

PACE-PAX check flight report 2024/08/29

Compiled by Kirk Knobelspiesse, 2024/08/29. Latest update 2024/09/07

ER-2: 2.5 hour planned check flight, starting with a quick pair of lines over the USC_Seaprisim site, followed by two long lines up and down the central valley. Expected cloud free throughout and moderate aerosol loads in central valley.

TO: Objectives: Evaluate payload performance over temperature and altitude range to facilitate planning for future science flights; demonstrate capability to perform maneuvers expected to be used during science flights (e.g. spirals, touch and go landings); check that facility instruments perform well in cloud.

Summary: Spiral performed over Watsonville with scattering coefficient of 15-20 Mm^{-1} up to 9 kft then clean at altitude limit of 10 kft. Transit southeast at 10kft for 30 minutes. Spiral down at King City with peak scattering coefficient of 30 Mm^{-1} at 8 kft. Reverse heading and transit back northwest at 1.5 kft then 1 kft (adjusted to stay in higher aerosol scattering). Outside air temperatures were 28°C at the southern end of the run and 17°C further north, while cabin temperatures and turbulence remained acceptable for instrumentation. Scattering coefficient 20-40 Mm^{-1} at low altitude and quite variable. Did a touch-and-go maneuver at Salinas. Sampled aerosols at 2kft over marine cloud layer, with a significant gradient in scattering (increasing westward). Reverse heading, with good consistent cloud run over ocean starting at 4:05 pm (local) at 1.5kft demonstrated facility instrument cloud probe performance. Touch-and-Go at Marina airport followed by landing.

a good cloud run from 18.1-18.26 UTC with optical depths from 5-25 and small (5 μm) drops with an effective variance of ~ 0.05

ER-2: Check flight successful. Minor issues all resolvable. TO: Successful check flight

ER-2

Takeoff: 17:11

Landing: 19:57

Duration: 2.8

Instrument status: PRISM had GPS issues possibly with impact to orthorectification. All other issues minor.

