



CERES DATA MANAGEMENT

WORKING GROUP REPORT

Spring 2023 CERES Science Team Meeting
Katie Deiwakh, Walter Miller & the CERES DMT

5.9.23



AGENDA

TEAM

HIGHLIGHTS

CODE RE-ARCHITECTURE

SYSTEMS





DATA MANAGEMENT TEAM

Instrument

Denise Cooper

Thomas Grepiotis

Dianne Snyder

Hunter Winecoff

Dale Walikainen

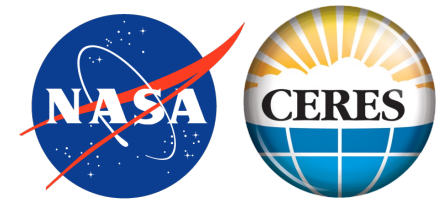
ERBE-like

Jeremie Lande

Inversion

Victor Sothcott

Igor Antropov



DATA MANAGEMENT TEAM

SARB

Tom Caldwell

Sunny Sun-Mack

Clouds

Walt Miller

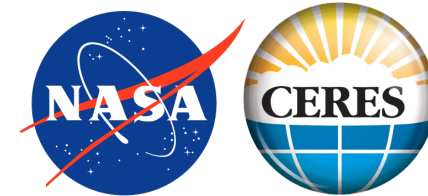
Ricky Brown

Rita Smith

Elizabeth Heckert

Yan Chen

Steve Kohler



DATA MANAGEMENT TEAM

CM &
Infrastructure

Nelson Hillyer

Tammy Ayers

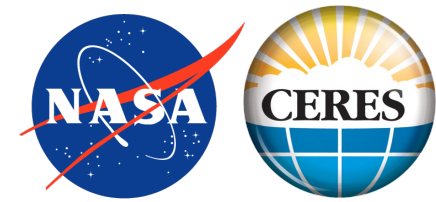
Willinda Evans

Dennis Keyes

Carla Grune

Elizabeth Heckert

PR Tool



DATA MANAGEMENT TEAM

TISA

Josh Wilkins

Beau Branch

Cathy Nguyen

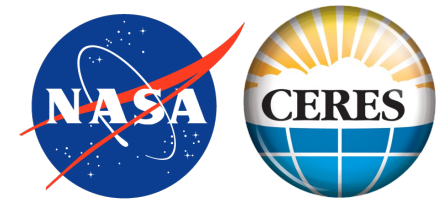
Ed Kizer

PC Sawaengphokhai

Jay Garg

Hunter Wincoff

FLASHFLux



DATA MANAGEMENT TEAM

CERES
Ordering Tool

Pamela Mlynczak

Churngwei Chu

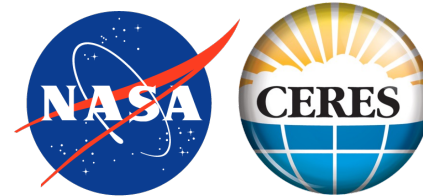
Babak Samani

Sharon Dukes-Allen

Karen Brown

Chris Harris

ASDC
Support



HIGHLIGHTS

DEVELOPMENT



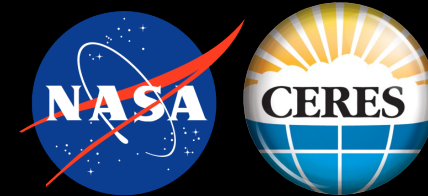
KEY DELIVERIES

- Cloud Radiative Swath (CRS) – new Edition 4A product
- Incorporating NOAA-20 into Edition 4A
 - FLASH-TISA
 - TSIB/SYN1deg
 - CldTypHist
- PR Tool
 - PHP 8.1
 - OCP4
- Edition 4A to 4B support
 - Gridded GEO
 - TSIB/SYN1deg
- Support for metadata updating



