Electronic Supplementary Material

for

Polarized light pollution of fixed-tilt photovoltaic solar panels measured by drone-polarimetry and its visual-ecological importance

Péter Takács[1,2], Dénes Száz[1], Balázs Bernáth[1,2], István Pomozi[2], Gábor Horváth[1,*]

1: Environmental Optics Laboratory, Department of Biological Physics, ELTE Eötvös Loránd University, H-1117 Budapest, Pázmány sétány 1, Hungary
2: Drem Innovation and Consulting Ltd., H-1033 Budapest, Szentendrei út 95., Hungary,

peter.takacs@drem.hu (orcid: 0000-0002-5668-0901)
(orcid: 0000-0002-9087-0928)
(orcid: 0000-0003-1712-3288)
(orcid: 0009-0004-6474-2764)
**Corresponding author, e-mail address: gh@arago.elte.hu (orcid: 0000-0002-9008-2411)*

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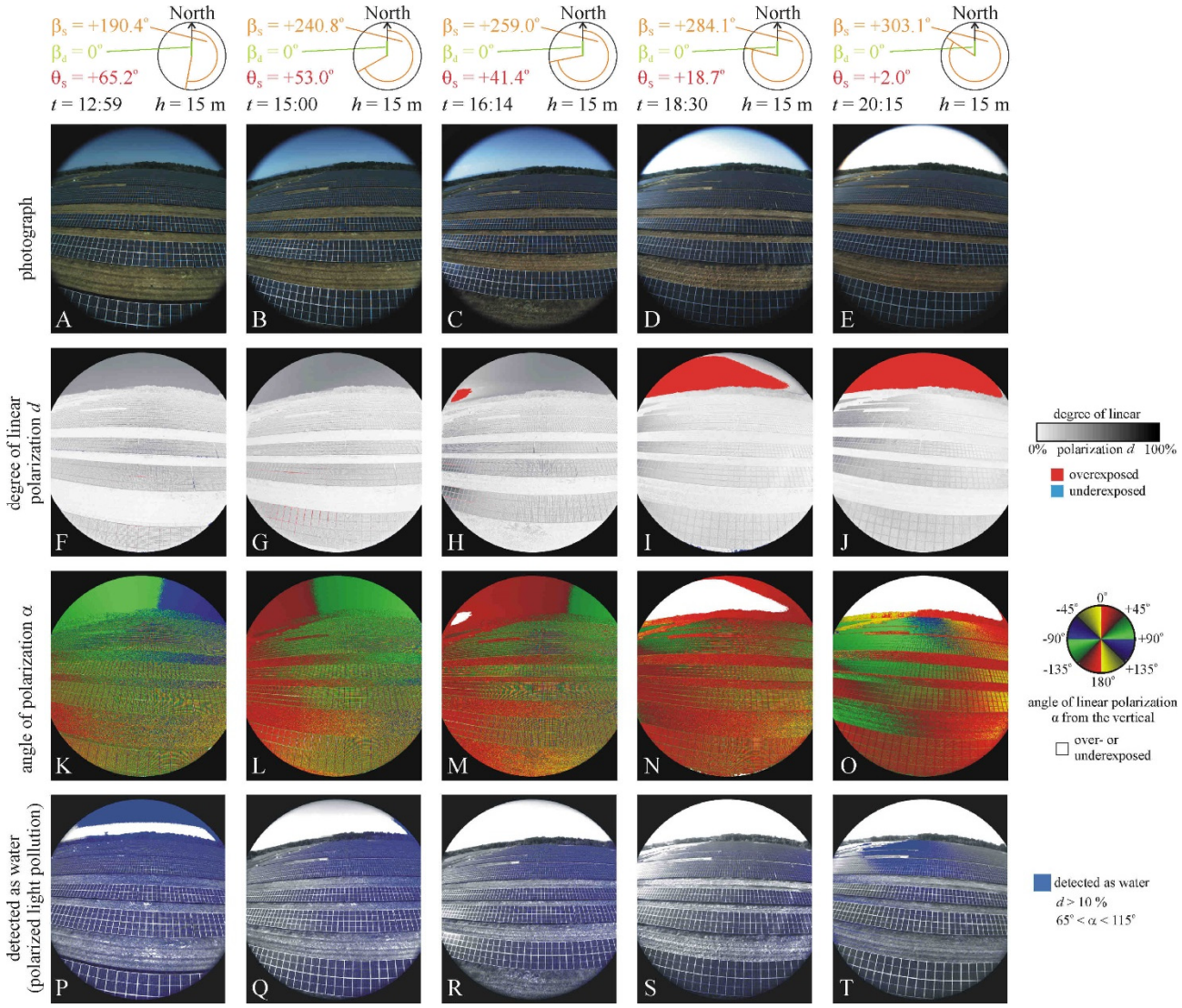
Supplementary Figures S1, S2, S3, S4, S5, S6

Supplementary Table S1: Polarized light pollution *plp* (%) of solar panels versus time *t* (local summer time = UTC + 2 h) from sunrise to sunset on the sunny day (30 June 2022) when the drone-polarimeter's azimuth was perpendicular (pointing toward North) and parallel (pointing toward East) to the solar panel rows being parallel to East-West.

