State of CERES

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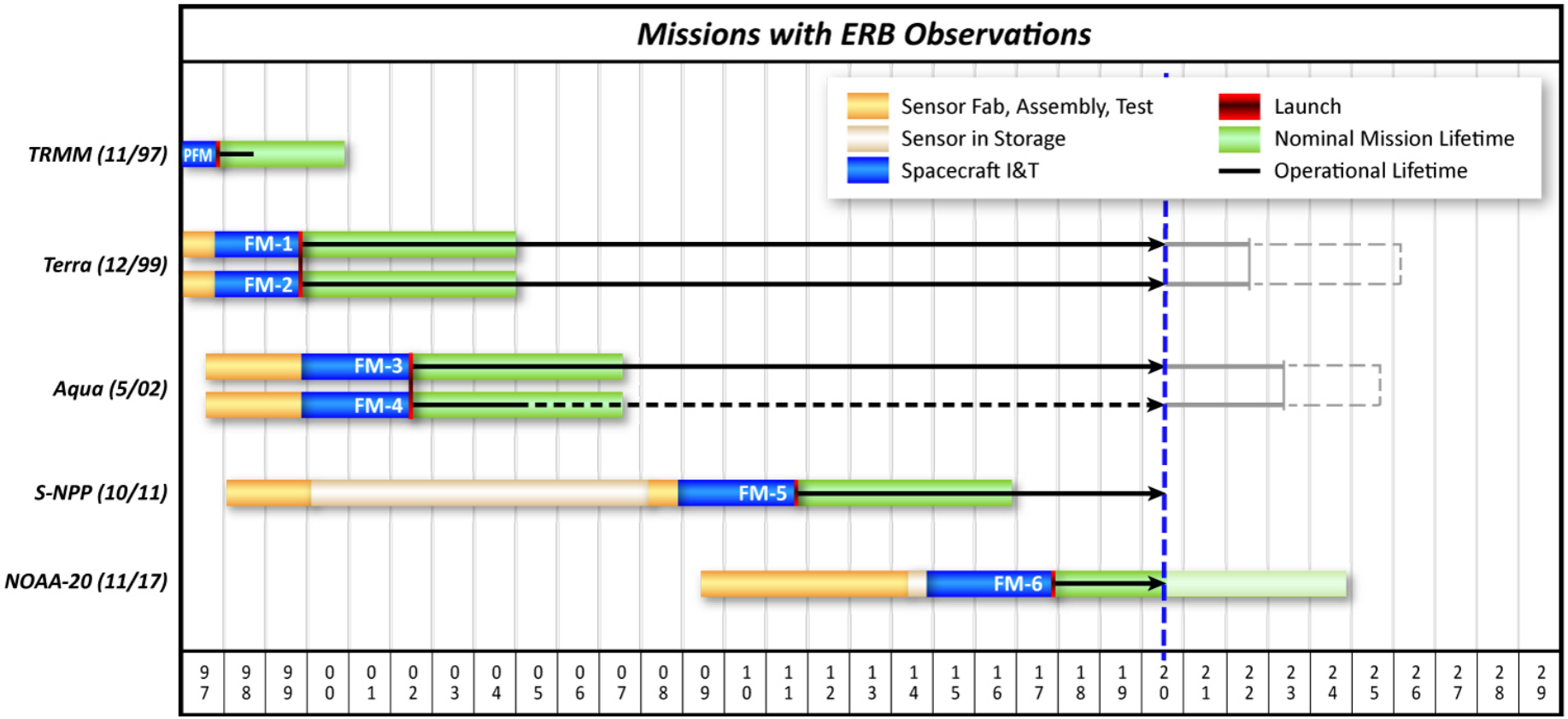
CERES Science Team Meeting, April 28-30, 2020
Virtual Meeting

CERES Meeting (Tuesday)

Review Status of CERES Instruments and Data Products:

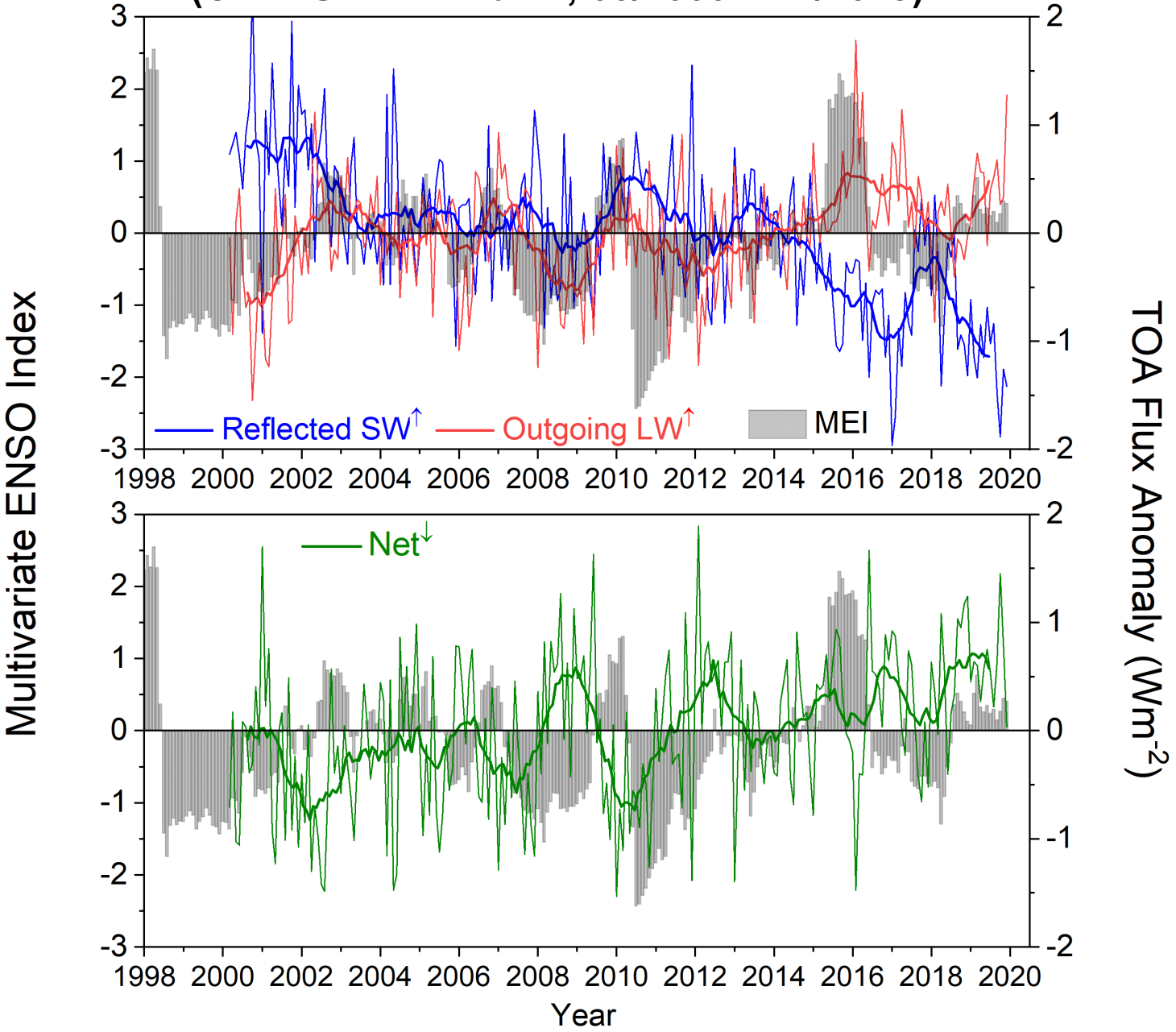
- State of CERES
- Earth Venture Continuity-1 (EVC-1) Update
- CERES Terra, Aqua, S-NPP, NOAA-20 Instrument Calibration Update
- MODIS & VIIRS Cloud Algorithm & Validation Status
- ADM, SARB and TISA Working Group Reports
- FLASHFLUX Update
- EBAF Update
- Data Management Team Update
- Atmospheric Science Data Center (ASDC) Update

