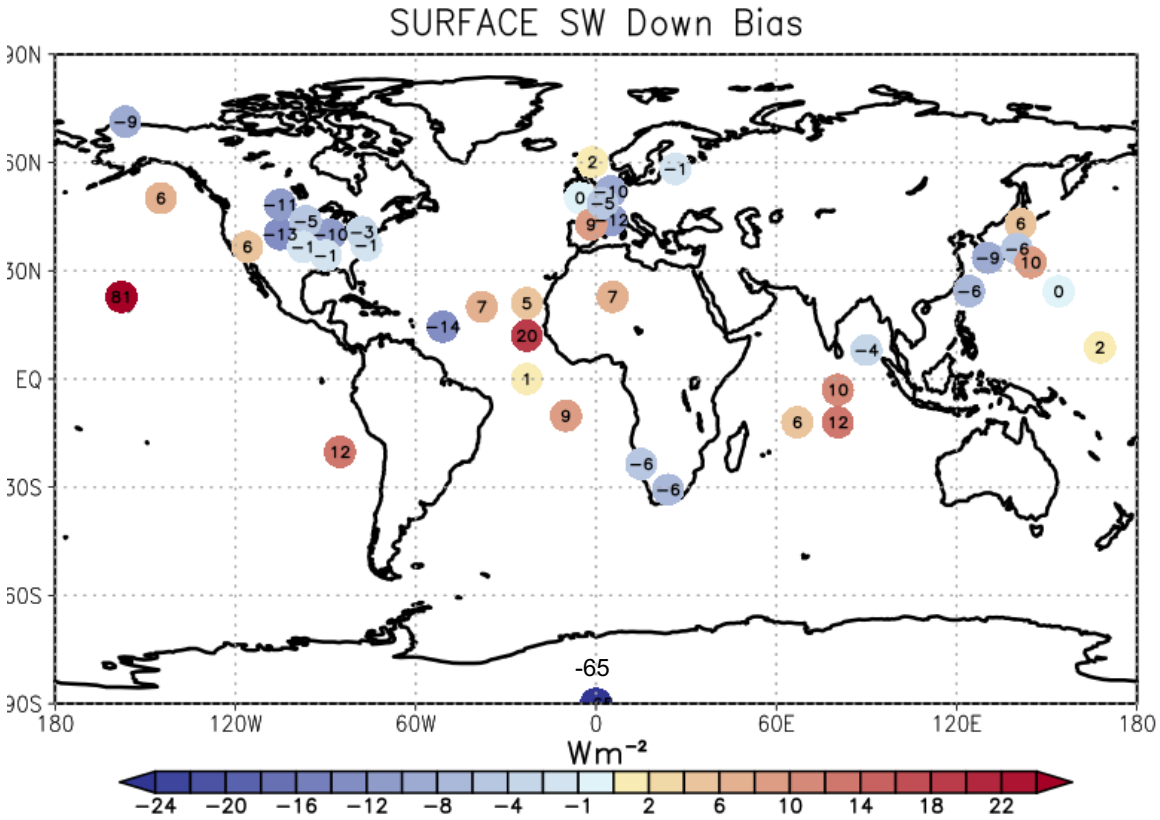
Recent SW Validation: 1/2017– 7/2017



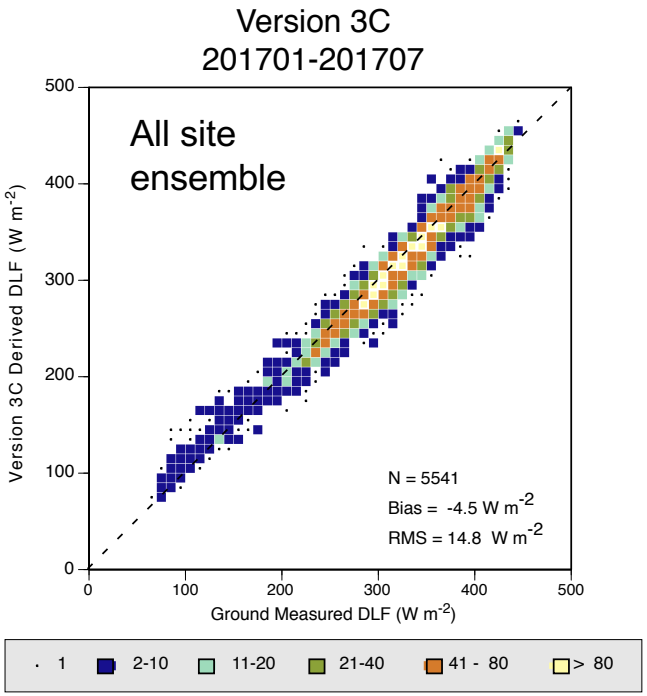
Daily Averaged TISA Comparison

Ensemble Type	Bias ($W\ m^{-2}$)	RMS ($W\ m^{-2}$)	N
All Obs	0.9	34.2	6319
Continental	-5.8	28.4	1890
Coastal	-3.1	28.5	1474
Desert	2.4	24.4	570
High Latitude	-30.8	57.4	179
Island	1.1	22.4	349
Buoy	13.6	43.9	1857

