PACE-PAX research flight report 2024/09/10

Compiled by Kirk Knobelspiesse, Ivona Cetinic, Bridget Seegers
2024/09/17
Reviewed by Samuel LeBlanc

Short ER2 flight in Southern California focusing on extremely active Line, Airport and Bridge fires, with overpass of R/V Blissfully and HyperNAV offshore. Intense smoke from fires in eastern LA basin and downwind to the East and North, with imagery indicating creation of pyrocumulus. Overpass of Ivanpah Playa with possible moderate aerosol load. Over ocean is relatively cloud free with low aerosol optical depths. Due to a data downlink issue, PACE was not ingesting science data on this day. High surface winds at AFRC necessitated an early return to base; no EarthCARE underpass possible.

ER-2
Takeoff: 16:27, Landing: 20:43, Duration: 4.3
Instrument status: RSP had a data logging / computer issue, no valid data collected. All other instruments operating well.
Mission Scientist: Kirk Knobelspiesse
Pilot: Kirt Stallings; Mobile: Tim Williams

Twin Otter
No flight

R/V Shearwater
No operations

R/V Blissfully
Departure: 15:19, Return: 21:01, Duration: 5.6
Instrument status: good
Captain/Mission Scientist: Bridget Seegers
See end for full R/V Blissfully report

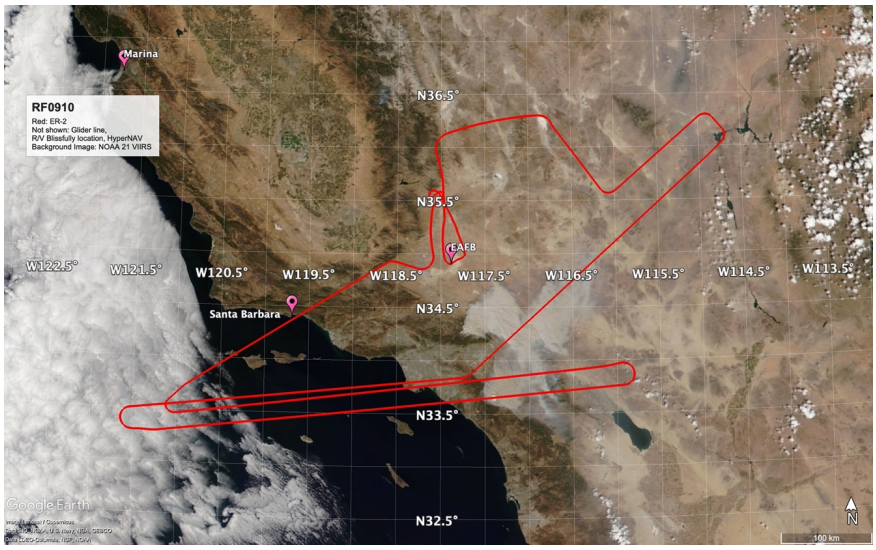
PACE
PACE has problem, Ka band not transmitting, no science data collection