CERES Flight Schedules



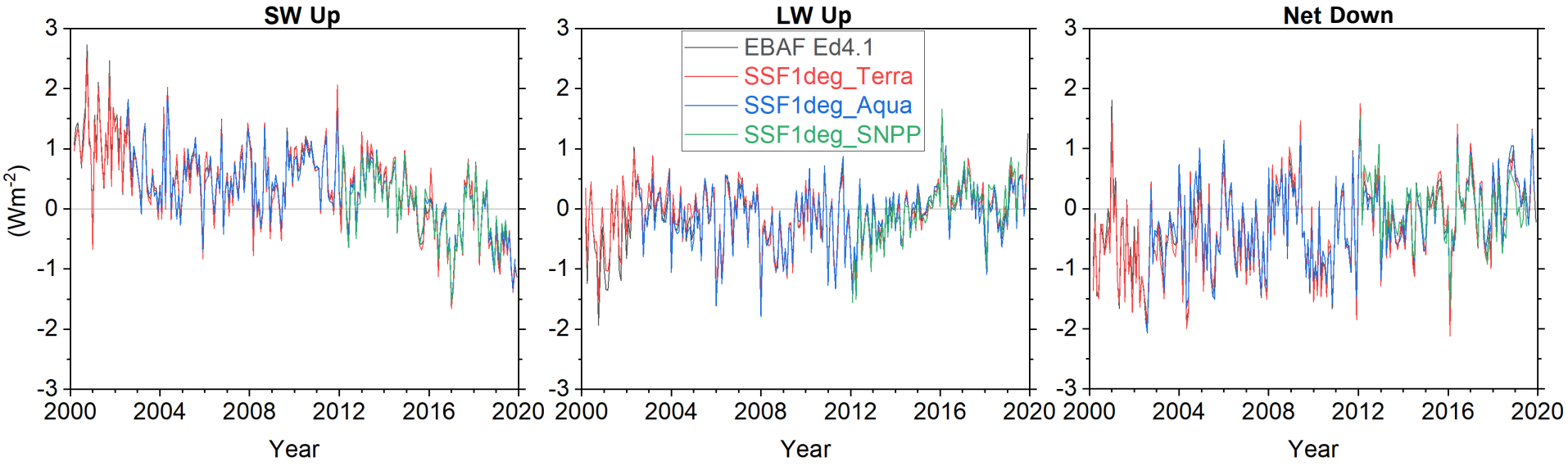
- Currently, 6 CERES instruments fly on 4 satellites: Terra (L1999), Aqua (L2002), S-NPP(L2011), NOAA-20 (L2017)

Global Mean All-Sky TOA Flux Anomalies & Multivariate ENSO Index
(CERES EBAF Ed4.1; 03/2000 – 12/2019)



Global Mean TOA Flux Anomalies

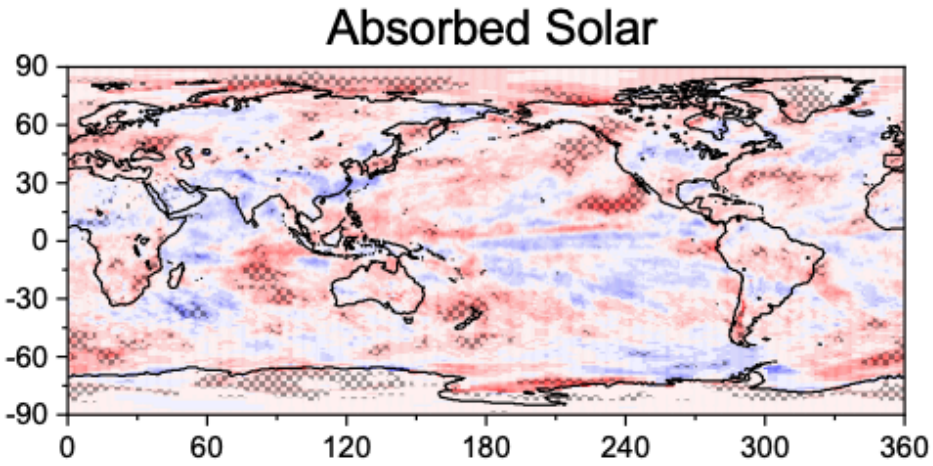
(Relative to Climatology for 02/2012-09/2019)

