

Technical Appendix 15.1

ForgeSolar Simulation



Appendix 15.1 – ForgeSolar Simulation

FORGESOLAR GLARE ANALYSIS

Project: **HEC-WE**

Site configuration: **HEC-WE Solar 1**

Created 24 Jan, 2025

Updated 30 Jan, 2025

Time-step 1 minute

Timezone offset UTC0

Minimum sun altitude 0.0 deg

DNI peaks at 1,000.0 W/m²

Category 10 MW to 100 MW

Site ID 139528.23636

Ocular transmission coefficient 0.5

Pupil diameter 0.002 m

Eye focal length 0.017 m

Sun subtended angle 9.3 mrad

PV analysis methodology V2

Summary of Results Glare with potential for temporary after-image predicted

PV Array	Tilt °	Orient °	Annual Green Glare		Annual Yellow Glare		Energy kWh
			min	hr	min	hr	
PV array 1	20.0	180.0	19,379	323.0	34,632	577.2	-
PV array 2	20.0	180.0	21,792	363.2	21,756	362.6	-
PV array 3	20.0	180.0	20,154	335.9	10,338	172.3	-
PV array 4	20.0	180.0	2,399	40.0	0	0.0	-
PV array 5	20.0	180.0	30,258	504.3	22,534	375.6	-
PV array 6	20.0	180.0	4,397	73.3	2,190	36.5	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
A70	3,097	51.6	0	0.0
B743	6,469	107.8	4,847	80.8
Route 3	47,131	785.5	66,382	1,106.4
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	994	16.6	0	0.0
OP 14	897	14.9	0	0.0
OP 15	924	15.4	0	0.0
OP 16	1,020	17.0	0	0.0
OP 17	1,107	18.4	0	0.0
OP 18	1,152	19.2	0	0.0
OP 19	1,140	19.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	3,757	62.6	1,826	30.4
OP 22	3,243	54.0	1,150	19.2
OP 23	3,255	54.2	1,134	18.9
OP 24	3,525	58.8	1,834	30.6
OP 25	2,408	40.1	5,640	94.0
OP 26	1,966	32.8	1,037	17.3
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	4,544	75.7	1,089	18.1
OP 31	4,336	72.3	0	0.0
OP 32	5,669	94.5	2,775	46.2
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	845	14.1	1,799	30.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	531	8.8	1,937	32.3
OP 39	0	0.0	0	0.0
OP 40	369	6.2	0	0.0

Component Data

PV Arrays

Name: PV array 1

Axis tracking: Fixed (no rotation)

Tilt: 20.0°

Orientation: 180.0°

Rated power: -

Panel material: Smooth glass with AR coating

Reflectivity: Vary with sun

Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	55.530910	-4.120911	232.60	3.00	235.60
2	55.531265	-4.120804	234.67	3.00	237.67
3	55.531766	-4.120342	236.50	3.00	239.50
4	55.532173	-4.120310	238.09	3.00	241.09
5	55.532633	-4.120373	240.19	3.00	243.19
6	55.533270	-4.120121	244.09	3.00	247.09
7	55.533720	-4.119644	247.11	3.00	250.11
8	55.533956	-4.119864	247.45	3.00	250.45
9	55.534087	-4.119697	247.51	3.00	250.51
10	55.534290	-4.118233	252.87	3.00	255.87
11	55.533647	-4.114440	252.02	3.00	255.02
12	55.533541	-4.113518	252.00	3.00	255.00
13	55.533134	-4.112826	253.56	3.00	256.56
14	55.533029	-4.112637	253.21	3.00	256.21
15	55.533545	-4.111360	255.03	3.00	258.03
16	55.534662	-4.109869	258.72	3.00	261.72
17	55.535852	-4.108227	253.98	3.00	256.98
18	55.535937	-4.108109	253.28	3.00	256.28
19	55.535767	-4.108002	253.02	3.00	256.02
20	55.535876	-4.107583	251.16	3.00	254.16
21	55.536605	-4.106714	250.27	3.00	253.27
22	55.537649	-4.104091	268.92	3.00	271.92
23	55.538563	-4.101202	279.03	3.00	282.03
24	55.536877	-4.101008	257.88	3.00	260.88
25	55.536489	-4.100905	256.09	3.00	259.09
26	55.535334	-4.105354	237.92	3.00	240.92
27	55.535262	-4.105600	238.30	3.00	241.30
28	55.534966	-4.105931	243.58	3.00	246.58
29	55.534835	-4.106052	244.51	3.00	247.51
30	55.533943	-4.107241	247.02	3.00	250.02
31	55.533527	-4.108195	245.76	3.00	248.76
32	55.532977	-4.110132	245.00	3.00	248.00
33	55.532837	-4.110030	242.77	3.00	245.77
34	55.532042	-4.113485	238.46	3.00	241.46
35	55.531565	-4.115584	238.69	3.00	241.69
36	55.531061	-4.119972	233.04	3.00	236.04

Name: PV array 2

Axis tracking: Fixed (no rotation)

Tilt: 20.0°

Orientation: 180.0°

Rated power: -

Panel material: Smooth glass with AR coating

Reflectivity: Vary with sun

Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	55.535194	-4.104787	237.48	3.00	240.48
2	55.535971	-4.101633	252.25	3.00	255.25
3	55.536378	-4.100260	255.02	3.00	258.02
4	55.536906	-4.099037	258.67	3.00	261.67
5	55.533949	-4.098168	235.93	3.00	238.93
6	55.533014	-4.100260	229.50	3.00	232.50
7	55.533118	-4.100421	231.38	3.00	234.38
8	55.532960	-4.100850	230.06	3.00	233.06
9	55.532693	-4.100753	226.60	3.00	229.60
10	55.532164	-4.101815	224.89	3.00	227.89
11	55.532753	-4.103435	229.15	3.00	232.15
12	55.533251	-4.103811	233.49	3.00	236.49
13	55.533488	-4.103607	235.28	3.00	238.28
14	55.534138	-4.104068	234.36	3.00	237.36
15	55.534211	-4.104508	233.27	3.00	236.27
16	55.534636	-4.104444	235.06	3.00	238.06
17	55.534903	-4.104723	235.90	3.00	238.90
18	55.535133	-4.104948	237.45	3.00	240.45

Name: PV array 3

Axis tracking: Fixed (no rotation)

Tilt: 20.0°

Orientation: 180.0°

Rated power: -

Panel material: Smooth glass with AR coating

Reflectivity: Vary with sun

Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	55.540856	-4.097756	286.21	3.00	289.21
2	55.539108	-4.096598	271.85	3.00	274.85
3	55.537821	-4.096748	263.50	3.00	266.50
4	55.534433	-4.095375	243.15	3.00	246.15
5	55.534846	-4.091469	247.12	3.00	250.12
6	55.535162	-4.091126	247.84	3.00	250.84
7	55.535283	-4.091040	247.99	3.00	250.99
8	55.535429	-4.090922	247.99	3.00	250.99
9	55.536206	-4.091255	250.59	3.00	253.59
10	55.536242	-4.091491	250.91	3.00	253.91
11	55.536376	-4.091727	252.66	3.00	255.66
12	55.536570	-4.091941	254.65	3.00	257.65
13	55.536849	-4.091941	256.18	3.00	259.18
14	55.537056	-4.091898	256.80	3.00	259.80
15	55.537287	-4.091555	257.24	3.00	260.24
16	55.537359	-4.091255	256.86	3.00	259.86
17	55.537991	-4.090847	258.84	3.00	261.84
18	55.538379	-4.090825	261.18	3.00	264.18
19	55.538561	-4.091598	263.58	3.00	266.58
20	55.539120	-4.090847	266.79	3.00	269.79
21	55.539084	-4.092907	272.18	3.00	275.18
22	55.541354	-4.094581	295.53	3.00	298.53

Name: PV array 4

Axis tracking: Fixed (no rotation)

Tilt: 20.0°

Orientation: 180.0°

Rated power: -

Panel material: Smooth glass with AR coating

Reflectivity: Vary with sun

Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	55.539138	-4.089023	265.89	3.00	268.89
2	55.538932	-4.088937	264.49	3.00	267.49
3	55.538665	-4.088851	263.11	3.00	266.11
4	55.538161	-4.089044	260.86	3.00	263.86
5	55.537863	-4.089098	259.49	3.00	262.49
6	55.537535	-4.089205	257.84	3.00	260.84
7	55.538282	-4.086180	259.47	3.00	262.47
8	55.538537	-4.086491	262.15	3.00	265.15
9	55.539745	-4.086362	271.04	3.00	274.04

Name: PV array 5

Axis tracking: Fixed (no rotation)

Tilt: 20.0°

Orientation: 180.0°

Rated power: -

Panel material: Smooth glass with AR coating

Reflectivity: Vary with sun

Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	55.542539	-4.087769	302.50	3.00	305.50
2	55.542357	-4.087694	299.43	3.00	302.43
3	55.542254	-4.087544	297.73	3.00	300.73
4	55.542023	-4.087436	294.36	3.00	297.36
5	55.541889	-4.087533	292.32	3.00	295.32
6	55.541282	-4.086621	284.48	3.00	287.48
7	55.540111	-4.085698	272.41	3.00	275.41
8	55.540518	-4.082810	274.64	3.00	277.64
9	55.540246	-4.082776	271.15	3.00	274.15
10	55.539094	-4.082342	258.89	3.00	261.89
11	55.539074	-4.081647	258.15	3.00	261.15
12	55.539226	-4.080771	258.88	3.00	261.88
13	55.539143	-4.079448	255.23	3.00	258.23
14	55.539438	-4.078519	256.27	3.00	259.27
15	55.539481	-4.078046	254.65	3.00	257.65
16	55.540964	-4.078891	273.99	3.00	276.99
17	55.541265	-4.077237	273.67	0.00	273.67
18	55.541265	-4.077237	273.67	0.00	273.67
19	55.541265	-4.077237	273.67	0.00	273.67
20	55.541265	-4.077237	273.67	0.00	273.67
21	55.541265	-4.077237	273.67	0.00	273.67
22	55.541265	-4.077237	273.67	0.00	273.67
23	55.541265	-4.077237	273.67	0.00	273.67
24	55.541265	-4.077237	273.67	0.00	273.67
25	55.541265	-4.077237	273.67	0.00	273.67
26	55.541639	-4.075573	270.45	0.00	270.45
27	55.541639	-4.075573	270.45	0.00	270.45
28	55.541639	-4.075573	270.45	0.00	270.45
29	55.541639	-4.075573	270.45	0.00	270.45
30	55.541639	-4.075573	270.45	0.00	270.45
31	55.541639	-4.075573	270.45	0.00	270.45
32	55.541639	-4.075573	270.45	0.00	270.45
33	55.541639	-4.075573	270.45	0.00	270.45
34	55.541639	-4.075573	270.45	0.00	270.45
35	55.542084	-4.075688	276.70	3.00	279.70
36	55.542497	-4.075914	281.84	3.00	284.84
37	55.542666	-4.076493	286.09	3.00	289.09
38	55.542581	-4.077598	288.40	3.00	291.40
39	55.542588	-4.078789	291.39	3.00	294.39
40	55.542636	-4.079325	293.14	3.00	296.14
41	55.542909	-4.079808	296.81	3.00	299.81
42	55.543122	-4.079905	298.44	3.00	301.44
43	55.543365	-4.079991	302.08	3.00	305.08
44	55.543486	-4.080345	305.04	3.00	308.04
45	55.543535	-4.080634	307.86	3.00	310.86
46	55.543753	-4.080763	312.72	3.00	315.72
47	55.543061	-4.084583	307.51	3.00	310.51
48	55.543006	-4.084583	306.65	3.00	309.65
49	55.542924	-4.085092	306.42	3.00	309.42
50	55.542952	-4.085216	306.75	3.00	309.75

Name: PV array 6

Axis tracking: Fixed (no rotation)

Tilt: 20.0°

Orientation: 180.0°

Rated power: -

Panel material: Smooth glass with AR coating

Reflectivity: Vary with sun

Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	55.545025	-4.074986	314.62	3.00	317.62
2	55.542706	-4.074320	283.33	3.00	286.33
3	55.543070	-4.072089	283.65	3.00	286.65
4	55.543580	-4.070136	282.59	3.00	285.59
5	55.544563	-4.071359	297.45	3.00	300.45
6	55.544976	-4.072260	308.26	3.00	311.26
7	55.545425	-4.072926	315.69	3.00	318.69

Route Receptors

Name: A70

Path type: Two-way

Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	55.516189	-4.131650	217.99	1.50	219.49
2	55.514968	-4.122166	217.87	1.50	219.37
3	55.515098	-4.120964	215.46	1.50	216.96
4	55.514305	-4.114184	219.05	1.50	220.55
5	55.514099	-4.112381	221.18	1.50	222.68
6	55.513467	-4.108647	221.08	1.50	222.58
7	55.513127	-4.100494	215.83	1.50	217.33
8	55.513248	-4.098348	211.81	1.50	213.31
9	55.514658	-4.086310	206.67	1.50	208.17
10	55.515460	-4.082877	207.84	1.50	209.34
11	55.518533	-4.075473	210.22	1.50	211.72
12	55.520780	-4.069400	218.01	1.50	219.51
13	55.521302	-4.067705	220.42	1.50	221.92
14	55.523452	-4.063971	222.76	1.50	224.26
15	55.524035	-4.062319	226.84	1.50	228.34
16	55.524290	-4.061354	228.24	1.50	229.74
17	55.525001	-4.060185	230.11	1.50	231.61
18	55.525906	-4.058640	225.02	1.50	226.52
19	55.526155	-4.057277	226.98	1.50	228.48
20	55.526197	-4.056011	227.33	1.50	228.83
21	55.526732	-4.053898	229.49	1.50	230.99
22	55.527412	-4.051913	233.05	1.50	234.55
23	55.528587	-4.046859	232.50	1.50	234.00
24	55.529059	-4.044776	232.52	1.50	234.02

Name: B743

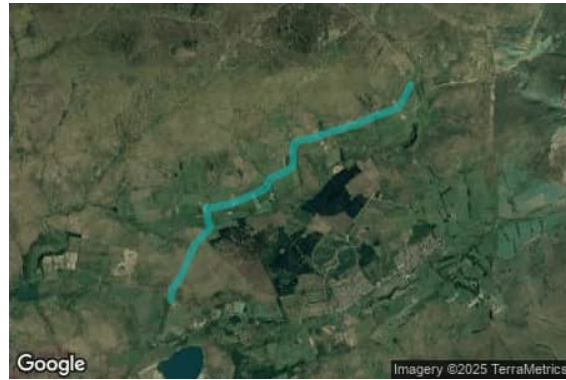
Path type: Two-way

Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	55.565373	-4.089976	293.06	1.50	294.56
2	55.564830	-4.089777	292.51	1.50	294.01
3	55.564309	-4.089214	291.65	1.50	293.15
4	55.563744	-4.087943	292.49	1.50	293.99
5	55.563049	-4.086884	294.36	1.50	295.86
6	55.562145	-4.085350	295.85	1.50	297.35
7	55.561866	-4.083880	294.43	1.50	295.93
8	55.561095	-4.082592	293.56	1.50	295.06
9	55.560034	-4.080425	293.25	1.50	294.75
10	55.557837	-4.076348	297.59	1.50	299.09
11	55.557266	-4.075586	296.54	1.50	298.04
12	55.555976	-4.073456	294.60	1.50	296.10
13	55.554338	-4.068167	287.15	1.50	288.65
14	55.552438	-4.065635	285.45	1.50	286.95
15	55.549932	-4.066192	280.36	1.50	281.86
16	55.548719	-4.065194	277.49	1.50	278.99
17	55.547359	-4.064561	276.98	1.50	278.48
18	55.544700	-4.064733	270.91	1.50	272.41
19	55.543657	-4.063271	267.51	1.50	269.01
20	55.540525	-4.063957	272.16	1.50	273.66
21	55.538643	-4.064966	279.17	1.50	280.67
22	55.536785	-4.062455	289.41	1.50	290.91
23	55.534337	-4.060625	277.17	1.50	278.67
24	55.533620	-4.060690	273.58	1.50	275.08
25	55.533068	-4.061773	270.25	1.50	271.75
26	55.532199	-4.063651	264.15	1.50	265.65
27	55.530873	-4.065294	254.50	1.50	256.00
28	55.526550	-4.065670	254.61	1.50	256.11
29	55.524867	-4.067236	243.06	1.50	244.56

Name: Route 3
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	55.549873	-4.066325	281.40	1.50	282.90
2	55.547730	-4.068031	300.51	1.50	302.01
3	55.546261	-4.069844	308.19	1.50	309.69
4	55.544779	-4.076964	312.12	1.50	313.62
5	55.543673	-4.081667	315.80	1.50	317.30
6	55.543096	-4.085089	309.05	1.50	310.55
7	55.542180	-4.090824	302.02	1.50	303.52
8	55.541746	-4.091966	300.80	1.50	302.30
9	55.541411	-4.095301	294.56	1.50	296.06
10	55.540903	-4.098262	285.12	1.50	286.62
11	55.540283	-4.098362	276.37	1.50	277.87
12	55.539833	-4.098748	273.84	1.50	275.34
13	55.538935	-4.098588	273.36	1.50	274.86
14	55.537287	-4.098622	261.32	1.50	262.82
15	55.536704	-4.099845	257.69	1.50	259.19
16	55.536206	-4.101283	254.18	1.50	255.68
17	55.535701	-4.103362	247.28	1.50	248.78
18	55.535286	-4.104947	238.39	1.50	239.89
19	55.533857	-4.105968	240.87	1.50	242.37
20	55.532877	-4.109301	242.70	1.50	244.20
21	55.531848	-4.113754	238.13	1.50	239.63
22	55.531398	-4.115662	236.93	1.50	238.43
23	55.530728	-4.121396	229.36	1.50	230.86
24	55.530867	-4.122458	224.80	1.50	226.30
25	55.528733	-4.122008	214.76	1.50	216.26
26	55.527898	-4.121192	215.36	1.50	216.86
27	55.525001	-4.125677	223.96	1.50	225.46
28	55.520045	-4.129534	230.55	1.50	232.05
29	55.518320	-4.131760	221.76	1.50	223.26
30	55.516522	-4.132264	217.90	1.50	219.40

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (m)	Height (m)
OP 1	1	55.518174	-4.087287	235.50	4.50
OP 2	2	55.518302	-4.086096	234.23	4.50
OP 3	3	55.518326	-4.085372	232.66	4.50
OP 4	4	55.518499	-4.084599	233.55	4.50
OP 5	5	55.518648	-4.083451	233.29	4.50
OP 6	6	55.519753	-4.081885	236.75	4.50
OP 7	7	55.519983	-4.081375	237.42	4.50
OP 8	8	55.520239	-4.080866	237.47	4.50
OP 9	9	55.520549	-4.080267	238.25	4.50
OP 10	10	55.518554	-4.082436	231.04	4.50
OP 11	11	55.518700	-4.081878	232.72	4.50
OP 12	12	55.518819	-4.081363	234.00	4.50
OP 13	13	55.525963	-4.069147	248.22	4.50
OP 14	14	55.526209	-4.068987	249.94	4.50
OP 15	15	55.526063	-4.068659	249.57	4.50
OP 16	16	55.525802	-4.068675	248.05	4.50
OP 17	17	55.524138	-4.069126	246.85	4.50
OP 18	18	55.524418	-4.067989	245.49	4.50
OP 19	19	55.524278	-4.068600	246.67	4.50
OP 20	20	55.520629	-4.070317	220.29	4.50
OP 21	21	55.530423	-4.122660	224.82	4.50
OP 22	22	55.530091	-4.122284	219.89	4.50
OP 23	23	55.530152	-4.123333	222.45	4.50
OP 24	24	55.532357	-4.104685	229.21	4.50
OP 25	25	55.532668	-4.104323	228.30	4.50
OP 26	26	55.532024	-4.104463	227.88	4.50
OP 27	27	55.545040	-4.068571	284.66	4.50
OP 28	28	55.528940	-4.055319	256.88	4.50
OP 29	29	55.512861	-4.108575	216.22	4.50
OP 30	30	55.530329	-4.130148	221.47	4.50
OP 31	31	55.529073	-4.135053	218.05	4.50
OP 32	32	55.540394	-4.090151	279.41	0.00
OP 33	33	55.542310	-4.090623	304.22	2.50
OP 34	34	55.542643	-4.091943	310.76	2.50
OP 35	35	55.531985	-4.095106	230.50	4.50
OP 36	36	55.528506	-4.060926	255.29	2.50
OP 37	37	55.545831	-4.060711	268.71	2.50
OP 38	38	55.535764	-4.089786	237.38	4.50
OP 39	39	55.521537	-4.069137	227.42	2.50
OP 40	40	55.523001	-4.067467	235.12	4.50

Obstruction Components

Name: Obstruction 1

Top height: 10.0 m



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)
1	55.530490	-4.096865	235.05
2	55.536635	-4.084054	253.34
3	55.537376	-4.081308	249.08
4	55.536259	-4.079377	272.69
5	55.533951	-4.084162	259.13
6	55.531899	-4.082402	272.17
7	55.532737	-4.080514	273.30
8	55.532118	-4.077403	273.46
9	55.528790	-4.081651	276.06
10	55.530478	-4.096865	235.28

Name: Obstruction 10

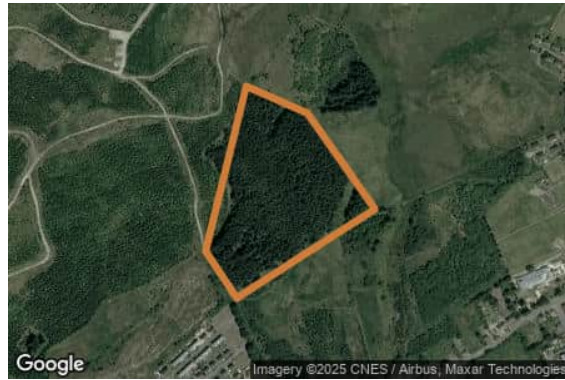
Top height: 8.0 m



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)
1	55.541634	-4.089902	293.43
2	55.541673	-4.089682	292.39
3	55.541033	-4.089081	284.41
4	55.540933	-4.089261	283.88
5	55.541634	-4.089902	293.43

Name: Obstruction 2

Top height: 10.0 m



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)
1	55.522899	-4.074673	244.84
2	55.521174	-4.079415	241.88
3	55.522085	-4.080488	250.24
4	55.525279	-4.079093	256.15
5	55.524757	-4.076990	259.93
6	55.522899	-4.074673	244.84

Name: Obstruction 3

Top height: 10.0 m



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)
1	55.527052	-4.092566	262.59
2	55.523165	-4.101921	258.77
3	55.521707	-4.102951	253.72
4	55.520055	-4.097286	253.69
5	55.520492	-4.092394	254.45
6	55.522728	-4.094840	257.52
7	55.526299	-4.089905	268.25
8	55.527052	-4.092566	262.59

Name: Obstruction 4

Top height: 10.0 m



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)
1	55.532448	-4.104225	228.34
2	55.532382	-4.104204	228.37
3	55.532512	-4.103560	227.43
4	55.532360	-4.103094	227.07
5	55.532206	-4.103737	226.81
6	55.532124	-4.103684	227.97
7	55.532345	-4.102847	226.39
8	55.532606	-4.103512	227.69
9	55.532448	-4.104225	228.34

Name: Obstruction 5

Top height: 10.0 m



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)
1	55.539914	-4.085732	271.62
2	55.540036	-4.085088	272.42
3	55.537874	-4.083951	246.32
4	55.537595	-4.085260	245.51
5	55.539914	-4.085732	271.62

Name: Obstruction 6

Top height: 8.0 m



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)
1	55.546047	-4.061189	261.95
2	55.545861	-4.061069	263.65
3	55.545639	-4.061229	261.69
4	55.545606	-4.061125	262.48
5	55.545669	-4.060588	267.50
6	55.545715	-4.060615	268.00
7	55.545683	-4.061039	264.08
8	55.545924	-4.060892	267.51
9	55.546079	-4.061044	263.95
10	55.546047	-4.061189	261.95

Name: Obstruction 7

Top height: 8.0 m



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)
1	55.531089	-4.124583	228.93
2	55.529766	-4.124637	216.61
3	55.529605	-4.124063	215.14
4	55.529717	-4.123446	215.36
5	55.530352	-4.123521	223.36
6	55.530452	-4.124036	224.23
7	55.530977	-4.123955	228.39
8	55.531089	-4.124583	228.93

Name: Obstruction 8

Top height: 8.0 m



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)
1	55.538400	-4.097014	266.94
2	55.538349	-4.097497	261.87
3	55.537380	-4.097674	257.07
4	55.537177	-4.097025	258.43
5	55.534117	-4.096392	237.67
6	55.534330	-4.095533	241.48
7	55.537201	-4.096617	259.46
8	55.537827	-4.097100	264.10
9	55.538400	-4.097014	266.94

Name: Obstruction 9

Top height: 6.0 m



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)
1	55.542208	-4.090840	302.76
2	55.542518	-4.091098	306.69
3	55.542688	-4.090170	306.92
4	55.542311	-4.090181	302.80
5	55.542393	-4.089628	301.95
6	55.542927	-4.089998	307.98
7	55.542633	-4.091425	307.67
8	55.542150	-4.091082	301.39
9	55.542208	-4.090840	302.76

Glare Analysis Results

Summary of Results Glare with potential for temporary after-image predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 1	20.0	180.0	19,379	323.0	34,632	577.2	-
PV array 2	20.0	180.0	21,792	363.2	21,756	362.6	-
PV array 3	20.0	180.0	20,154	335.9	10,338	172.3	-
PV array 4	20.0	180.0	2,399	40.0	0	0.0	-
PV array 5	20.0	180.0	30,258	504.3	22,534	375.6	-
PV array 6	20.0	180.0	4,397	73.3	2,190	36.5	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
A70	3,097	51.6	0	0.0
B743	6,469	107.8	4,847	80.8
Route 3	47,131	785.5	66,382	1,106.4
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	994	16.6	0	0.0
OP 14	897	14.9	0	0.0
OP 15	924	15.4	0	0.0
OP 16	1,020	17.0	0	0.0
OP 17	1,107	18.4	0	0.0
OP 18	1,152	19.2	0	0.0
OP 19	1,140	19.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	3,757	62.6	1,826	30.4
OP 22	3,243	54.0	1,150	19.2
OP 23	3,255	54.2	1,134	18.9
OP 24	3,525	58.8	1,834	30.6

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 25	2,408	40.1	5,640	94.0
OP 26	1,966	32.8	1,037	17.3
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	4,544	75.7	1,089	18.1
OP 31	4,336	72.3	0	0.0
OP 32	5,669	94.5	2,775	46.2
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	845	14.1	1,799	30.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	531	8.8	1,937	32.3
OP 39	0	0.0	0	0.0
OP 40	369	6.2	0	0.0

PV: PV array 1 potential temporary after-image

Receptor results ordered by category of glare

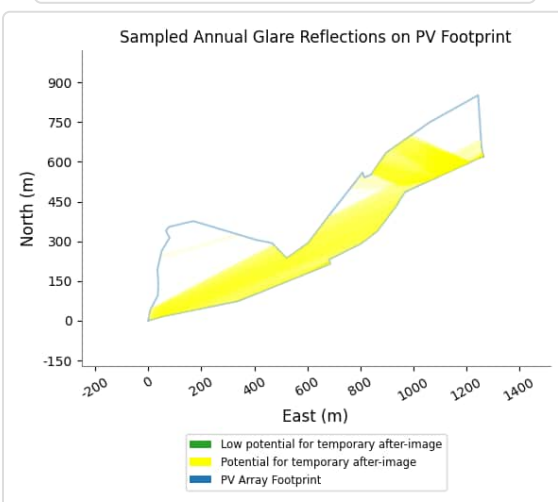
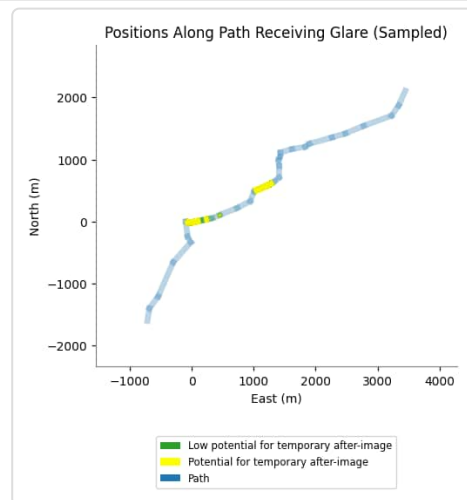
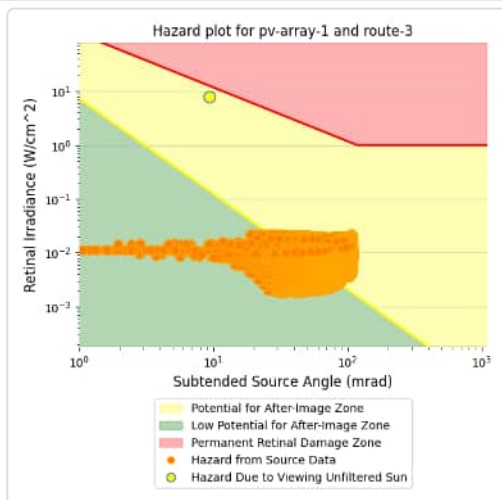
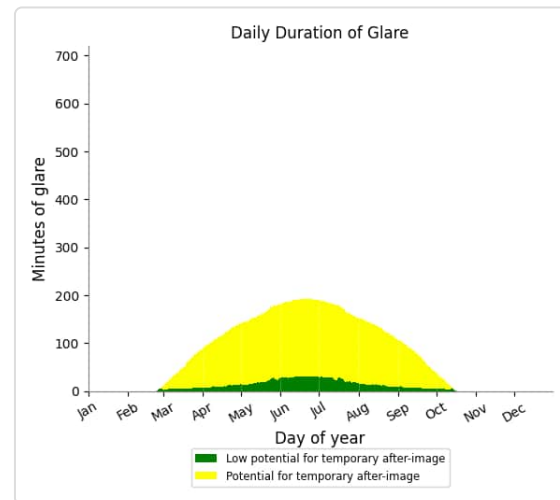
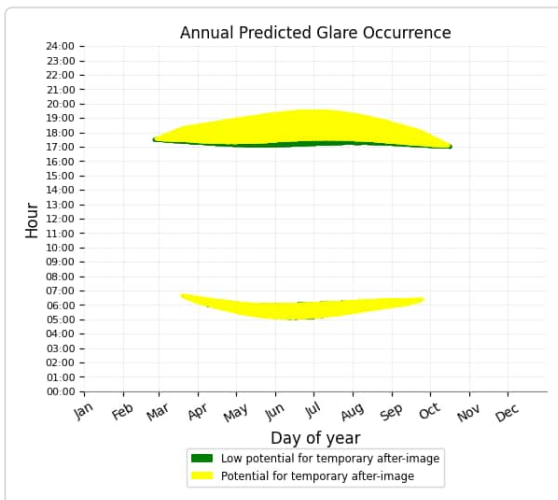
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route 3	3,403	56.7	24,556	409.3
A70	956	15.9	0	0.0
B743	0	0.0	0	0.0
OP 21	668	11.1	1,826	30.4
OP 22	609	10.2	1,150	19.2
OP 23	681	11.3	1,134	18.9
OP 24	671	11.2	1,834	30.6
OP 25	740	12.3	2,006	33.4
OP 26	1,384	23.1	1,037	17.3
OP 30	1,121	18.7	1,089	18.1
OP 13	994	16.6	0	0.0
OP 14	897	14.9	0	0.0
OP 15	924	15.4	0	0.0
OP 16	1,020	17.0	0	0.0
OP 17	1,107	18.4	0	0.0
OP 18	1,152	19.2	0	0.0
OP 19	1,140	19.0	0	0.0
OP 31	1,543	25.7	0	0.0
OP 40	369	6.2	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0

PV array 1 and Route: Route 3

Yellow glare: 24,556 min.