EarthCARE
No underpass

Gliders
Operational

HyperNAV
Operational

Overall image summary



Bridge fire, photo from ER-2 pilot Kirt Stallings

Validation Traceability Matrix itemized objectives

VTM elements in **black** satisfied, **blue** partially satisfied

Time	Platform	VTM(hrs)	
15:19	RB		Departure
16:27	ER2		Takeoff
17:21	ER2	1a(0.5x0.25), 4a(0.5x0.50)	Overfly Ivanpah Playa. Possible aerosol load? Small clouds partly obscure scene
17:39	ER2	1d(1.0x0.50) 6a(1.0x0.50)	Overfly extremely high aerosol loads downwind of the Line, Bridge and Airport fires. 17:44 overflies Line fire
18:03	ER2	4d(0.5) 4b(1.0)	Overfly HyperNAV location (surfaces at 20:26), possible sunglint
18:47	ER2, SB	1b(0.5+1.5), 1c(0.5+1.5)	ER-2 overfly R/V Blissfully and USC_SeaPRISM AERONET site, AOD(490nm)=0.10
18:53	ER2	1d(1.0x0.75) 6a(1.0x0.75) 6c(0.5x0.25)	Overfly extremely high aerosol loads downwind of the Airport fires. Evidence of pyrocumulus cloud in imagery
19:16	ER2	1d(1.0x0.75) 6a(1.0x0.75)	Overfly extremely high aerosol loads downwind of the Airport fires. Edge of plume observed by previous line
19:35	ER2	4d(1.0)	Overfly HyperNAV location (surfaces at 20:26)
19:58	ER2	4b(0.5)	Ovefly UCSB AER0NET. AOD(490)=0.1, sunglint
20:43	ER2		Landing
21:01	RB		Return

ER2: ER-2
RB: R/V Blissfully

Commented [SL1]: No TO, so only half

Commented [SL2]: Evidence of multiple aerosol layers in HSRL, but no TO

Assessment:

- Top remaining objectives (score above 6.0): PACE aerosol in narrow swath (3a,b), EarthCARE cloud (3e), land surface (1a)

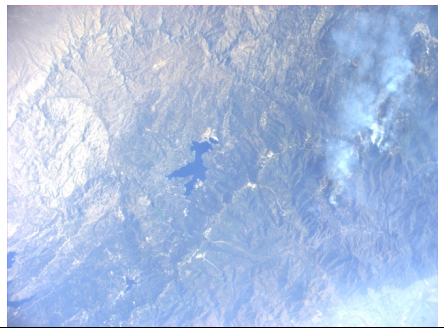
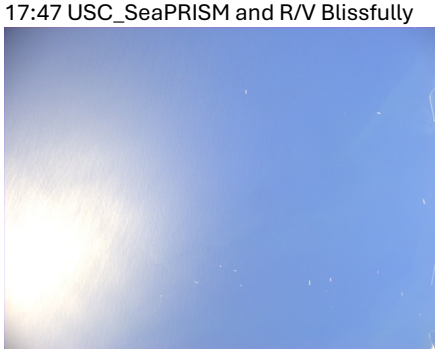
PACE-PAX progress tracking