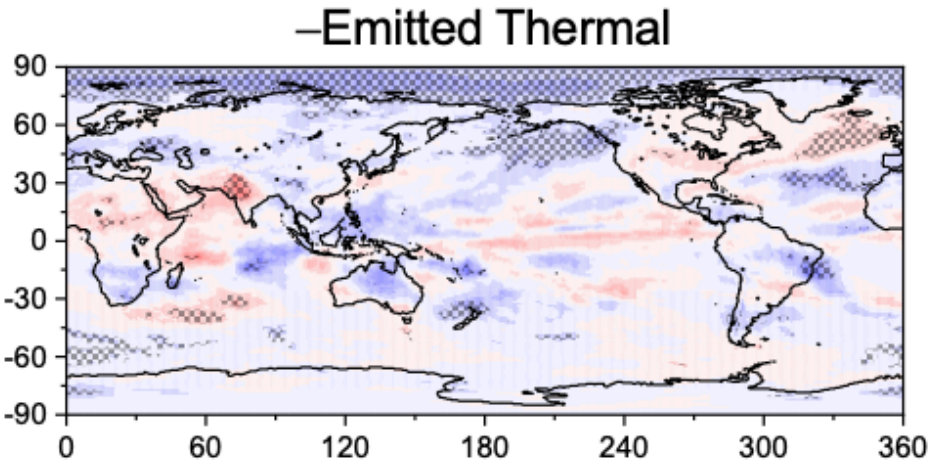


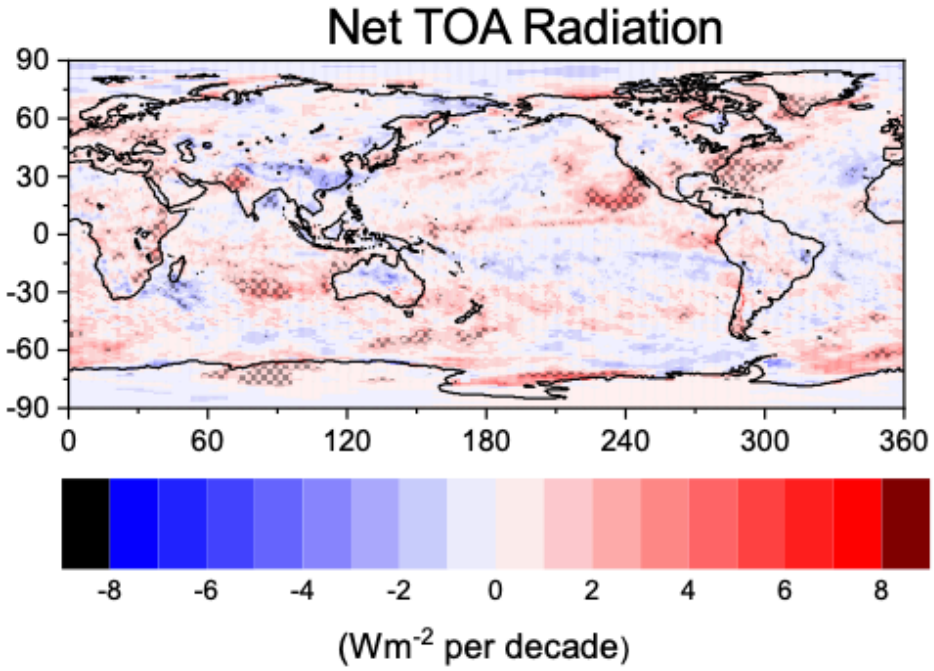
EBAF Trends		
-0.73 ± 0.17 Wm^{-2} per decade	0.25 ± 0.16 Wm^{-2} per decade	0.43 ± 0.19 Wm^{-2} per decade

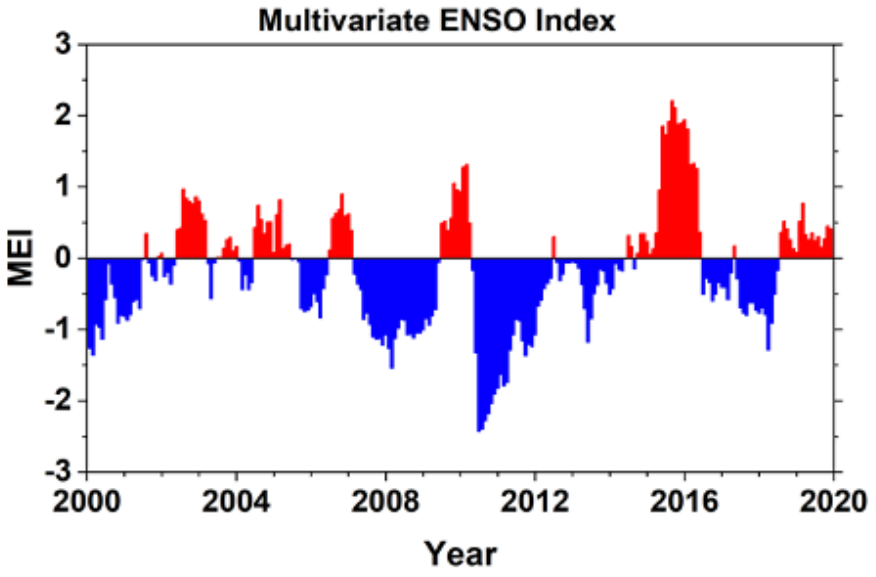
- RMS differences between Terra, Aqua and SNPP monthly anomalies for common period are: < 0.2 Wm^{-2} for SW and LW, and < 0.25 Wm^{-2} for net TOA flux.