Mission Scientist: Kirk Knobelspiesse

Pilot: Tim Williams

Twin Otter

Takeoff: 21:00

Landing: 23:27

Duration: 2.4

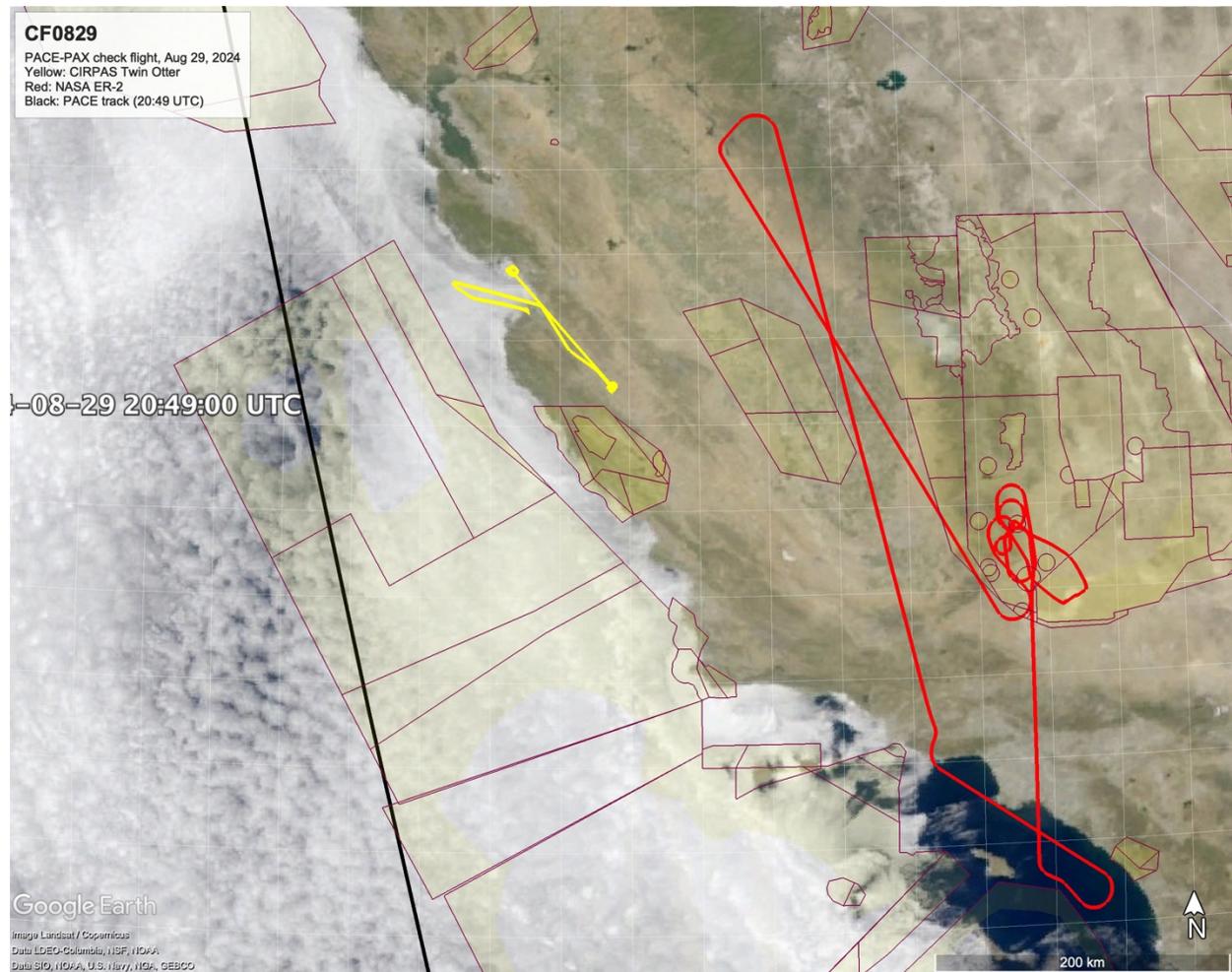
Instrument status: nominal

Mission Scientist: Anthony Bucholtz
 Pilot: Bryce Kujat, Jeff Martin

PACE

Overpass: 20:49

Orbit track west offshore



All times are in UTC, VTM elements in **black** satisfied, **blue** partially satisfied and **red** not satisfied.

Time	Platform	VTM	
17:11	ER2		Departs
17:56	ER2	4c	Overfly USC_SeaPRISM. Cloudy
18:09	ER2	4c	Overfly USC_SeaPRISM in SPP. Cloudy
18:26	ER2	1d	Overfly (nearby) Bakersfield. Moderate AOD=0.13
18:41	ER2	1d	Overfly Fresno_2. Moderate AOD=0.188
18:43	ER2	1a, 1d	Overfly NEON SJER. Moderate AOD=0.18

19:02	ER2	1d	Overfly Fresno_2. Moderate AOD=0.176
19:16	ER2	1d	Overfly (nearby) Bakersfield. Moderate AOD=0.13
19:57	ER2		Land
20:49	PACE		Overpass over cloudy ocean west of Monterey Bay
21:00	TO		Takeoff
21:33	TO	1d, 6e	Spiral performed over Watsonville NPS CEOBS site with scattering coefficient of 15-20 Mm ⁻¹ up to 9 kft then clean at altitude limit of 10 kft.
22:11	TO		Spiral down at King City with peak scattering coefficient of 30 Mm ⁻¹ at 8 kft.
22:29	TO		Head back north at 1.5 kft then 1 kft. Outside air temperatures were 28°C at the southern end of the run and 17°C further north. Scattering coefficient 20-40 Mm ⁻¹ at low altitude and quite variable.
22:48	TO		Did a touch and go landing at Salinas.
23:06	TO		Some clouds over Watsonville then a better, good cloud run over ocean starting at 4:05 pm demonstrated facility instrument cloud probe performance.
23:28	TO		Land

SPP: Solar Principal Plane

Assessment:

- 5.7% of objectives satisfied. Not bad for a check flight!