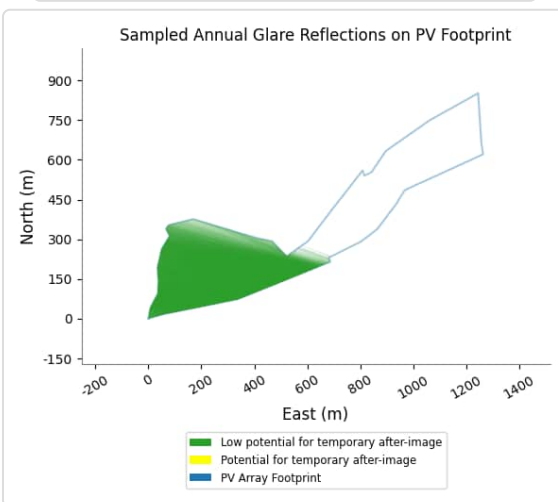
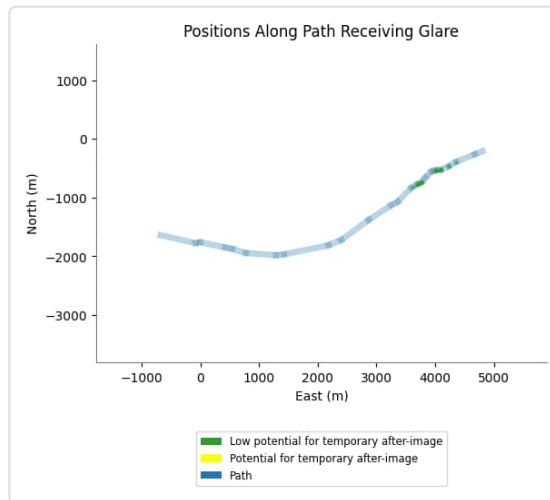
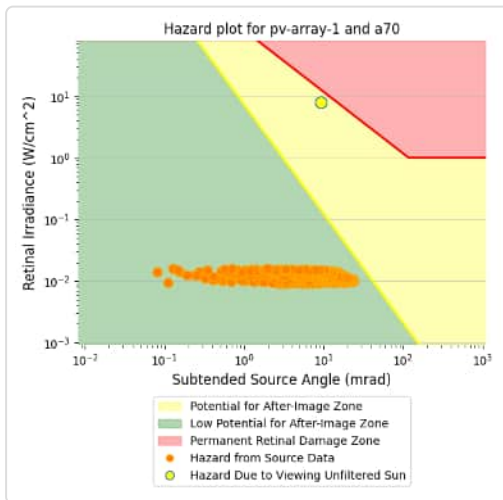
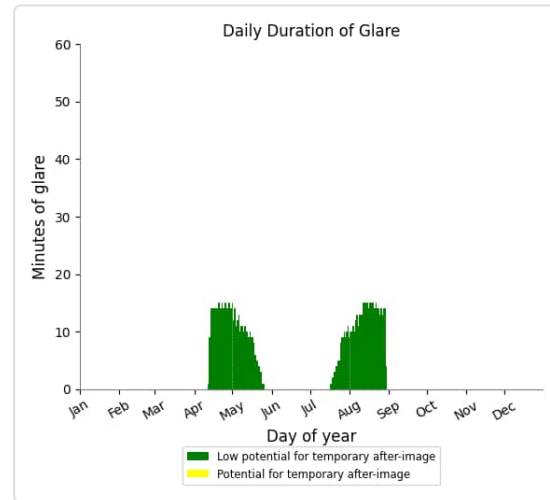
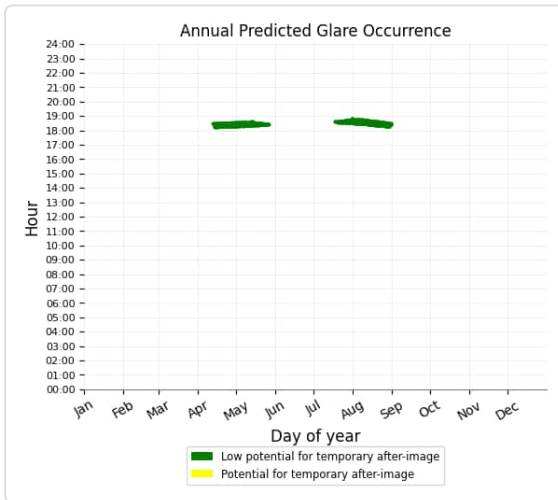
Green glare: 3,403 min.



PV array 1 and Route: A70

Yellow glare: none

Green glare: 956 min.



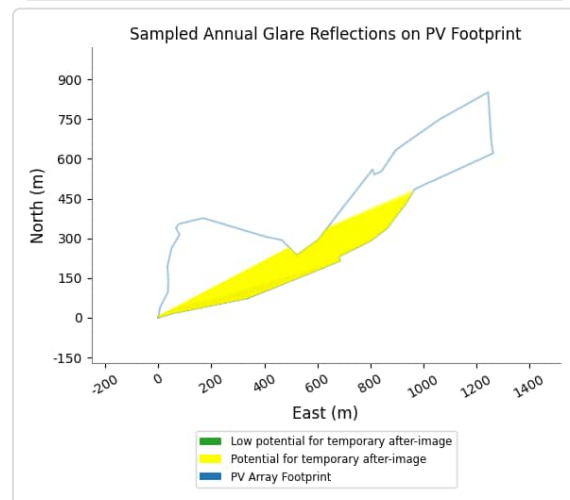
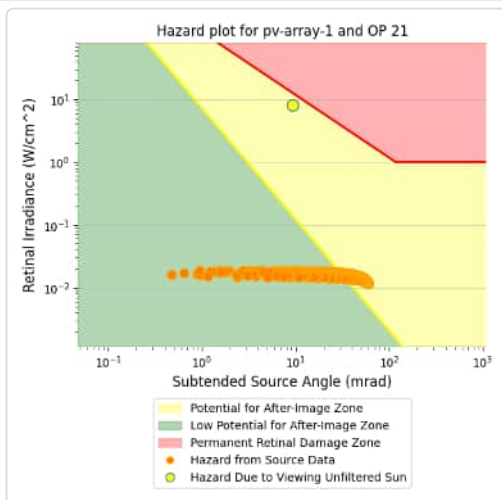
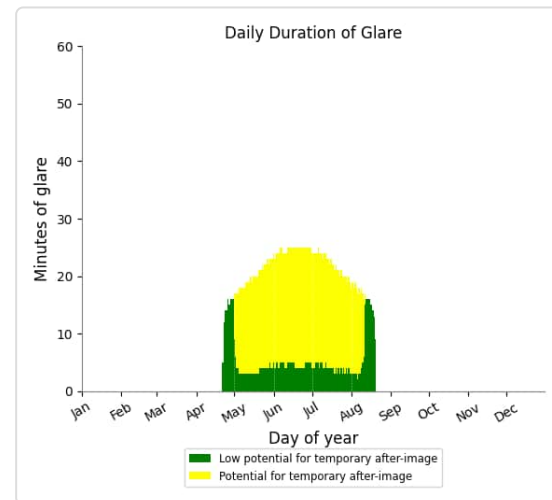
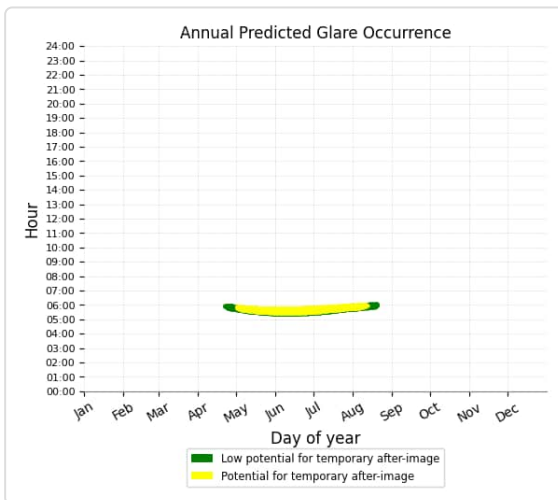
PV array 1 and Route: B743

No glare found

PV array 1 and OP 21

Yellow glare: 1,826 min.

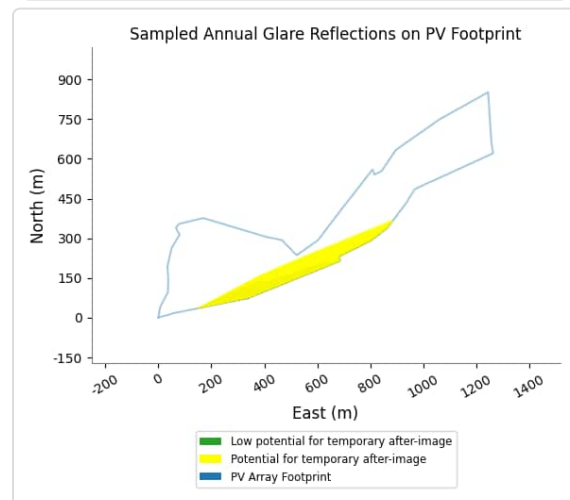
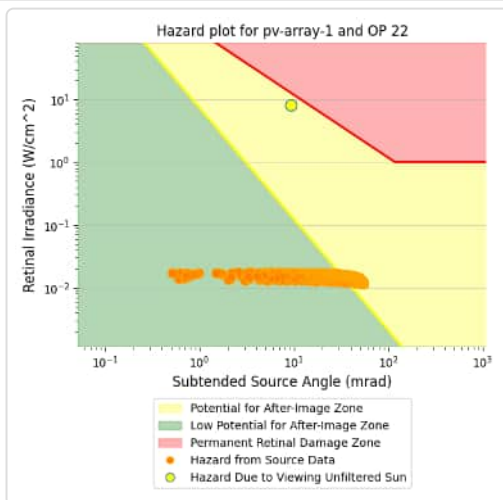
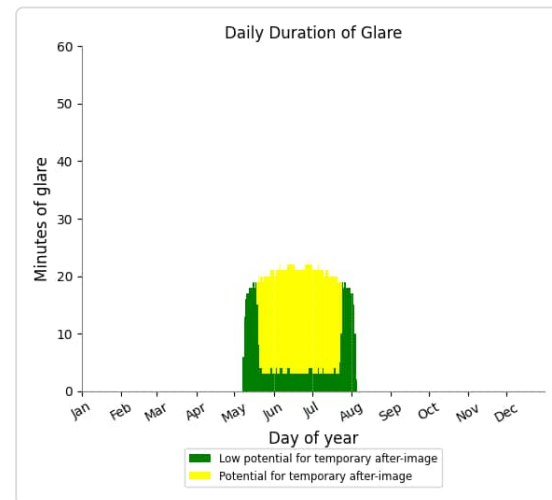
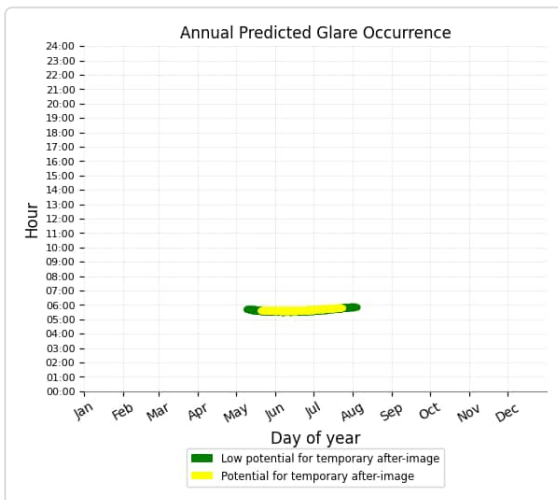
Green glare: 668 min.



PV array 1 and OP 22

Yellow glare: 1,150 min.

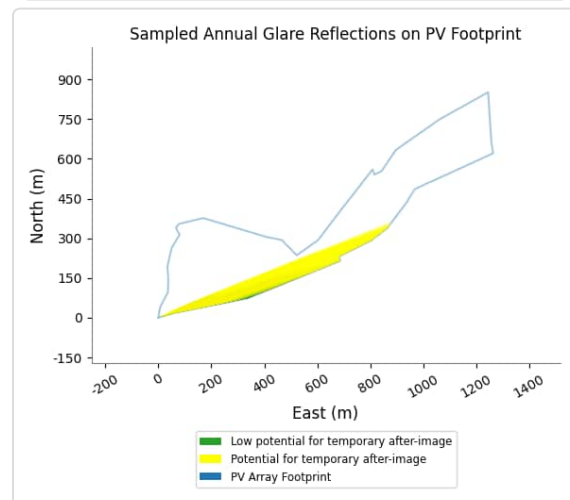
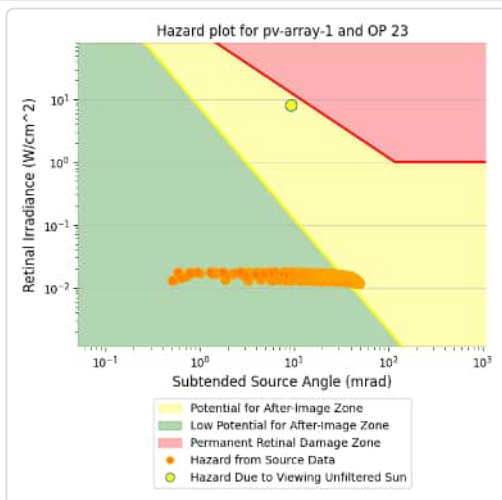
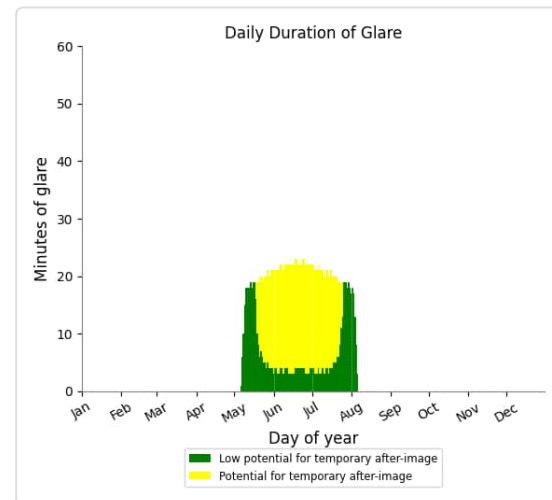
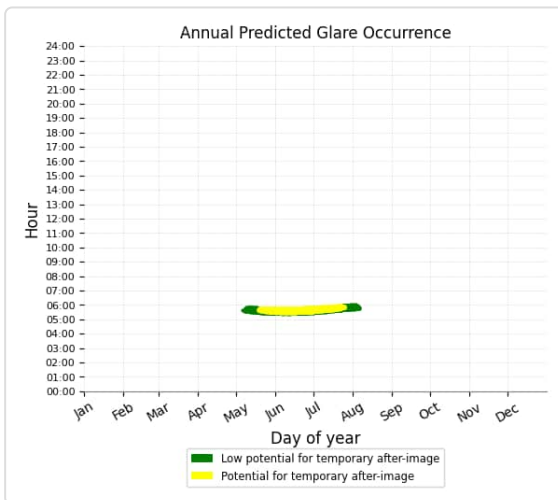
Green glare: 609 min.



PV array 1 and OP 23

Yellow glare: 1,134 min.

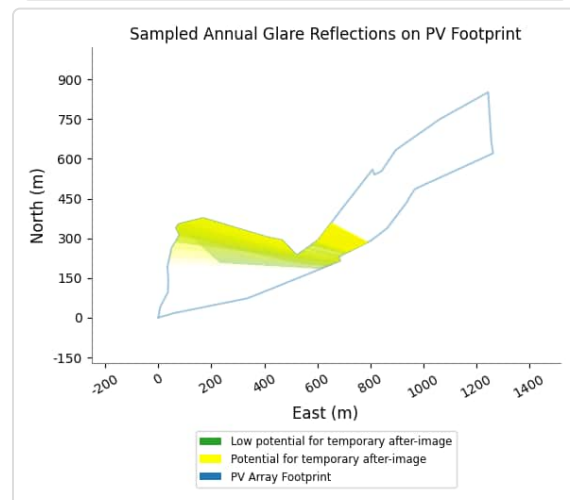
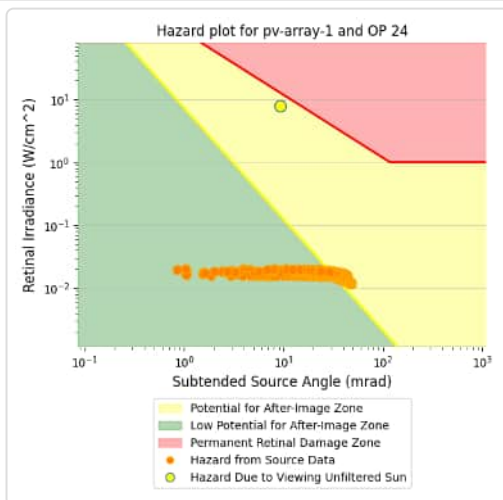
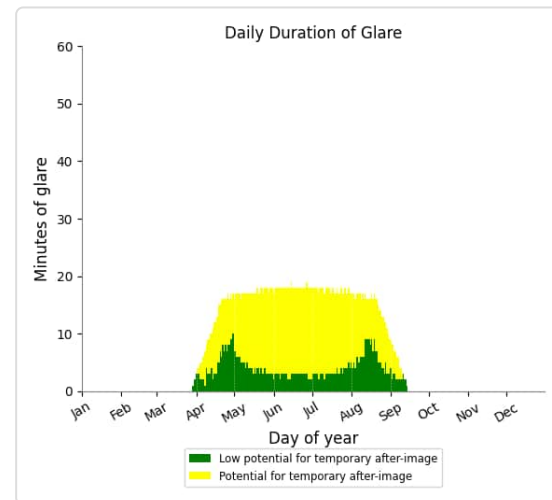
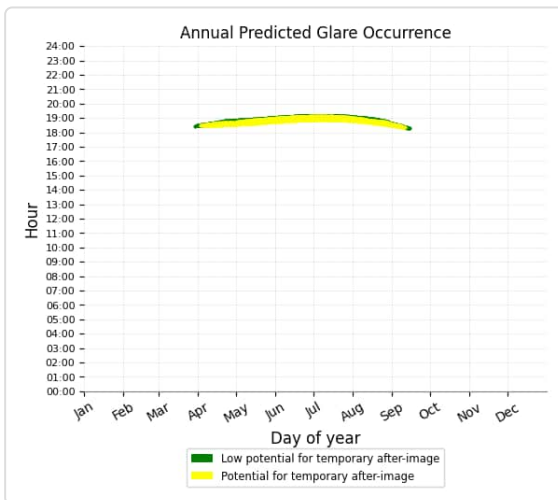
Green glare: 681 min.



PV array 1 and OP 24

Yellow glare: 1,834 min.

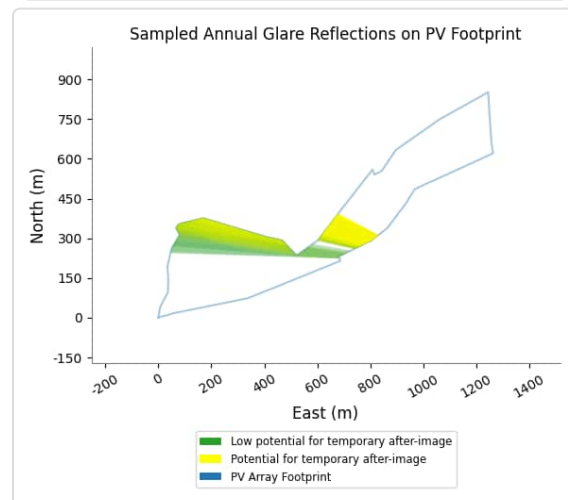
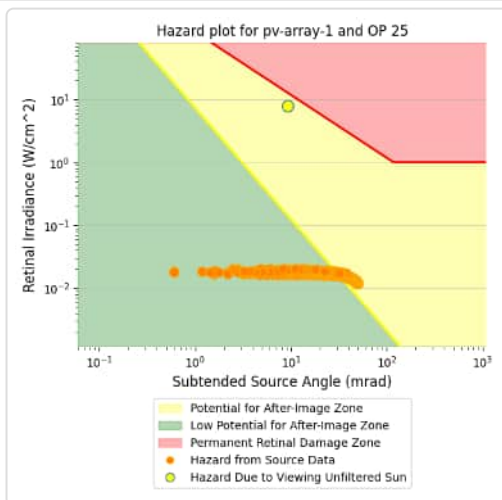
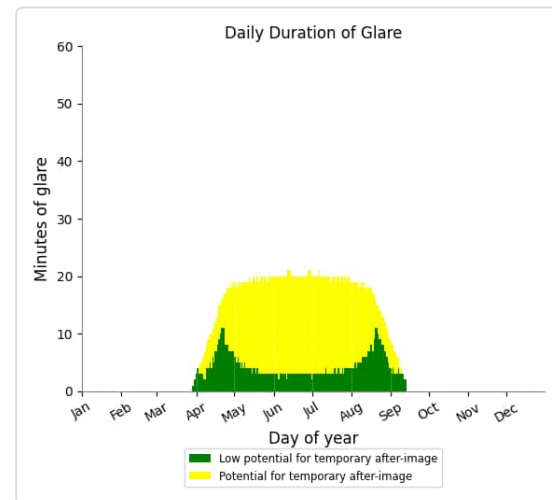
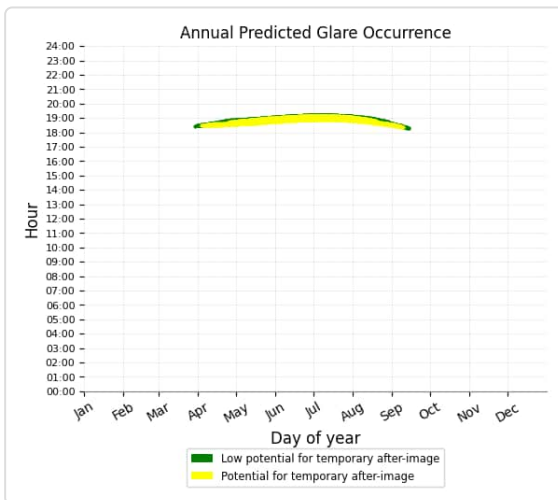
Green glare: 671 min.



PV array 1 and OP 25

Yellow glare: 2,006 min.