Regional Trends in TOA Radiation (03/2000-12/2019)

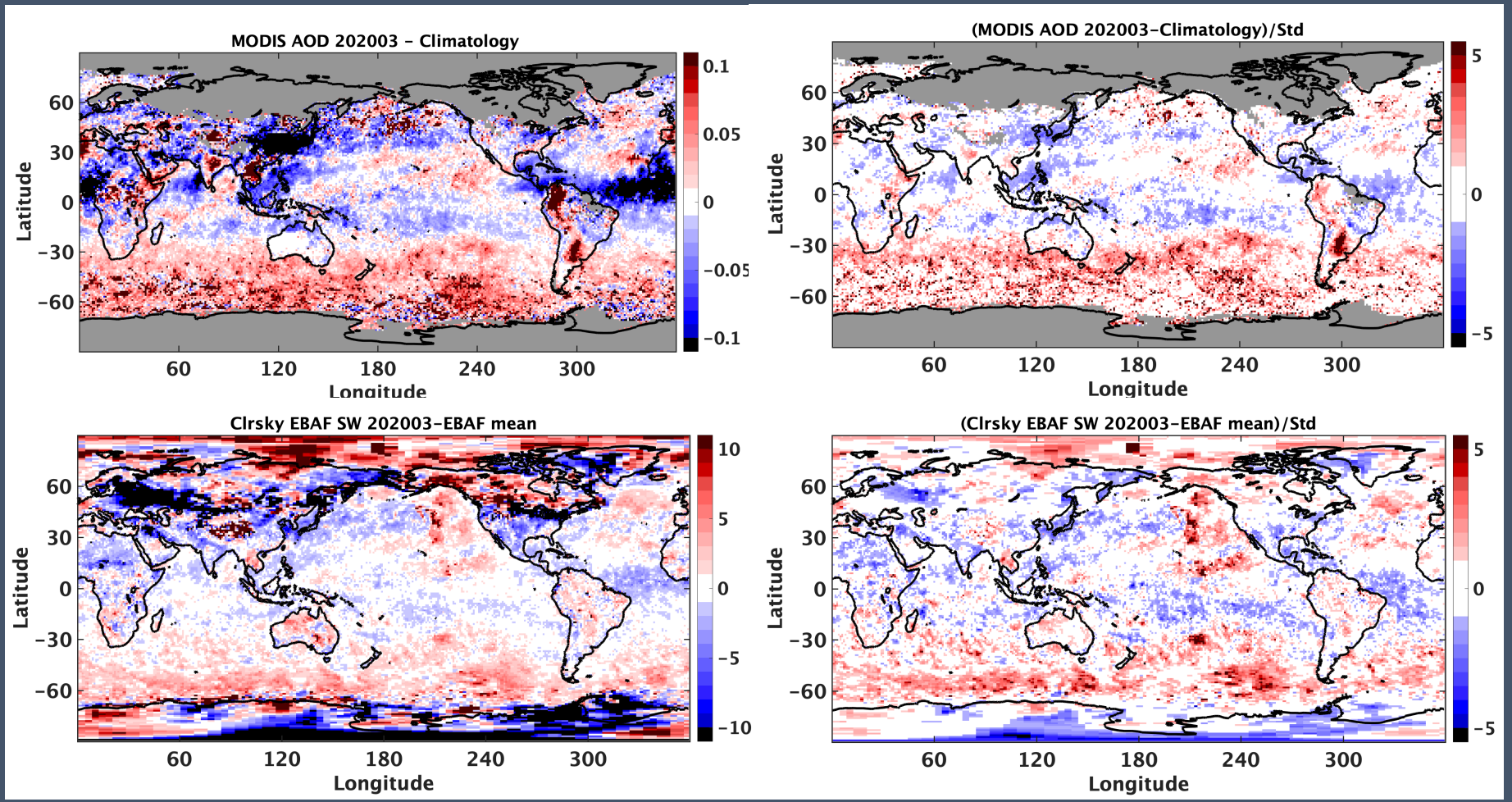








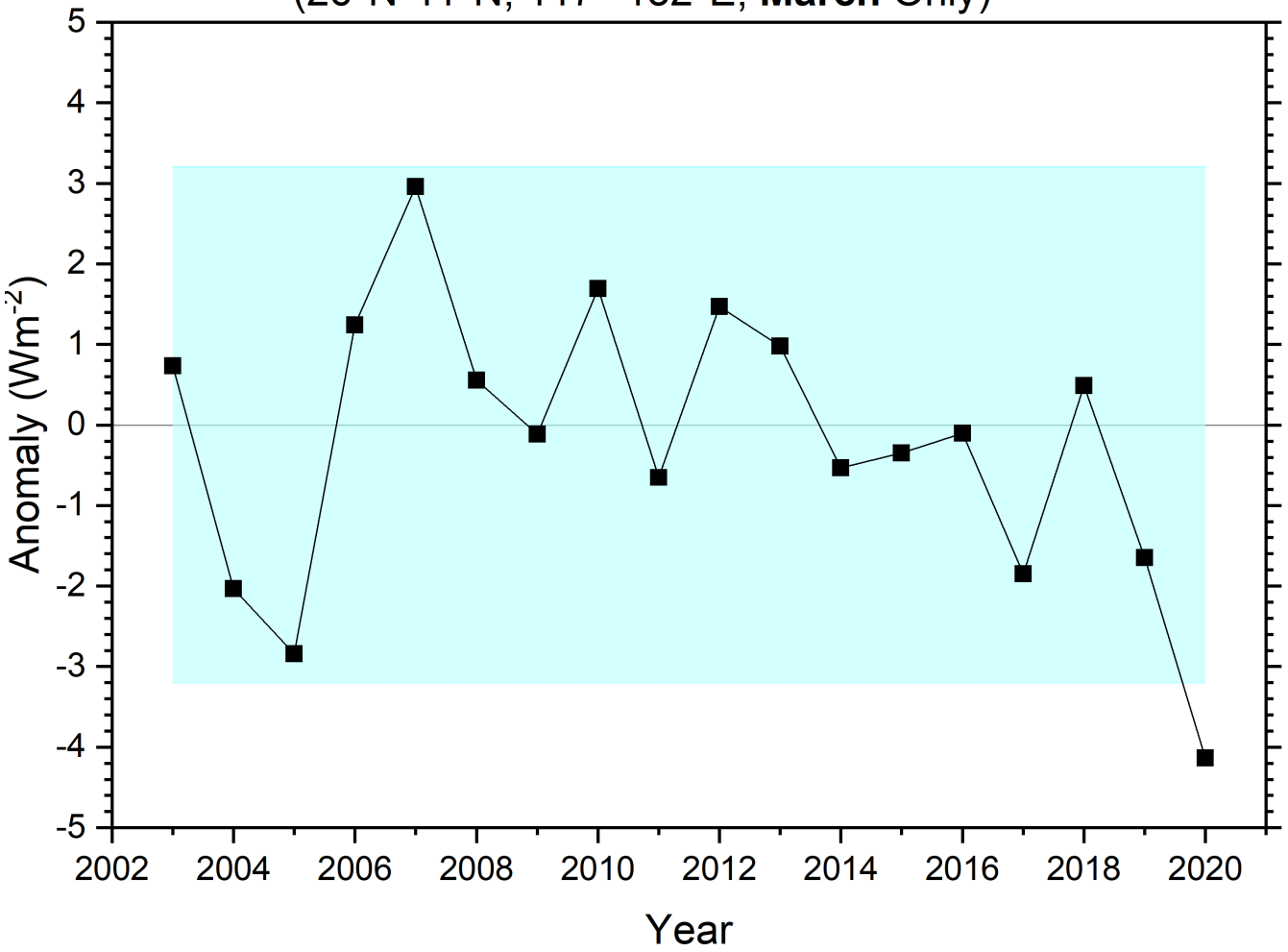
COVID-19 Global Shutdown: CERES Clear-Sky SW TOA Flux & MODIS AOD Anomalies (March 2020 vs. climatology)