Validation objectives	ID	Measurement objectives	Importance, w	Observation time, h (hours)	Total observed (hours)	Fractional success 9/9	Fractional success 9/10	Fractional success 9/11	Fractional success 9/12	Fractional success 9/13	Fractional success 9/14	Fractional success 9/15	Total success	Remaining score
1. Validate new retrieval properties	a	Land surface parameters	8	2.0	0.6	0.0%	4.8%	0.0%	0.0%	0.0%	0.0%	0.0%	25.0%	6.0
	b	Ocean radiometric parameters	10	8.0	22.5	0.0%	3.6%	0.0%	6.7%	0.0%	0.0%	0.0%	94.0%	0.6
	c	Aerosol parameters over the ocean	12	8.0	16.4	0.0%	5.1%	0.0%	5.0%	0.0%	0.0%	0.0%	87.1%	1.5
	d	Aerosol parameters over land	12	8.0	27.2	0.0%	1.7%	0.0%	2.3%	0.0%	0.0%	0.0%	96.6%	0.4
	e	Cloud parameters	12	8.0	7.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	58.3%	5.0
	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	3.5	0.0%	0.0%	0.0%	13.3%	0.0%	0.0%	0.0%	35.4%	6.5
	b	Aerosol parameters over land (PACE)	10	8.0	2.1	0.0%	0.0%	0.0%	11.6%	0.0%	0.0%	0.0%	23.3%	7.7
	c	Cloud parameters (PACE)	5	2.0	1.5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	52.8%	2.4
	d	Aerosol parameters (EarthCARE)	8	4.0	0.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	46.5%	4.3
	e	Cloud parameters (EarthCARE)	8	4.0	0.5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	11.8%	7.1
4. Validate radiometric and polarimetric properties	a	Validate large reflectances	6	2.0	0.1	0.0%	6.1%	0.0%	0.0%	0.0%	0.0%	0.0%	6.1%	5.6
	b	Validate large reflectances with high polarization	6	2.0	1.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	39.3%	3.6
	c	Validate large reflectances with low polarization	6	2.0	2.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	63.2%	2.2
	d	Overfly vicarious calibration sites	6	4.0	1.3	0.0%	26.8%	0.0%	0.0%	0.0%	0.0%	0.0%	26.8%	4.4
6. Focus on specific processes or phenomena	a	High aerosol loads over land	4	2.0	3.3	0.0%	41.0%	0.0%	0.0%	0.0%	0.0%	0.0%	80.3%	0.8
	b	High aerosol loads over ocean	4	2.0	1.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	39.3%	2.4
	c	Multiple aerosol layers	1	2.0	4.1	0.0%	0.0%	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	3.5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	82.6%	0.7
	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	1.1	0.0%	0.0%	0.0%	43.0%	0.0%	0.0%	0.0%	43.0%	2.3
	h	Aerosol and ocean parameters over turbid waters	2	2.0	3.1	0.0%	0.0%	0.0%	56.9%	0.0%	0.0%	0.0%	79.0%	0.4
	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	1.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	39.3%	0.6
		total:	150	98	102.7	0.0%	3.4%	0.0%	4.6%	0.0%	0.0%	0.0%	49.6%	
														total
				ER-2 flight hours	18.9	0	4.3	0	0	0	0	0	0	4.3
				TO flight hours	22.2	0	0	0	3.7	0	0	0	0	3.7
				Shearwater days	2	0	1	0	1	0	0	0	0	2
		PACE-PAX overall objectives satisfied:		49.6%										

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

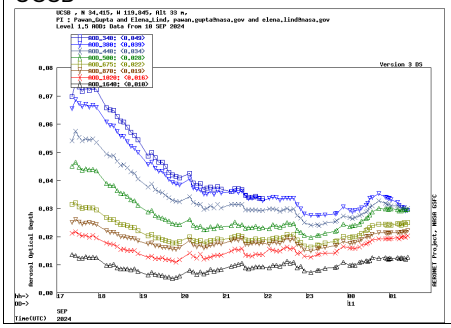
https://www-air.larc.nasa.gov/missions/pacepax/index.html

ER-2/MVIS images

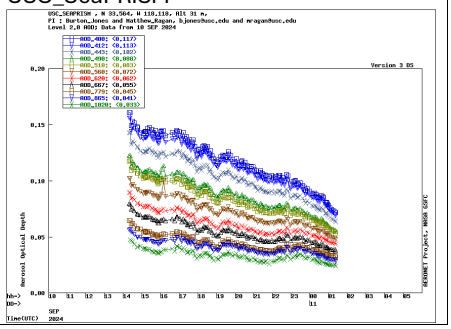
17:25:19 Ivanpah Playa 	17:43:17 Line fire 
17:47 USC_SeaPRISM and R/V Blissfully 	18:52:39 Airport fire with pyrocu 
19:59:58 Overfly UCSB Aeronet location 	