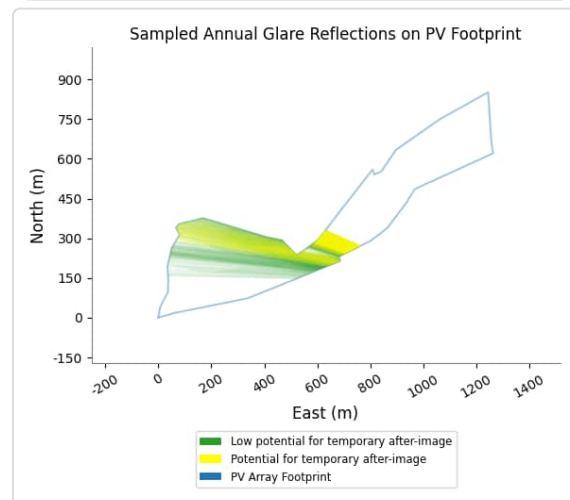
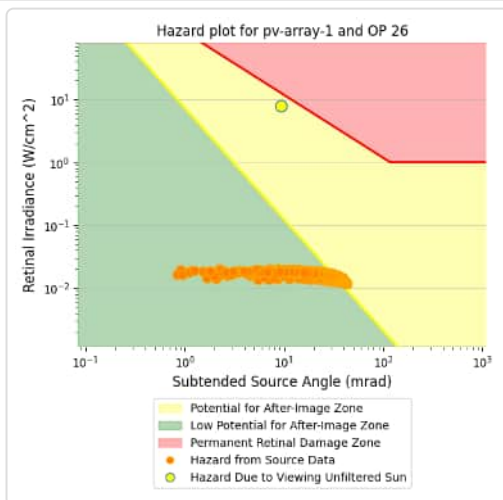
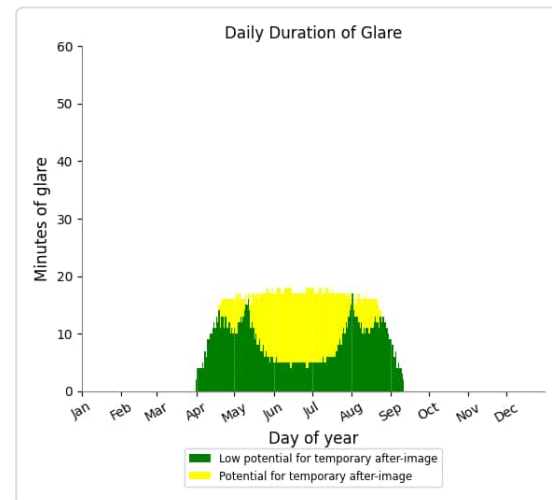
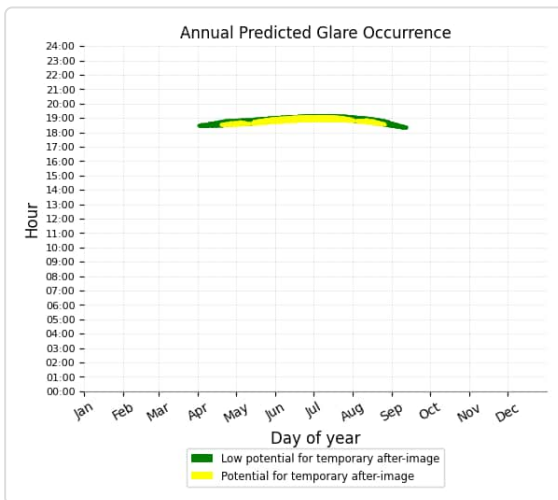
Green glare: 740 min.



PV array 1 and OP 26

Yellow glare: 1,037 min.

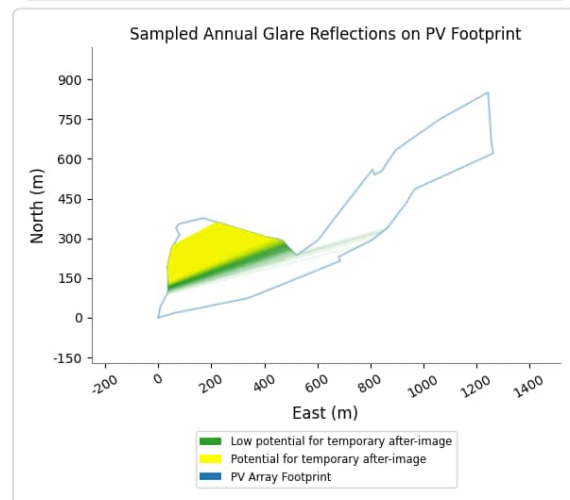
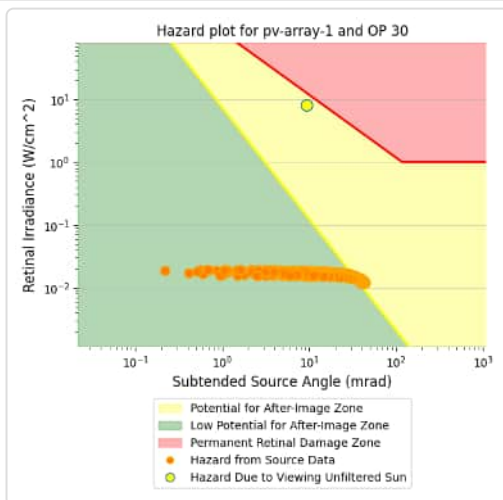
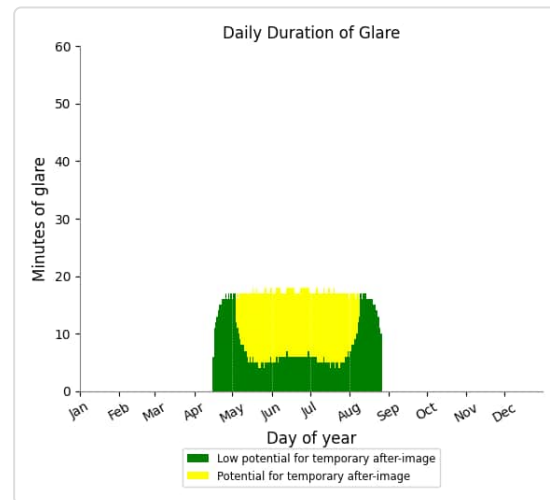
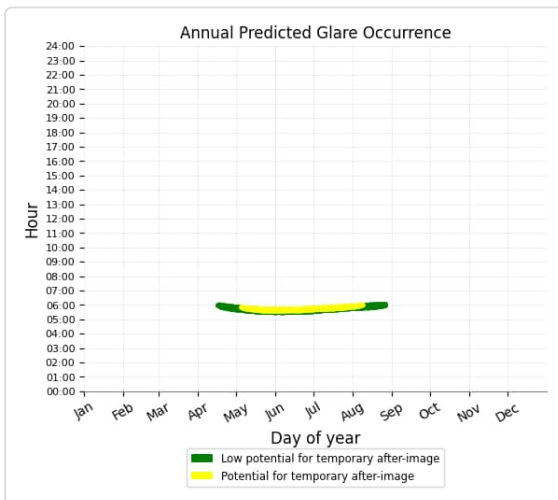
Green glare: 1,384 min.



PV array 1 and OP 30

Yellow glare: 1,089 min.

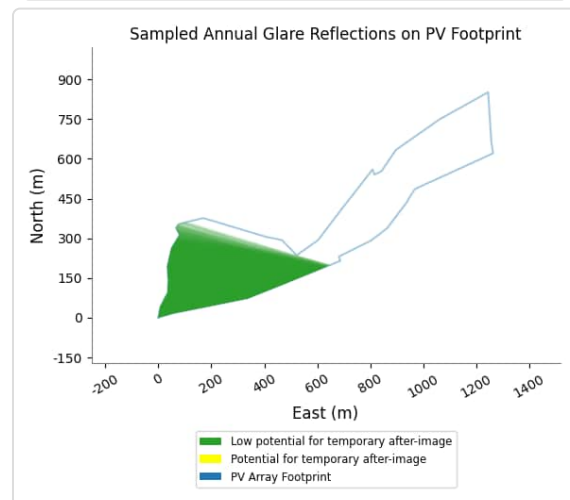
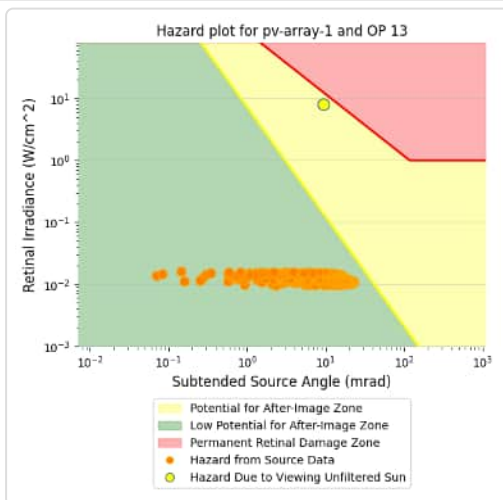
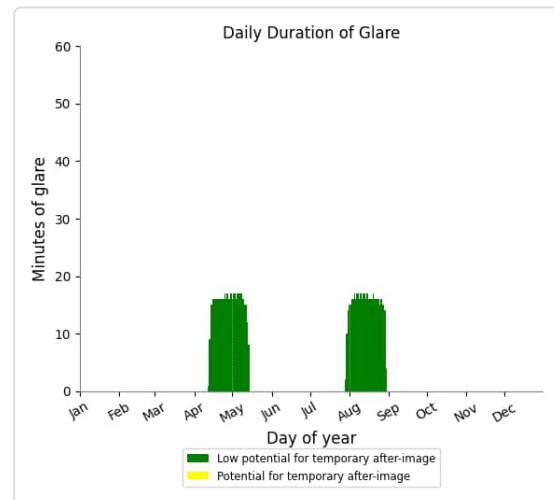
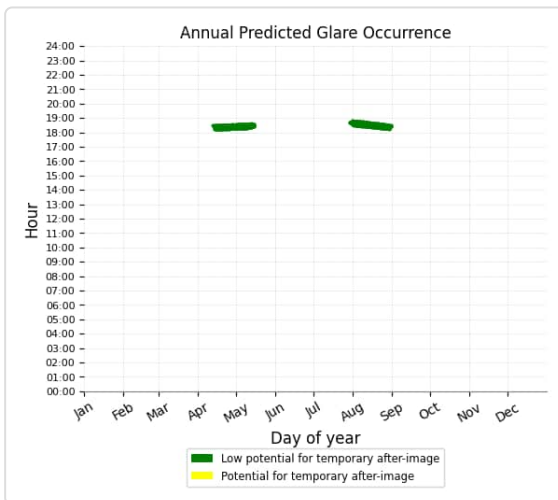
Green glare: 1,121 min.



PV array 1 and OP 13

Yellow glare: none

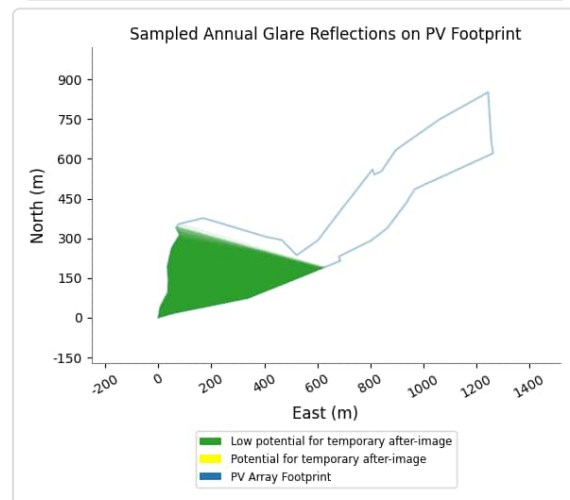
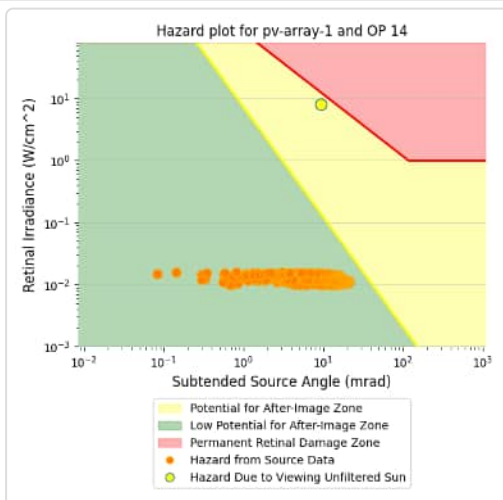
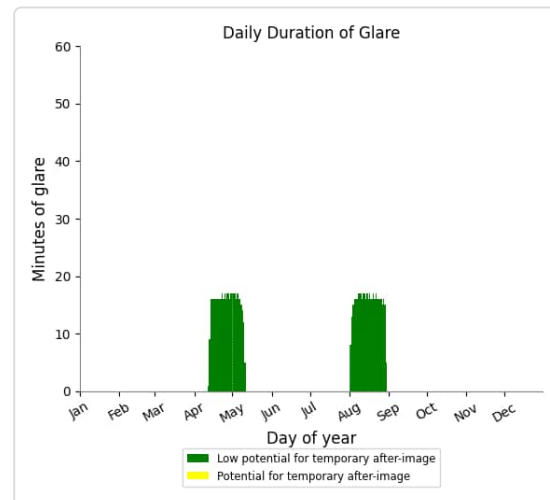
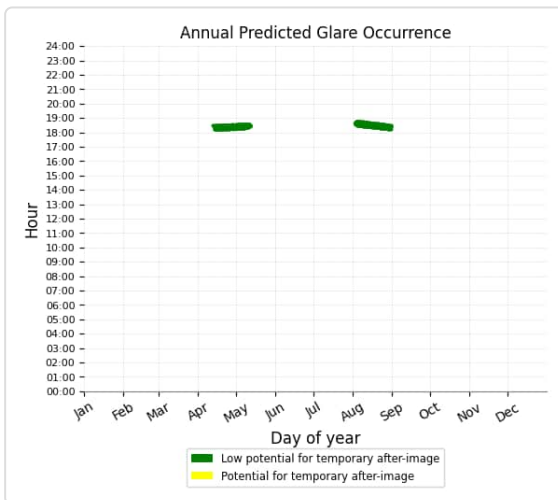
Green glare: 994 min.



PV array 1 and OP 14

Yellow glare: none

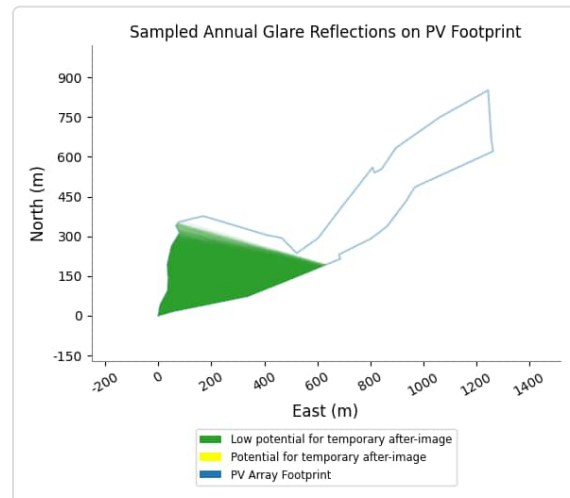
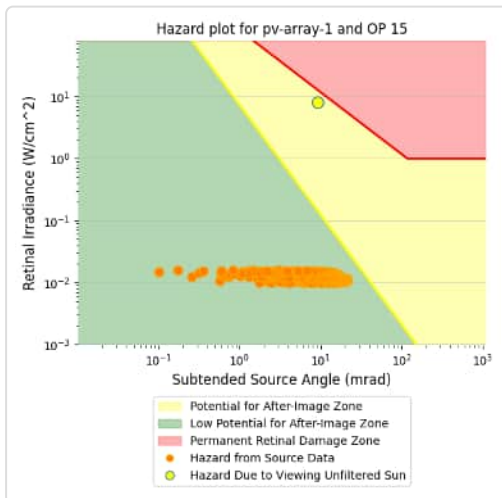
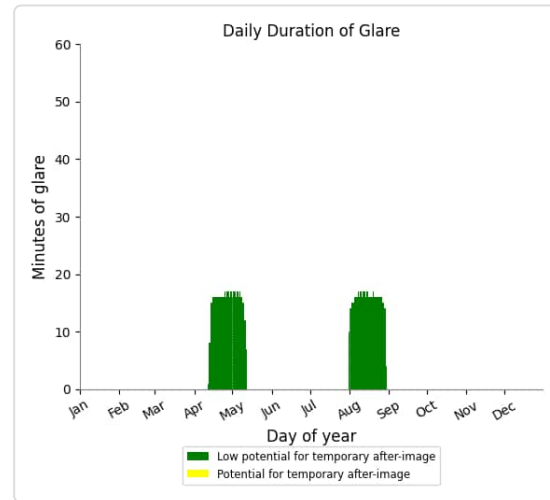
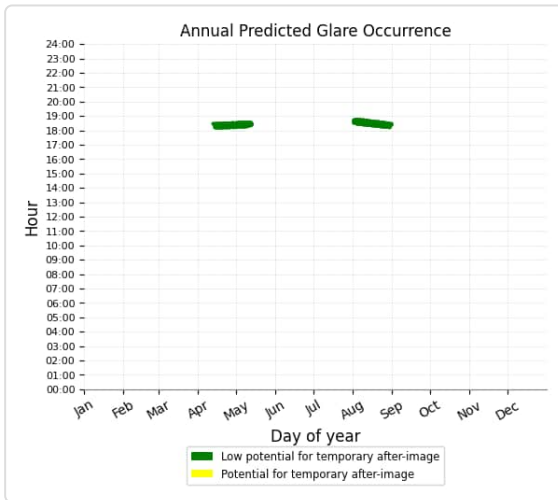
Green glare: 897 min.



PV array 1 and OP 15

Yellow glare: none

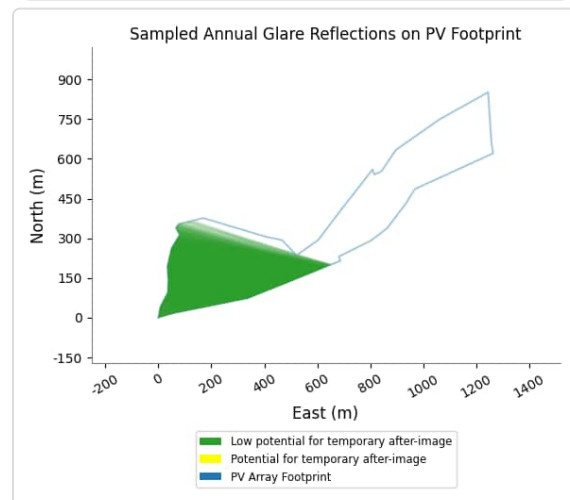
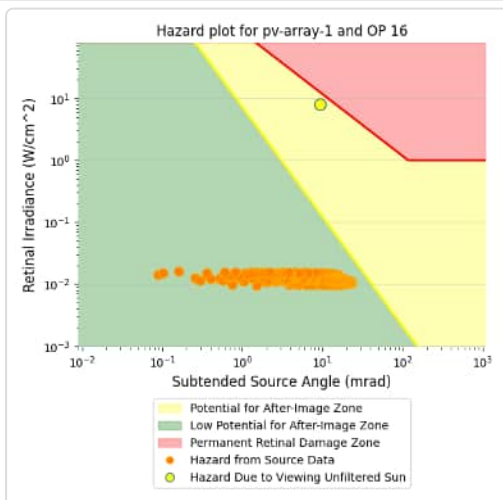
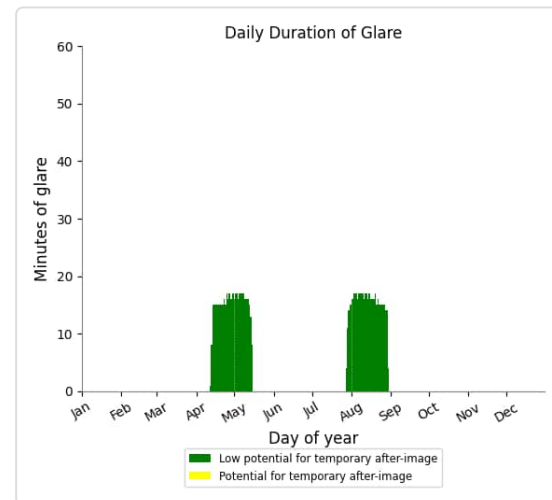
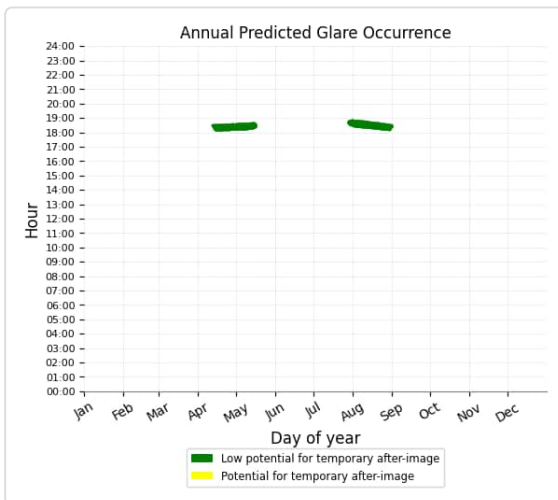
Green glare: 924 min.



PV array 1 and OP 16

Yellow glare: none

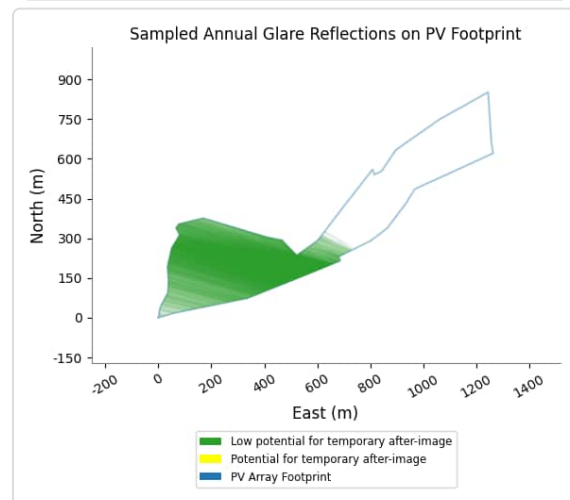
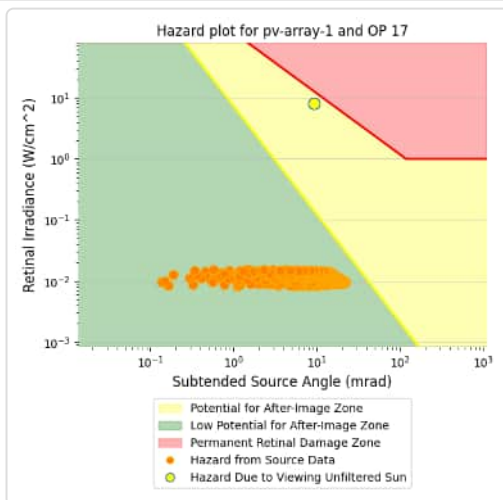
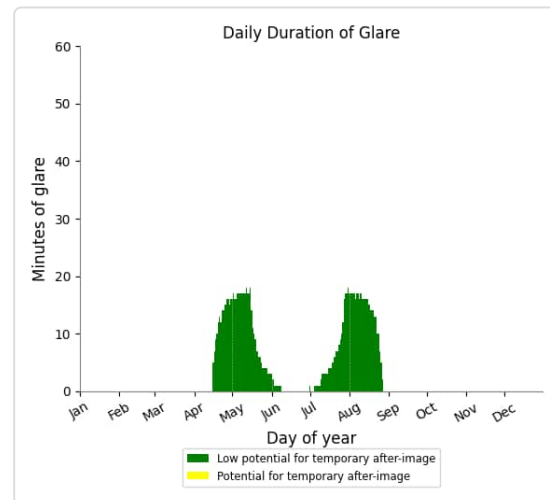
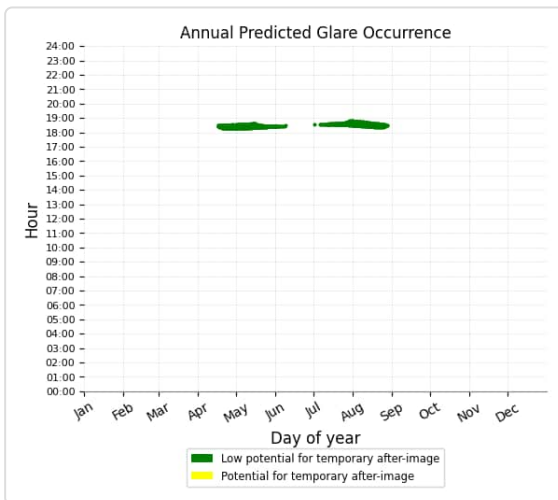
Green glare: 1,020 min.



PV array 1 and OP 17

Yellow glare: none

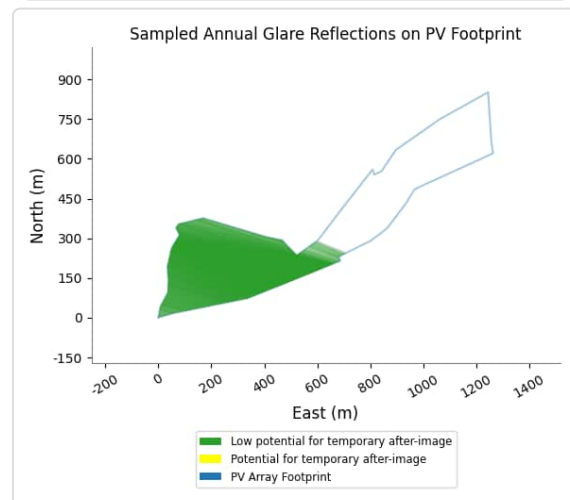
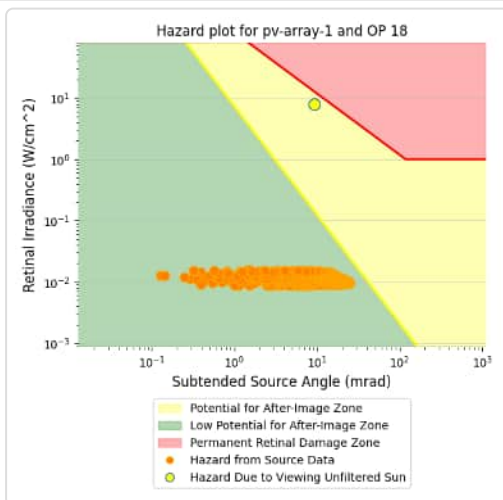
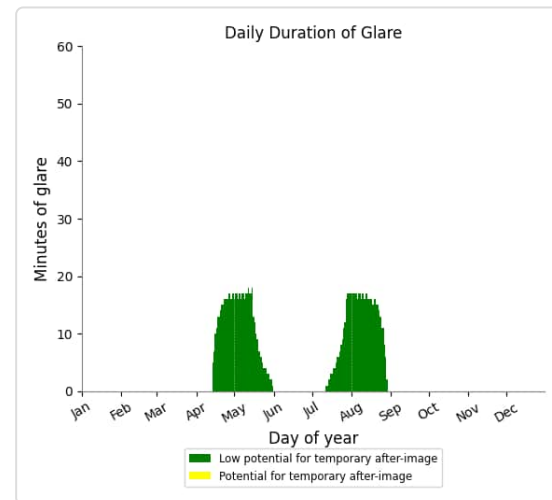
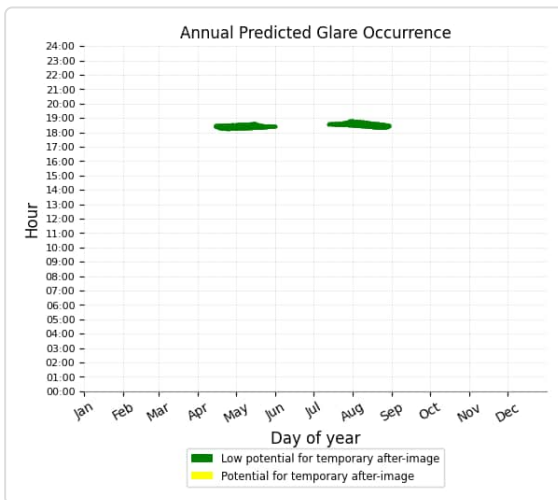
Green glare: 1,107 min.