EDITION 4A PRODUCT AVAILABILITY

<u>Product</u>	<u>Platform</u>	<u>Processed Thru</u>	<u>Publicly Available?</u>
BDS	Terra, Aqua	January '23	Yes
SSF		2018 - 2022	
CRS			

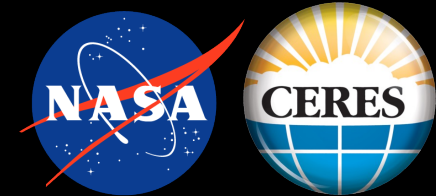


EDITION 4A PRODUCT AVAILABILITY

<u>Product</u>	<u>Platform</u>	<u>Processed Thru</u>	<u>Publicly Available?</u>
SSF1 deg-Hour*	Terra, Aqua	January '23	Yes
SSF1 deg-Day/-Month*			
SYN1 deg-1 Hour/Mhour**	Terra+Aqua	March '22	
SYN1 deg-Day/-Month**			
SYN1 deg-1 Hour/MHour	Terra+NOAA-20	April '22 – December '22	
SYN1 deg-Day/-Month			

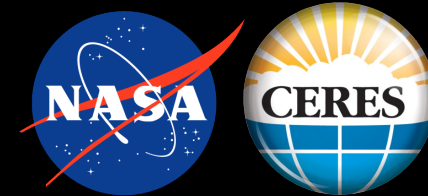
* Aqua processing suspended February 2023. Instrument in RAPS mode.

** Terra+Aqua ended in March 2022. Terra+NOAA-20 began in April 2022.



EDITION 4A PRODUCT AVAILABILITY

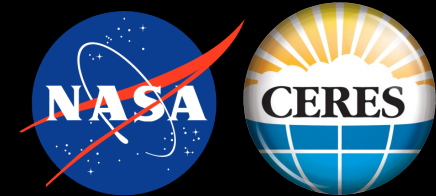
<u>Product</u>	<u>Platform</u>	<u>Processed Thru</u>	<u>Publicly Available?</u>
CldTypHist	Terra+Aqua	December '22	Yes
FluxByCldTyp			
EBAF	Terra+Aqua, NOAA-20	February '23	
EBAF ToA			



EDITION 2A S-NPP PRODUCT AVAILABILITY

<u>Product</u>	<u>Platform</u>	<u>Processed Thru</u>	<u>Publicly Available?</u>
BDS	S-NPP	January '23	Yes
SSF			
SSF1 deg-Hour		Sept. '19*	
SSF1 deg-Day/-Month			