PACE-PAX progress tracking														
Validation objectives	ID	Measurement objectives	Importance, w	Observation time, h (hours)	Total observed (hours)	Fractional success 8/29	Fractional success 9/3	Fractional success 9/4	Fractional success 9/5	Fractional success 9/6	Fractional success 9/7	Fractional success 9/8	Total success	Remaining score
1. Validate new retrieval properties	a	Land surface parameters	8	2.0	0.5	20.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	20.1%	6.4
	b	Ocean radiometric parameters	10	8.0	0.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.0
	c	Aerosol parameters over the ocean	12	8.0	0.5	0.0%	0.0%	6.1%	0.0%	0.0%	0.0%	0.0%	6.1%	11.3
	d	Aerosol parameters over land	12	8.0	10.0	39.3%	24.4%	6.2%	0.0%	0.0%	0.0%	0.0%	70.0%	3.6
	e	Cloud parameters	12	8.0	0.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	12.0
	f	Ocean surface parameters	1	8.0	0.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0
3. Validate in a narrow swath	a	Aerosol parameters over the ocean (PACE)	10	8.0	0.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.0
	b	Aerosol parameters over land (PACE)	10	8.0	0.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.0
	c	Cloud parameters (PACE)	5	2.0	0.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.0
	d	Aerosol parameters (EarthCARE)	8	4.0	0.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	8.0
	e	Cloud parameters (EarthCARE)	8	4.0	0.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	8.0
4. Validate radiometric and polarimetric properties	a	Validate large reflectances	6	2.0	0.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.0
	b	Validate large reflectances with high polarization	6	2.0	0.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.0
	c	Validate large reflectances with low polarization	6	2.0	0.5	22.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	22.1%	4.7
	d	Overfly vicarious calibration sites	6	4.0	0.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.0
6. Focus on specific processes or phenomena	a	High aerosol loads over land	4	2.0	0.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.0
	b	High aerosol loads over ocean	4	2.0	0.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.0
	c	Multiple aerosol layers	1	2.0	4.5	0.0%	87.3%	0.0%	0.0%	0.0%	0.0%	0.0%	87.3%	0.1
	d	Aerosol under thin cirrus	2	2.0	0.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.0
	e	Aerosol above liquid phase cloud	4	2.0	0.5	22.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	22.1%	3.1
	f	Broken clouds with complex structure	4	2.0	0.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.0
	g	Dust aerosols over ocean	4	2.0	0.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.0
	h	Aerosol and ocean parameters over turbid waters	2	2.0	0.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.0
	i	Aerosol and ocean parameters over biologically productive waters	4	2.0	0.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.0
	k	Smoke aerosols over ocean	1	2.0	0.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0
	total:			150	98	16.5	5.7%	2.5%	1.0%	0.0%	0.0%	0.0%	0.0%	9.2%
		ER-2 flight hours			2.8	0	0	0	0	0	0	0	0	2.8
		TO flight hours			2.5	0	0	0	0	0	0	0	0	2.5
		Shearwater days			0	0	0	0	0	0	0	0	0	0

Note: images and data presented in this report are preliminary, and not for publication, presentation, or scientific use. The PACE-PAX data archive is:

<https://www-air.larc.nasa.gov/missions/pacepax/index.html>

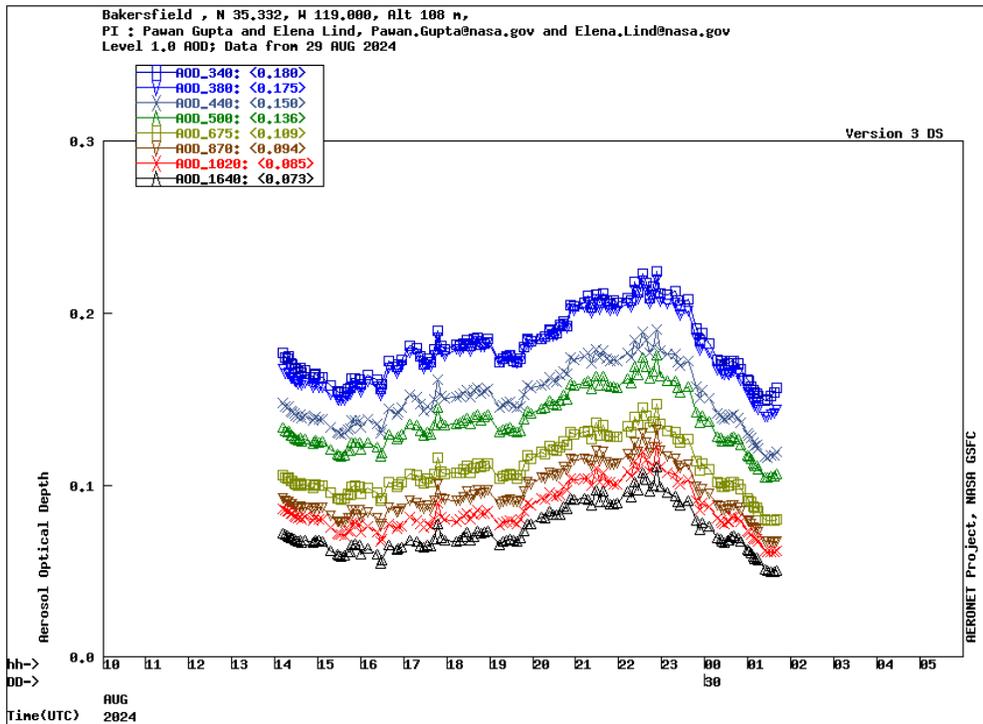
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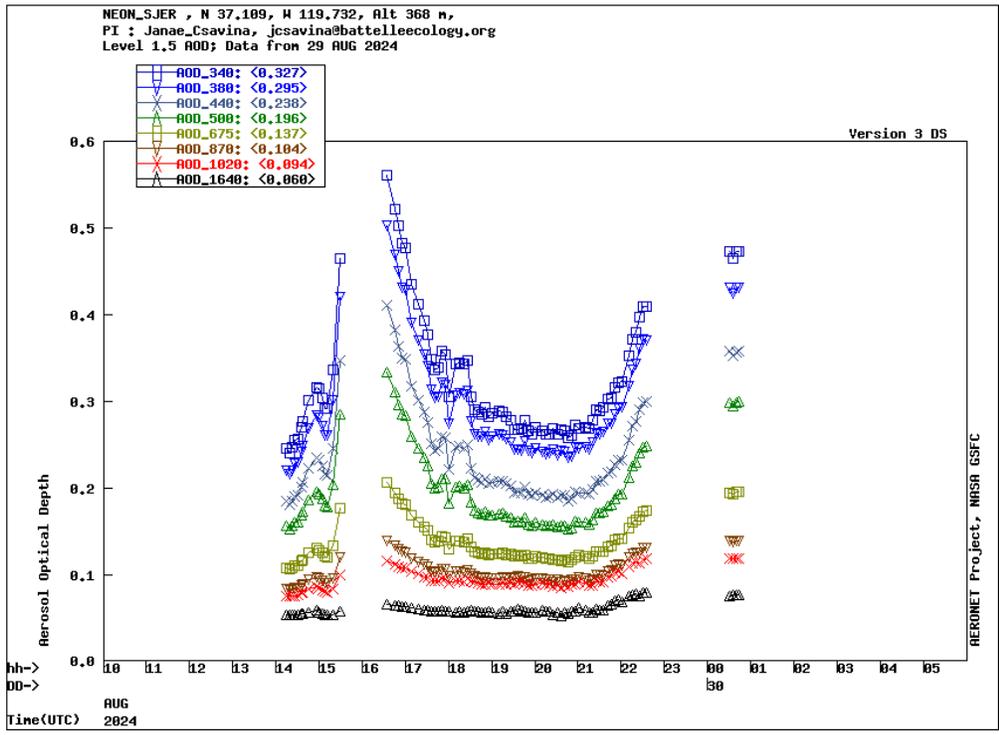
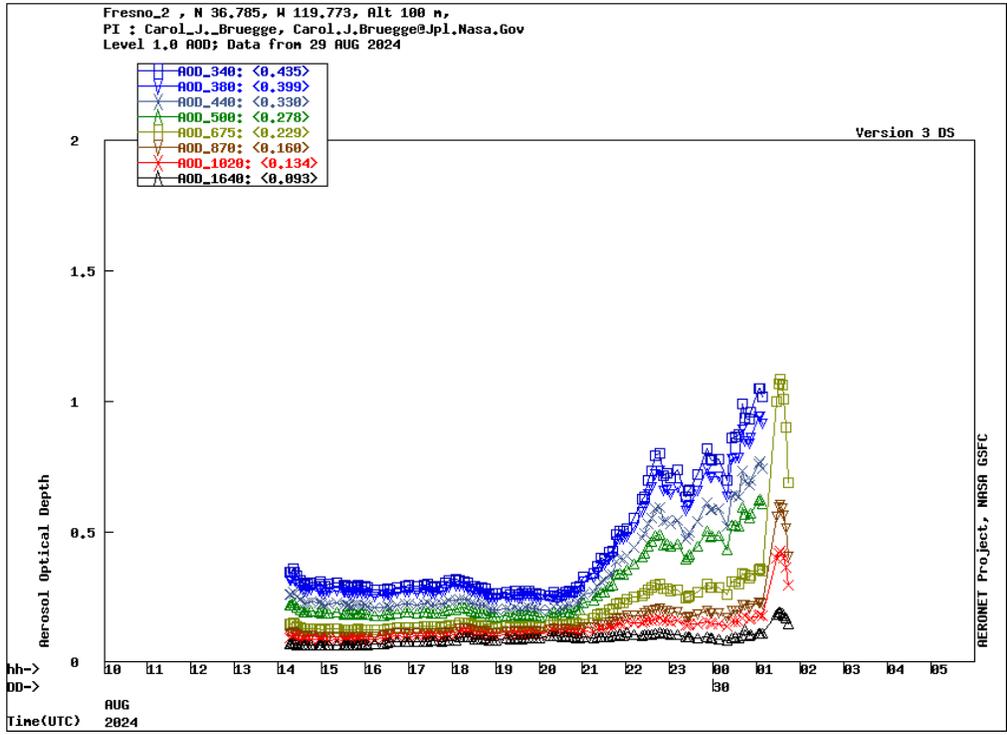