PV array 1 and OP 18

Yellow glare: none

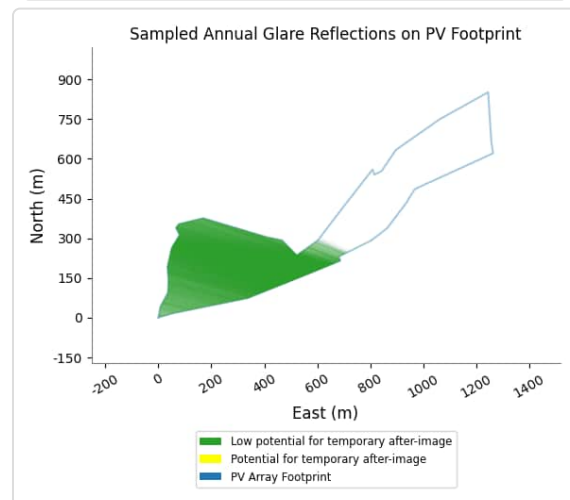
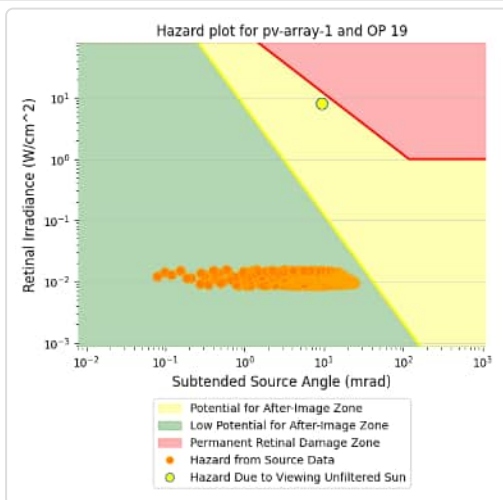
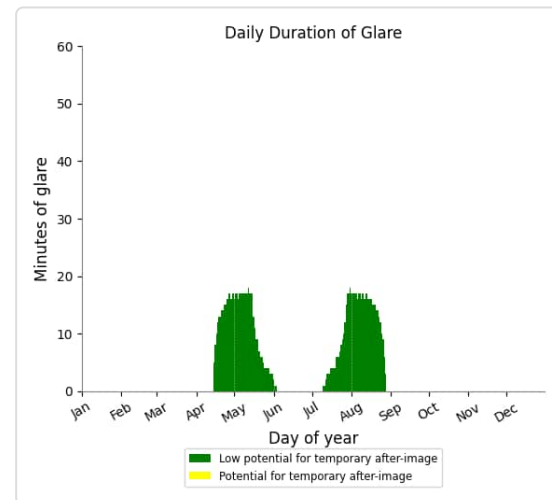
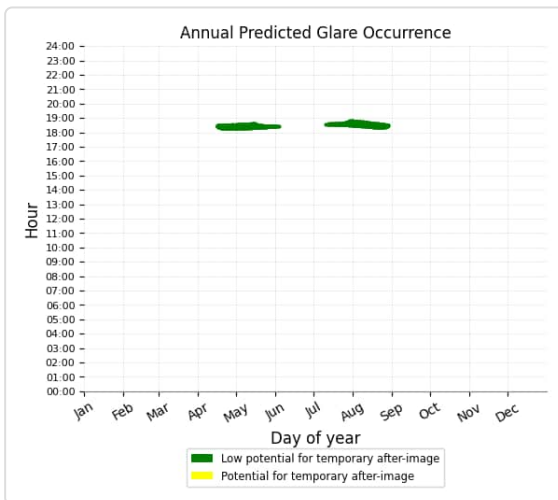
Green glare: 1,152 min.



PV array 1 and OP 19

Yellow glare: none

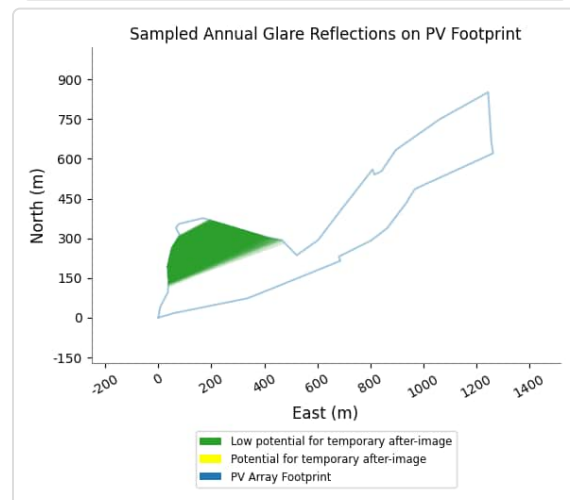
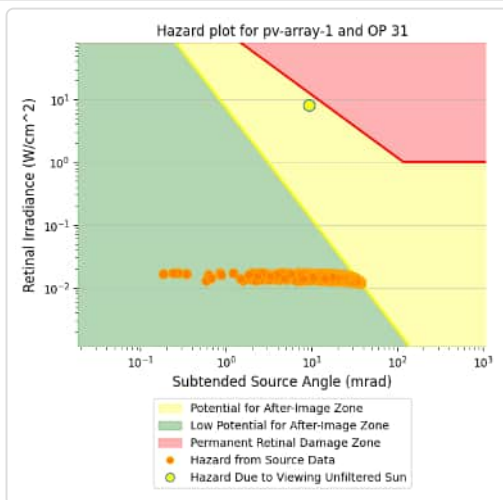
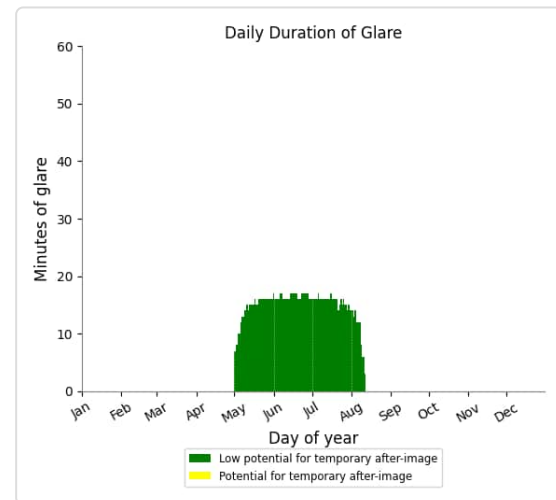
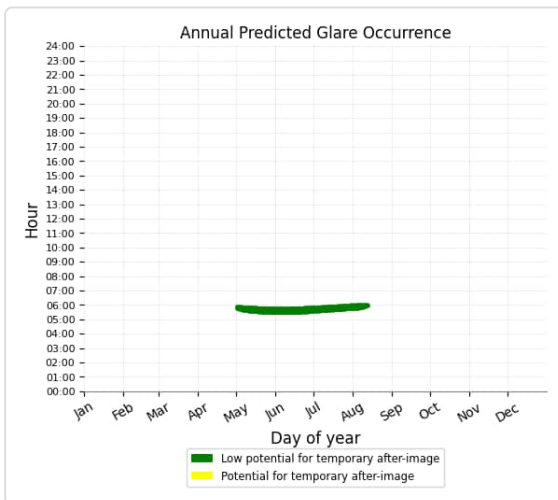
Green glare: 1,140 min.



PV array 1 and OP 31

Yellow glare: none

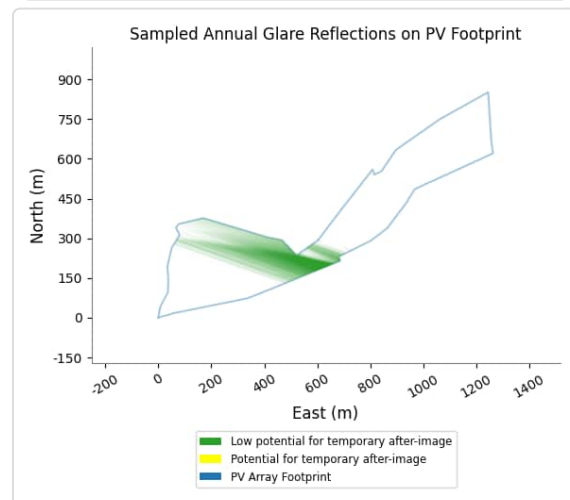
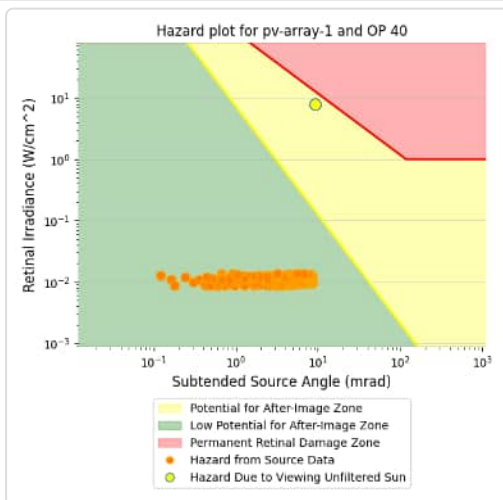
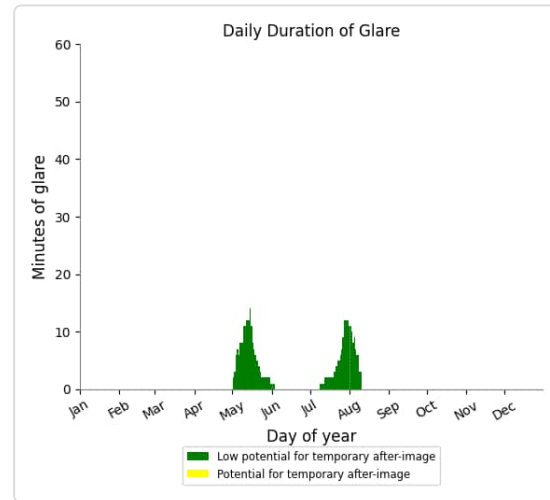
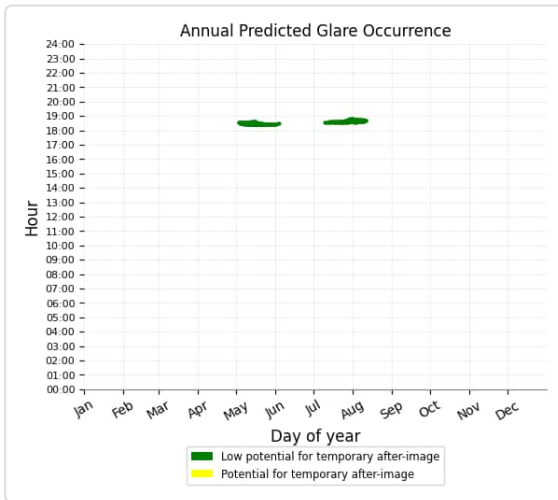
Green glare: 1,543 min.



PV array 1 and OP 40

Yellow glare: none

Green glare: 369 min.



PV array 1 and OP 1

No glare found

PV array 1 and OP 2

No glare found

PV array 1 and OP 3

No glare found

PV array 1 and OP 4

No glare found

PV array 1 and OP 5

No glare found

PV array 1 and OP 6

No glare found

PV array 1 and OP 7

No glare found

PV array 1 and OP 8

No glare found

PV array 1 and OP 9

No glare found

PV array 1 and OP 10

No glare found

PV array 1 and OP 11

No glare found

PV array 1 and OP 12

No glare found

PV array 1 and OP 20

No glare found

PV array 1 and OP 27

No glare found

PV array 1 and OP 28

No glare found

PV array 1 and OP 29

No glare found

PV array 1 and OP 32

No glare found

PV array 1 and OP 33

No glare found

PV array 1 and OP 34

No glare found

PV array 1 and OP 35

No glare found

PV array 1 and OP 36

No glare found

PV array 1 and OP 37

No glare found

PV array 1 and OP 38

No glare found

PV array 1 and OP 39

No glare found

PV: PV array 2 potential temporary after-image

Receptor results ordered by category of glare

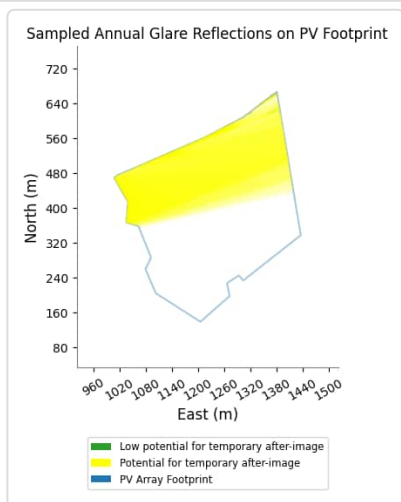
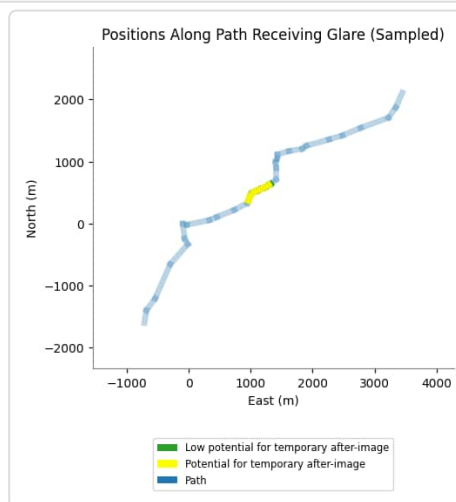
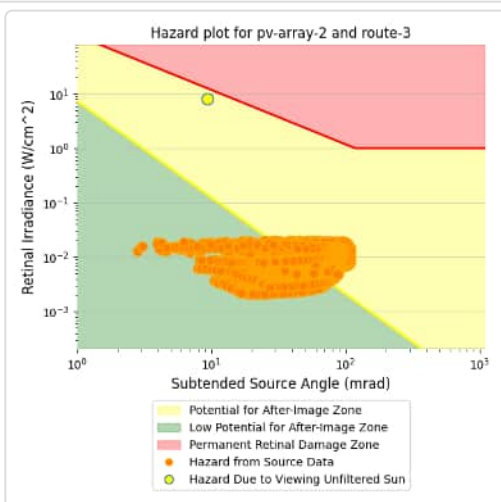
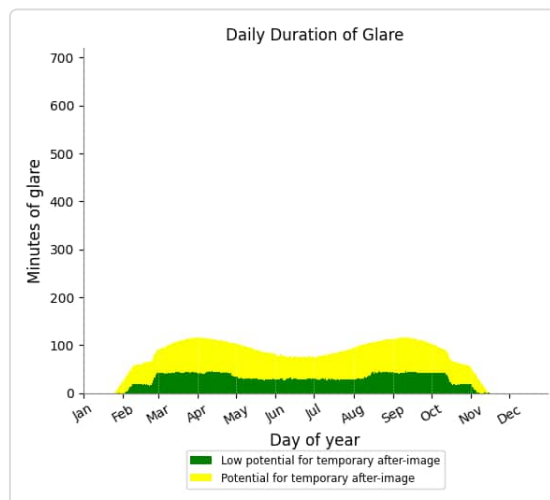
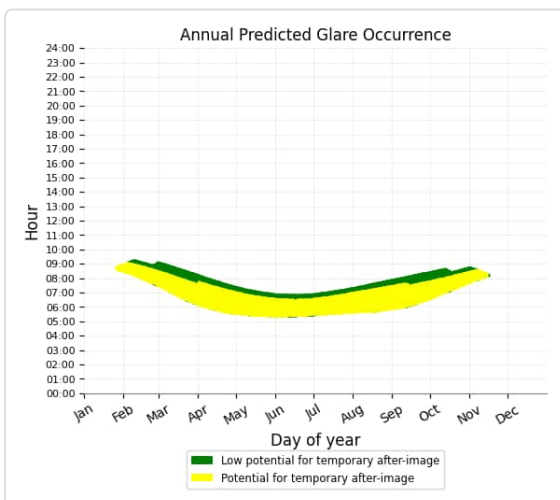
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route 3	9,202	153.4	16,323	272.1
A70	0	0.0	0	0.0
B743	0	0.0	0	0.0
OP 25	1,164	19.4	3,634	60.6
OP 35	845	14.1	1,799	30.0
OP 21	2,448	40.8	0	0.0
OP 22	2,047	34.1	0	0.0
OP 23	2,025	33.8	0	0.0
OP 24	2,449	40.8	0	0.0
OP 26	582	9.7	0	0.0
OP 30	743	12.4	0	0.0
OP 31	287	4.8	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 36	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0

PV array 2 and Route: Route 3

Yellow glare: 16,323 min.

Green glare: 9,202 min.



PV array 2 and Route: A70

No glare found

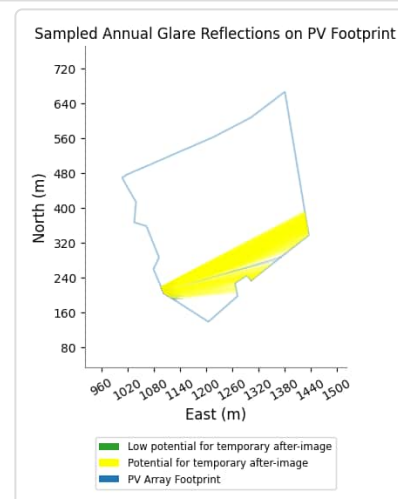
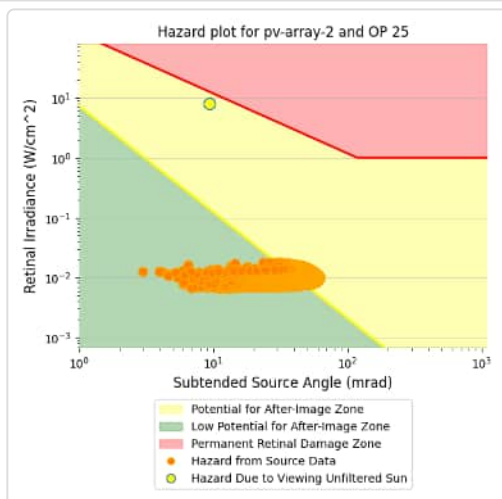
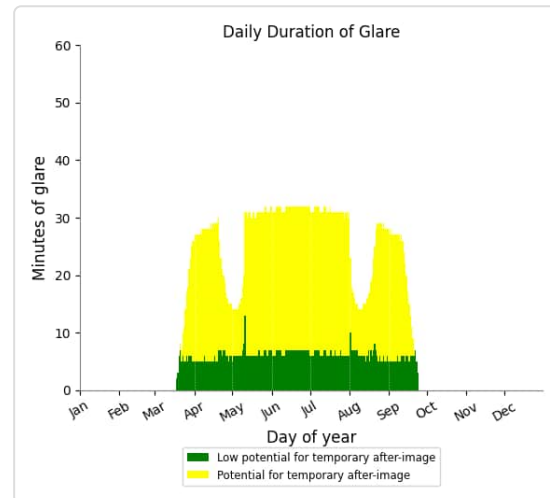
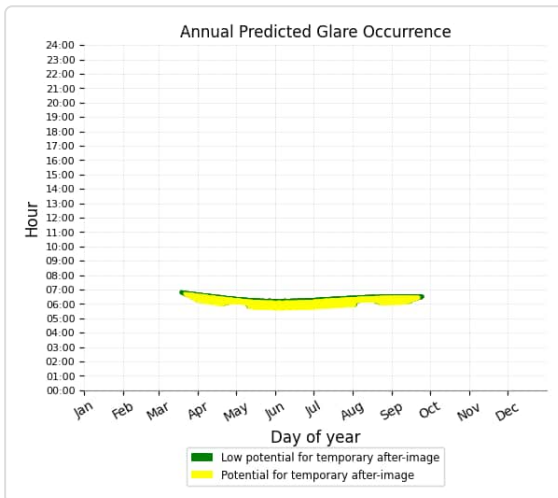
PV array 2 and Route: B743

No glare found

PV array 2 and OP 25

Yellow glare: 3,634 min.

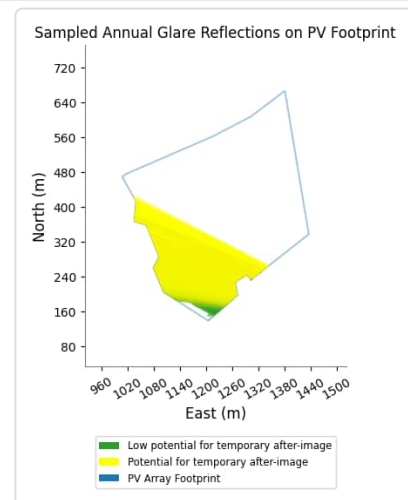
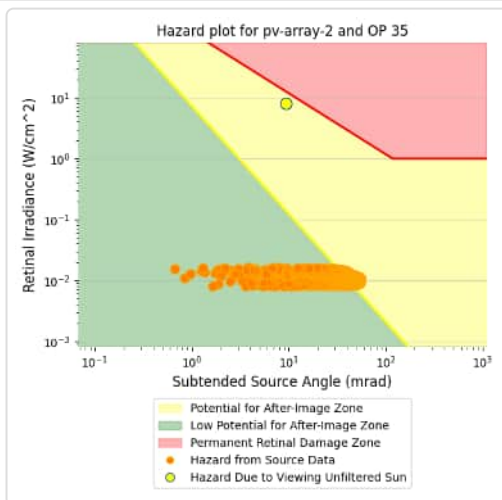
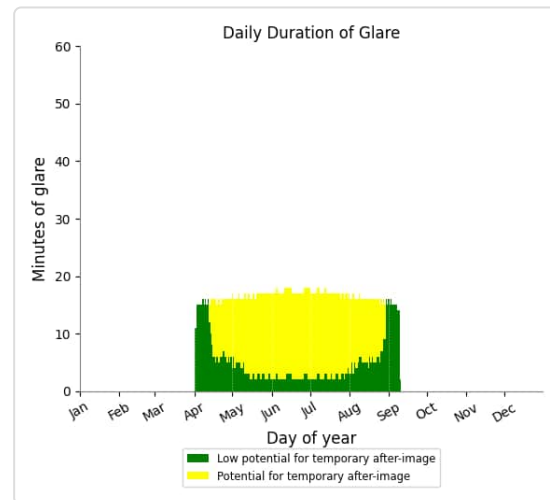
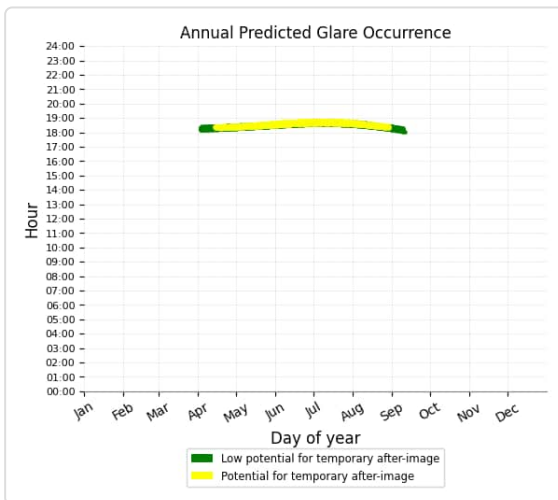
Green glare: 1,164 min.



PV array 2 and OP 35

Yellow glare: 1,799 min.

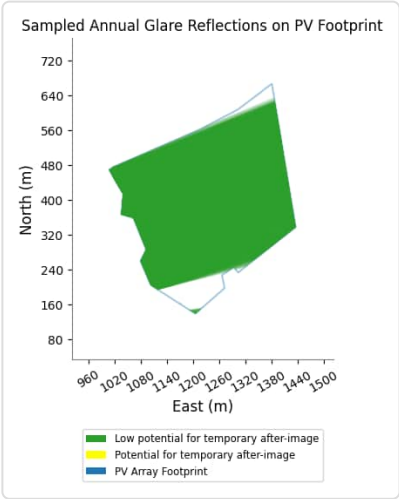
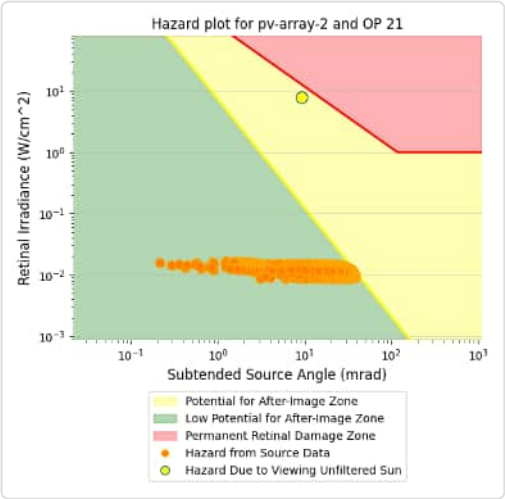
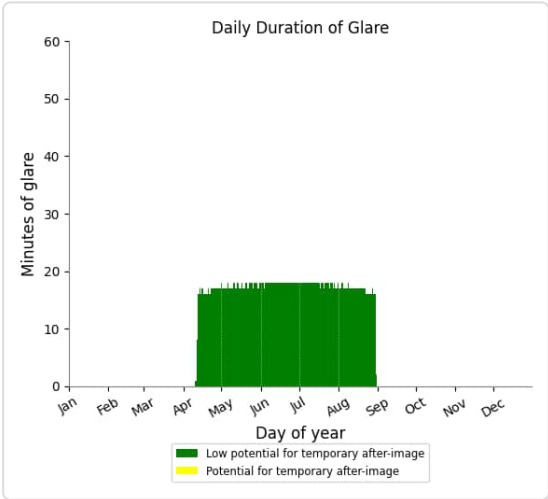
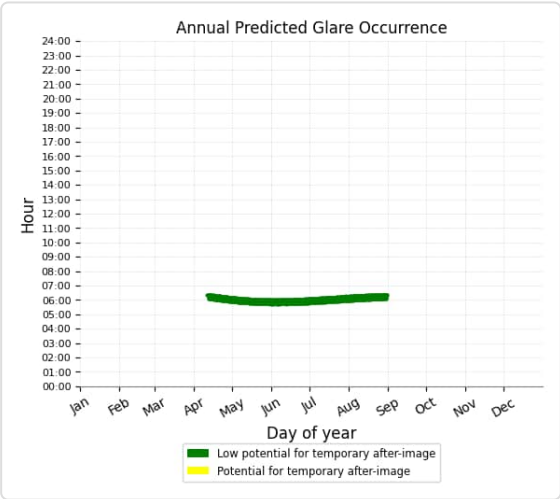
Green glare: 845 min.



PV array 2 and OP 21

Yellow glare: none

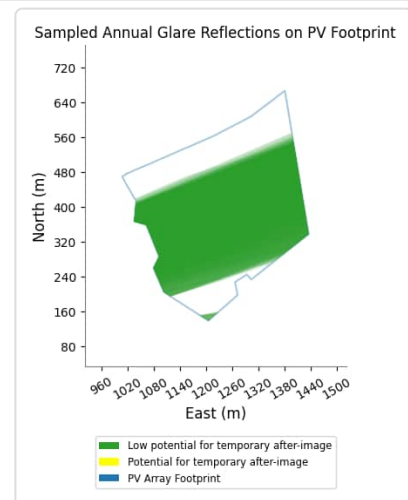
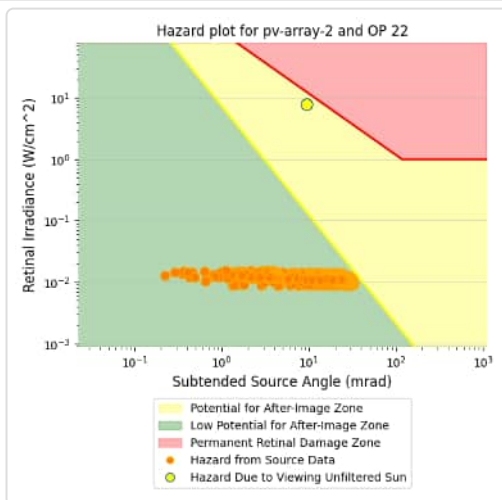
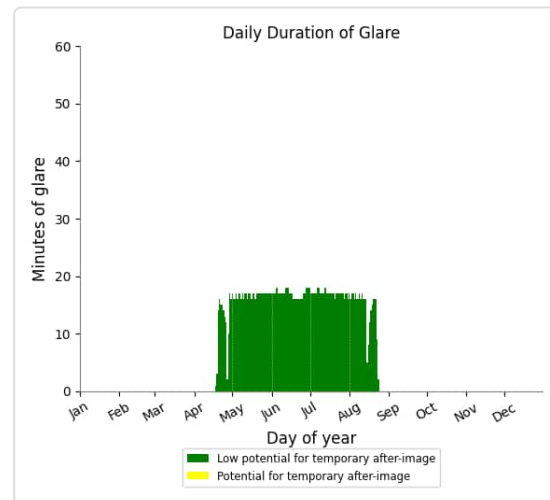
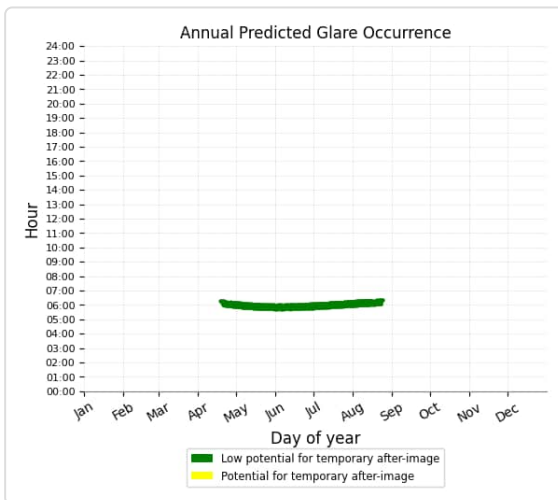
Green glare: 2,448 min.