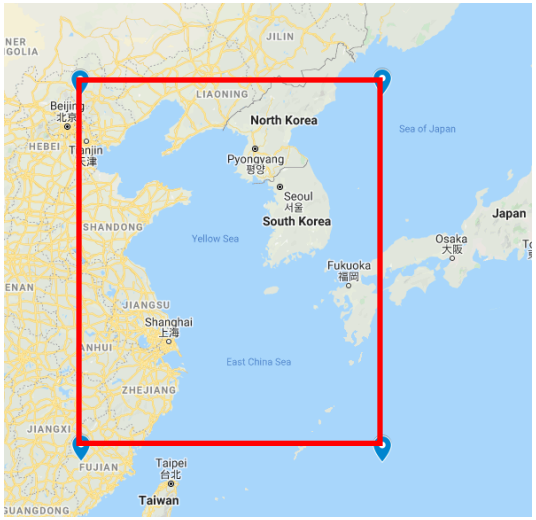


Acknowledgements: Zach Eitzen, Wenying Su

Clear-Sky SW TOA Flux Anomalies Over East Asian Marginal Seas

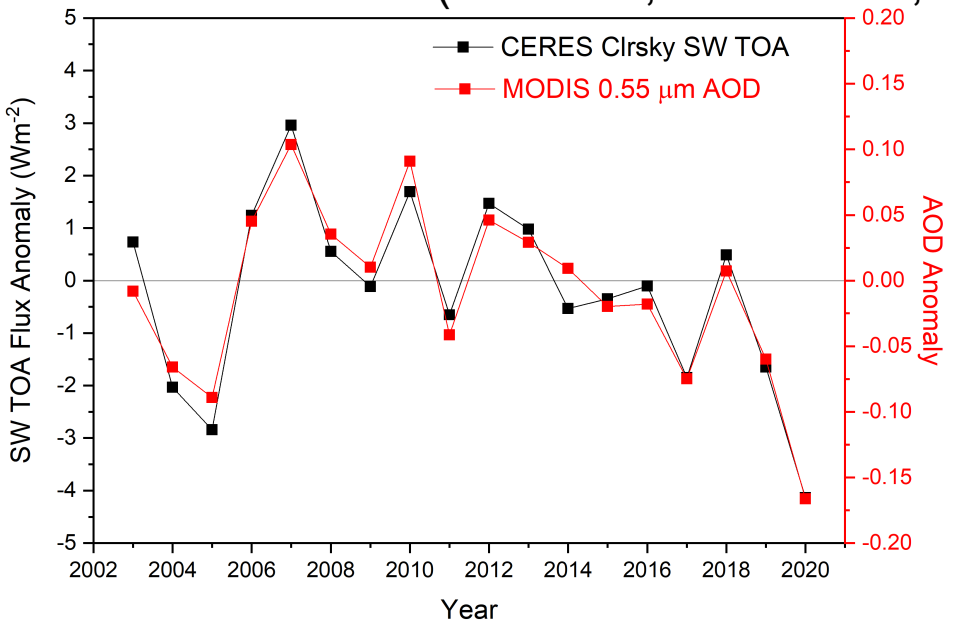
(26°N-41°N; 117°-132°E; **March** Only)

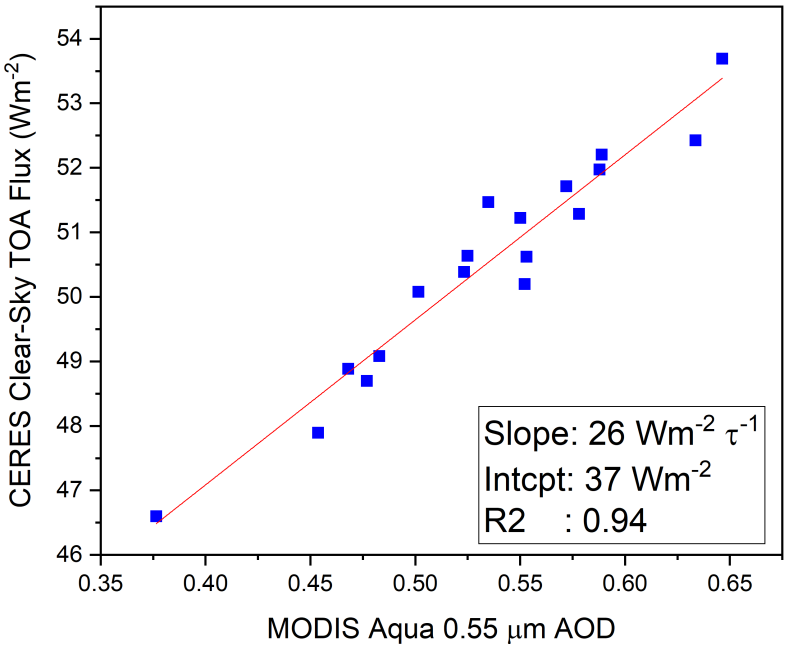




Climatology	95% Conf. Intvl (Wm^{-2})	03/2020 Anomaly (Wm^{-2})
2003-2019	3.2	-4.1
2014-2019	2.3	-3.5