AERONET quicklooks

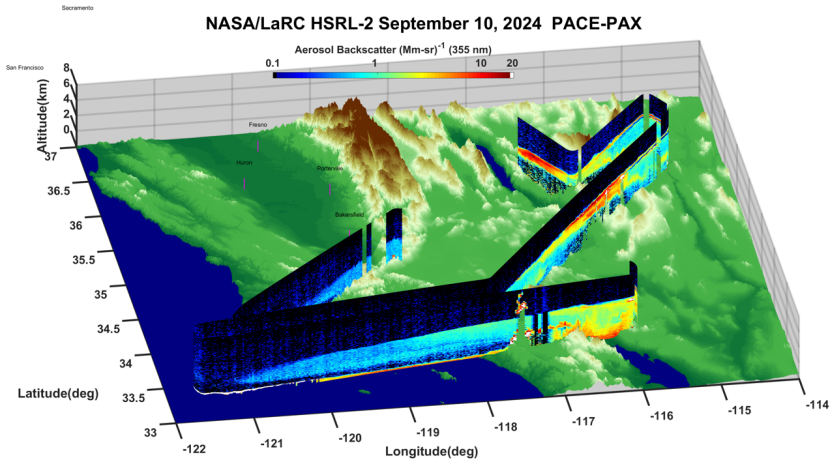
UCSB

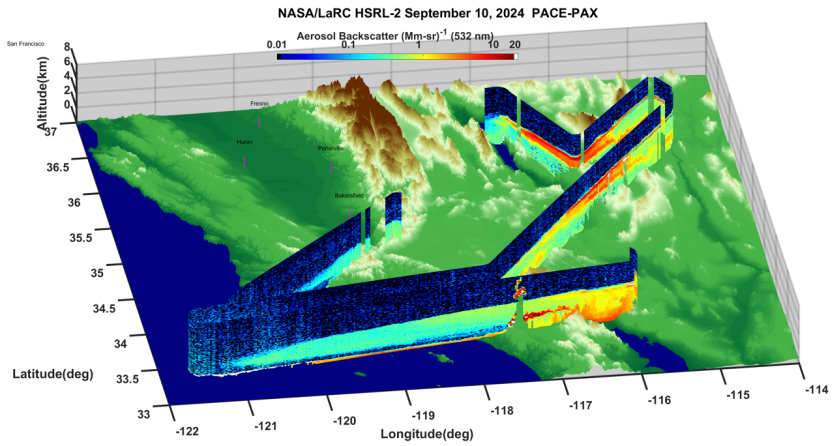


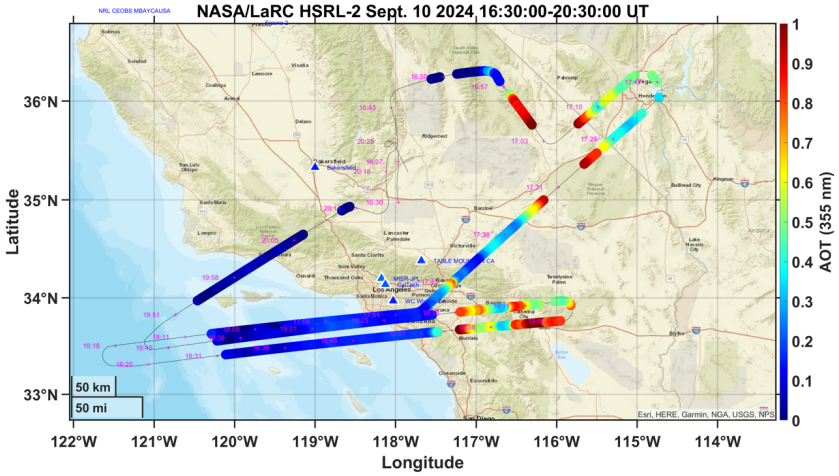
USC_SeaPRISM

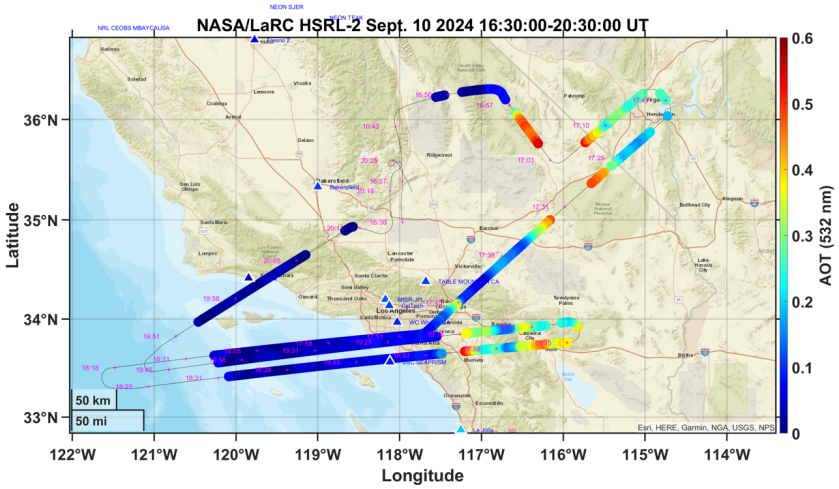


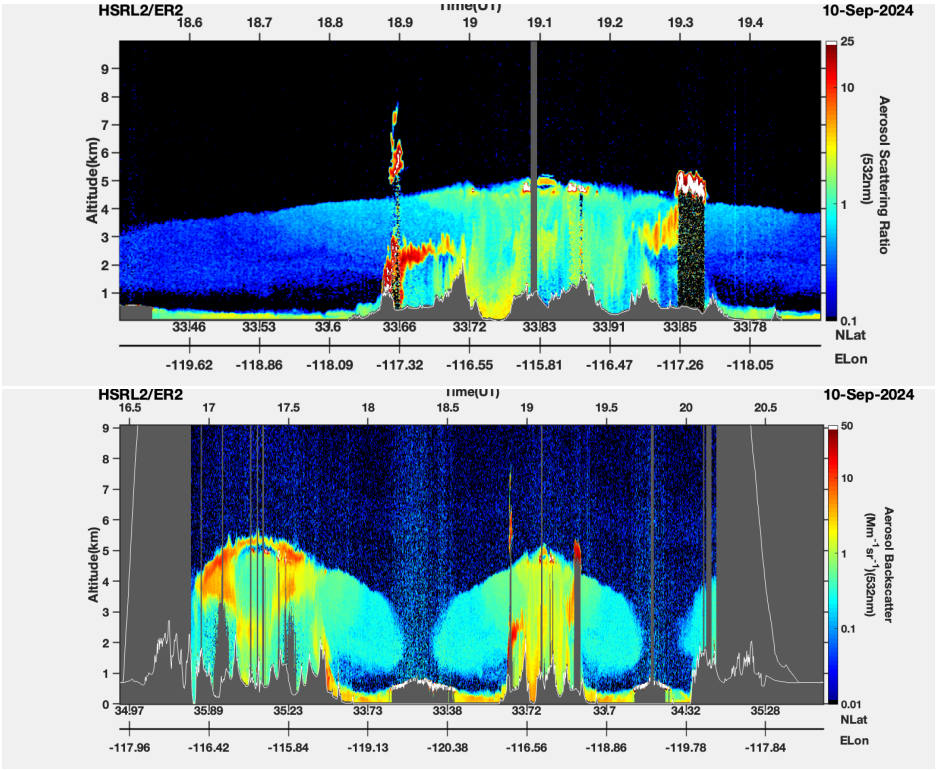
ER2/HSRL2


Sacramento
NASA/LaRC HSRL-2 September 10, 2024 PACE-PAX
Aerosol Backscatter (Mm-sr)-1 (355 nm)
0.1
1
10
20
San Francisco
Altitude(km)
Fresno
Huron
Porterville
Bakersfield
Latitude(deg)
Longitude(deg)