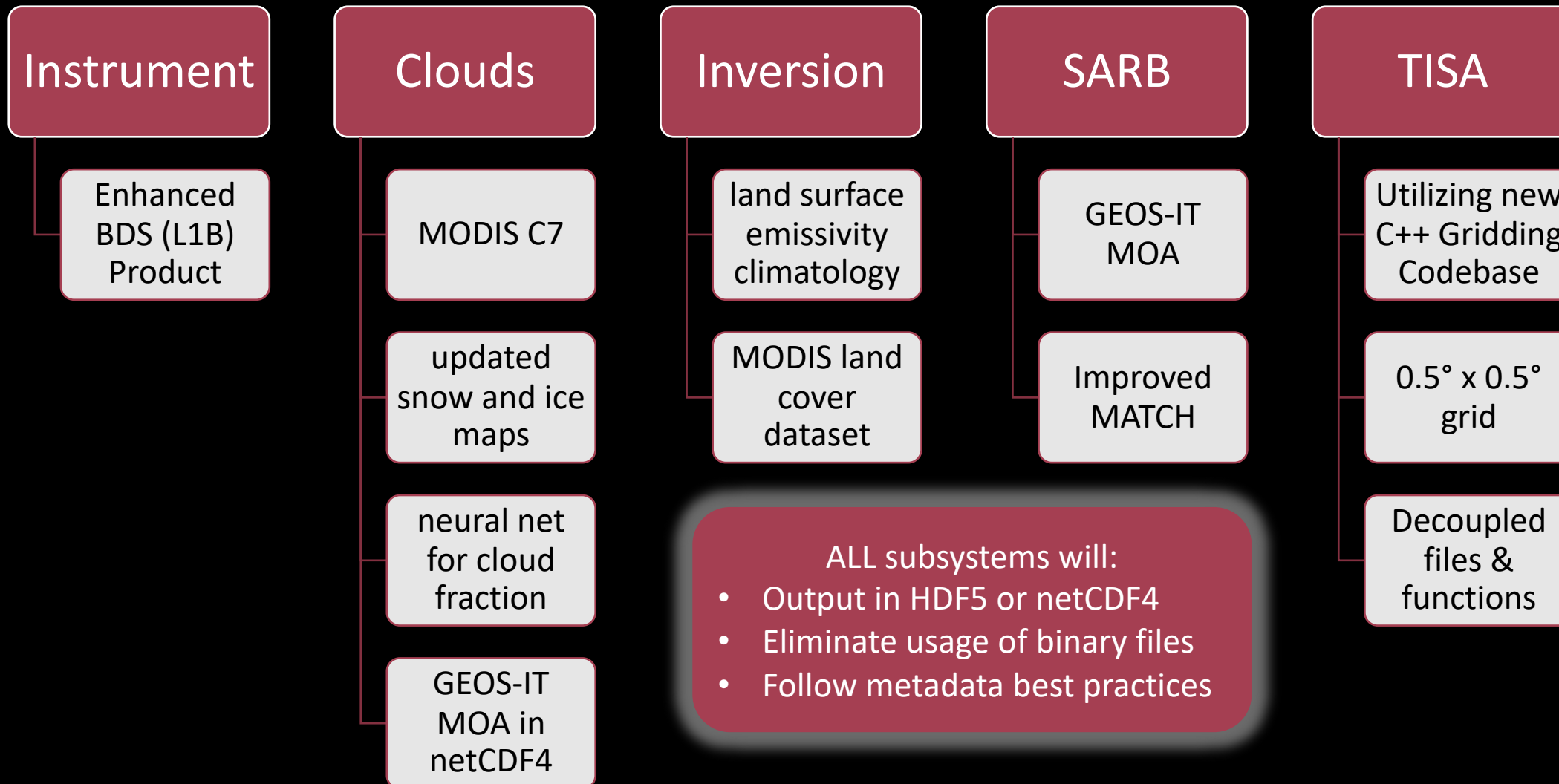
* L3 processing stopped. Instrument in RAPS mode.



