

PACE-PAX research report 2024/09/30

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2024/10/08**

Reviewed by Samuel LeBlanc

Successful ER-2 (alone) flight with under flights by of PACE (offshore) and EarthCARE (California/Arizona border). Generally cloud free onshore and limited cloud cover in offshore section. Also observations of smoke from “Happy” fire and Railroad Valley calibration reference.

ER-2

Take off: 17:43

Landing: 00:10

Duration: 6.5 hrs

Pilot: Kirt Stallings, mobile: Greg Nelson

All instruments operated successfully. Last flight!

PACE

21:09 offshore California. ER-2 ground track intentionally observes a line offset from the center swath, but still within the PACE-OHS swath.

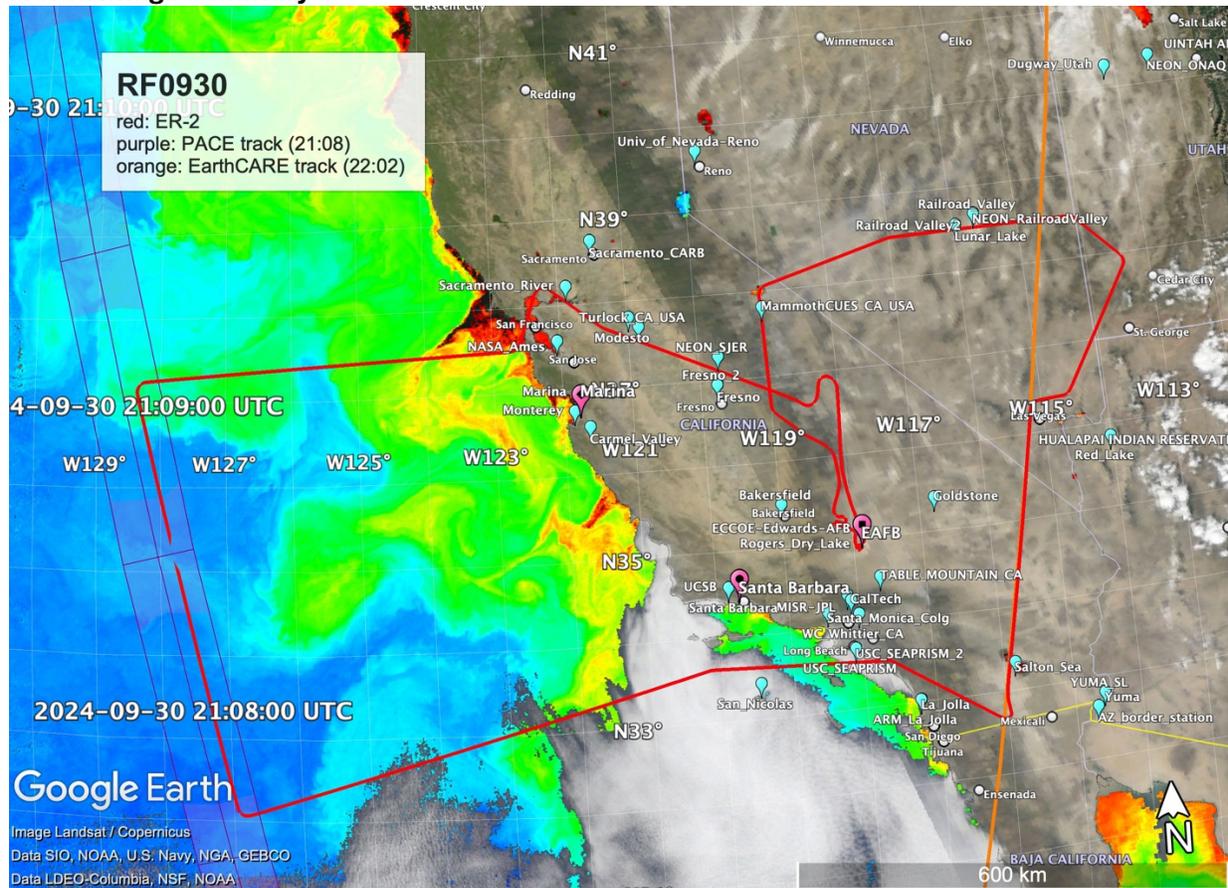
EarthCARE

22:02 California/Nevada border. Orbit 1944

Gliders

Operational

Overall image summary



Validation Traceability Matrix itemized objectives

VTM elements in **black** satisfied, **blue** partially satisfied, **red** to be confirmed