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MVIS Image 20240829 17:59:17





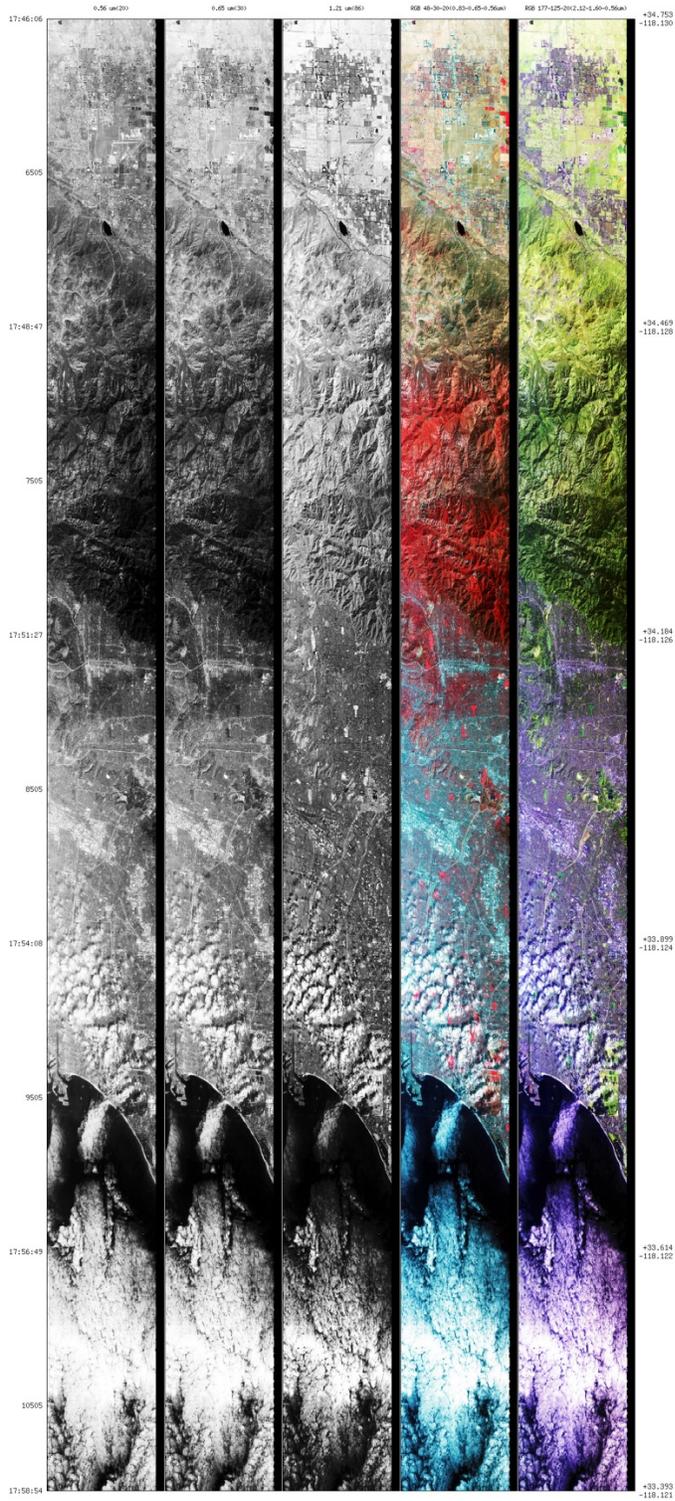
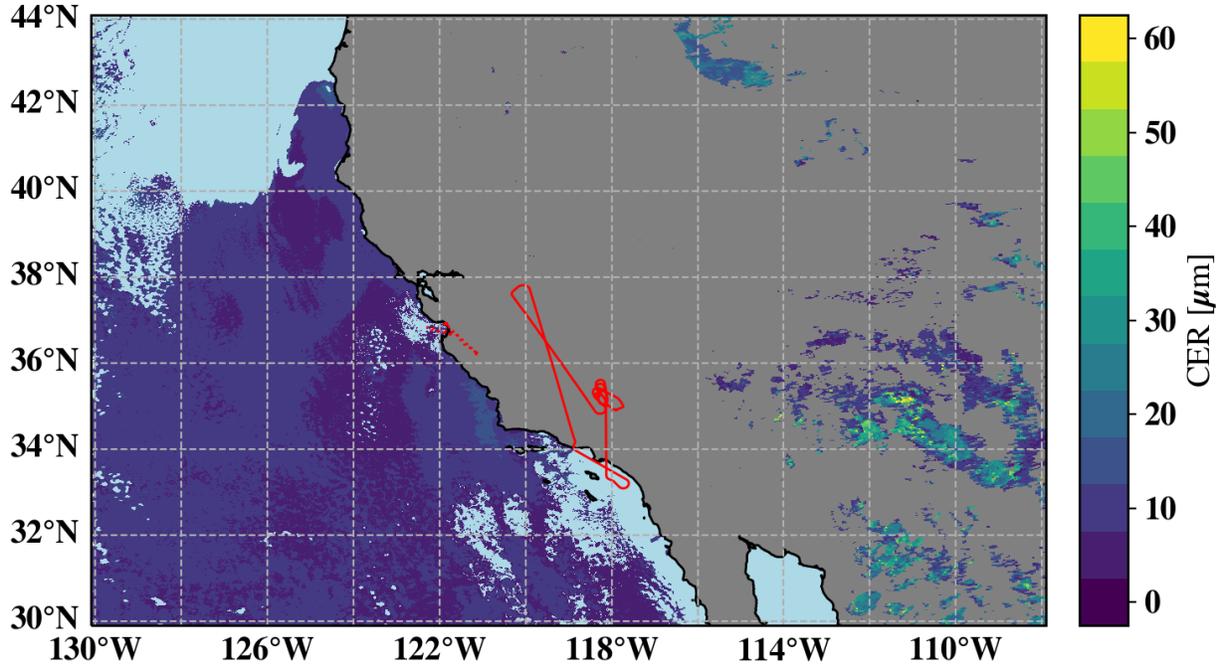