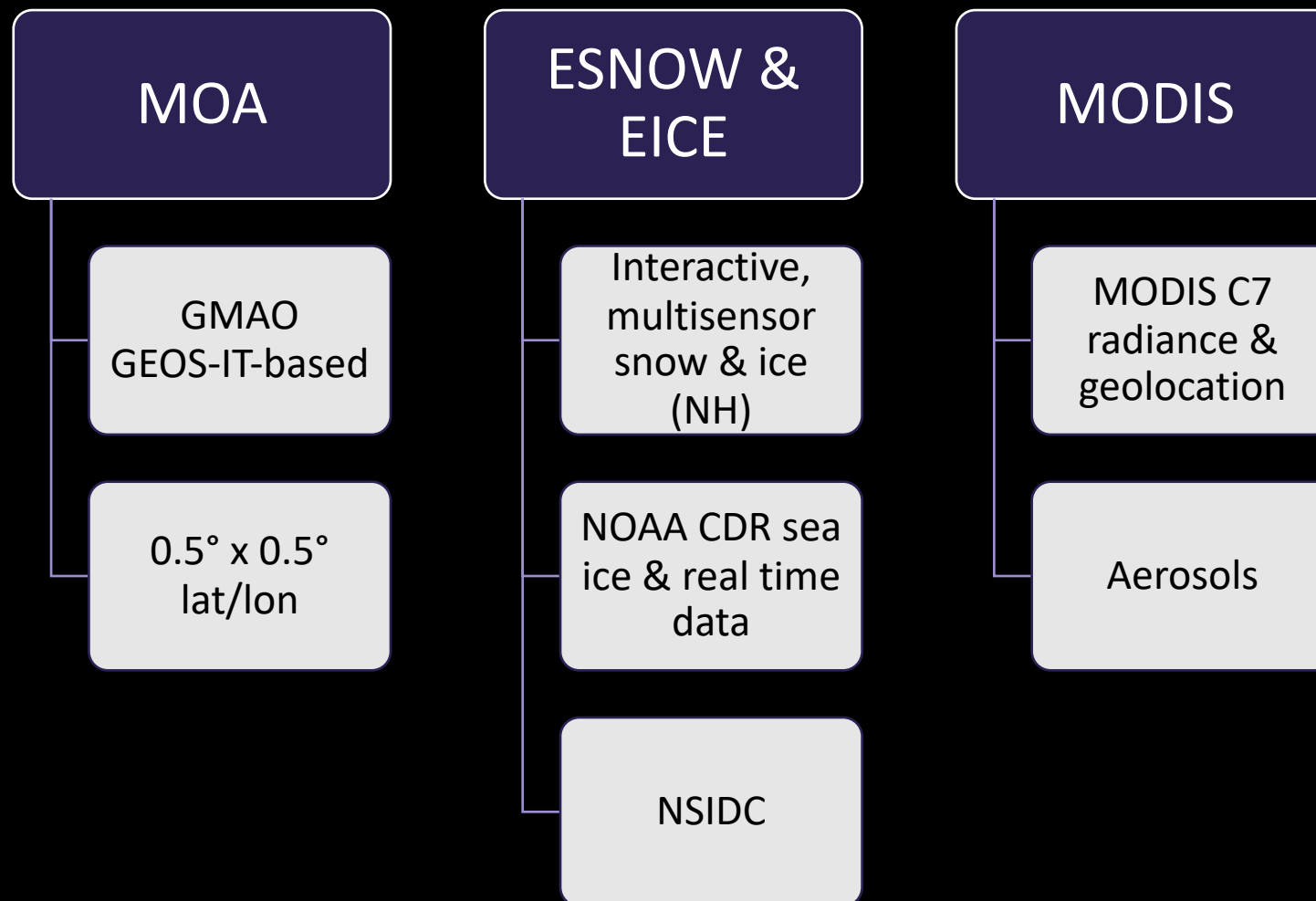
EDITION 1B NOAA-20 PRODUCT AVAILABILITY

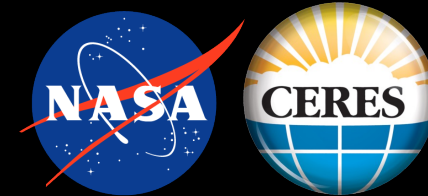
<u>Product</u>	<u>Platform</u>	<u>Processed Thru</u>	<u>Publicly Available?</u>
BDS	NOAA-20	February '23	Yes
SSF			
SSF1 deg-Hour			
SSF1 deg-Day/-Month			

EDITION 5 DEVELOPMENT - CODE



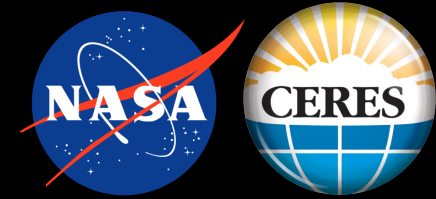
EDITION 5 DEVELOPMENT - INPUTS





EDITION 5 DEVELOPMENT - STRATEGY

- Iterate early and as often as possible:
Running “Alpha 1” Edition 5 SSFs starting September 2023
 - Largely Ed4 codebase
 - Any available input test data/file formats/algorithms
- Initial delivery of MODIS → initial production of ADMs →
Beta production of downstream products
- Formal scheduler on board
- Schedule largely driven by availability of updated input data