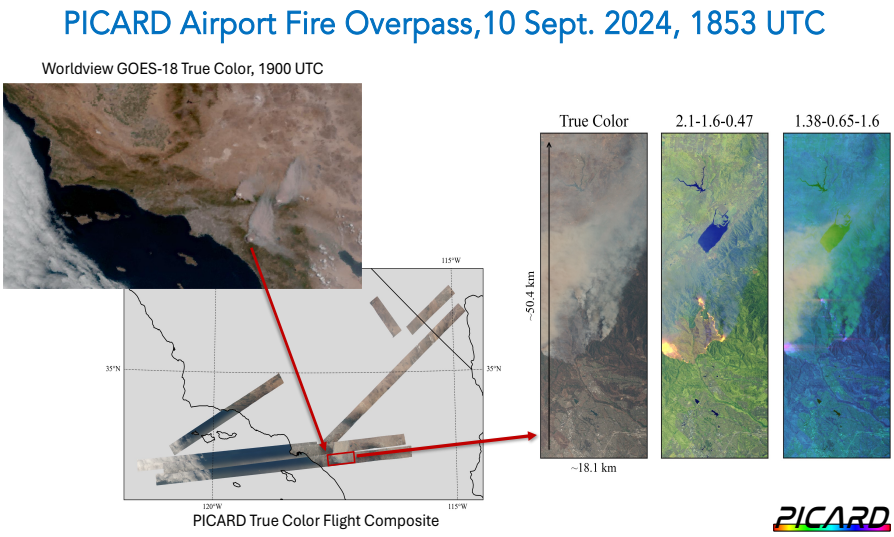

NASA/LaRC HSRL-2 September 10, 2024 PACE-PAX
Aerosol Backscatter (Mm-sr)-1 (532 nm)
0.01
0.1
1
10
20
San Francisco
Altitude(km)
Fresno
Huron
Porterville
Bakersfield
Latitude(deg)
Longitude(deg)