Recent SW Validation: 1/2017 –7/2017



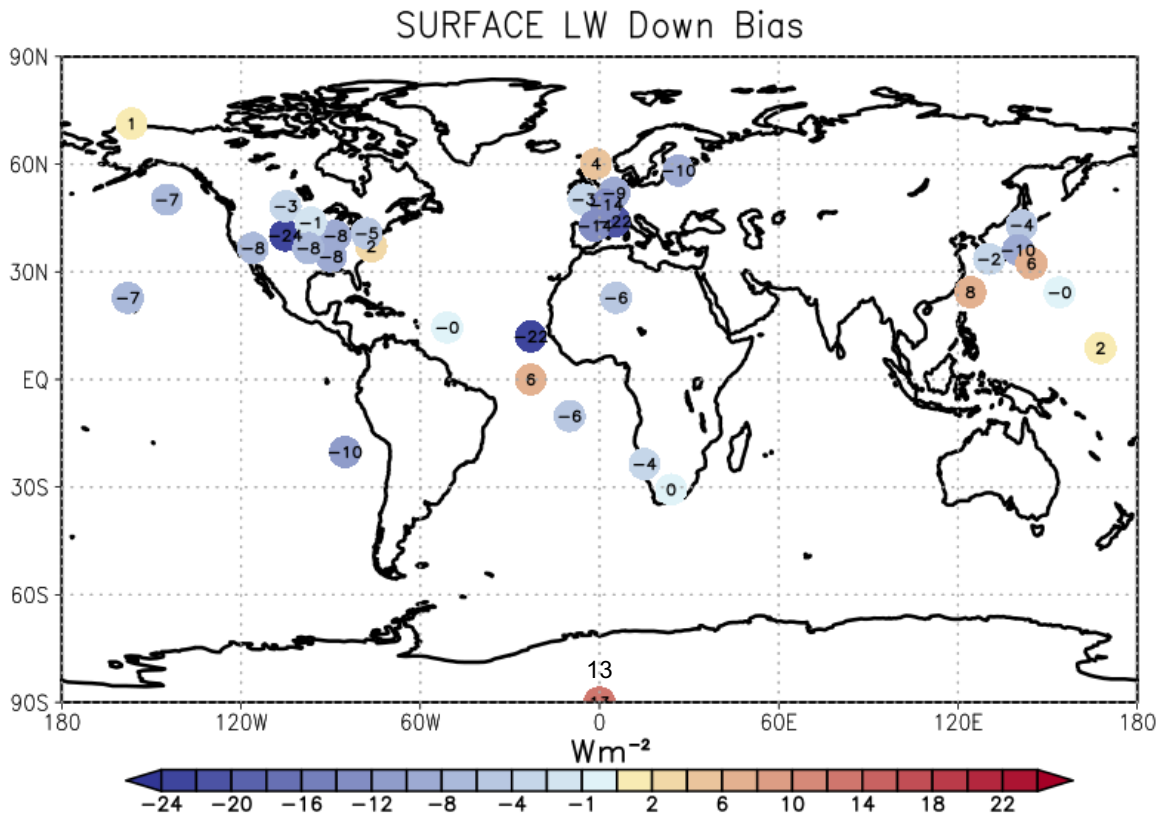
Recent LW Validation: 1/2017 –7/2017



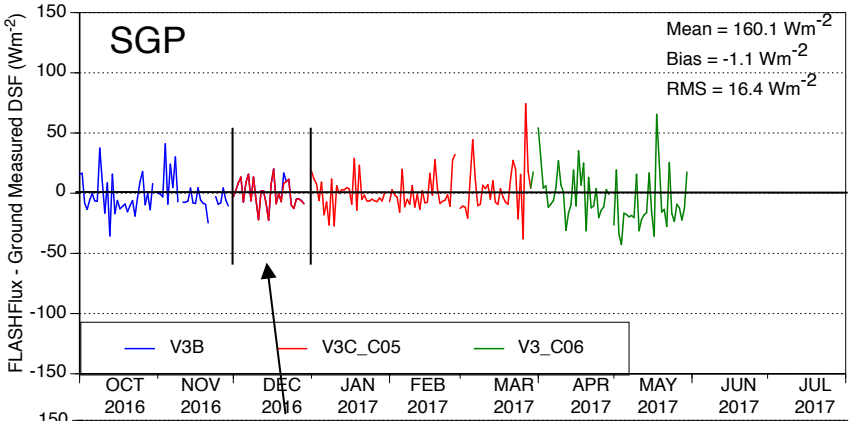
Daily Averaged TISA Comparison

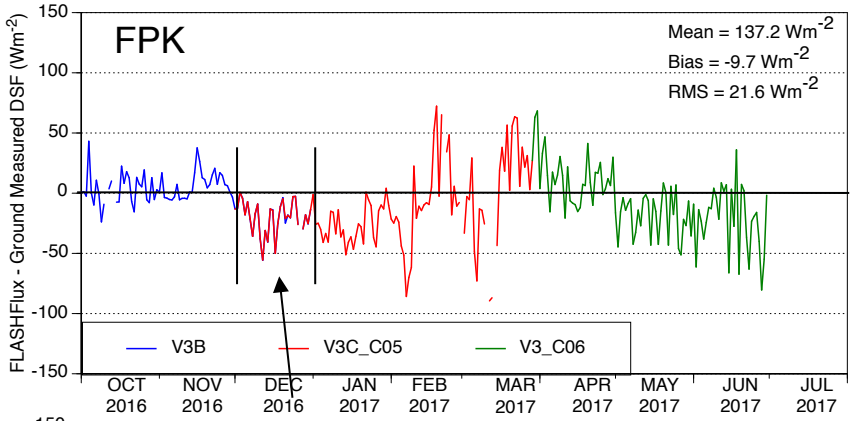
Ensemble Type	Bias ($W\ m^{-2}$)	RMS ($W\ m^{-2}$)	N
All Obs	-4.5	14.8	5541
Continental	-9.0	16.0	1849
Coastal	-1.8	12.2	1475
Desert	-5.6	14.4	563
High Latitude	7.4	17.8	323
Island	0.5	9.2	350
Buoy	-5.4	16.6	981