PV array 2 and OP 22

Yellow glare: none

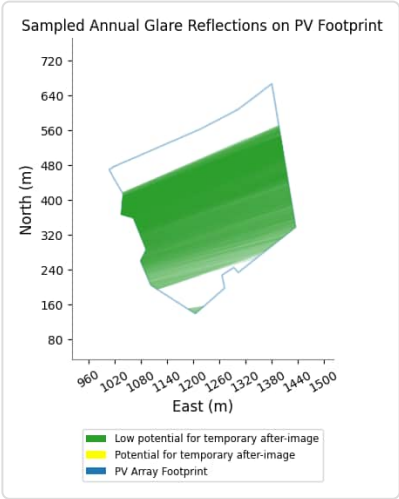
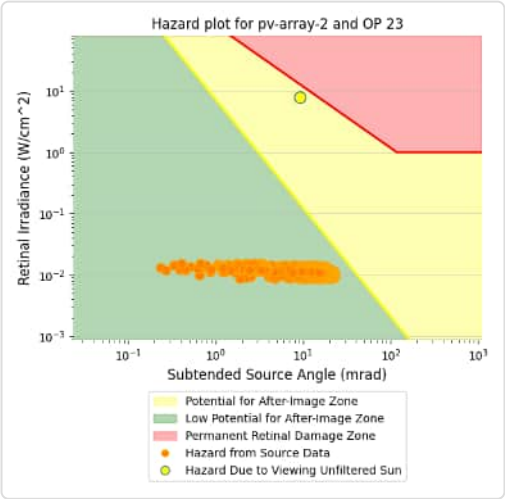
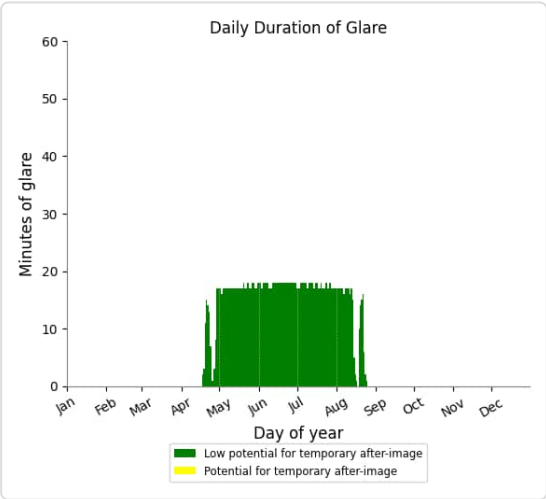
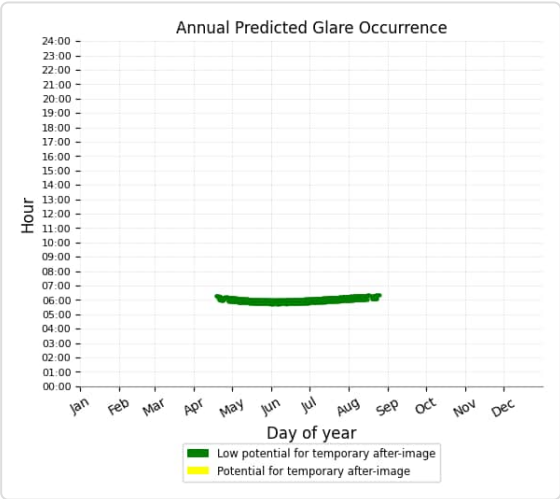
Green glare: 2,047 min.



PV array 2 and OP 23

Yellow glare: none

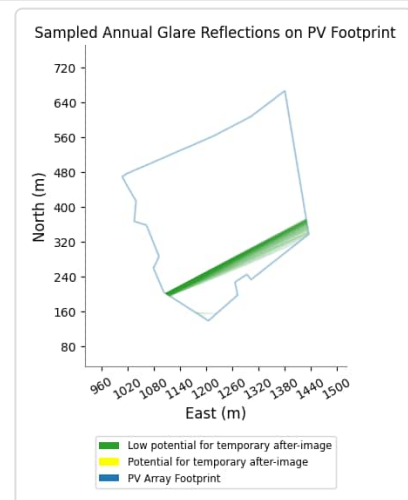
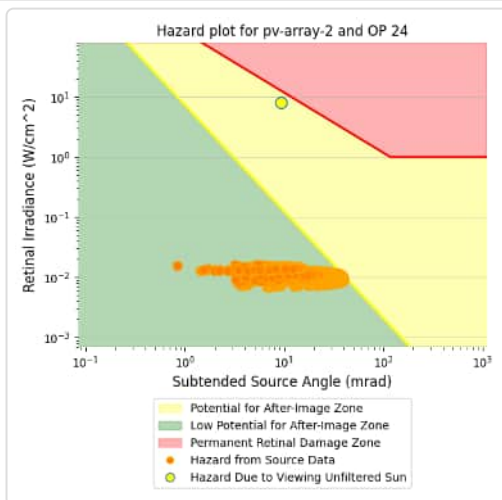
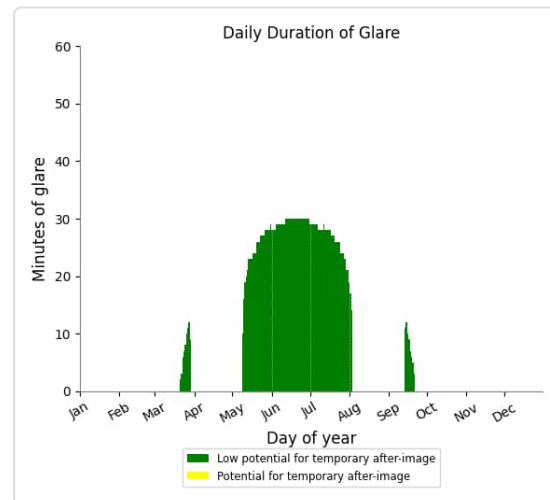
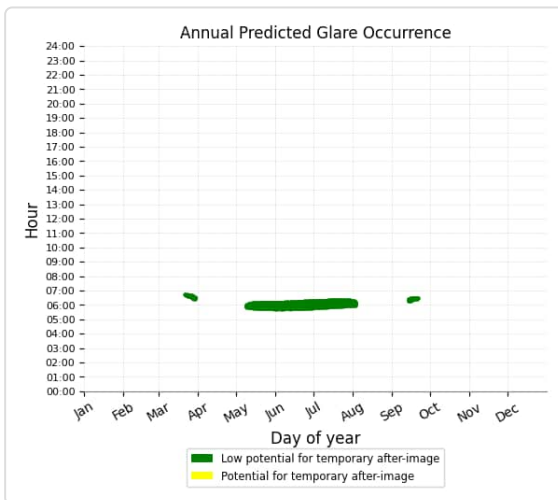
Green glare: 2,025 min.



PV array 2 and OP 24

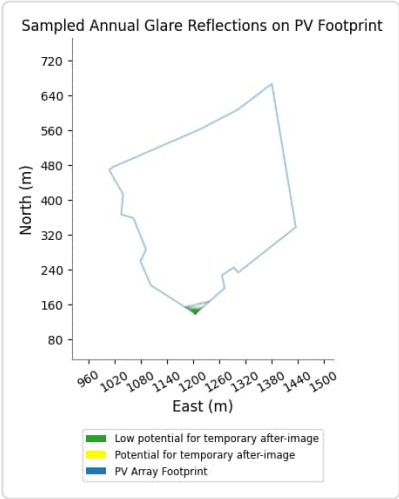
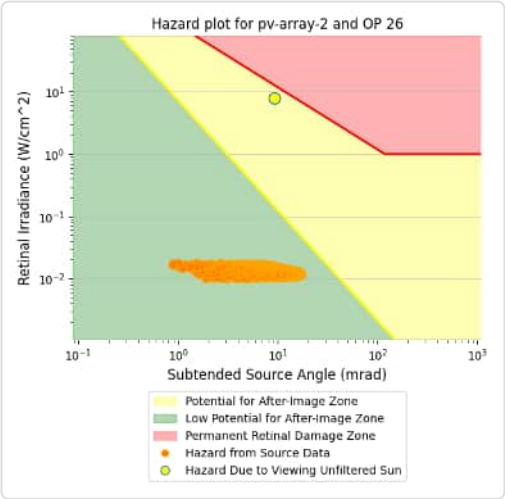
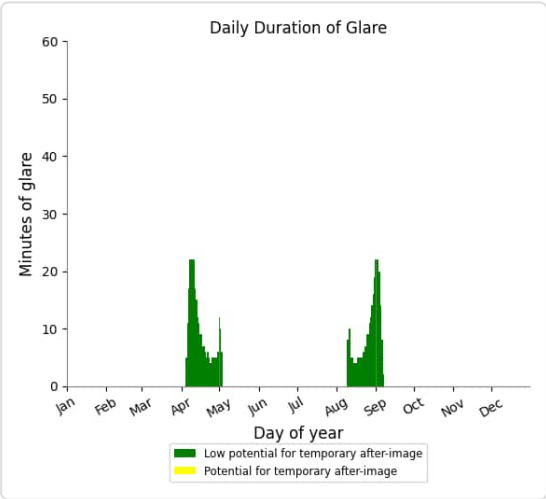
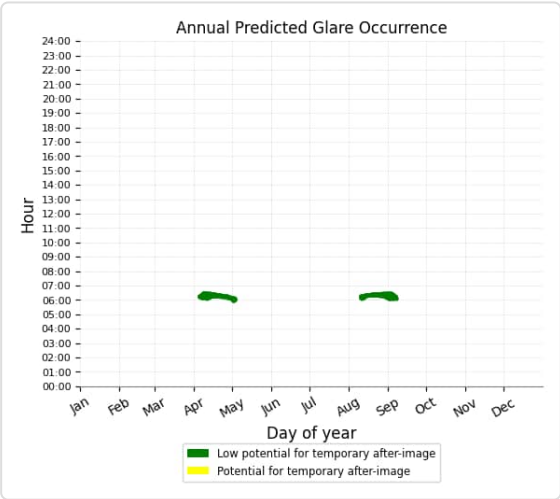
Yellow glare: none

Green glare: 2,449 min.



PV array 2 and OP 26

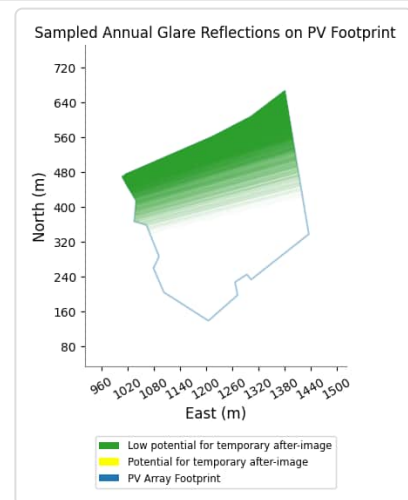
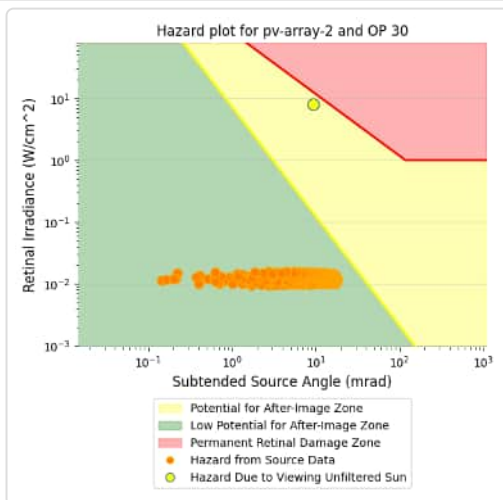
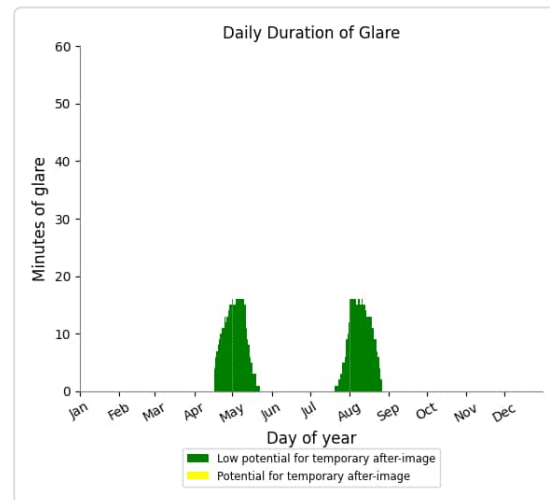
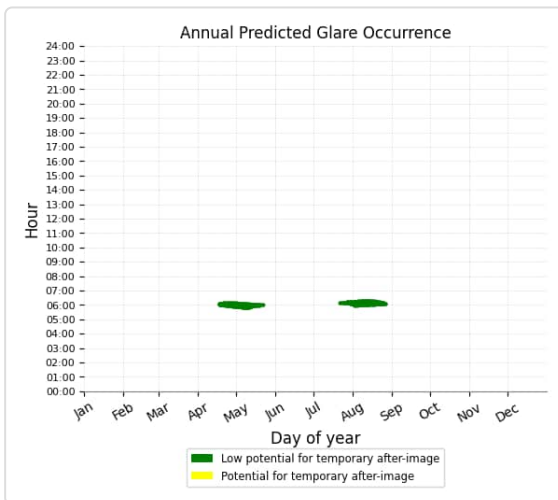
Yellow glare: none
Green glare: 582 min.



PV array 2 and OP 30

Yellow glare: none

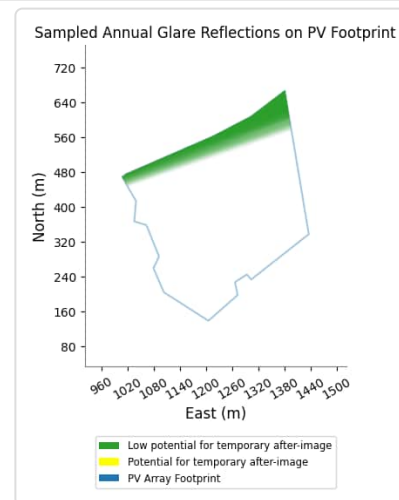
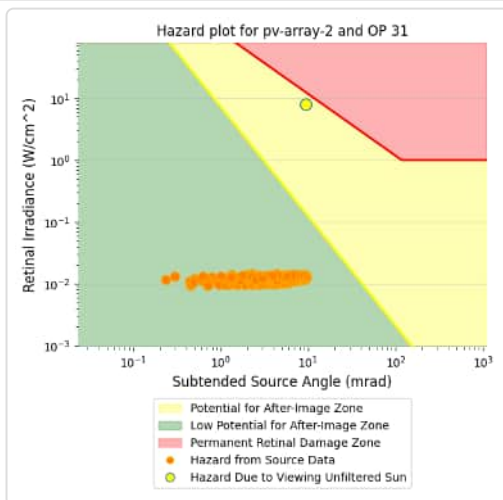
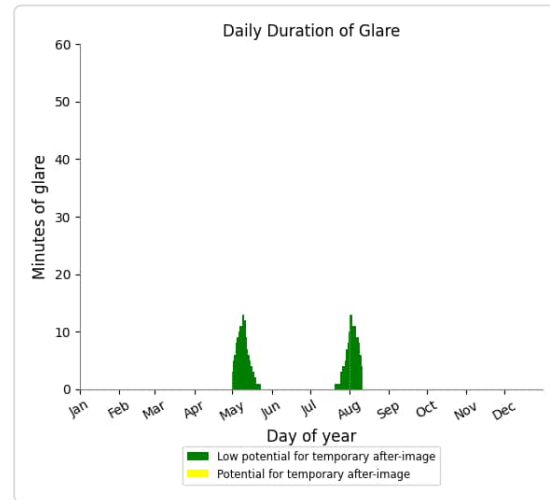
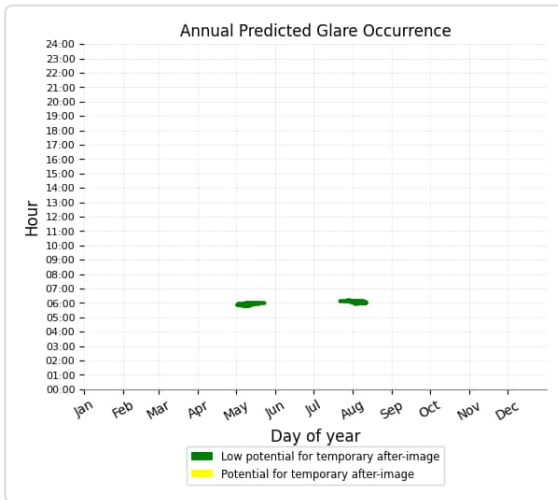
Green glare: 743 min.



PV array 2 and OP 31

Yellow glare: none

Green glare: 287 min.



PV array 2 and OP 1

No glare found

PV array 2 and OP 2

No glare found

PV array 2 and OP 3

No glare found

PV array 2 and OP 4

No glare found

PV array 2 and OP 5

No glare found

PV array 2 and OP 6

No glare found

PV array 2 and OP 7

No glare found

PV array 2 and OP 8

No glare found

PV array 2 and OP 9

No glare found

PV array 2 and OP 10

No glare found

PV array 2 and OP 11

No glare found

PV array 2 and OP 12

No glare found

PV array 2 and OP 13

No glare found

PV array 2 and OP 14

No glare found

PV array 2 and OP 15

No glare found

PV array 2 and OP 16

No glare found

PV array 2 and OP 17

No glare found

PV array 2 and OP 18

No glare found

PV array 2 and OP 19

No glare found

PV array 2 and OP 20

No glare found

PV array 2 and OP 27

No glare found

PV array 2 and OP 28

No glare found

PV array 2 and OP 29

No glare found

PV array 2 and OP 32

No glare found

PV array 2 and OP 33

No glare found

PV array 2 and OP 34

No glare found

PV array 2 and OP 36

No glare found

PV array 2 and OP 37

No glare found

PV array 2 and OP 38

No glare found

PV array 2 and OP 39

No glare found

PV array 2 and OP 40

No glare found

PV: PV array 3 potential temporary after-image

Receptor results ordered by category of glare

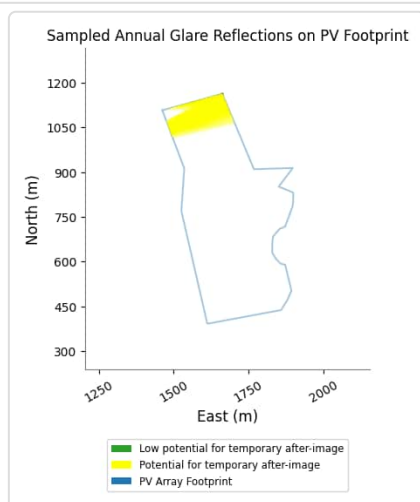
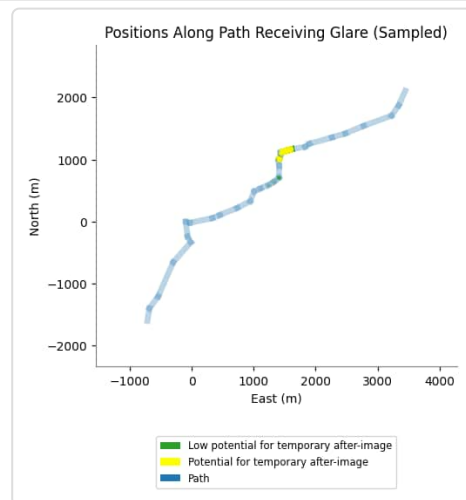
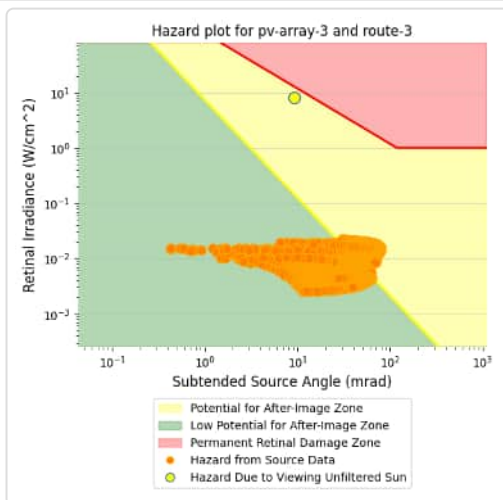
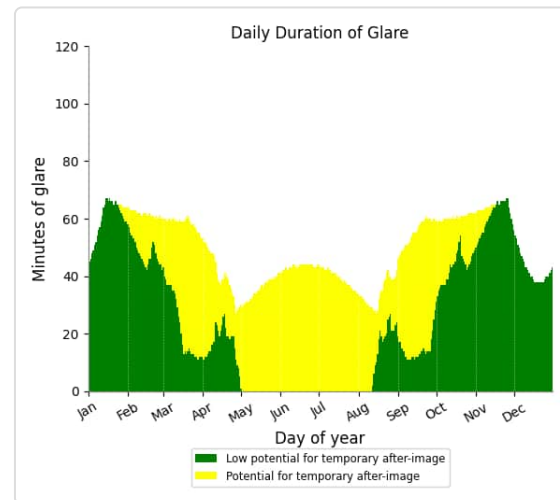
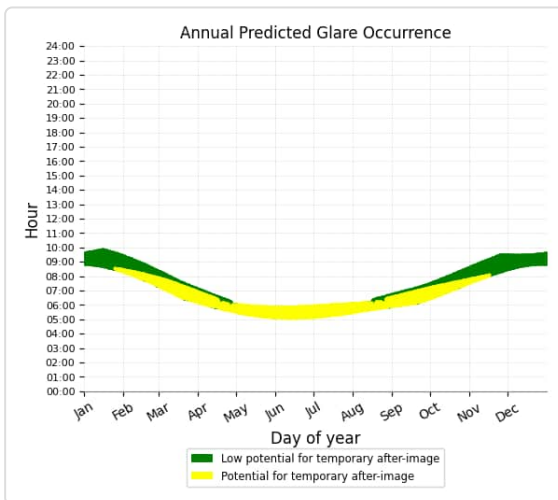
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route 3	9,686	161.4	8,401	140.0
A70	279	4.7	0	0.0
B743	1,589	26.5	0	0.0
OP 38	531	8.8	1,937	32.3
OP 21	641	10.7	0	0.0
OP 22	587	9.8	0	0.0
OP 23	549	9.2	0	0.0
OP 24	405	6.8	0	0.0
OP 25	504	8.4	0	0.0
OP 30	1,773	29.6	0	0.0
OP 31	1,572	26.2	0	0.0
OP 32	2,038	34.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0

PV array 3 and Route: Route 3

Yellow glare: 8,401 min.

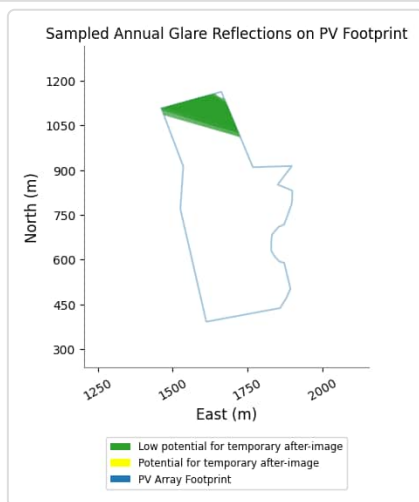
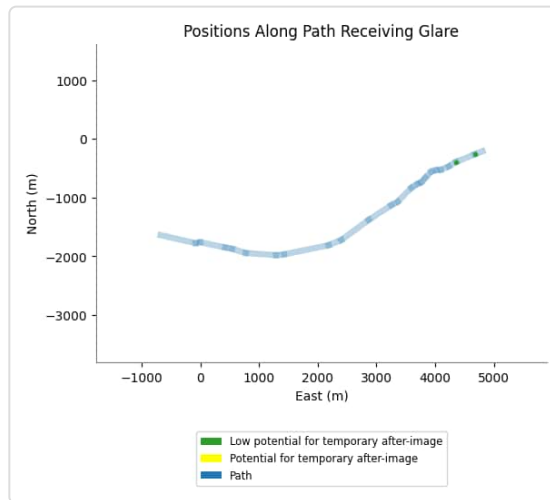
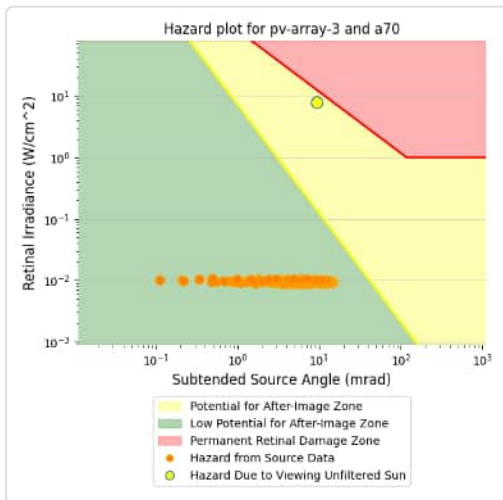
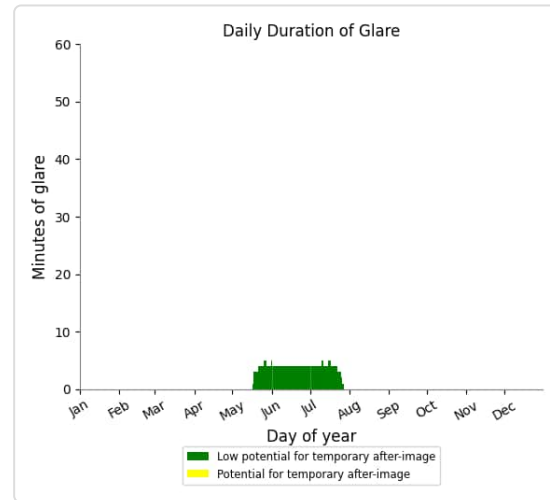
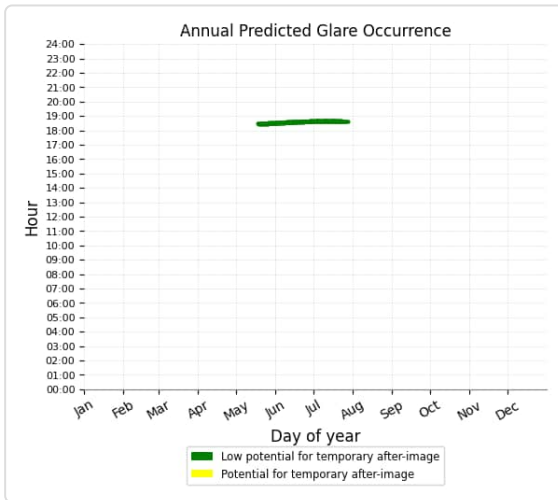
Green glare: 9,686 min.