EDITION 5 DATA PRODUCT AVAILABILITY

Product	Terra and Aqua	S-NPP and/or NOAA-20
BDS	SEP 2023	DEC 2023
SSF	JUL 2025	MAR 2026
CRS	APR 2026	AUG 2026
SSF1deg-Hour	SEP 2025	APR 2026
SSF1deg-Day/Month	OCT 2025	MAY 2026
SYN1deg-1Hour/Mhour/Day/Month	MAY 2026	JUL 2026
CldTypHist	NOV 2025	SEP 2026
FluxByCldTyp	NOV 2025	MAY 2026
EBAF-TOA	JAN 2026	SEP 2026
EBAF	NOV 2026	DEC 2026



LIBERA

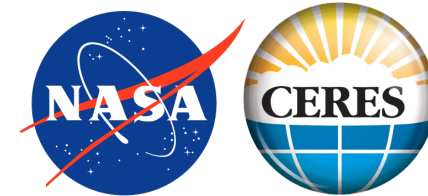
DATA MANAGEMENT WORKING GROUP

- LASP-RBSP every-other-week meetings
- First in-person DMWG meeting held September 8-9, 2022
- Working on ICDs:
 - LASP-ASDC
 - ASDC-RBSP
- Access to software repository; open communication



CODE RE-ARCHITECTURE

TISA AND CLOUDS

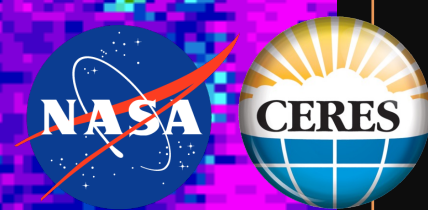


CODE RE-ARCHITECTURE

Clouds

CLOUD COMPUTING WORK:

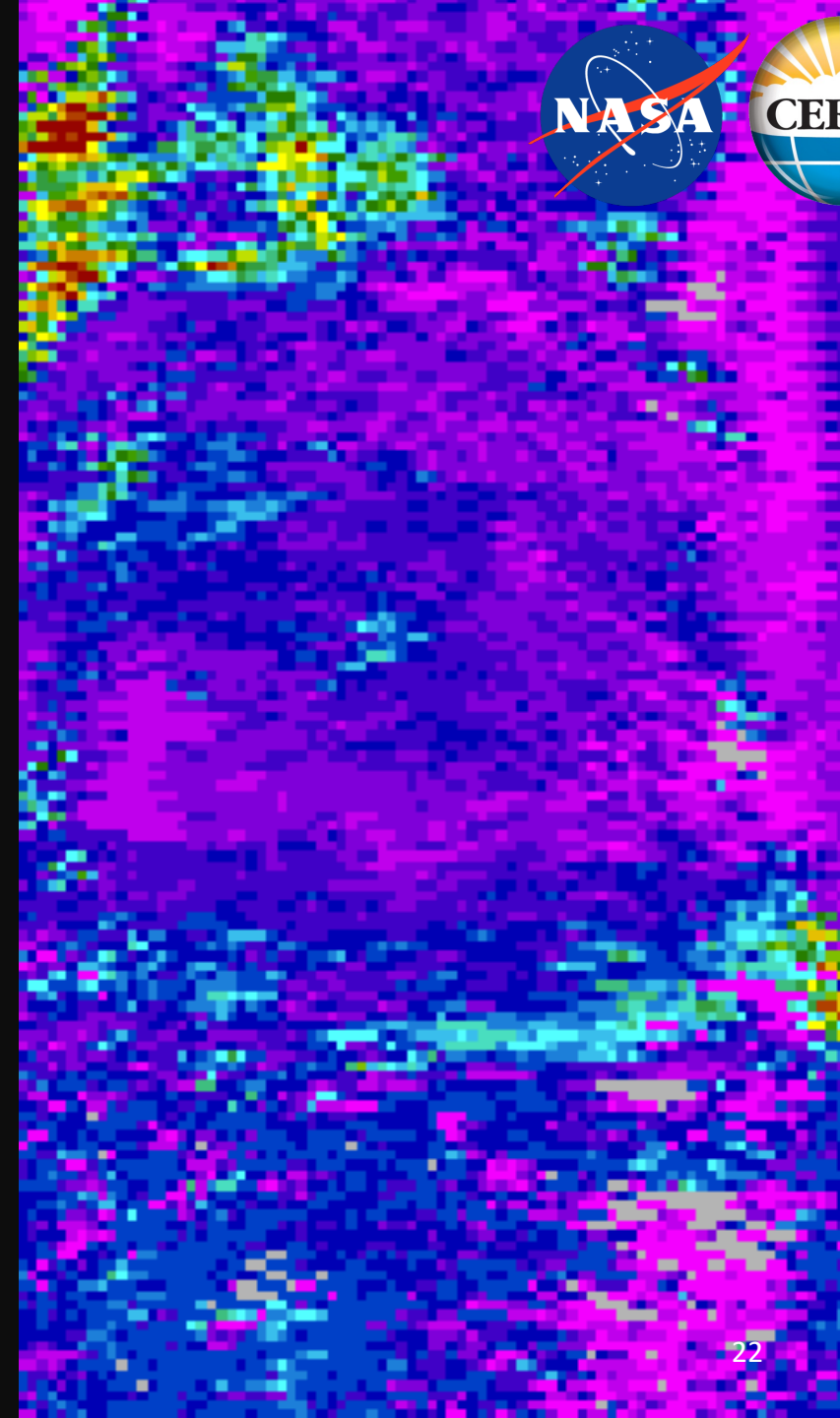
- 2 PGEs run successfully in NASA's Science Managed Cloud Environment (SMCE) in AWS
 - CER4.1-4.1P6 (Clouds hourly)
 - CER4.1-4.2P5 (Clear sky map)
- Runtime equivalent to on-premises processing environment
- Currently validating test data
- Next step:
How to simplify configuration and testing?