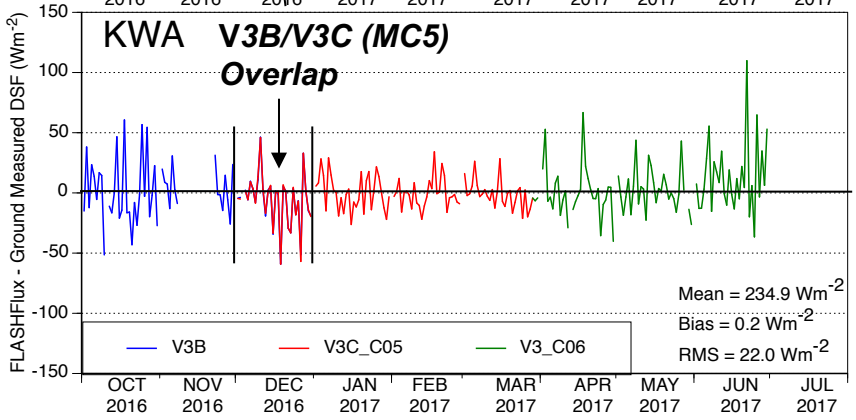
Recent LW Validation: 1/2017 –7/2017

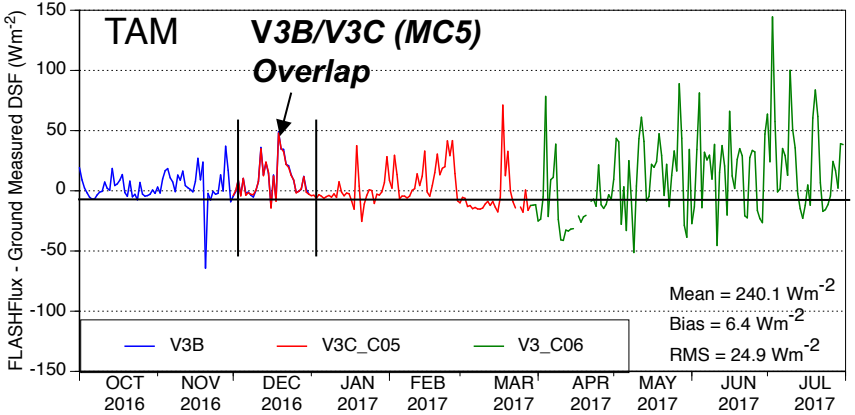


Multi-Version Difference Time Series: SW

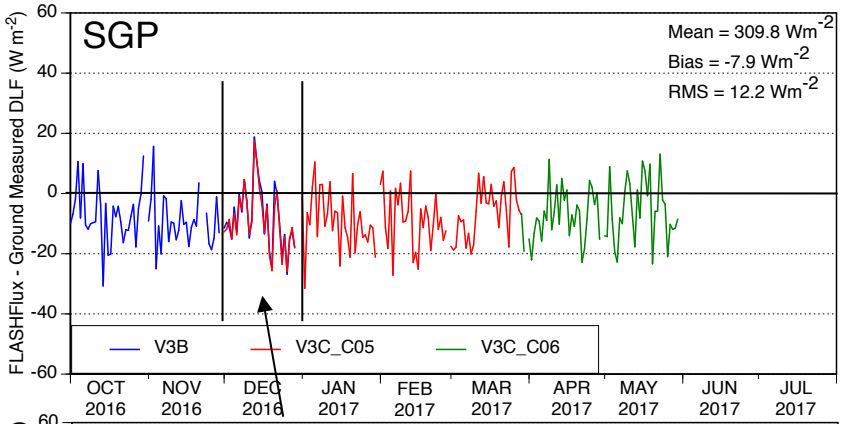


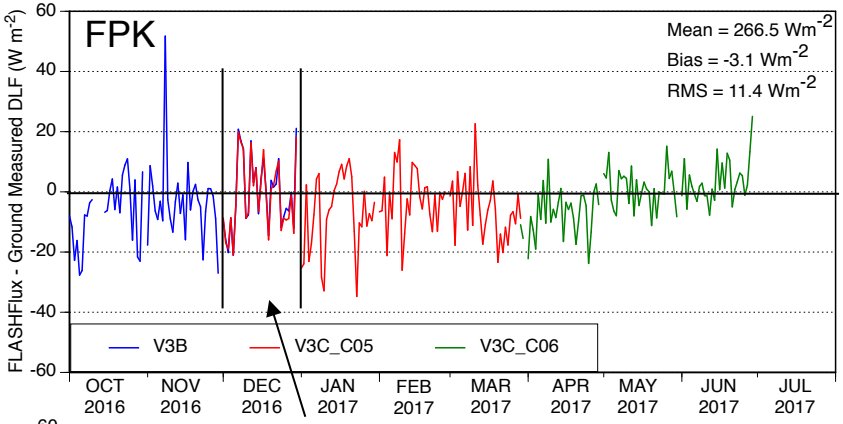


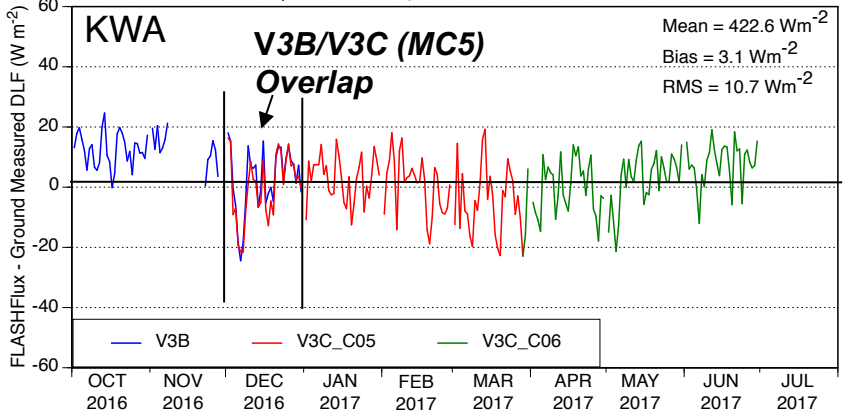


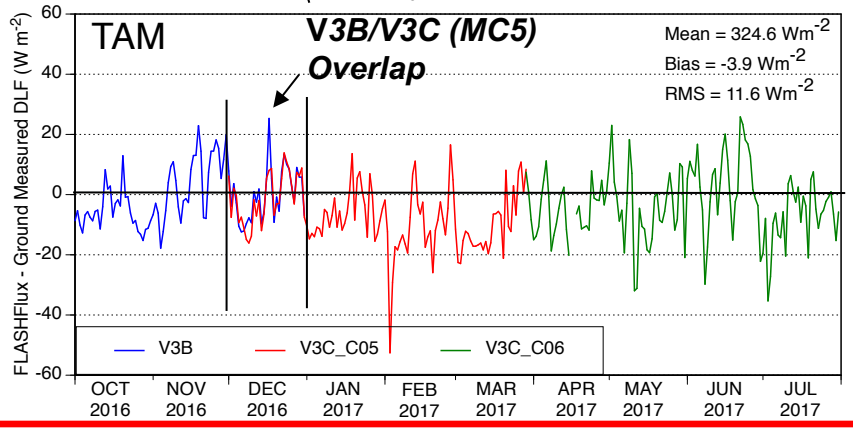


Multi-Version Difference Time Series: LW





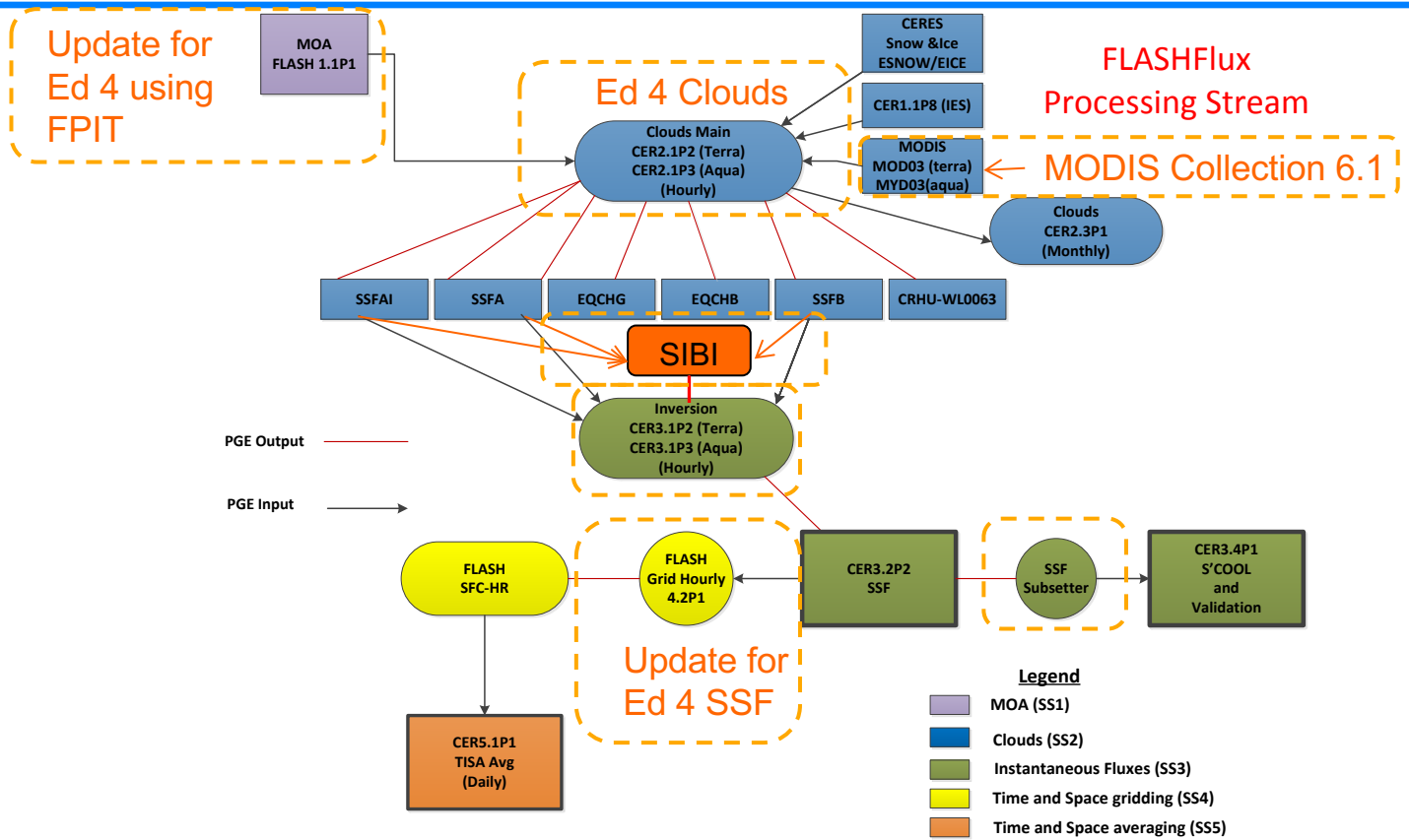




Near Future: Moving FLASHFlux Toward V4

Attribute	FF v3C (MC6)	FF v4A	FF v4B
Baseline 1QC	Previous	New calibration	New calibration
GEOS FP-IT input	GEOS 5.12.4	GEOS 5.12.4	GEOS 5.12.4
MOA	Ed 4 compatible	Ed 4 compatible	Ed 4 compatible
MODIS	Collection 6	Collection 6.1	Collection 6.1
Clouds	Ed 2	Ed 4	Ed 4