PV array 3 and Route: A70

Yellow glare: none

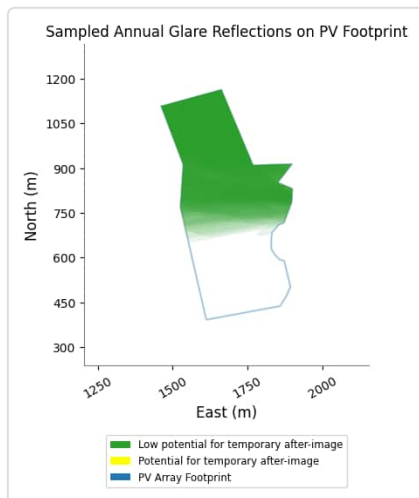
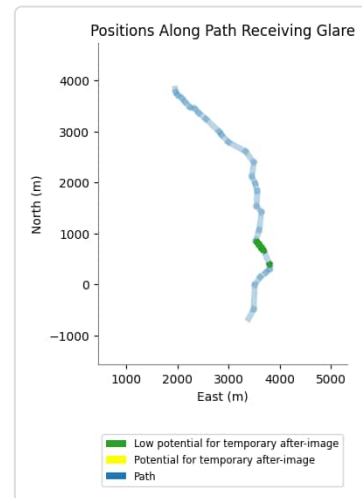
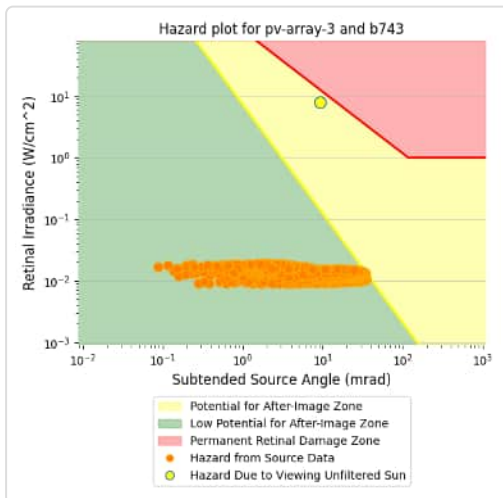
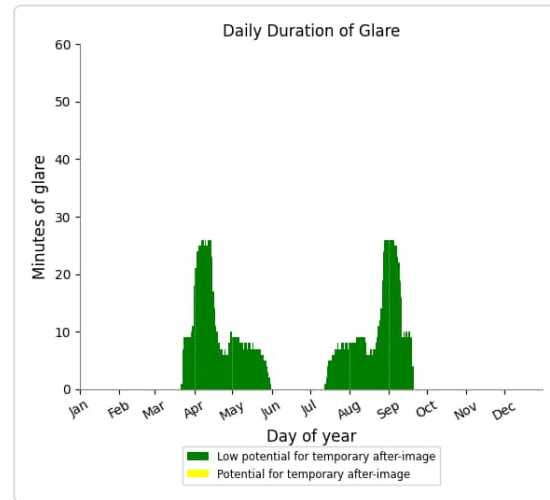
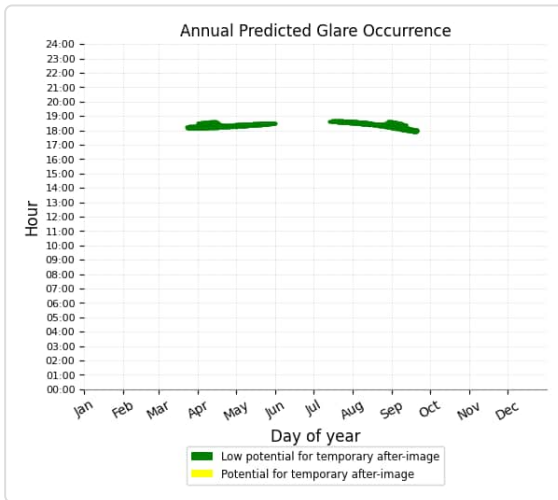
Green glare: 279 min.



PV array 3 and Route: B743

Yellow glare: none

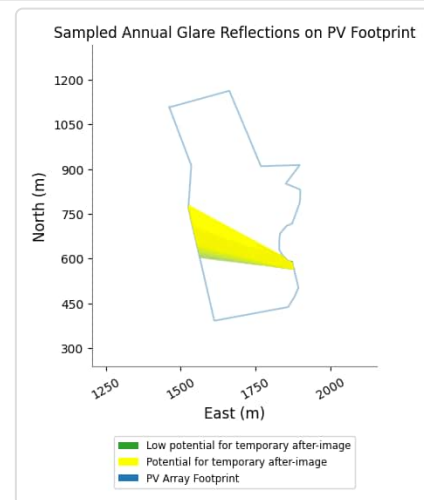
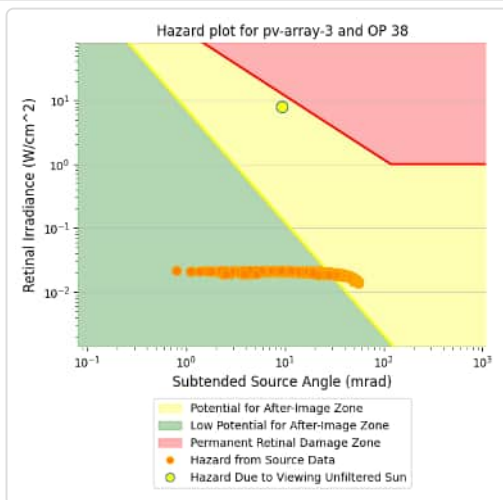
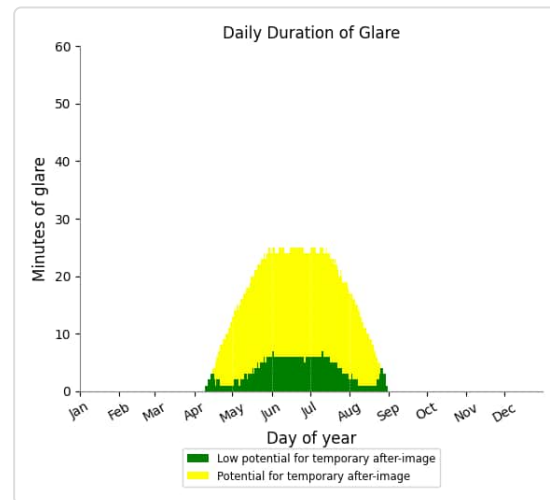
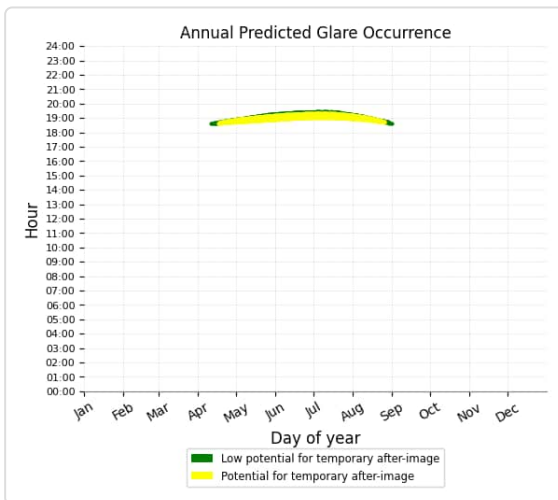
Green glare: 1,589 min.



PV array 3 and OP 38

Yellow glare: 1,937 min.

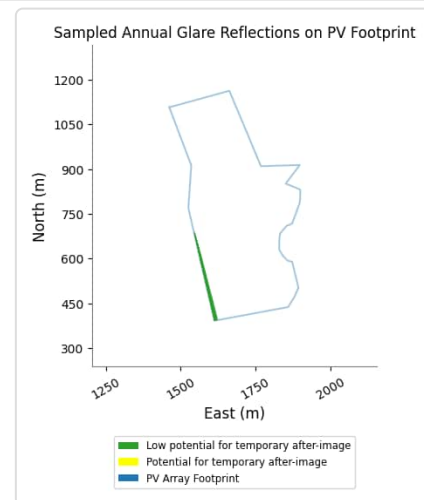
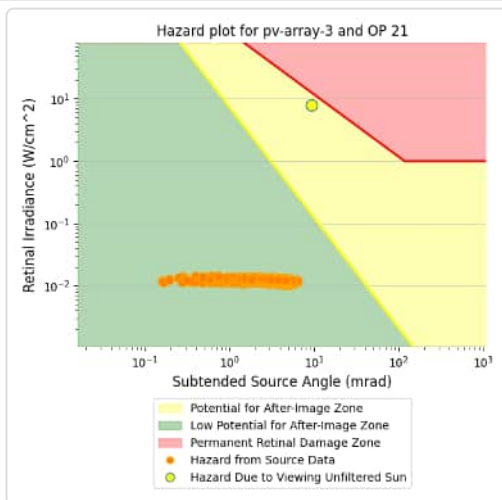
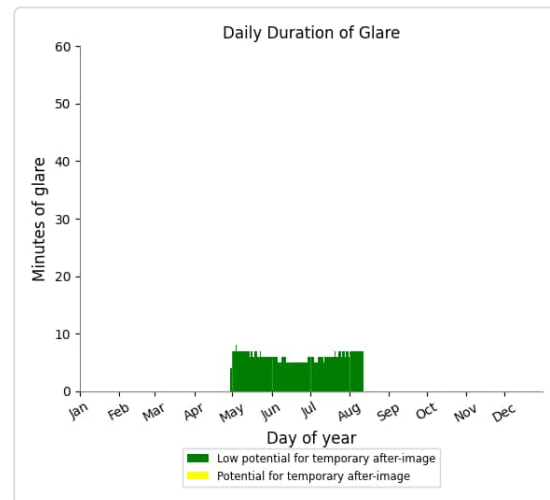
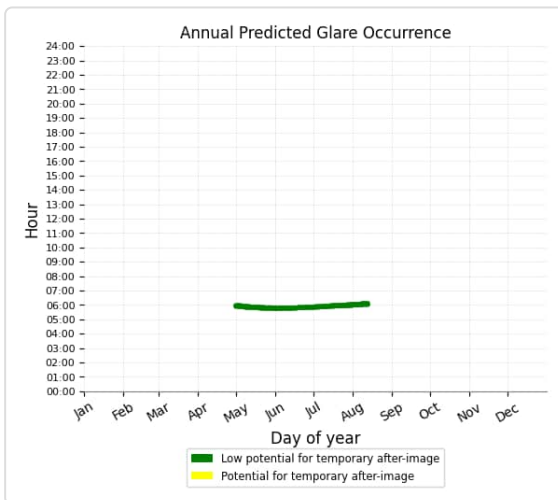
Green glare: 531 min.



PV array 3 and OP 21

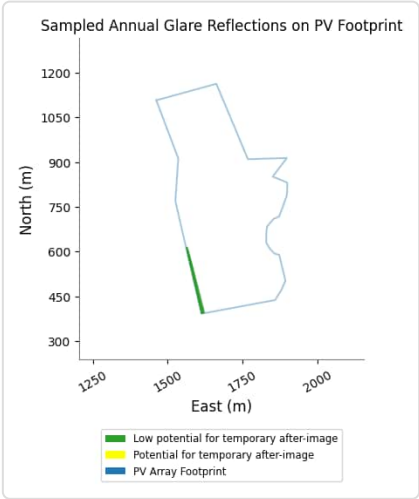
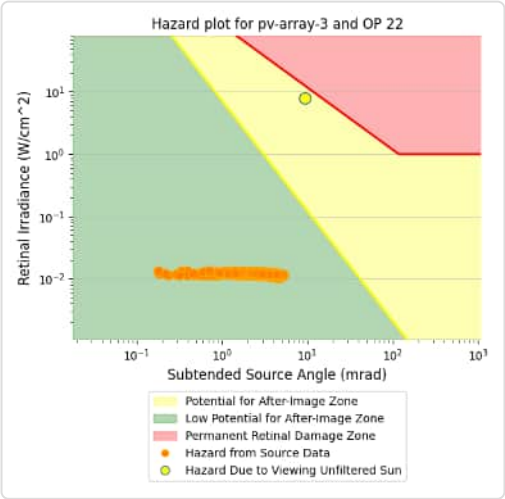
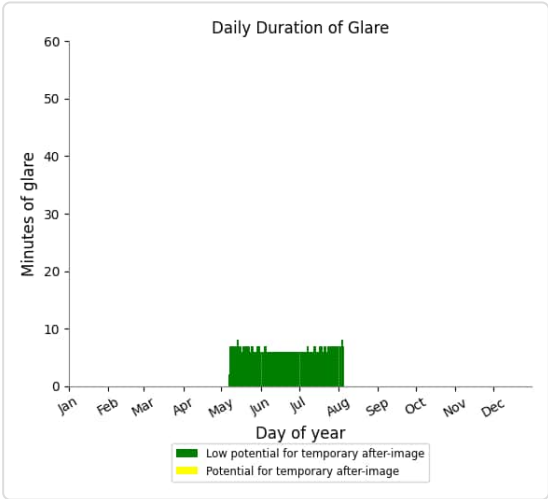
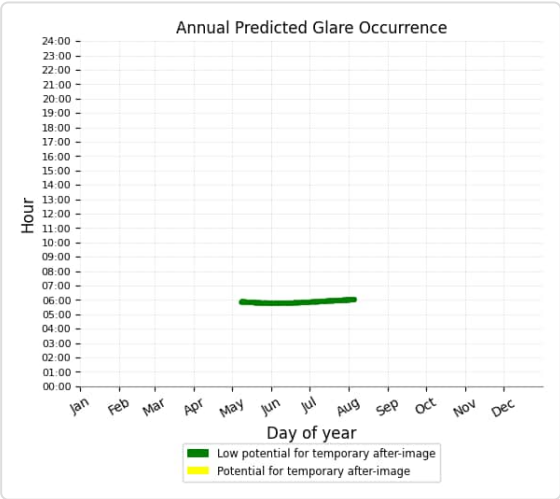
Yellow glare: none

Green glare: 641 min.



PV array 3 and OP 22

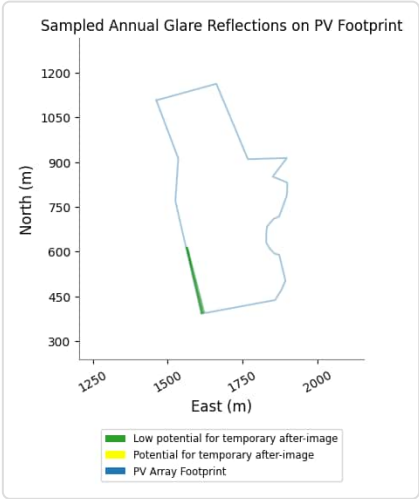
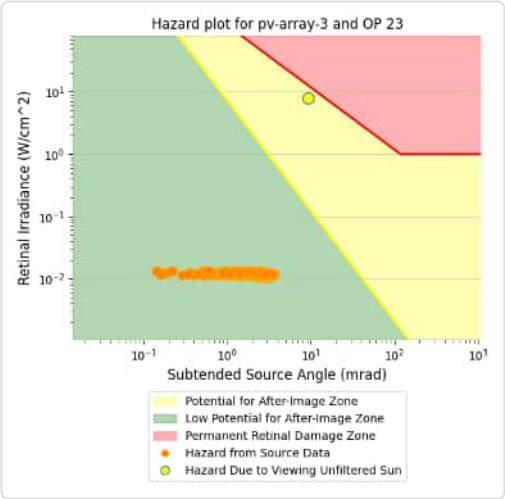
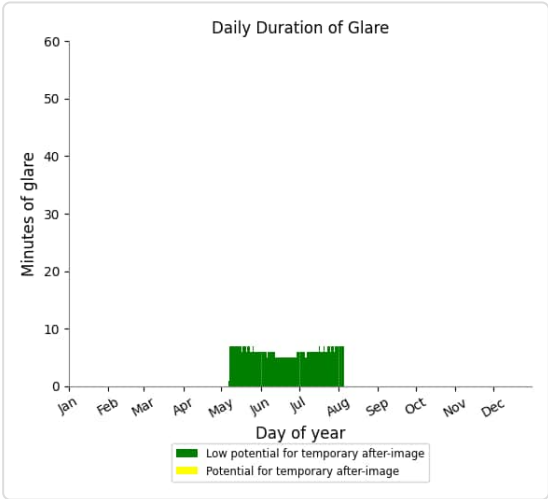
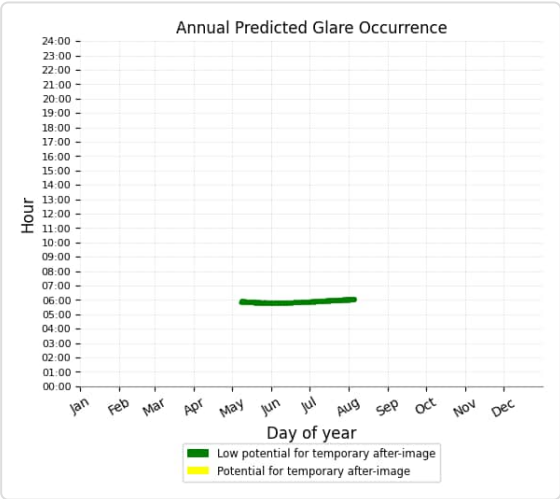
Yellow glare: none
Green glare: 587 min.



PV array 3 and OP 23

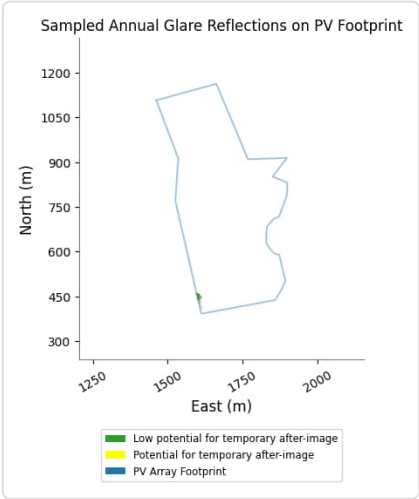
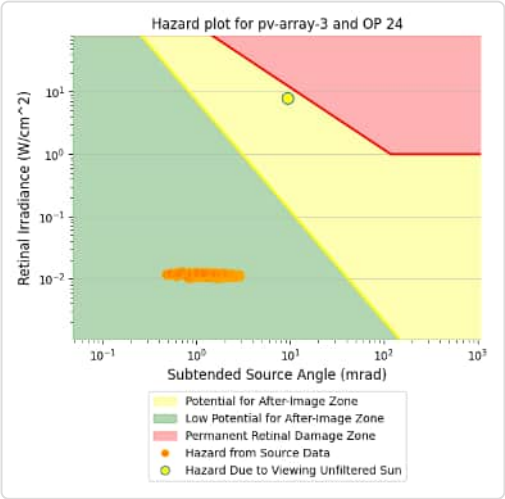
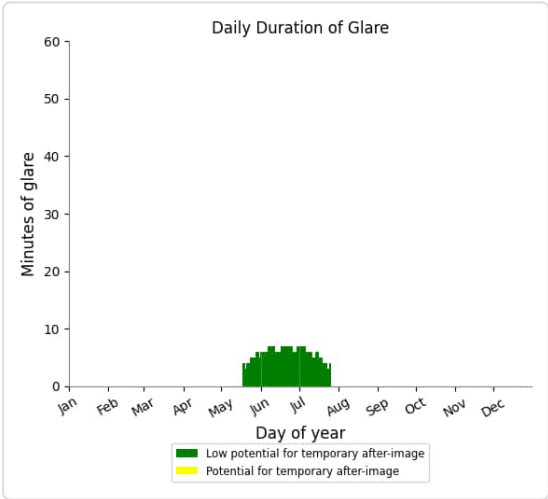
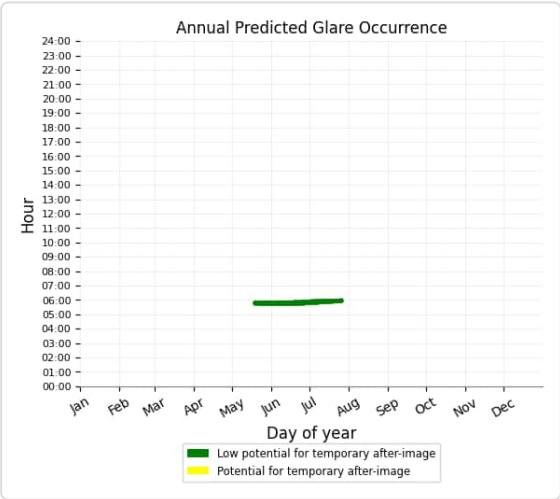
Yellow glare: none

Green glare: 549 min.



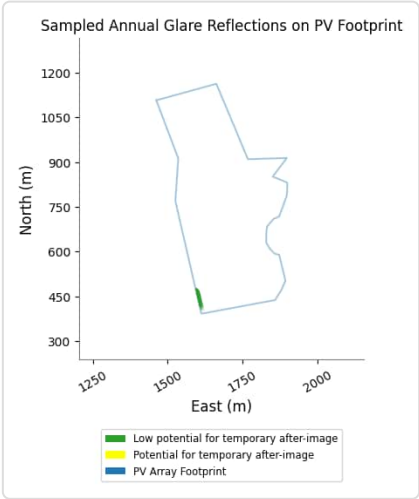
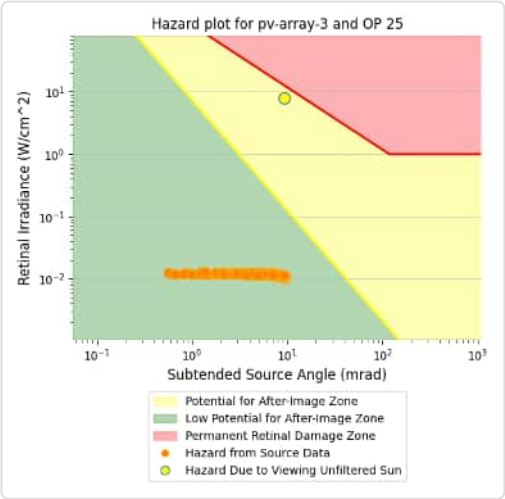
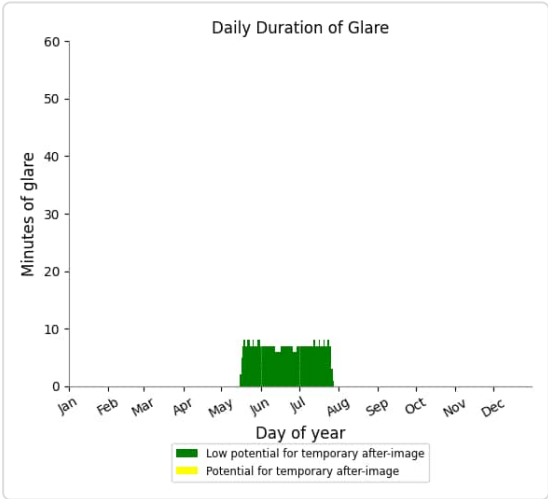
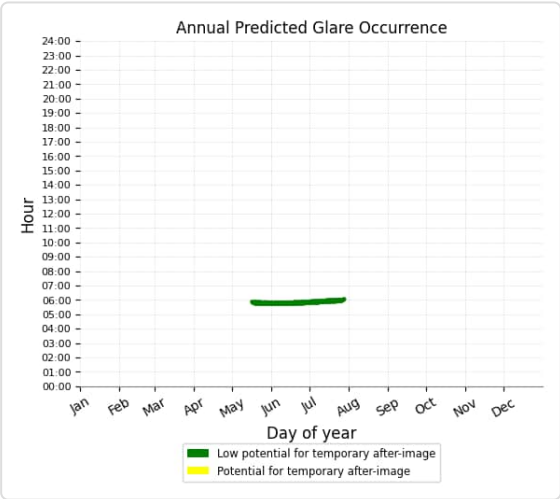
PV array 3 and OP 24

Yellow glare: none
Green glare: 405 min.



PV array 3 and OP 25

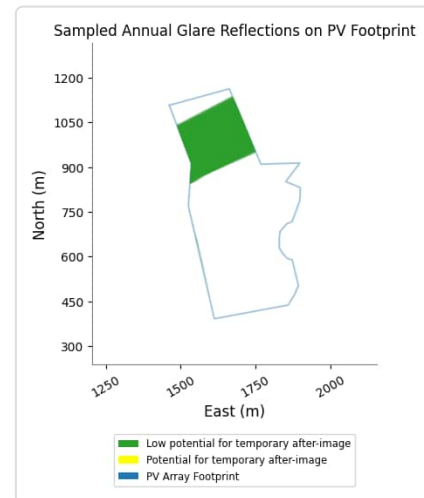
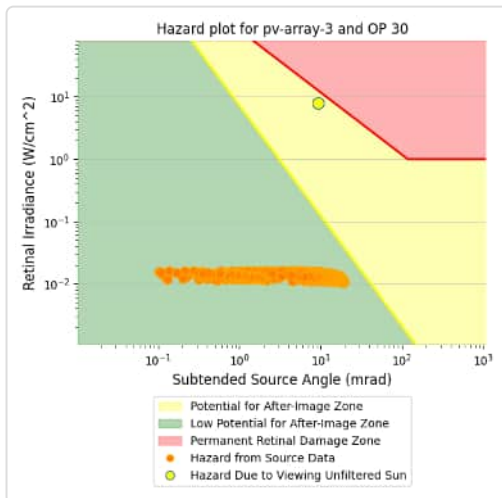
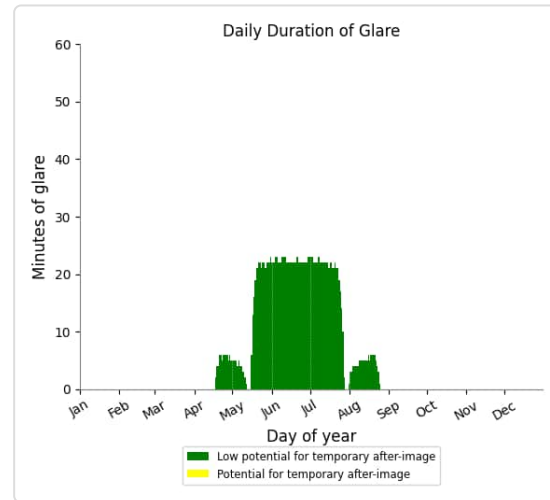
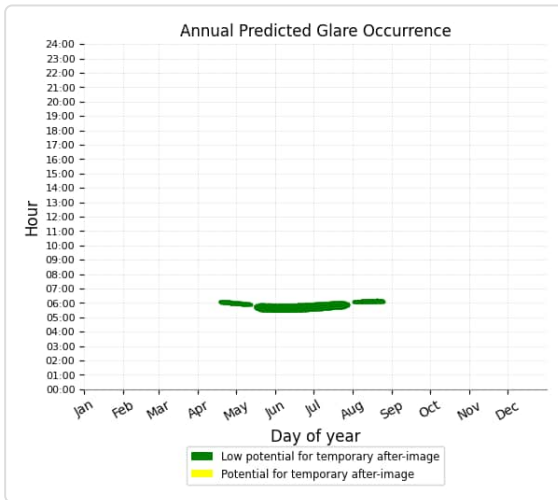
Yellow glare: none
Green glare: 504 min.