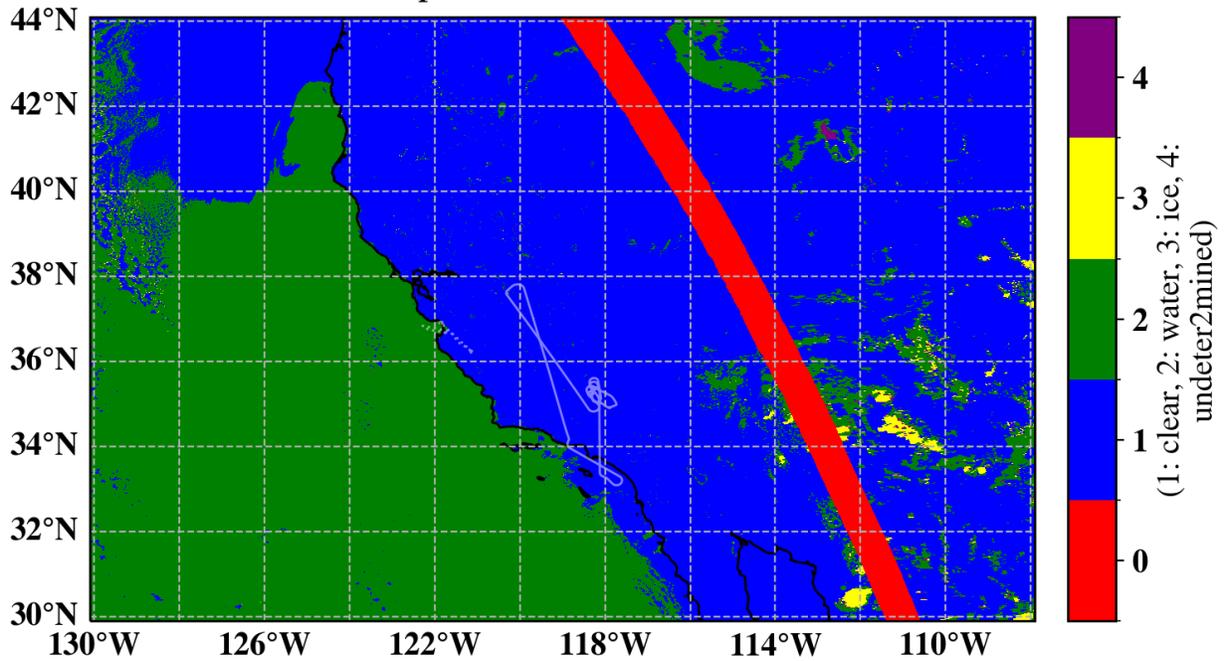
Figure 1 PICARD quicklook for ER-2 takeoff, over the Antelope Valley, LA Basin, and (cloudy) USC_SeaPRISM site. More quicklooks here: https://asapdata.arc.nasa.gov/picard/data/flt_html/24622.html