Time UTC	Platform	VTM(hrs)	
17:43	ER2		ER-2 takeoff
18:24	ER2		Beginning of line over California Central Valley. Smoke lofted in start of line, with geographically distinct layers
18:25	ER2	1a(0.5), 1d(0.5)	ER2 over NEON_SJER AERONET site, AOT(500)=0.11
18:32	ER2	1d(0.5)	ER2 over Turlock AERONET site, AOT(500)=0.07 (note later in the day a high AOT plume moves in, with high fine mode fraction, presumably smoke)
18:42	ER2	1b(0.5), 1c(0.5), 6h(0.5)	ER2 over Sacramento_River AERONET-OC site. AOT(490)=0.07
18:53	ER2	1b(1.0*0.5), 1c(1.0*0.5), 3a(1.0*0.5), 6h(0.5*0.5), 6i(0.5*0.5)	Transit to PACE (jn PACE-OH swath) track along cloud free and gradient of very high Chl waters to much lower concentrations on the line. End 19:31. Scored but reduced due to time difference.
19:34	ER2	1b(1.5), 1c(1.5), 3a(1.5)	Transit within PACE-OHS swath. Cloud free with a gradient of more to less Chl-a from start (North) to end (South). Ends 20:17
21:09	PACE		PACE offshore California

20:20	ER2	1e(1.0), 3c(0.5), 4c(1.0)	Return to shore line from PACE track, over marine stratocumulus clouds. Cloudy in all coastal sites of interest (HyperNAV location, SeaPRISM site) clouds ends ~21:24. Some clear areas until cross coast at 21:32
21:48	ER2	1d(1.0), 3d(2.0)	ER2 begins EarthCARE line. Line ends 22:20. Elevated aerosols that HSRL indicates are “dusty mix”. Cloud free.
21:54	ER2	1d(0.5), 3d(0.5)	Over Salton Sea AERONET site, AOT(500)=0.1
22:02	EarthCARE		EarthCARE California/Nevada border. Orbit 1944
22:13	ER2	1a(0.5*0.5), 4a(0.5*0.5)	Over Ivanpah Playa calibration site (no ground team)
22:59	ER2	1a(1.0), 1d(0.5), 4a(0.5), 4d(0.5)	Over Railroad valley calibration and AERONET site. AOT(500)=0.05
23:09	ER2	1d(0.5*0.5)	Line over smoke from “Happy” fire observed earlier. End 23:23
23:27	ER2	1d(0.5)	Over Mammoth_CUES_CA_USA AERONET site, AOT(500)=0.06
23:33	ER2	1a(0.5*0.5), 1d(0.5)	Over NEON_TEAK (neon land surface site) AERONET site, AOT(500)=0.1 (variations through the day likely linked to happy fire)
00:10	ER2		ER-2 lands

PACE-O: within swath of PACE’s OCI instrument

PACE-OH: within swath of PACE’s OCI and HARP2 instruments

PACE-OHS: within swath of PACE’s OCI, SPEXone and HARP2 instruments

TO: Twin Otter

RB: R/V Blissfully

RS: R/V Shearwater

Assessment:

- 0.014 of objectives observed. Successful ER-2 under flights by of PACE (offshore) and EarthCARE (California/Arizona border). Generally cloud free
- No scores above 6.0. Although this flight contributed, the largest remaining is still PACE aerosol in narrow swath over ocean (3a) at 4.4