PV array 3 and OP 30

Yellow glare: none

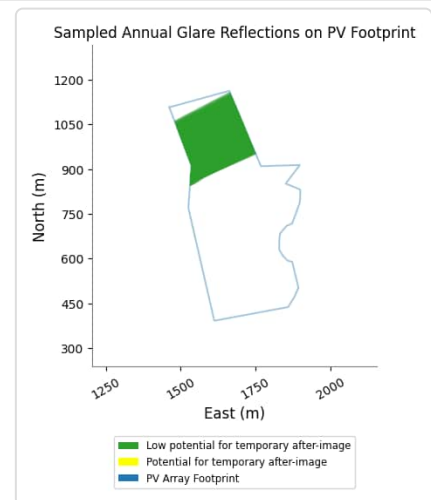
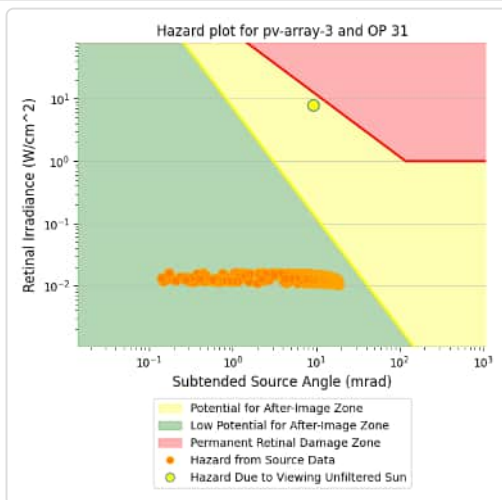
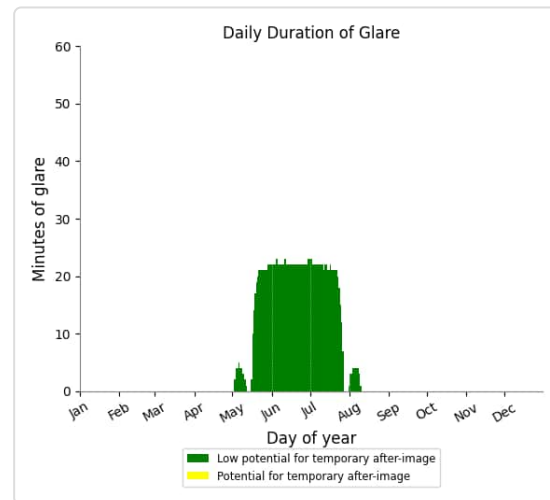
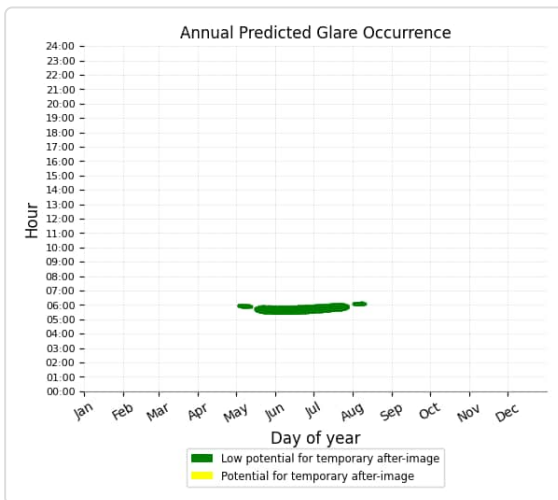
Green glare: 1,773 min.



PV array 3 and OP 31

Yellow glare: none

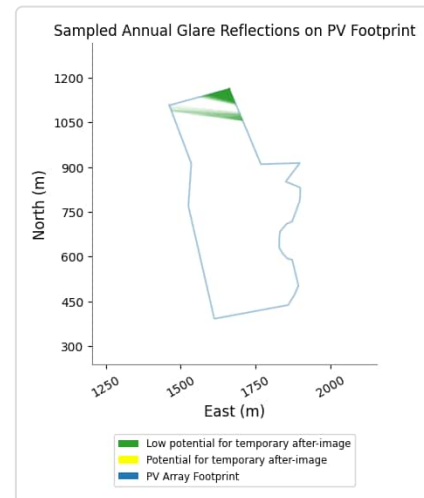
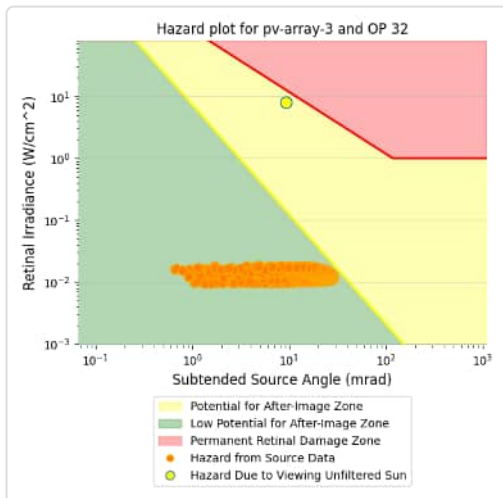
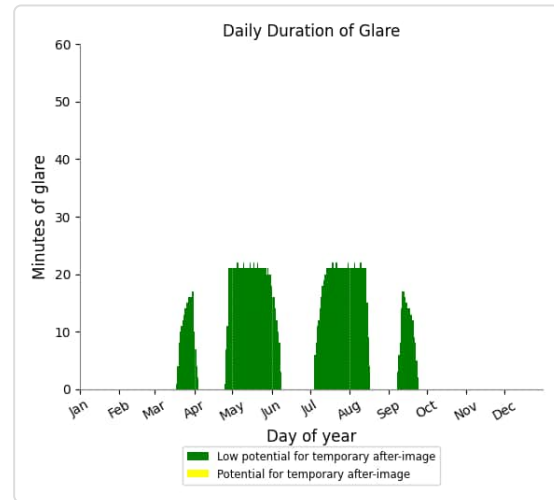
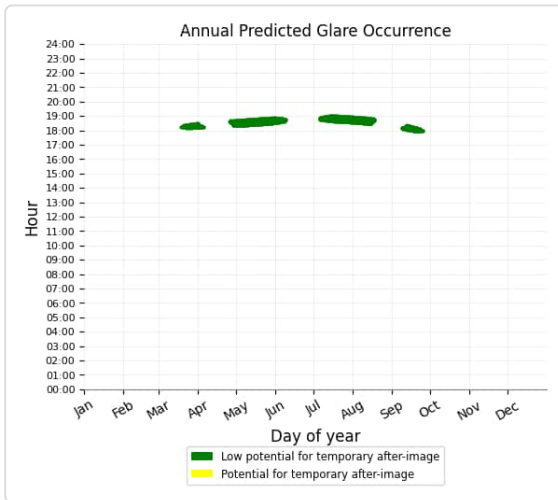
Green glare: 1,572 min.



PV array 3 and OP 32

Yellow glare: none

Green glare: 2,038 min.



PV array 3 and OP 1

No glare found

PV array 3 and OP 2

No glare found

PV array 3 and OP 3

No glare found

PV array 3 and OP 4

No glare found

PV array 3 and OP 5

No glare found

PV array 3 and OP 6

No glare found

PV array 3 and OP 7

No glare found

PV array 3 and OP 8

No glare found

PV array 3 and OP 9

No glare found

PV array 3 and OP 10

No glare found

PV array 3 and OP 11

No glare found

PV array 3 and OP 12

No glare found

PV array 3 and OP 13

No glare found

PV array 3 and OP 14

No glare found

PV array 3 and OP 15

No glare found

PV array 3 and OP 16

No glare found

PV array 3 and OP 17

No glare found

PV array 3 and OP 18

No glare found

PV array 3 and OP 19

No glare found

PV array 3 and OP 20

No glare found

PV array 3 and OP 26

No glare found

PV array 3 and OP 27

No glare found

PV array 3 and OP 28

No glare found

PV array 3 and OP 29

No glare found

PV array 3 and OP 33

No glare found

PV array 3 and OP 34

No glare found

PV array 3 and OP 35

No glare found

PV array 3 and OP 36

No glare found

PV array 3 and OP 37

No glare found

PV array 3 and OP 39

No glare found

PV array 3 and OP 40

No glare found

PV: PV array 4 low potential for temporary after-image

Receptor results ordered by category of glare

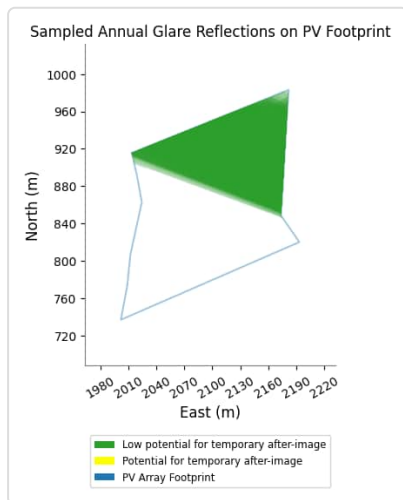
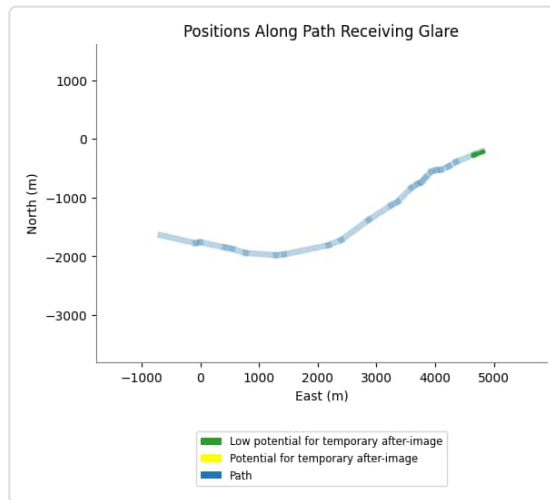
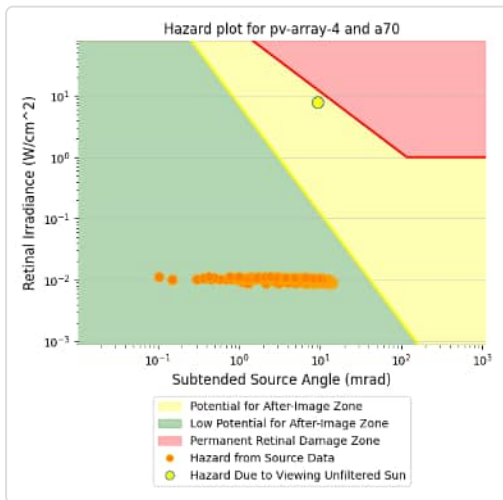
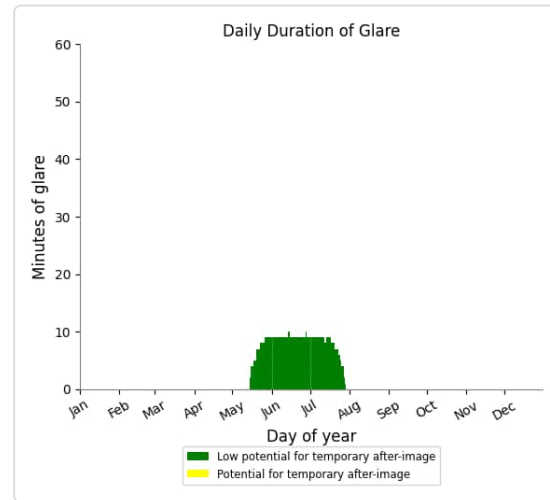
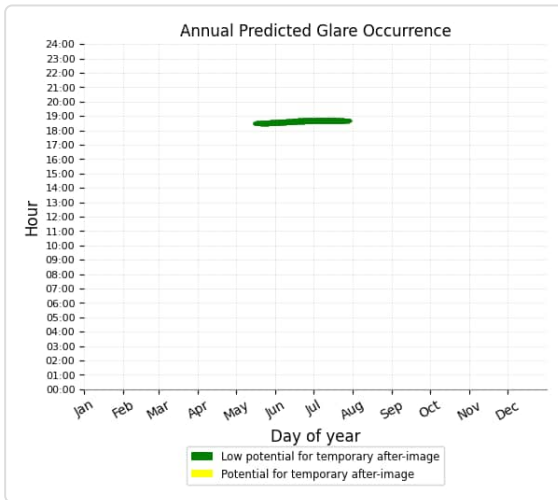
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
A70	610	10.2	0	0.0
B743	1,789	29.8	0	0.0
Route 3	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0
OP 36	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0

PV array 4 and Route: A70

Yellow glare: none

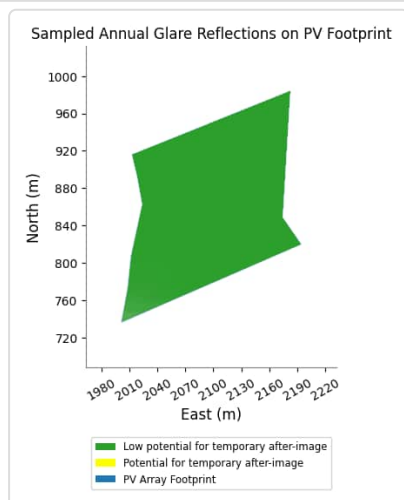
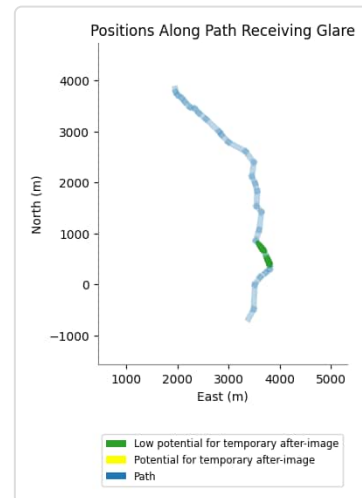
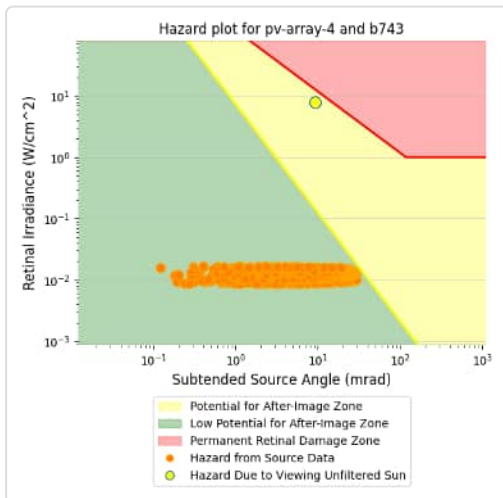
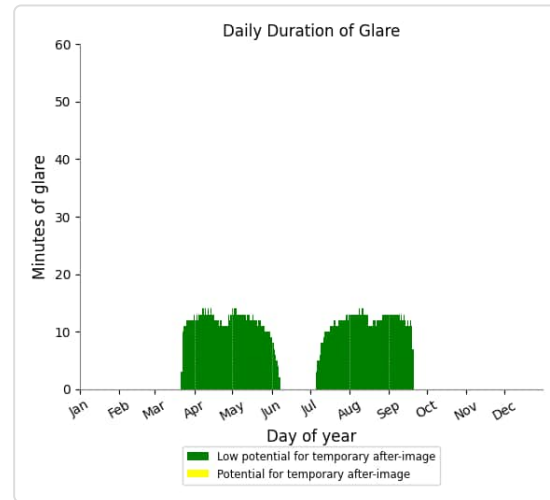
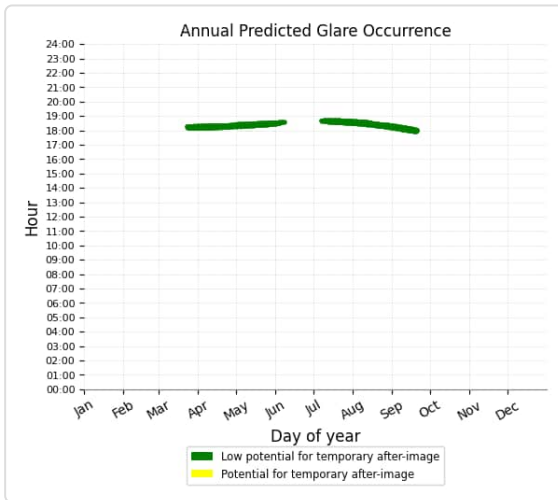
Green glare: 610 min.



PV array 4 and Route: B743

Yellow glare: none

Green glare: 1,789 min.



PV array 4 and Route: Route 3

No glare found

PV array 4 and OP 1

No glare found

PV array 4 and OP 2

No glare found

PV array 4 and OP 3

No glare found

PV array 4 and OP 4

No glare found

PV array 4 and OP 5

No glare found

PV array 4 and OP 6

No glare found

PV array 4 and OP 7

No glare found

PV array 4 and OP 8

No glare found

PV array 4 and OP 9

No glare found

PV array 4 and OP 10

No glare found

PV array 4 and OP 11

No glare found

PV array 4 and OP 12

No glare found

PV array 4 and OP 13

No glare found

PV array 4 and OP 14

No glare found

PV array 4 and OP 15

No glare found

PV array 4 and OP 16

No glare found

PV array 4 and OP 17

No glare found

PV array 4 and OP 18

No glare found

PV array 4 and OP 19

No glare found

PV array 4 and OP 20

No glare found

PV array 4 and OP 21

No glare found

PV array 4 and OP 22

No glare found

PV array 4 and OP 23

No glare found

PV array 4 and OP 24

No glare found

PV array 4 and OP 25

No glare found

PV array 4 and OP 26

No glare found

PV array 4 and OP 27

No glare found

PV array 4 and OP 28

No glare found

PV array 4 and OP 29

No glare found

PV array 4 and OP 30

No glare found

PV array 4 and OP 31

No glare found

PV array 4 and OP 32

No glare found

PV array 4 and OP 33

No glare found

PV array 4 and OP 34

No glare found

PV array 4 and OP 35

No glare found

PV array 4 and OP 36

No glare found

PV array 4 and OP 37

No glare found

PV array 4 and OP 38

No glare found

PV array 4 and OP 39

No glare found

PV array 4 and OP 40

No glare found

PV: PV array 5 potential temporary after-image

Receptor results ordered by category of glare

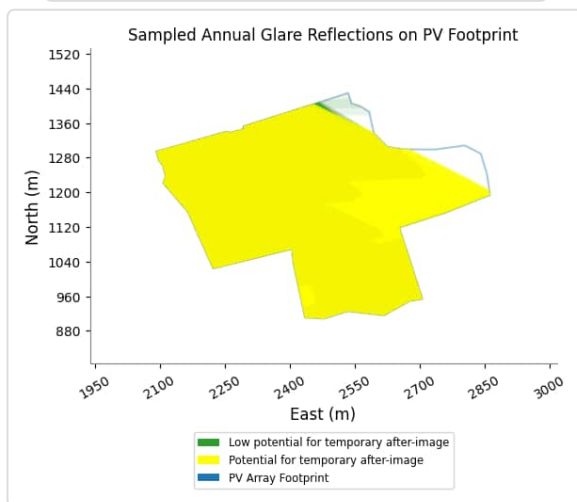
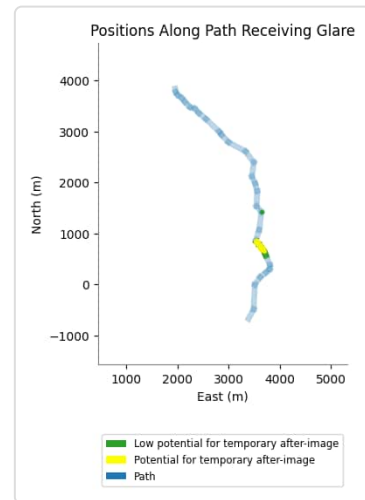
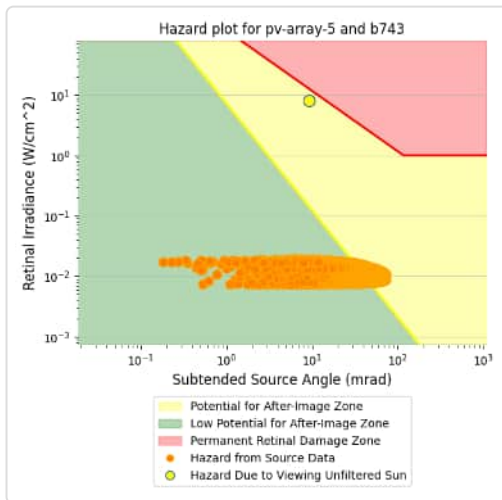
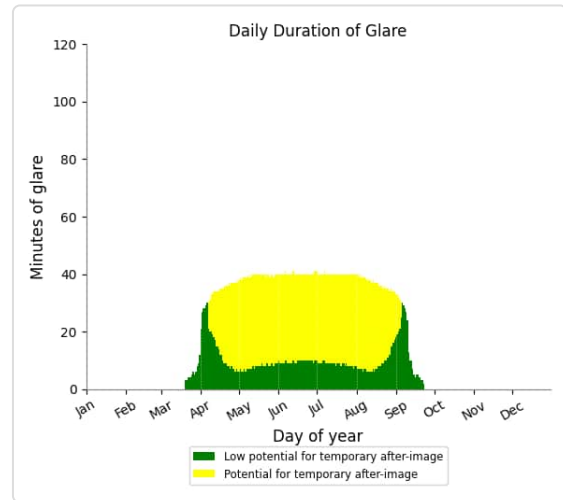
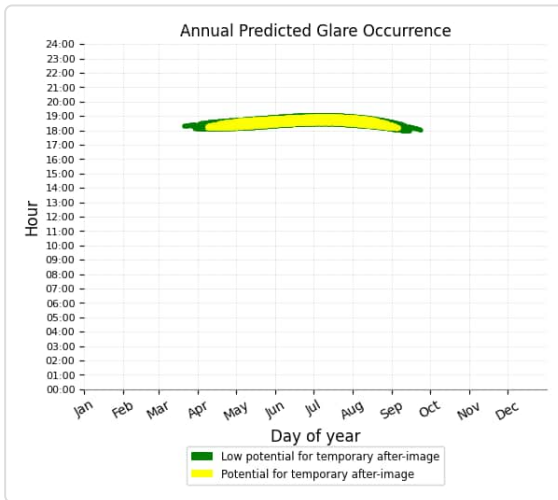
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
B743	1,903	31.7	4,360	72.7
Route 3	24,576	409.6	15,399	256.6
A70	1,252	20.9	0	0.0
OP 32	686	11.4	2,775	46.2
OP 30	907	15.1	0	0.0
OP 31	934	15.6	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0
OP 36	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0

PV array 5 and Route: B743

Yellow glare: 4,360 min.

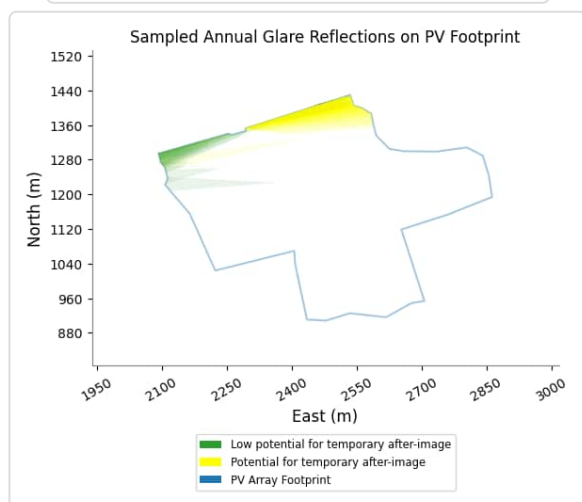
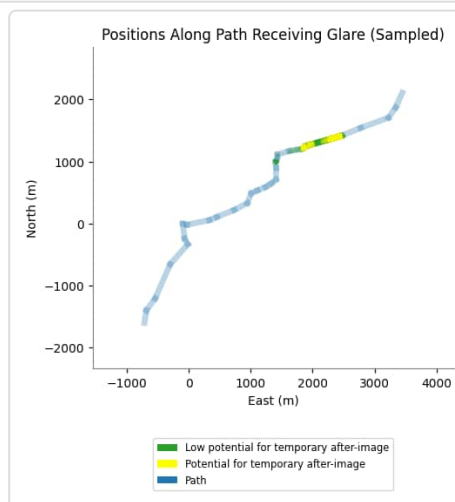
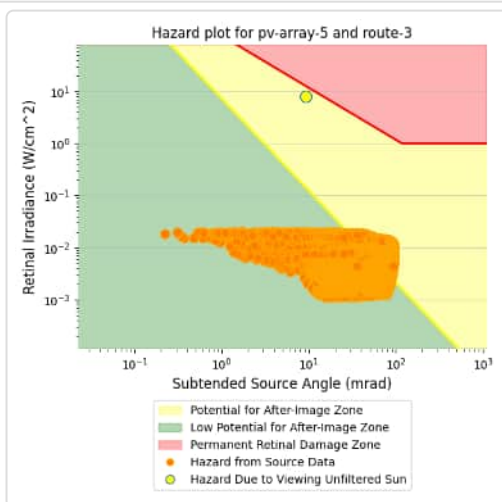
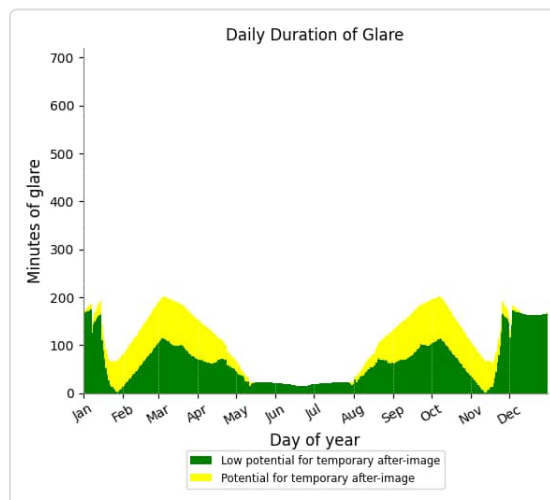
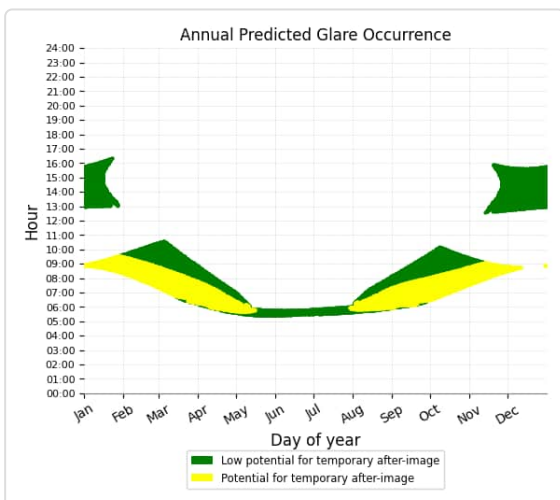
Green glare: 1,903 min.



PV array 5 and Route: Route 3

Yellow glare: 15,399 min.

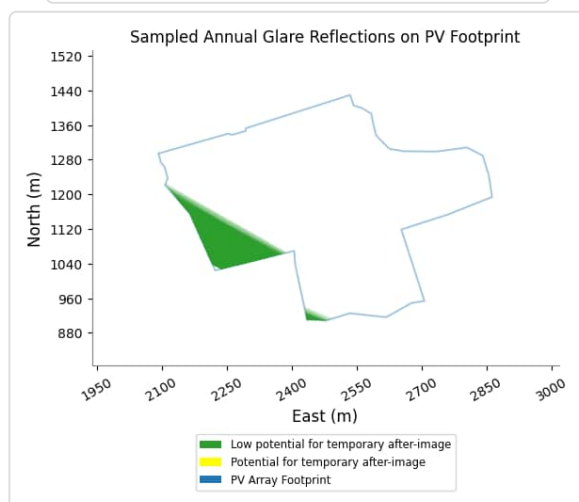
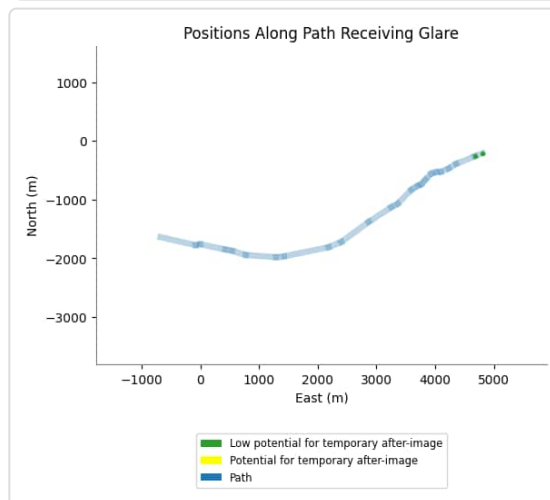
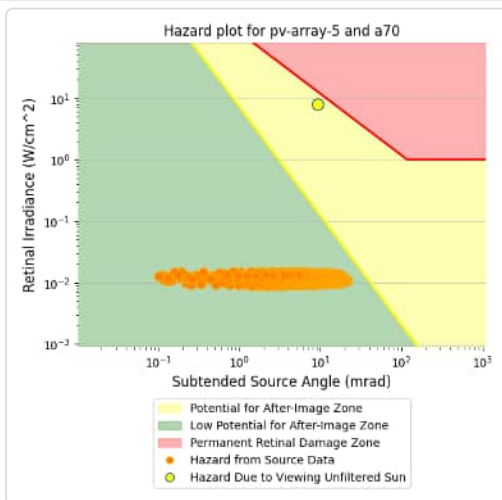
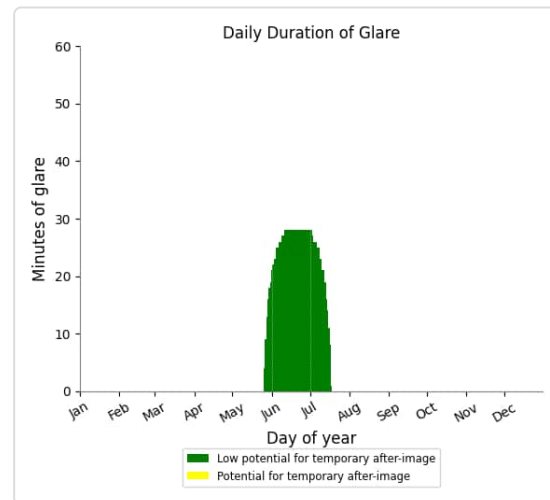
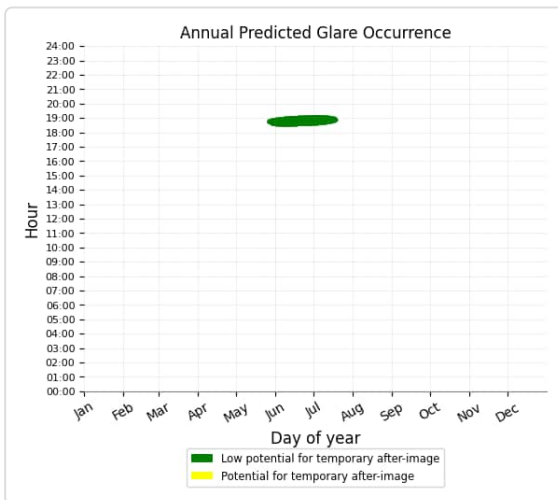
Green glare: 24,576 min.