SIBi (Snow/ICE Brightness Index)	No	Yes	Yes
Inversion (improved ADMs)	Ed 2	Ed 4	Ed 4
Aerosols	MATCH climatology	MATCH climatology	GEOS 5.12.4
Flux Algorithms	Unchanged	Unchanged ?	A0, Ap adjustments; new clear-sky TOA & surface albedos (current work)
TISA	Ed 2	Compatible w/ Ed 4 (current work)	Compatible w/ Ed 4 (custom CERES TSI?)
Data Processed	March 28 - present	Planned to begin 12/1/17	None
Validation Results	1/1/17 – 7/31/17	---	---

Planned v4A Production System (Jan 2018)



Expanding Accessibility with Web Services

POWER
Prediction Of Worldwide Energy Resource

POWER Applied Science project aims to make NASA data more accessible

New POWER Website serves as a platform for discovery of multiple data access points

Website is a Responsive Platform for Desktop, Tablet, and Smartphone

POWER web site now in beta: power.larc.nasa.gov/new

Main Data Accessibility Options

Multiple Data Access Options

The POWER Data Access Options are currently in **BETA**. All content, capabilities and data may not be fully available. If you have any questions or would like to be part of our beta testing team please do not hesitate to Contact Us.

Data Access Viewer BETA v1.0.6

Responsive web mapping application providing coordinate and parameter selections in an easy-to-use interface. Analyze your request with dynamic plotting capabilities and expanding output options such as ASCII, CSV, JSON, NetCDF, ICASA and GEOTIFF based on the community, spatial and temporal average selected.