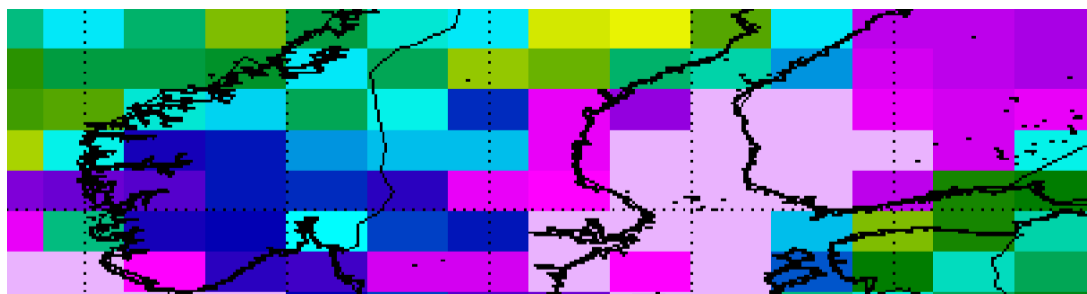
CODE RE-ARCHITECTURE – CLOUDS

CLOUD MASK WORK:

- C++ core structure in place
- Configuration files in place
- Day, night, twilight
 - Polar tests ✓
 - Non-polar tests ✓
 - Magic numbers ✓
- More nuanced cloud test logic in progress