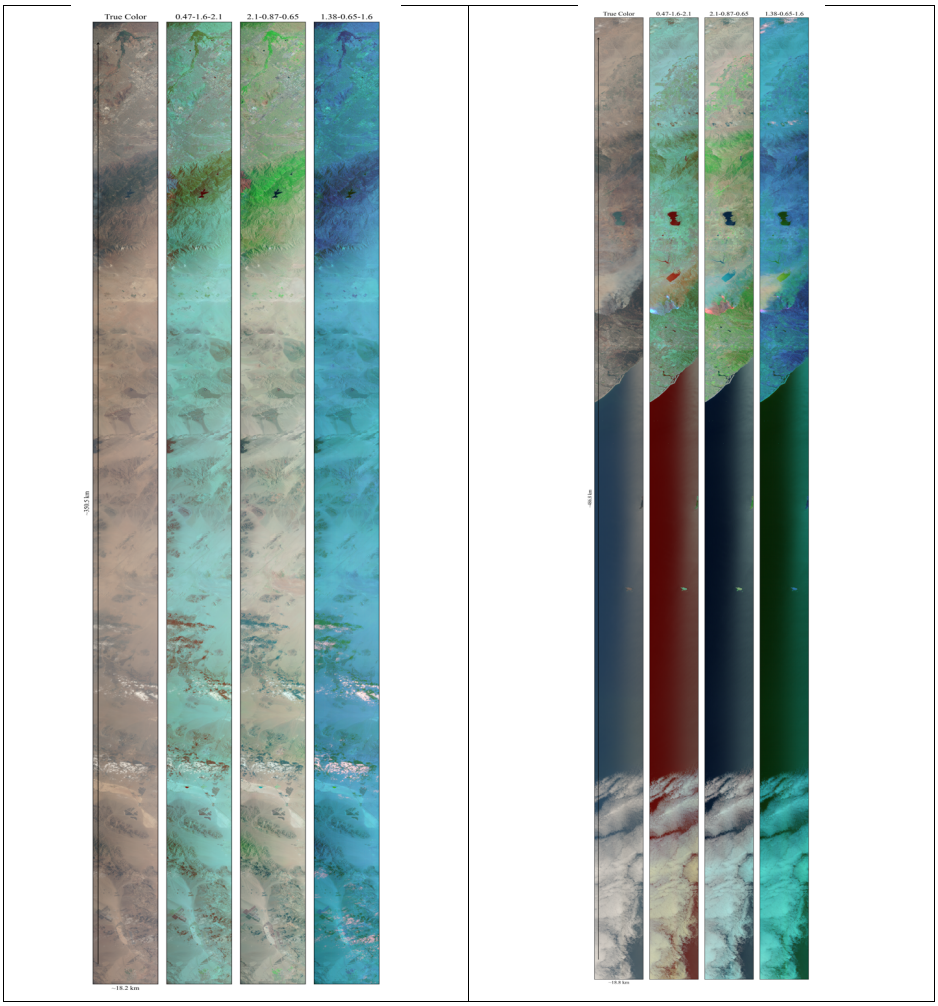

NASA/LaRC HSRL-2 Sept. 10 2024 16:30:00-20:30:00 UT
NRL CEOBS MBAYCAUSA
Latitude
Longitude
AOT (355 nm)
36°N
35°N
34°N
33°N
122°W
121°W
120°W
119°W
118°W
117°W
116°W
115°W
114°W
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
50 km
50 mi
Esri, HERE, Garmin, NGA, USGS, NPS


NASA/LaRC HSRL-2 Sept. 10 2024 16:30:00-20:30:00 UT
NRL CEOBS MBAYCAUSA
NEON SJER
Latitude
Longitude
AOT (532 nm)
36°N
35°N
34°N
33°N
122°W
121°W
120°W
119°W
118°W
117°W
116°W
115°W
114°W
0.6
0.5
0.4
0.3
0.2
0.1
0
50 km
50 mi
Esri, HERE, Garmin, NGA, USGS, NPS


HSRL2/ER2
10-Sep-2024
Time(UT)
18.6 18.7 18.8 18.9 19 19.1 19.2 19.3 19.4
Altitude(km)
1 2 3 4 5 6 7 8 9
25
10
1
0.1
Aerosol Scattering Ratio (532nm)
33.46 33.53 33.6 33.66 33.72 33.83 33.91 33.85 33.78
NLat
-119.62 -118.86 -118.09 -117.32 -116.55 -115.81 -116.47 -117.26 -118.05
ELon
HSRL2/ER2
10-Sep-2024
Time(UT)
16.5 17 17.5 18 18.5 19 19.5 20 20.5
Altitude(km)
0 1 2 3 4 5 6 7 8 9
50
10
1
0.1
0.01
Aerosol Backscatter (Mm-1sr-1)(532nm)
34.97 35.89 35.23 33.73 33.38 33.72 33.7 34.32 35.28
NLat
-117.96 -116.42 -115.84 -119.13 -120.38 -116.56 -118.86 -119.78 -117.84
ELon

ER2/PICARD


PICARD Airport Fire Overpass,10 Sept. 2024, 1853 UTC
Worldview GOES-18 True Color, 1900 UTC
True Color
2.1-1.6-0.47
1.38-0.65-1.6
~50.4 km
~18.1 km
115°W
35°N
120°W
PICARD True Color Flight Composite
PICARD


True Color
0.47-1.6-2.1
2.1-0.87-0.65
1.38-0.65-1.6
~384 km
~18.2 km
True Color
0.47-1.6-2.1
2.1-0.87-0.65
1.38-0.65-1.6
~384 km
~18.8 km

R/V Blissfully report

PACE-PAX R/V Blissfully day report

Date: 09/10/2024

Creator: Bridget Seegers

Cruise ID: RF0910-RB

Sailed out: 15:19

Back in port: 21:01

Today, the ship accomplished....

Collection of vertical radiometry profiles and discrete sample collection (HPLC + ap) on a single station in proximity of SeaPRISM site (2 nm north due to flight path). The station had three sets of 5 HyperPro profiles to 20m and a single deep cast to 60m and discrete water samples included triplicate HPLC + ap and duplicate community composition Lugol's preserved and paraformaldehyde samples for flow cytometry.

Station 1 - 33.597871°, -118.117673°, arrival at 17:34

Sampling happened parallel to the ER-2 overflight at 18:47

Tomorrow, RV Blissfully is taking a day off

Ship plans through the next 3 days...

Sampling in coordination with rest of the experiment

System Status...

All good

Group Status...

All great