ACCESS DATA | NEW FEATURES

Web Data Access Service BETA v1.0.6

Access the POWER data holdings through your own custom script or application by using the Data Access Web Processing Service. This service provides a JSON return with links for downloading data in multiple other outputs based on the community, spatial and temporal average selected.

API DOCUMENTATION

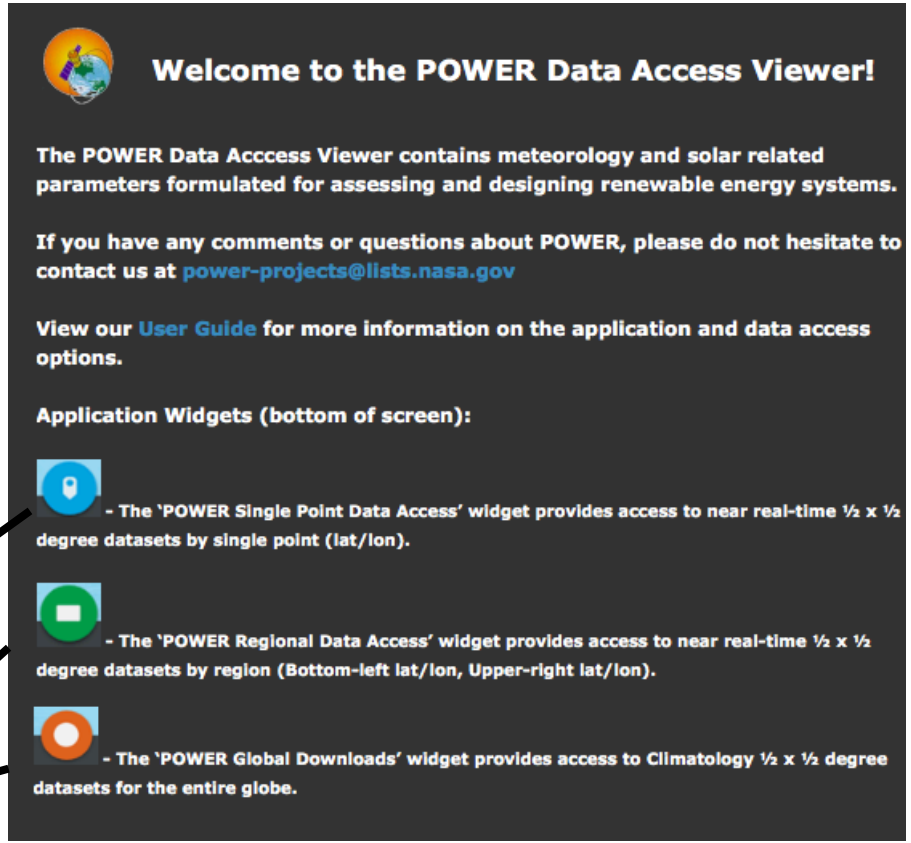
POWER: Data Access Viewer

Graphical Data Access

- ½ x ½ deg; within 5-7 days of obs
- multiple parameters from FLASHFlux, GMAO, etc. available
- parameters arranged by application community (i.e., renewable energy, buildings, agroclimatology)
- Multiple data output formats