PACE satellite quicklooks

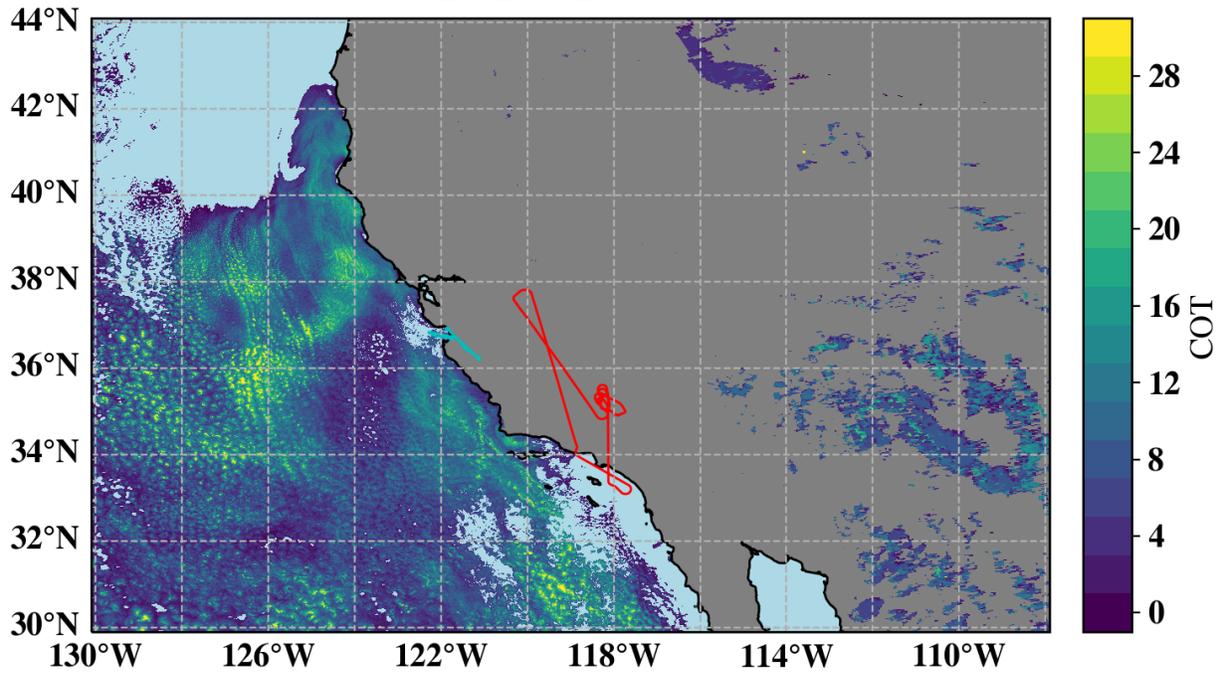
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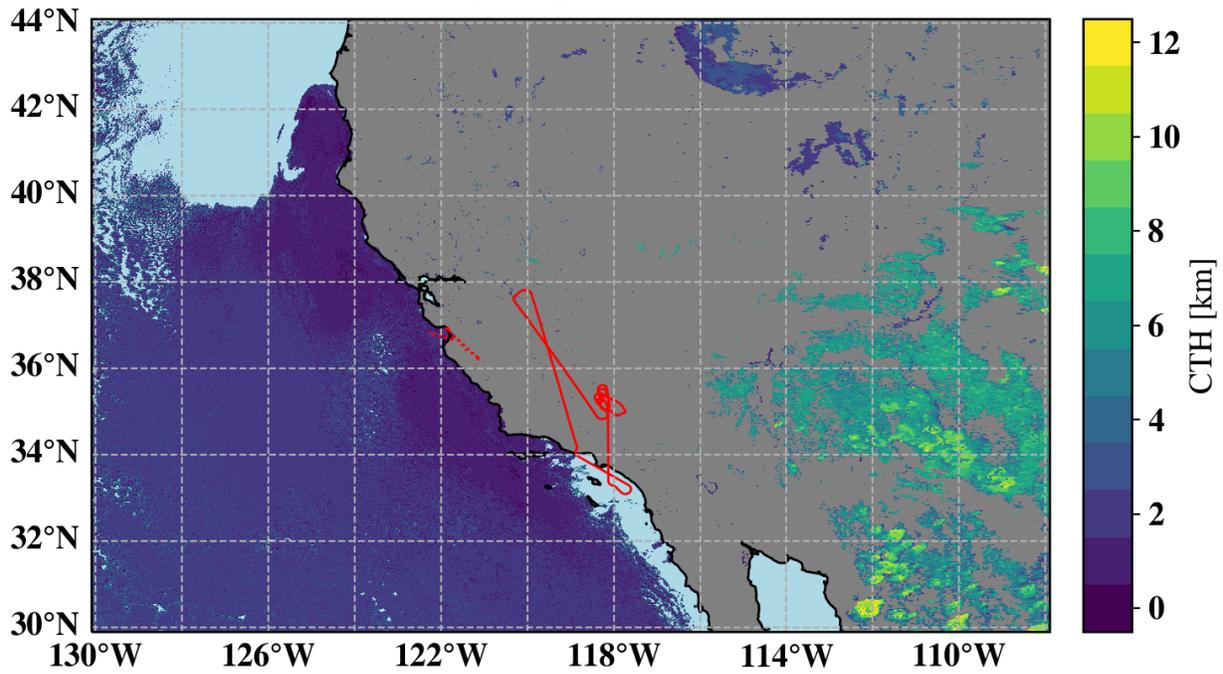
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