PACE-PAX progress tracking															
Validation objectives	ID	Measurement objectives	Importance, w	Observation time, h (hours)	Total observed (hours)	Fractional success 9/23	Fractional success 9/24	Fractional success 9/25	Fractional success 9/26	Fractional success 9/27	Fractional success 9/29	Fractional success 9/30	Total success	Remaining score	
1. Validate new retrieval properties	a	Land surface parameters	8	2.0	3.0	0.000	0.000	0.000	0.000	0.000	0.015	0.007	0.994	0.1	
	b	Ocean radiometric parameters	10	8.0	18.0	0.000	0.000	0.000	0.003	0.001	0.000	0.000	0.999	0.0	
	c	Aerosol parameters over the ocean	12	8.0	20.5	0.000	0.000	0.000	0.014	0.003	0.001	0.001	0.998	0.0	
	d	Aerosol parameters over land	12	8.0	22.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.0	
	e	Cloud parameters	12	8.0	7.8	0.058	0.025	0.000	0.000	0.023	0.000	0.009	0.930	0.8	
	f	Ocean surface parameters	1	8.0	1.5	0.000	0.000	0.000	0.133	0.000	0.000	0.000	0.354	0.6	
3. Validate in a narrow swath	a	Aerosol parameters over the ocean (PACE)	10	8.0	3.0	0.000	0.000	0.000	0.000	0.076	0.000	0.126	0.556	4.4	
	b	Aerosol parameters over land (PACE)	10	8.0	7.0	0.132	0.000	0.000	0.103	0.000	0.113	0.000	0.751	2.5	
	c	Cloud parameters (PACE)	5	2.0	2.5	0.000	0.000	0.000	0.000	0.181	0.000	0.023	0.918	0.4	
	d	Aerosol parameters (EarthCARE)	8	4.0	5.5	0.038	0.000	0.000	0.053	0.000	0.000	0.038	0.956	0.4	
	e	Cloud parameters (EarthCARE)	8	4.0	2.5	0.152	0.167	0.000	0.000	0.000	0.000	0.000	0.632	2.9	
4. Validate radiometric and polarimetric properties	a	Validate large reflectances	6	2.0	1.0	0.000	0.000	0.000	0.000	0.000	0.000	0.018	0.972	0.2	
	b	Validate large reflectances with high polarization	6	2.0	1.5	0.000	0.000	0.000	0.194	0.000	0.000	0.000	0.826	1.0	
	c	Validate large reflectances with low polarization	6	2.0	2.5	0.034	0.000	0.000	0.000	0.000	0.000	0.012	0.982	0.1	
	d	Overfly vicarious calibration sites	6	4.0	0.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.268	4.4	
6. Focus on specific processes or phenomena	a	High aerosol loads over land	4	2.0	0.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.0	
	b	High aerosol loads over ocean	4	2.0	0.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.393	2.4	
	c	Multiple aerosol layers	1	2.0	0.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.0	
	d	Aerosol under thin cirrus	2	2.0	3.5	0.826	0.000	0.000	0.000	0.000	0.000	0.000	0.826	0.3	
	e	Aerosol above liquid phase cloud	4	2.0	0.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.826	0.7	
	f	Broken clouds with complex structure	4	2.0	3.0	0.186	0.000	0.000	0.000	0.181	0.000	0.000	0.895	0.4	
	g	Dust aerosols over ocean	4	2.0	0.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.430	2.3	
	h	Aerosol and ocean parameters over turbid waters	2	2.0	2.3	0.000	0.000	0.000	0.046	0.036	0.028	0.031	0.932	0.1	
	i	Aerosol and ocean parameters over biologically productive waters	4	2.0	5.3	0.000	0.000	0.000	0.043	0.028	0.004	0.001	0.994	0.0	
	k	Smoke aerosols over ocean	1	2.0	0.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.713	0.3	
	total:			150	98	112.8	0.041	0.011	0.000	0.021	0.019	0.009	0.014	0.835	total
				ER-2 flight hours		6.2	0	0	6.4	6.5	6.7	6.5	0	32.3	
				TO flight hours		4.1	3.1	0	5.1	3.1	0	0	0	15.4	
				Shearwater days		0	0	0	0	0	0	0	0	0	
PACE-PAX overall objectives satisfied:			0.835												

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

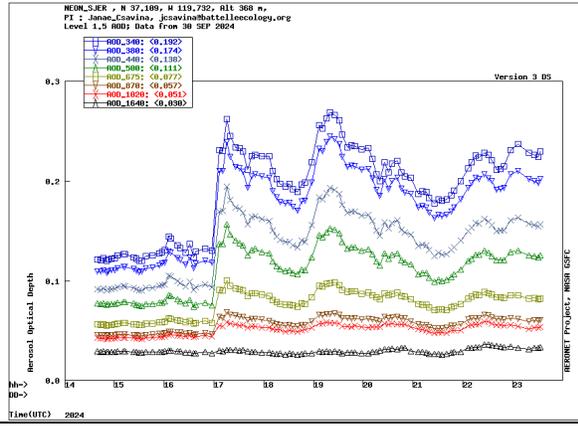
<https://www-air.larc.nasa.gov/missions/pacepax/index.html>