Three Applications:

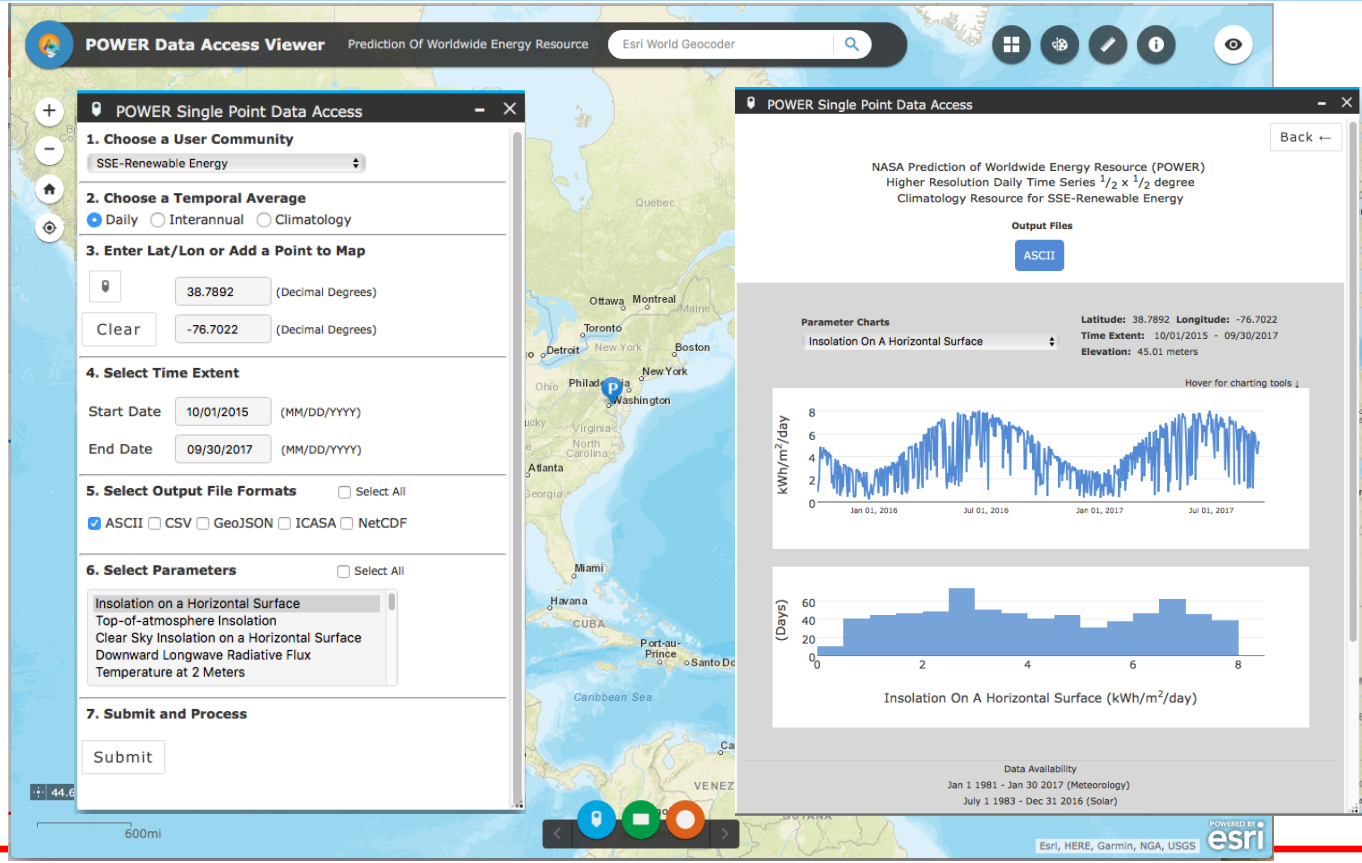
- Time series at a single point (daily, monthly, 30 year)
- Regional times series (limited area)
- Global climatology (30 year)