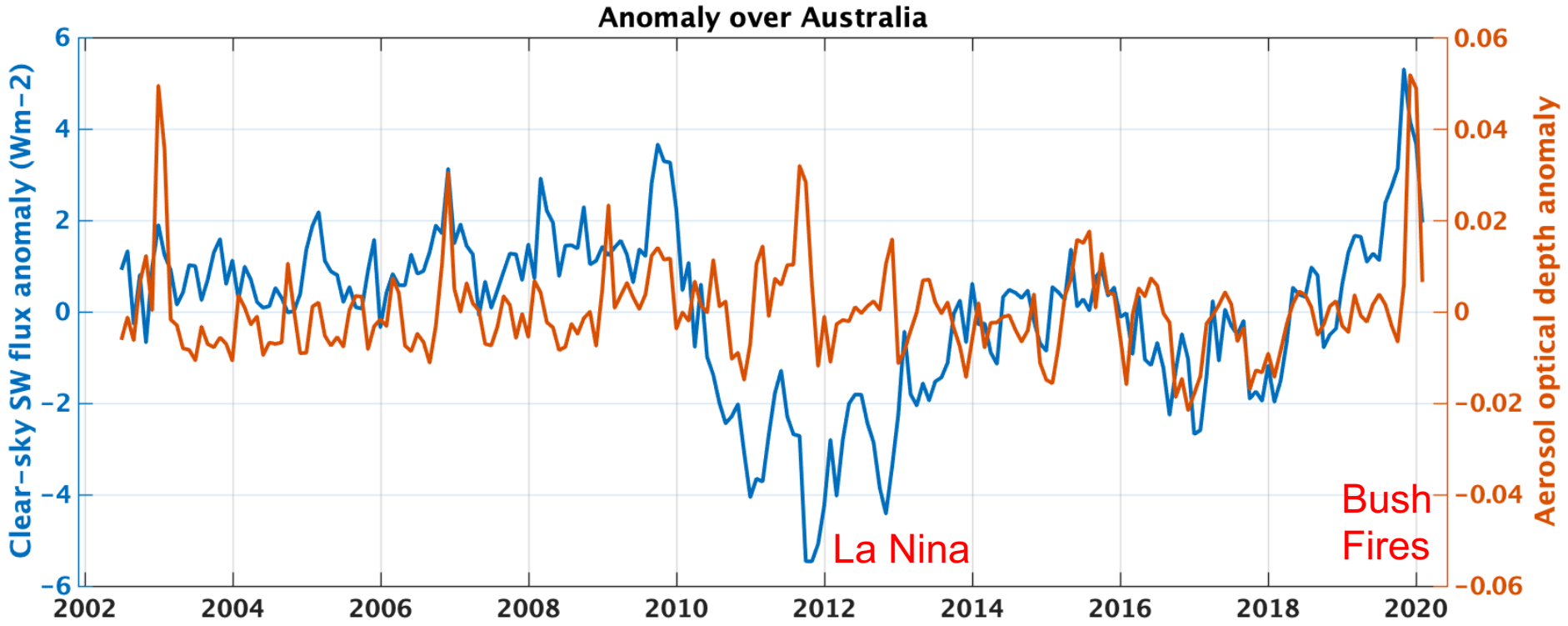
CERES Clear-Sky SW TOA Flux & MODIS AOD Over E. Asian Marginal Seas (26°-41°N; 117°-132°E; March Only)