MVIS imagery

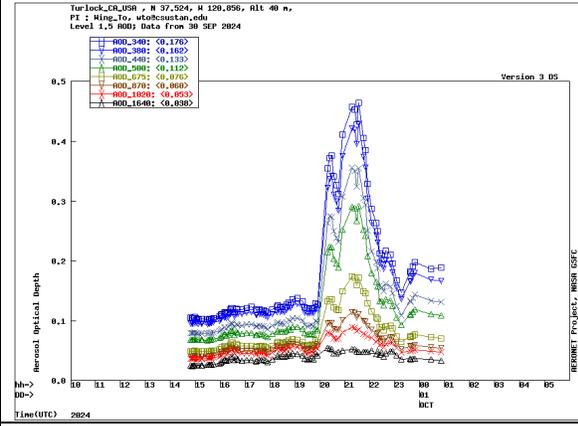
<p>19:34 Start of PACE-OHS line</p> 	<p>20:19 End of PACE-OHS line</p> 
<p>21:27 Nearest clear sky to USC_SEAPRISM</p> 	<p>21:53:30 Salton Sea</p> 
<p>22:13:30 Ivanpah Playa</p> 	<p>23:00 Railroad valley</p> 

AERONET plots

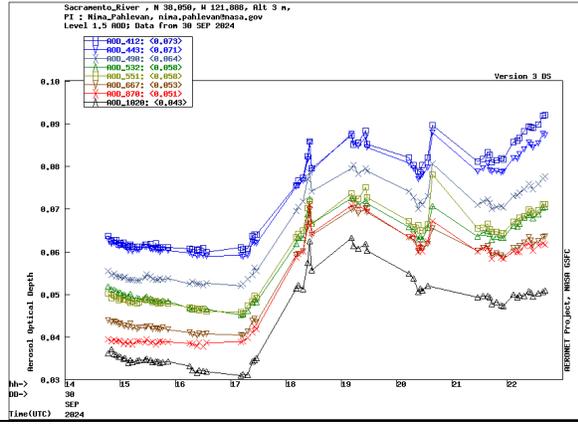
NEON_SJER



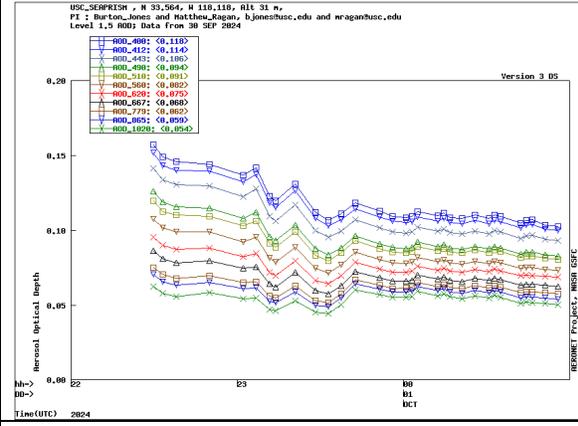
Turlock_CA_USA



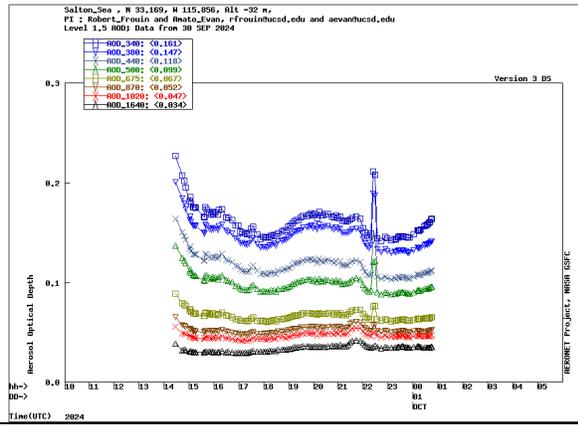
Sacramento_River



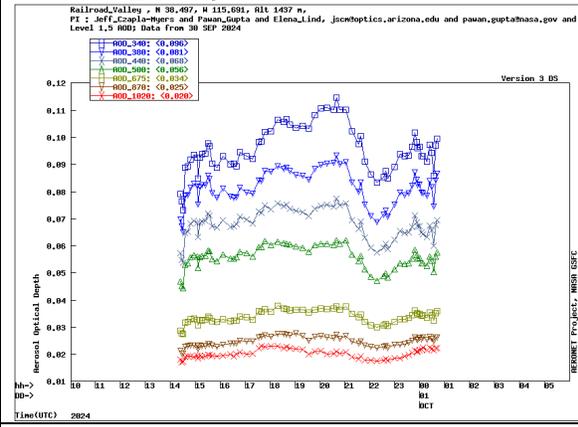
USC_SeaPRISM



Salton_Sea

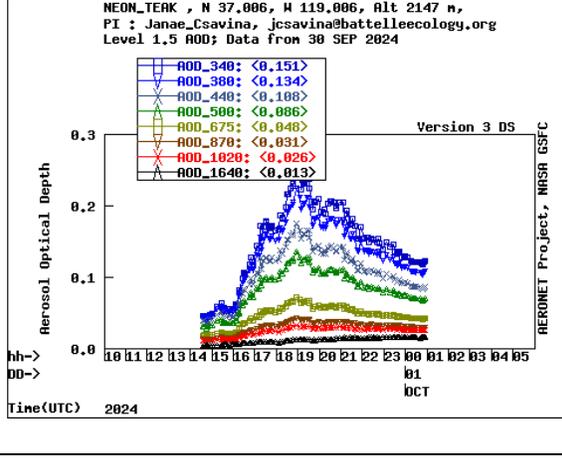
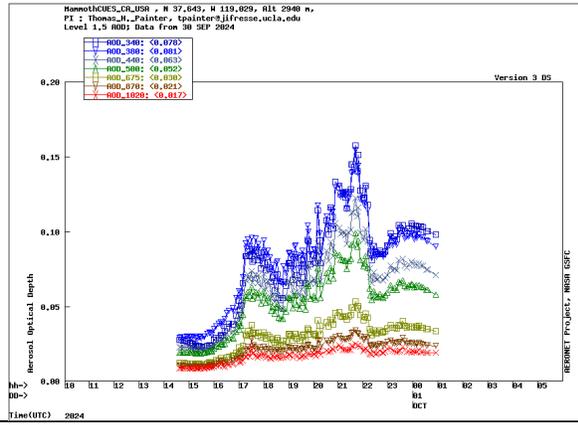