POWER: Data Access Viewer

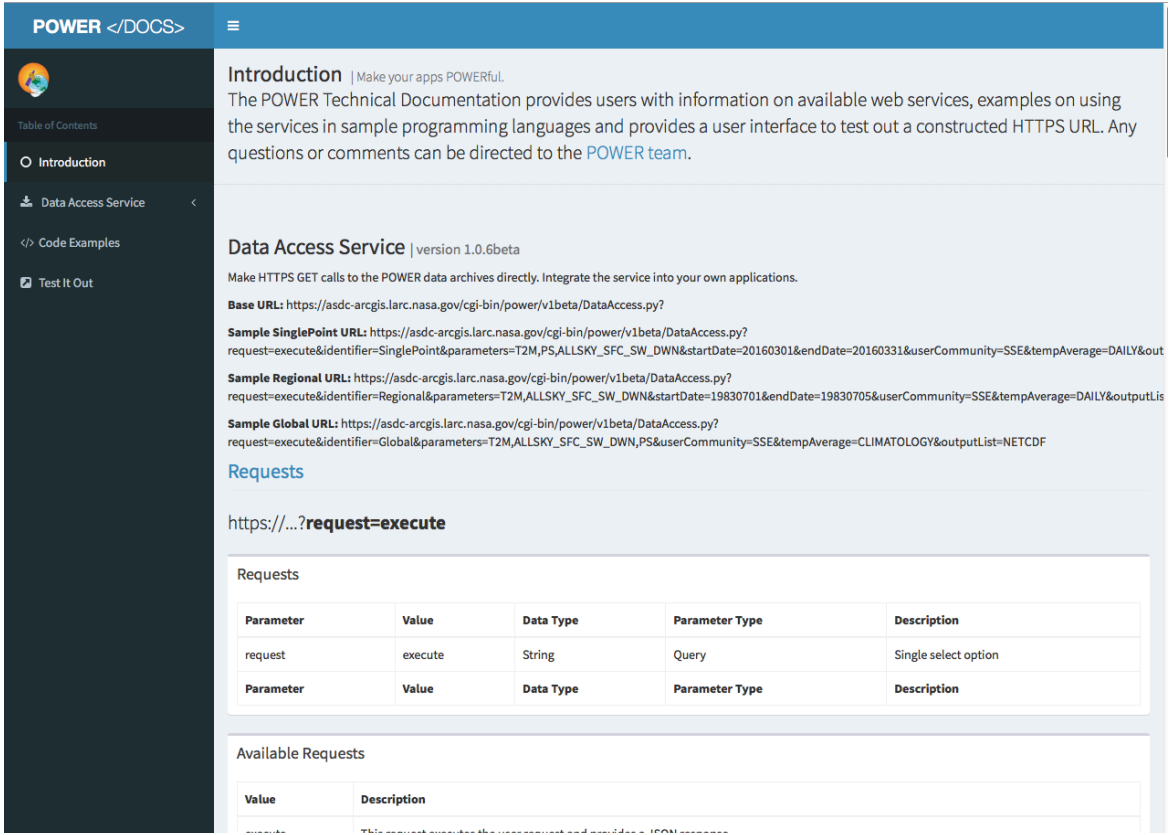
Single Point Time series

1. Select community
2. Select daily, monthly or climatology
3. Select location
4. Select time period
5. Select output format
6. Select parameter



POWER: Web Data Access Service

- Complete instructions to setup up URL based data access (API using OPeNDAP)
- Provide immediate access to the data parameters and time periods required
- Returned file formatted for general software (Excel, GRaDs, MatLab) or customized script/coding for Decision Support Tools (RETScreen, HOMER)



Summary and Conclusions

- ***FLASHFlux 3C and 4A progress***
  - Continued producing v3C (MODIS C6); evaluation
  - Developing v4A compatible with CERES Ed 4; will move to MODIS Collection 6.1
  - Evaluating changes to SW MODEL B
- ***FLASHFlux Applications:***
  - New web site featuring GIS tools for CERES/FF/POWER and with ASDC to raise discoverability and accessibility in beta form and scheduled for release by Dec 1
- ***FLASHFlux publications:***
  - 2016 SotC report published
  - Future papers: FLASHFlux TISA applications including energy
- ***Future Versions***
  - Developing v4A by migrating CERES Ed 4 Clouds (collection 6.1) and Inversion; must adapt current FF TISA => target Jan ‘18
  - Longer-term Upgrades (Spring ‘18): Refine SW Model B, Assess & adapt CERES TSI to FLASHFlux TISA, Assess FPIT aerosol assimilation

FLASHFlux Web Sites:

https://flashflux.larc.nasa.gov

https://power.nasa.gov & https://power.nasa.gov/new (in Beta)