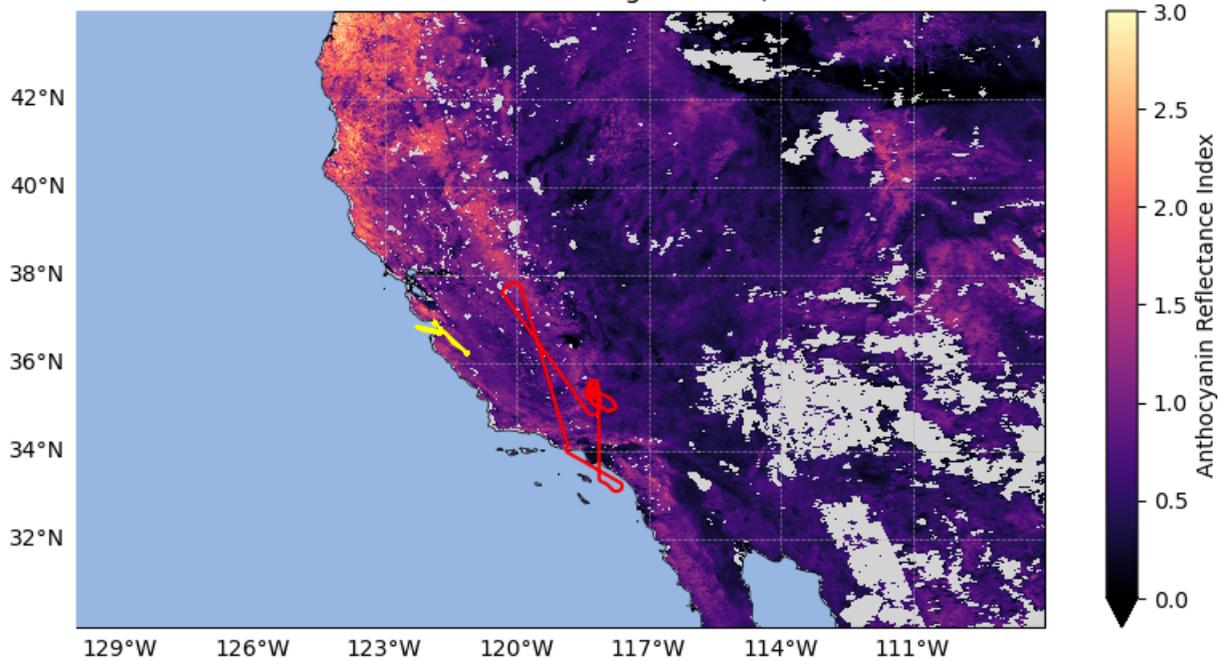
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OCI mARI with ER2/Twin Otter Flight Tracks, 2024-08-29



OCI NDVI with ER2/Twin Otter Flight Tracks, 2024-08-29