Railroad_Valley

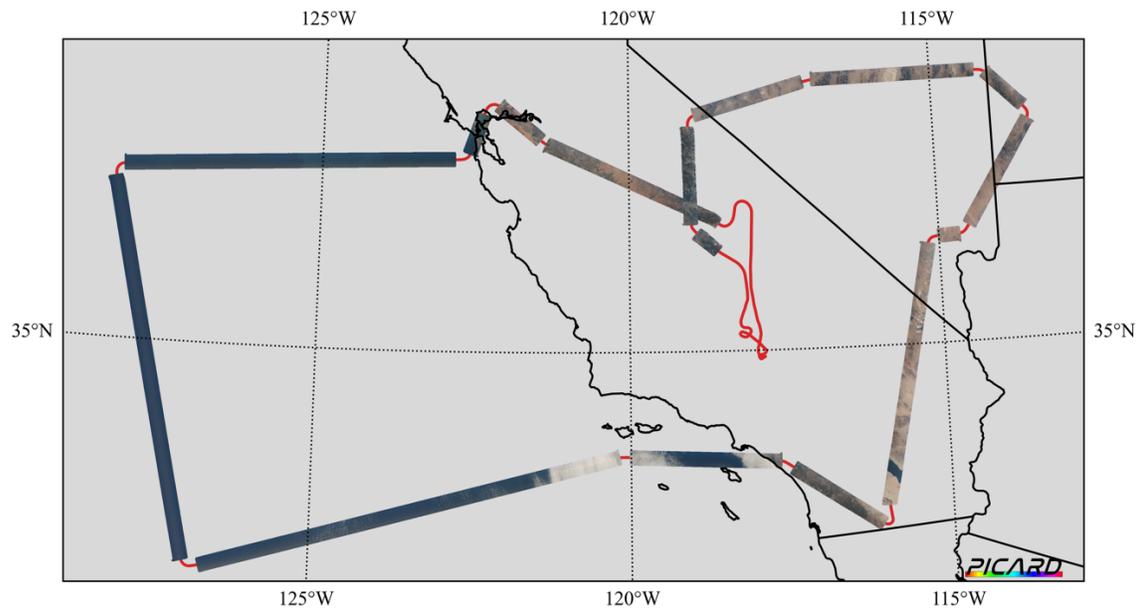


NEON_TEAK

MammothCUES_CA_USA

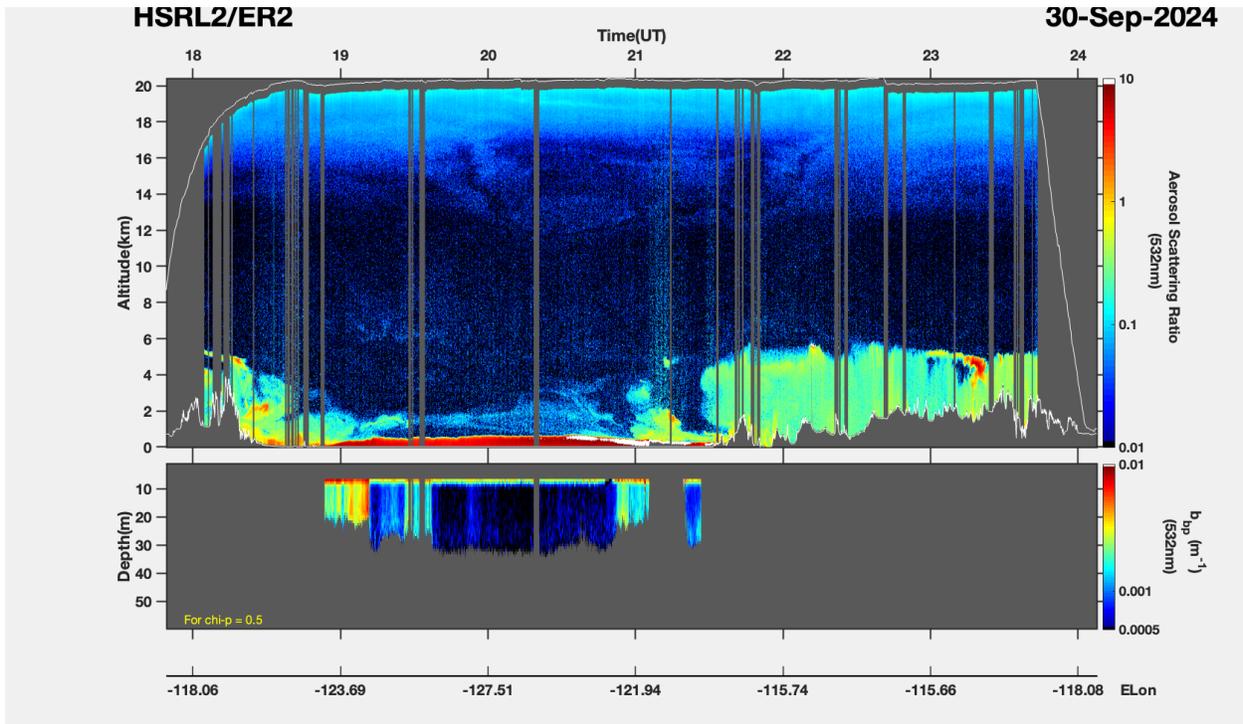
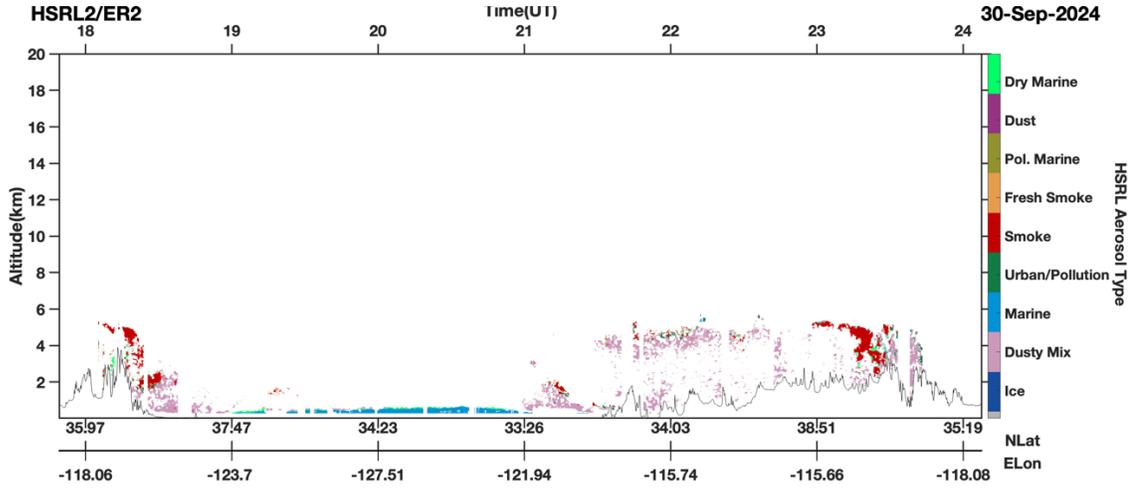


PICARD quicklooks



Pushbroom Imager for Cloud and Aerosol Research and Development
PACE-PAX, NASA Armstrong Flight Research Center
30 September 2024

HSRL2 quicklooks



PACE quicklooks