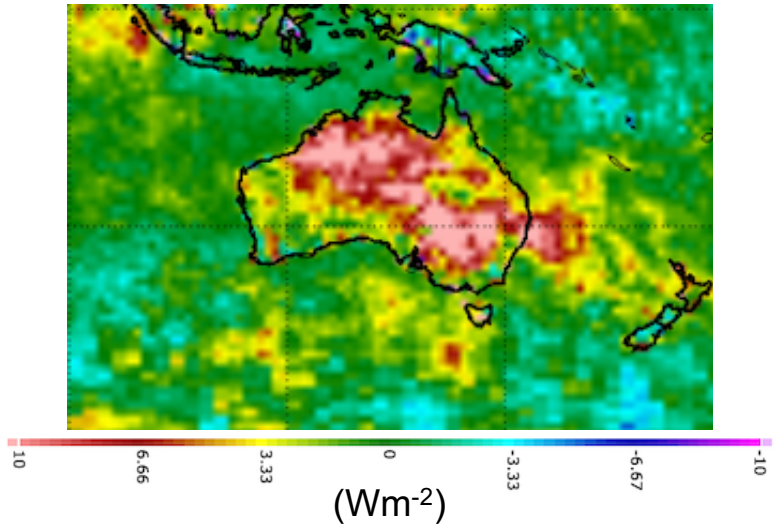




March 2020:
30% decrease in AOD
8% decrease in SW TOA Flux

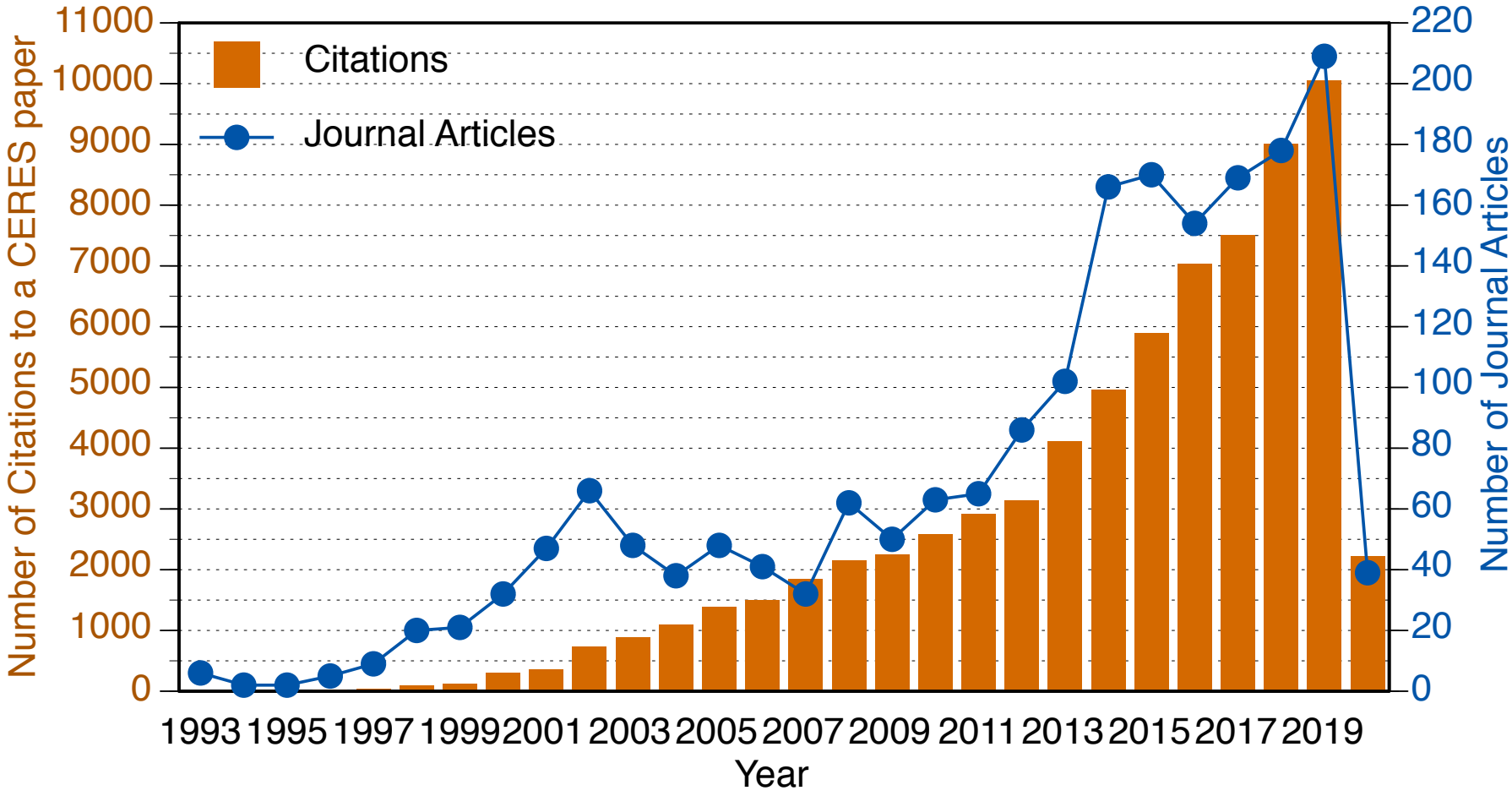
Clear-Sky SW TOA Flux & MODIS AOD Anomalies Over Australia





Nov 2019

CERES Journal Publications and Citation Counts
(For Papers Between 1993-2019; Updated April 20, 2020)



- Total number of peer-reviewed journal articles: 1,898
- Total number of citations to CERES papers: 70,632

(Compiled by Anne Wilber & Dave Kratz)

Number of Unique Users by CERES Data Product

(through March 31, 2020)

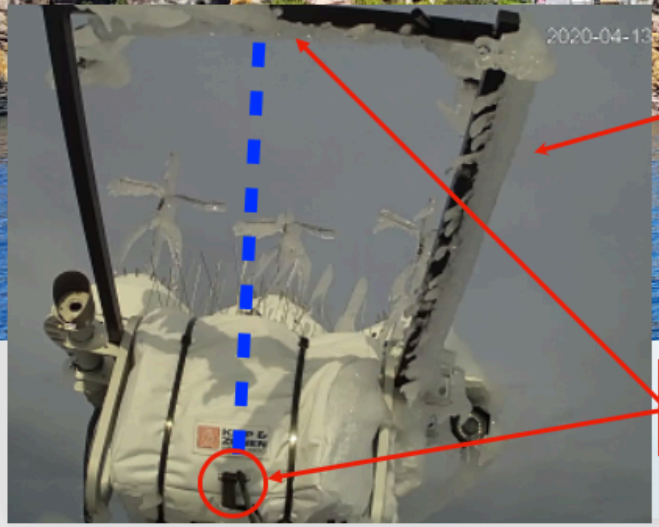
Level	Product	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1b	BDS	11	9	14	19	14	11	13	14	10	12	4
2	SSF	84	77	138	223	247	253	278	327	235	251	69
	FLASH_SSF	25	8	15	23	30	61	41	68	101	92	24
	C3M	31	32	33	37	28	55	54	49	49	36	11
	ES8	22	20	18	31	16	21	15	15	10	8	3
	SSF-MISR	9	4	2	5	4	2	1	3	1	1	2
3 & 3b	EBAF										256	166
	EBAF-TOA	72	160	346	484	579	580	540	646	668	629	173
	EBAF-Surface			147	289	375	424	464	510	484	386	37
	SYN1deg	70	168	199	353	382	438	494	607	639	754	220
	SSF1deg	77	126	107	157	166	160	194	190	159	221	64
	CldTypHist	17	12	37	57	41	40	47	86	87	79	15
	ES4	59	36	11	27	19	13	12	17	17	17	3
	ES9	21	12	5	13	9	5	5	8	6	6	1
	FLASH_TISA	17	18	20	17	15	15	36	52	65	81	19

CRAVE – CERES Radiation and Validation Experiments

Challenging Winter conditions again at Granite Island:

- Communication link broken with AERONET. Hoping data remains in local buffer.
- November 27: Storm dirtied SW direct measurements, which remained uncleaned throughout Winter. Still had global and diffuse.
- April 2: Tech cleaned instruments, restoring direct measurements and acceptable residuals. R = Global - Diffuse - Direct X cos(SZA).
- April 12: Ice storm severed connecting arm that was crucial to vertical motion. Now have only global; no SW direct or diffuse, no LW.
- April 26: SW direct, diffuse, and LW restored by Ducky the boat captain
- Met data always stable.