PV array 5 and Route: A70

Yellow glare: none

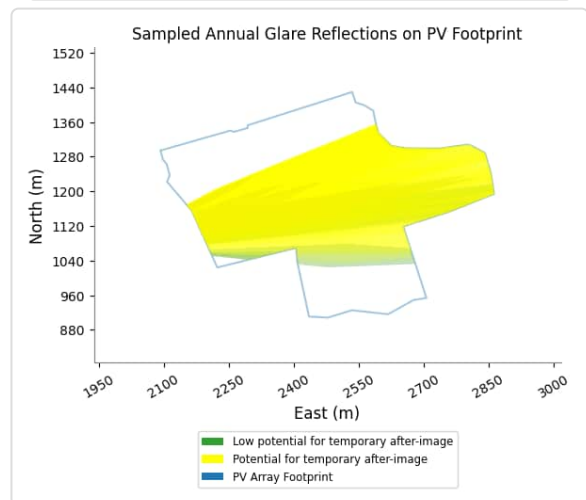
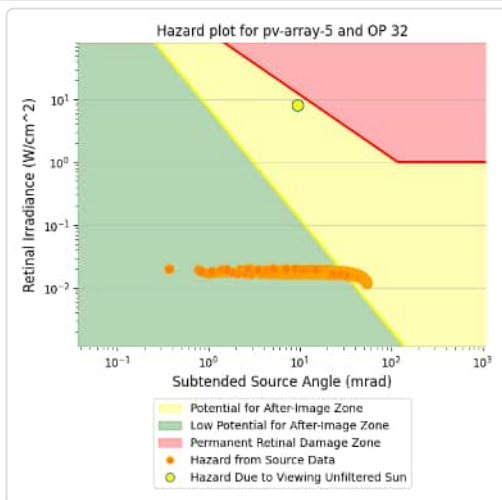
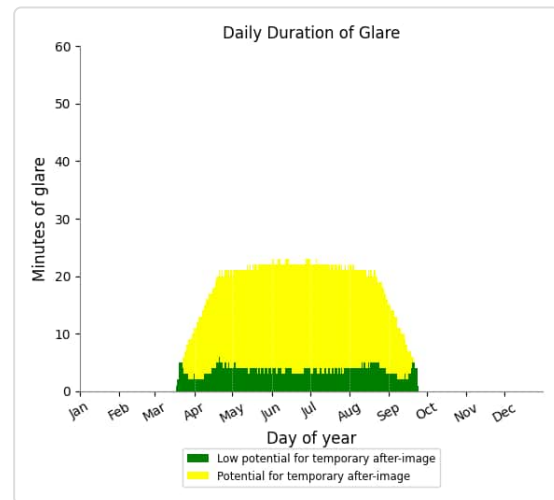
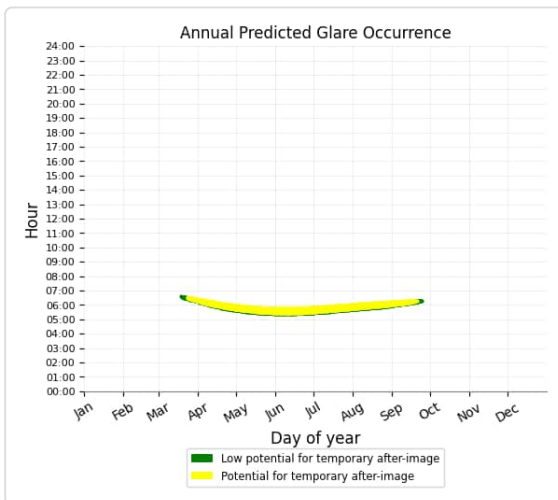
Green glare: 1,252 min.



PV array 5 and OP 32

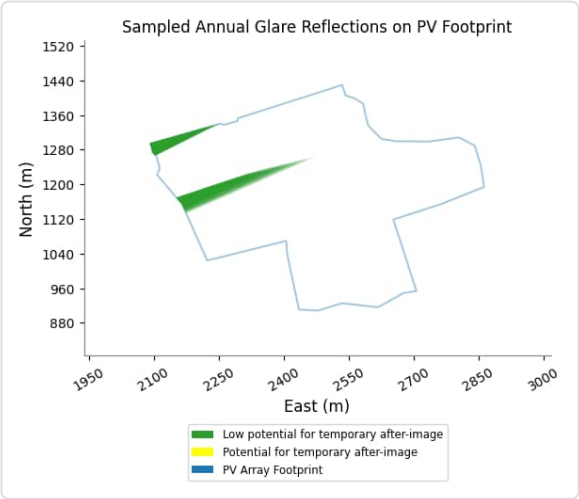
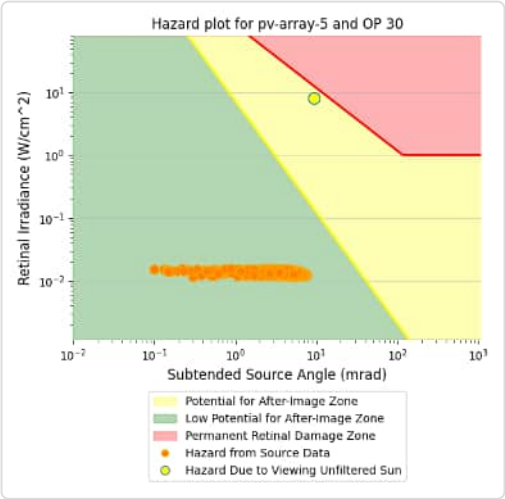
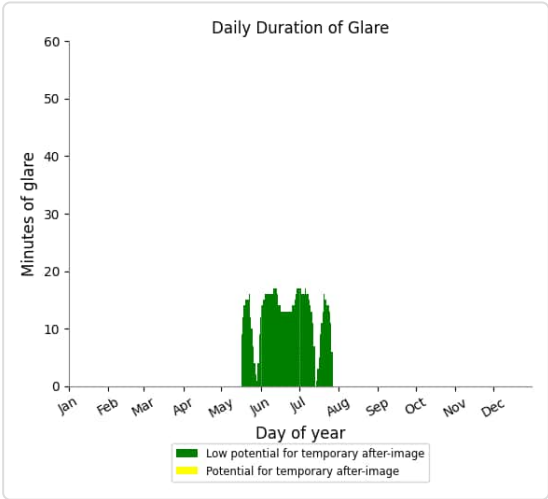
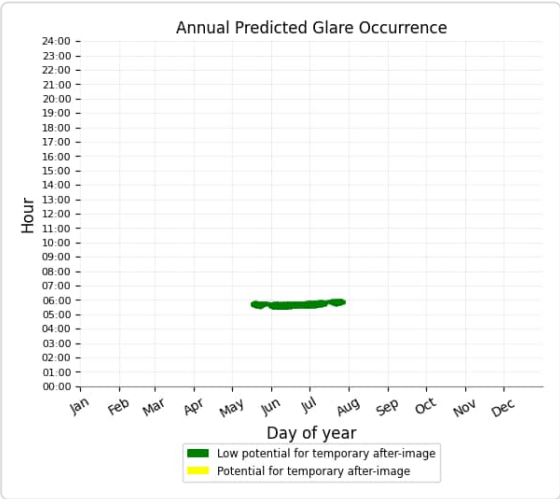
Yellow glare: 2,775 min.

Green glare: 686 min.



PV array 5 and OP 30

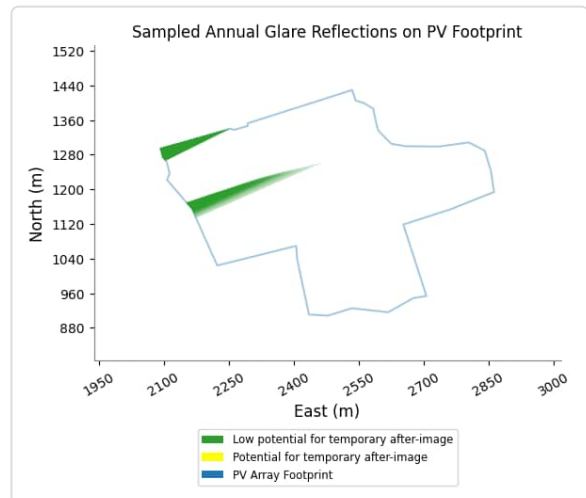
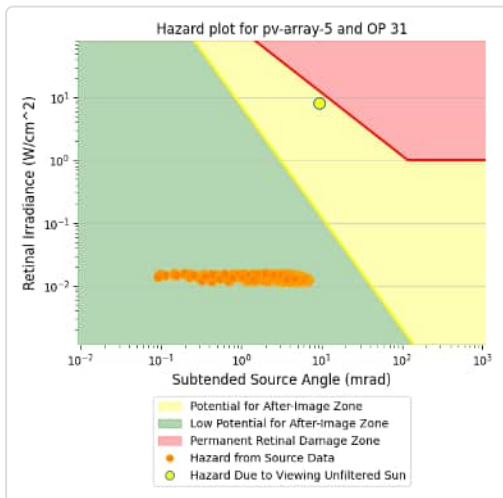
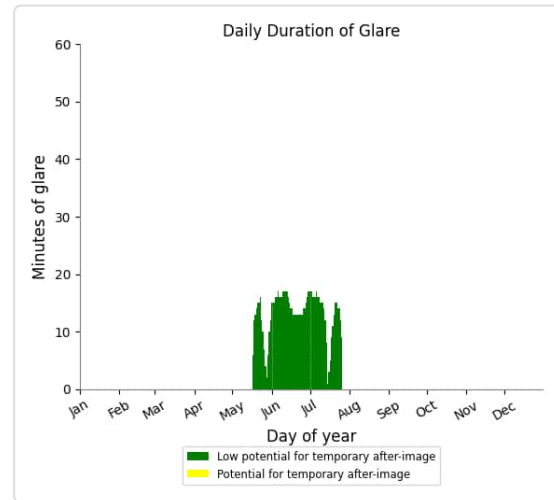
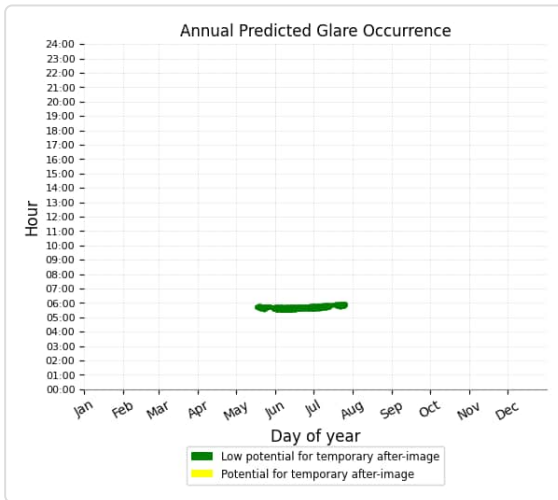
Yellow glare: none
Green glare: 907 min.



PV array 5 and OP 31

Yellow glare: none

Green glare: 934 min.



PV array 5 and OP 1

No glare found

PV array 5 and OP 2

No glare found

PV array 5 and OP 3

No glare found

PV array 5 and OP 4

No glare found

PV array 5 and OP 5

No glare found

PV array 5 and OP 6

No glare found

PV array 5 and OP 7

No glare found

PV array 5 and OP 8

No glare found

PV array 5 and OP 9

No glare found

PV array 5 and OP 10

No glare found

PV array 5 and OP 11

No glare found

PV array 5 and OP 12

No glare found

PV array 5 and OP 13

No glare found

PV array 5 and OP 14

No glare found

PV array 5 and OP 15

No glare found

PV array 5 and OP 16

No glare found

PV array 5 and OP 17

No glare found

PV array 5 and OP 18

No glare found

PV array 5 and OP 19

No glare found

PV array 5 and OP 20

No glare found

PV array 5 and OP 21

No glare found

PV array 5 and OP 22

No glare found

PV array 5 and OP 23

No glare found

PV array 5 and OP 24

No glare found

PV array 5 and OP 25

No glare found

PV array 5 and OP 26

No glare found

PV array 5 and OP 27

No glare found

PV array 5 and OP 28

No glare found

PV array 5 and OP 29

No glare found

PV array 5 and OP 33

No glare found

PV array 5 and OP 34

No glare found

PV array 5 and OP 35

No glare found

PV array 5 and OP 36

No glare found

PV array 5 and OP 37

No glare found

PV array 5 and OP 38

No glare found

PV array 5 and OP 39

No glare found

PV array 5 and OP 40

No glare found

PV: PV array 6 potential temporary after-image

Receptor results ordered by category of glare

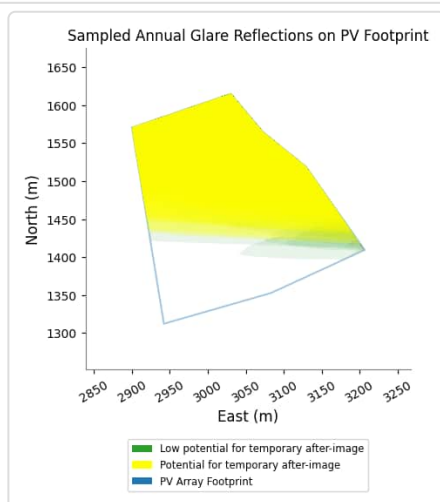
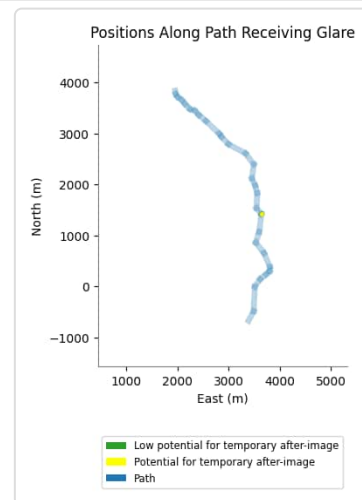
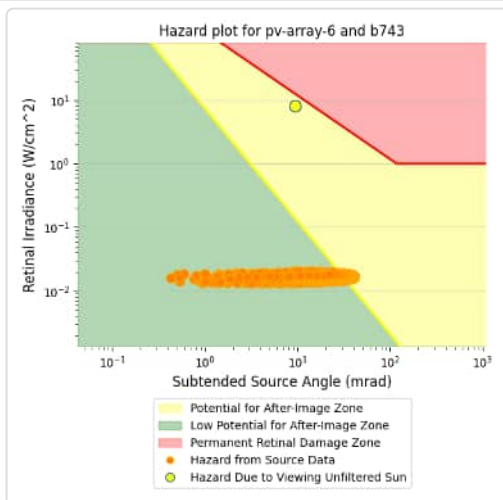
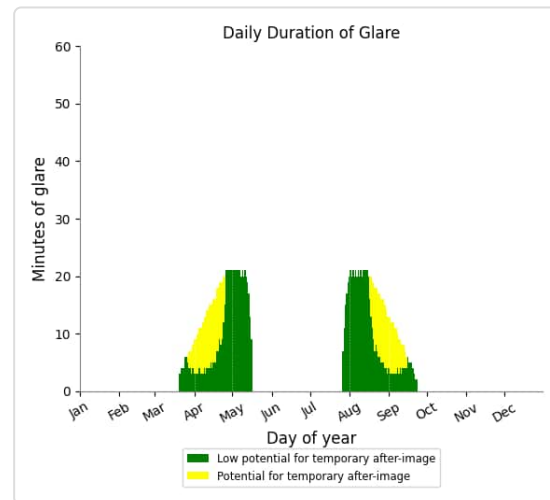
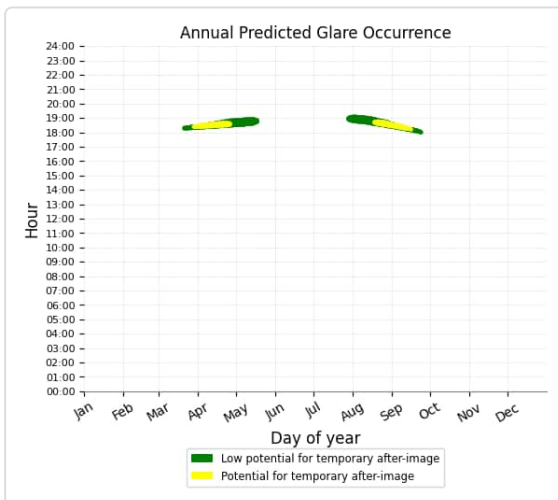
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
B743	1,188	19.8	487	8.1
Route 3	264	4.4	1,703	28.4
A70	0	0.0	0	0.0
OP 32	2,945	49.1	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0
OP 36	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0

PV array 6 and Route: B743

Yellow glare: 487 min.

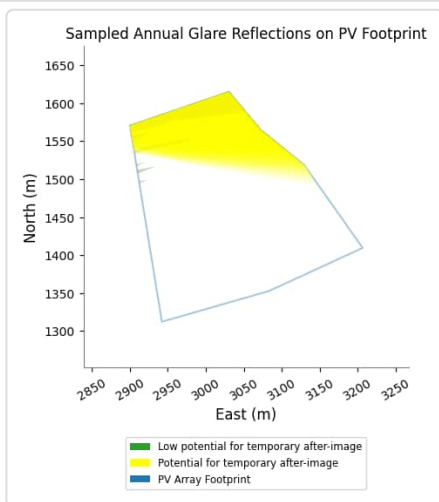
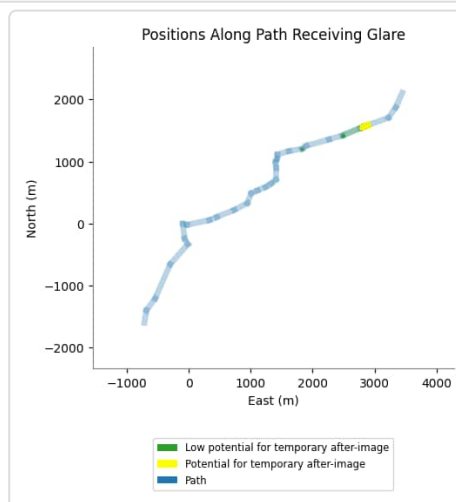
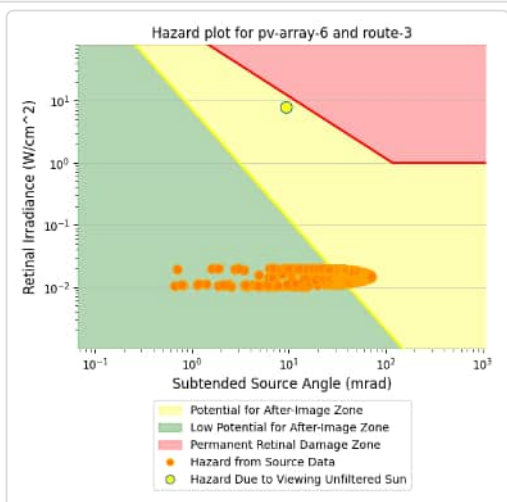
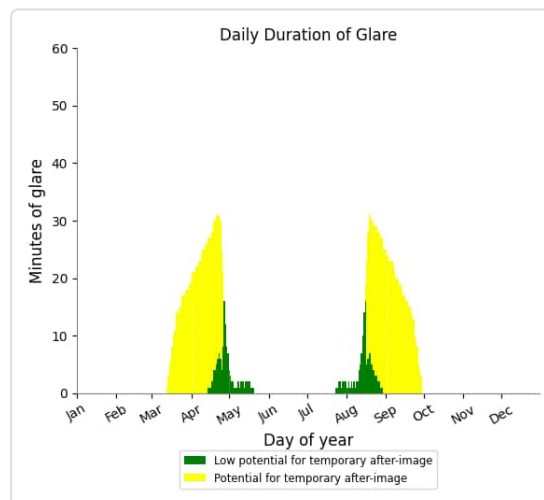
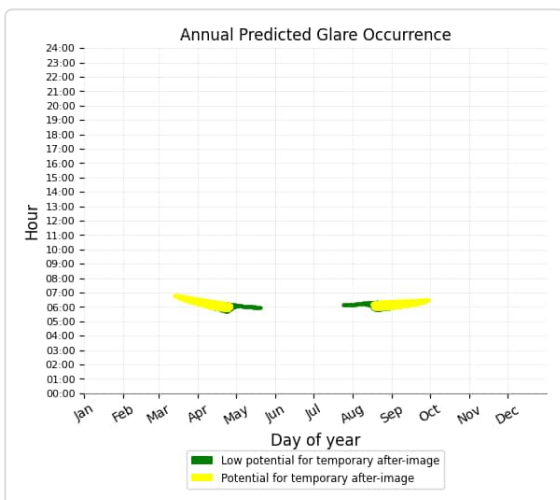
Green glare: 1,188 min.



PV array 6 and Route: Route 3

Yellow glare: 1,703 min.

Green glare: 264 min.



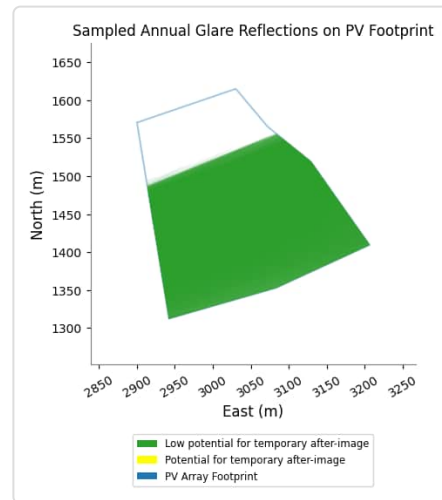
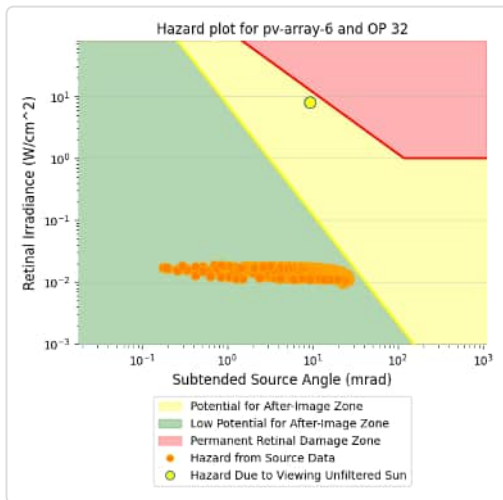
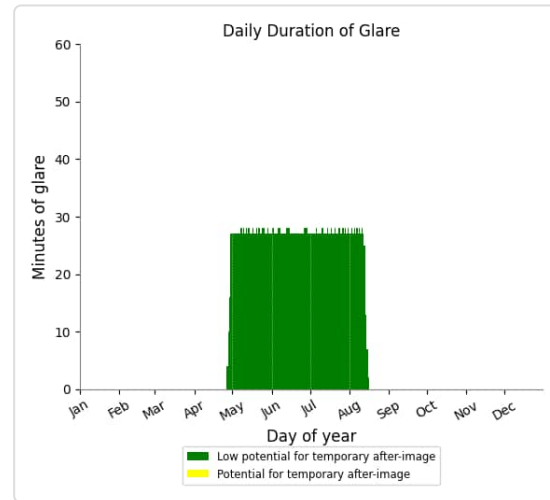
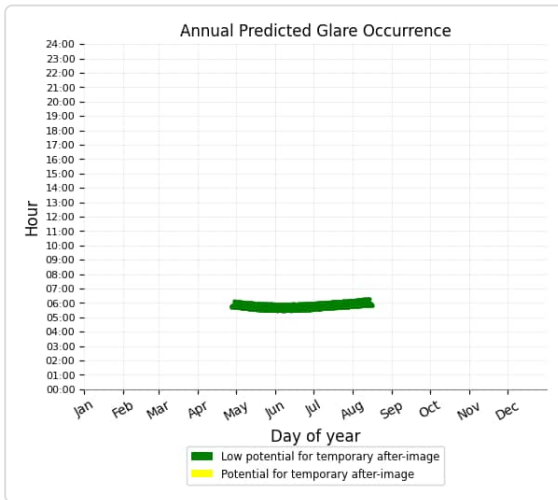
PV array 6 and Route: A70

No glare found

PV array 6 and OP 32

Yellow glare: none

Green glare: 2,945 min.



PV array 6 and OP 1

No glare found

PV array 6 and OP 2

No glare found

PV array 6 and OP 3

No glare found

PV array 6 and OP 4

No glare found

PV array 6 and OP 5

No glare found

PV array 6 and OP 6

No glare found

PV array 6 and OP 7

No glare found

PV array 6 and OP 8

No glare found

PV array 6 and OP 9

No glare found

PV array 6 and OP 10

No glare found

PV array 6 and OP 11

No glare found

PV array 6 and OP 12

No glare found

PV array 6 and OP 13

No glare found

PV array 6 and OP 14

No glare found

PV array 6 and OP 15

No glare found

PV array 6 and OP 16

No glare found

PV array 6 and OP 17

No glare found

PV array 6 and OP 18

No glare found

PV array 6 and OP 19

No glare found

PV array 6 and OP 20

No glare found

PV array 6 and OP 21

No glare found

PV array 6 and OP 22

No glare found

PV array 6 and OP 23

No glare found

PV array 6 and OP 24

No glare found

PV array 6 and OP 25

No glare found

PV array 6 and OP 26

No glare found

PV array 6 and OP 27

No glare found

PV array 6 and OP 28

No glare found

PV array 6 and OP 29

No glare found

PV array 6 and OP 30

No glare found

PV array 6 and OP 31

No glare found

PV array 6 and OP 33

No glare found

PV array 6 and OP 34

No glare found

PV array 6 and OP 35

No glare found

PV array 6 and OP 36

No glare found

PV array 6 and OP 37

No glare found

PV array 6 and OP 38

No glare found

PV array 6 and OP 39

No glare found

PV array 6 and OP 40

No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.

The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.

Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.

Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.

The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.

The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)

The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.

The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.

The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.

Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.

Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.

Refer to the Help page at www.forgesolar.com/help/ for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

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