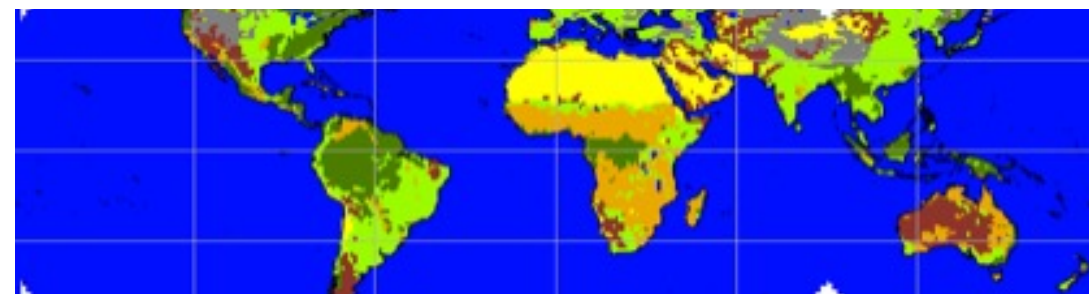


CODE RE-ARCHITECTURE – TISA



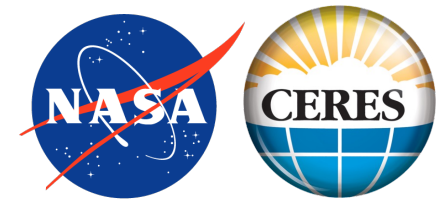
GRIDDING WORK – C++

- Ongoing development
- CRS1Deg:
 - extension of C++ codebase (estimated release – August 2023)
 - exercising codebase



TEMPORAL INTERPOLATION/SPATIAL AVERAGING WORK – MODERN FORTRAN

- Access functions:
 - IGBP Type (decoupled from SSF1deg) using Daily SNOW/SEA-ICE Updated 10-minute base maps. netCDF4 format.
 - ADM SW Scene Type ID
 - ADM Factor
- Unit testing for above components



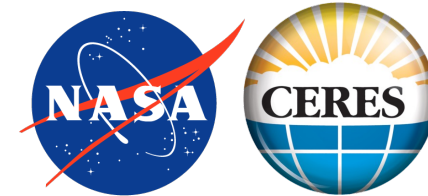
CODE RE-ARCHITECTURE – TISA

NB RADIANCE TO BB FLUX:

- xGLB files of global statistics
- CERES-GEO Flux Normalization: Analyzing impact at 1 X 1 degrees, of various CERES-GEO spatial/temporal filter matching window sizes
 - bias/rms error
 - perceived continental boundaries

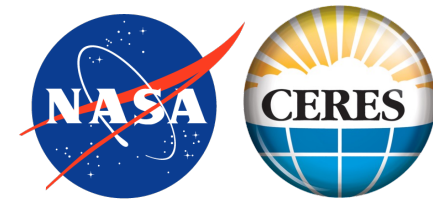
GENERAL REFACTORING:

- SSF1deg-Hour, three-day-Interpolation/Averaging development for Cloud Properties
- Isolating functionality among modules, functions, subroutines
- Variable and function naming improvements
- Ancillary files → netCDF4 format



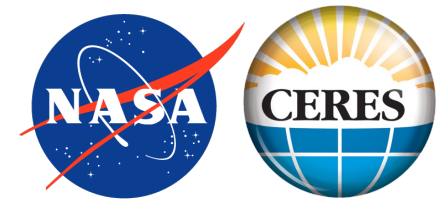
SYSTEMS

ASDC & ORDERING TOOL



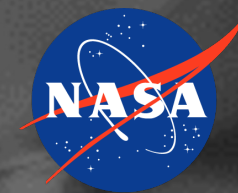
CERES ORDERING TOOL

- Accommodated:
 - Edition 4.2 EBAF and EBAF ToA
 - new Level-2 CRS product
- Seamlessly merged Terra-Aqua and Terra-NOAA20 records in SYN1deg
- Increasing reliability of internal/testbed tool infrastructure, moving to VMs
- Several feature/bug fix releases



ASDC AND SCF SUPPORT

- Continued support for processing and storage infrastructure
- Collection-level metadata issue still resolving
 - Core CERES and FLASHFlux products ~80% complete
 - GEO Clouds still outstanding
- OpenShift4 transition underway – CERES website, internal sites



THANK YOU!



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ANY QUESTIONS?