Ice storm damaged tracker

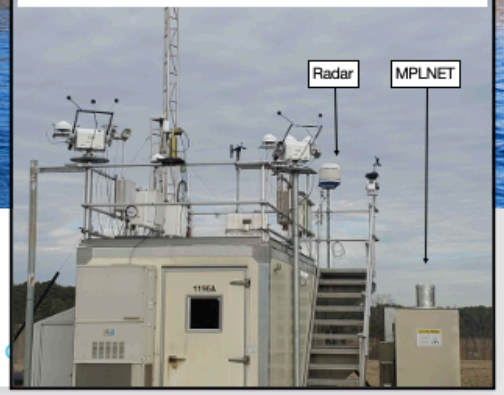


Tracker link to T-bar severed on Apr 12, disabling vertical motion.

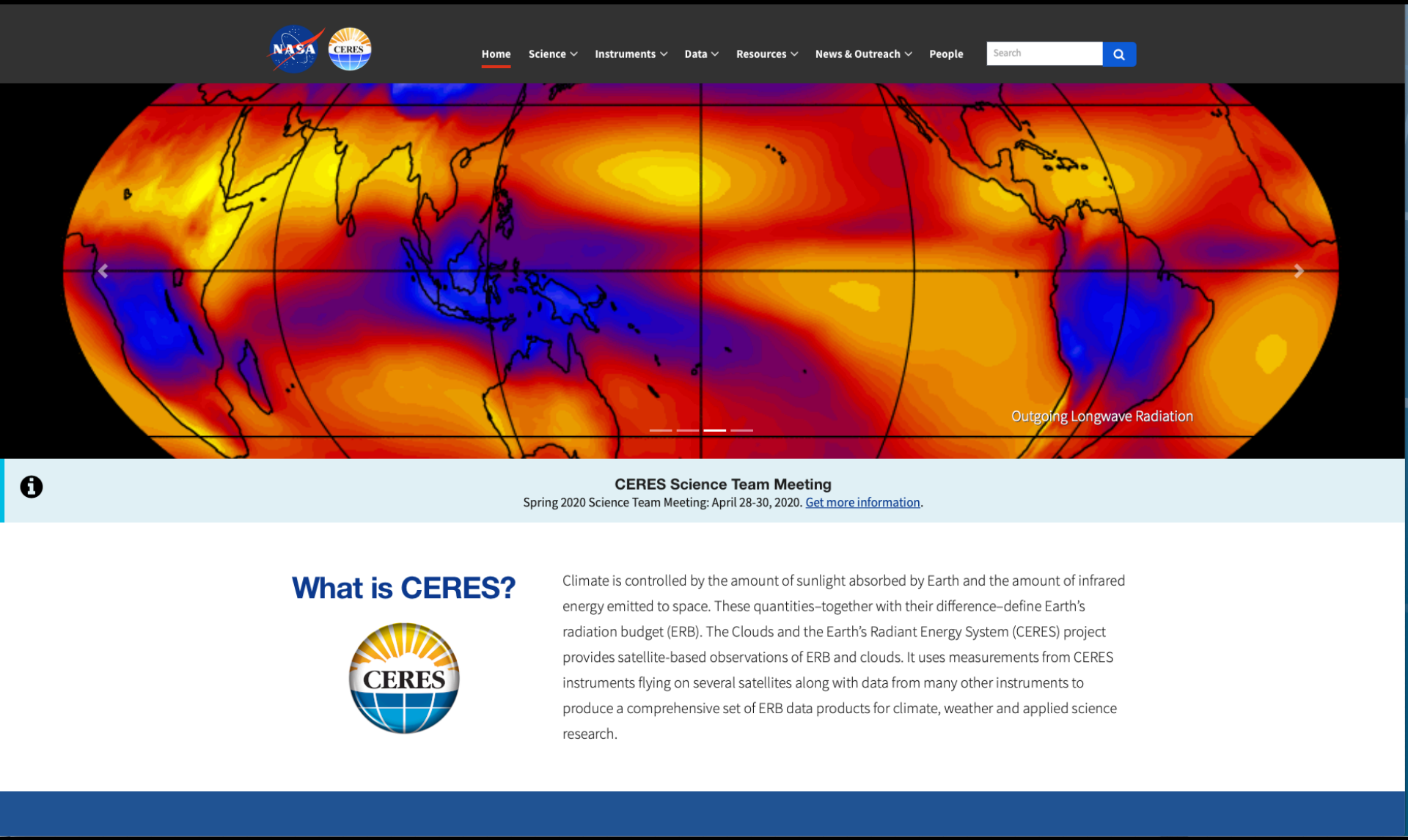
CRAVE – LaRC

All systems good, except:

- MPLNET radar interlock broken 3/2020
- MPLNET off until we can return to LaRC



CERES Webpage Redesign



CERES First Light 20th Anniversary (Feb. 27, 2020)

Other News

- NASA ESD 2020 Senior Review
  - Terra & Aqua proposals were submitted in March
  - Panel meeting postponed to July 8-10, 2020
- Release of new FluxByCldTyp1deg-day, -month product within the next two weeks
- Edition 2 S-NPP and Edition 1 NOAA-20 SSF & SSF1deg to be released this spring.
- CERES FM5 (S-NPP) in full bi-axial (RAP) mode. CERES FM2 taking targeted PAP measurements over MOSAIC site.
- MDPI Special Issue (new deadline is August 31, 2020):

  "Analysis of Decadal-Scale Continuous Data Products from Weather Satellite Platforms"
- Next CERES meeting: Sept 15-18, 2020, Max-Planck-Institute for Meteorology, Hamburg, Germany (Joint with ScaRaB & GERB)
- Earth Venture-Continuity Selection: Libera