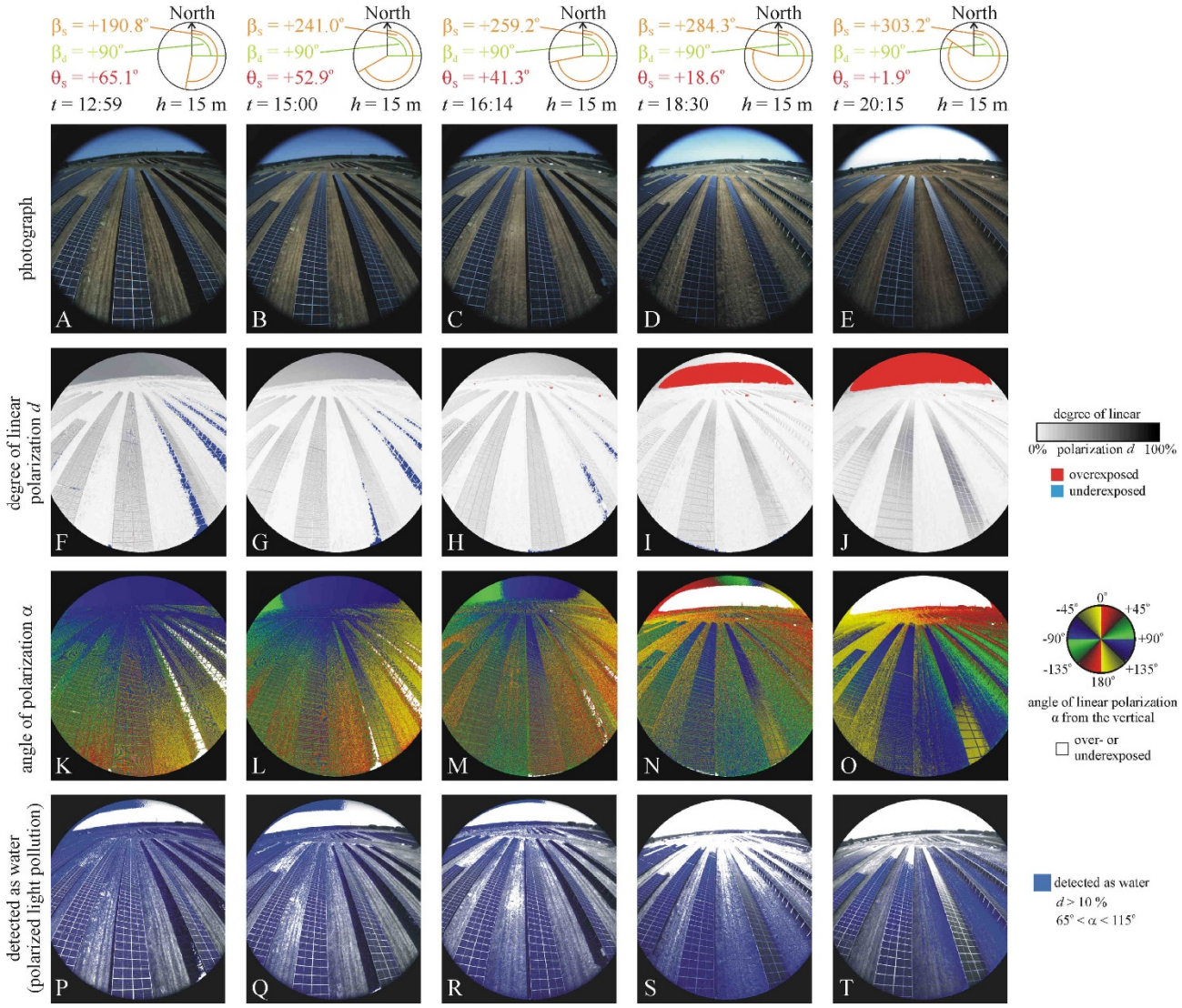
Figure (ID number)	**situation**	**time (UTC + 2 h)**	***plp*** **(d > 10%, 65° < α < 115°)**
Fig. 2A,E,I,M (438)	sunny 1, perpendicular, North	5:01	16.68 %
Fig. 2B,F,J,N (247)	sunny 2, perpendicular, North	7:01	9.53 %
Fig. 2C,G,K,O (190)	sunny 3, perpendicular, North	8:58	20.63 %
Fig. 2D,H,L,P (181)	sunny 4, perpendicular, North	10:58	26.98 %
Fig. S1A,F,K,P (163)	sunny 5, perpendicular, North	12:59	28.94 %
Fig. S1B,G,L,Q (166)	sunny 6, perpendicular, North	15:00	21.99 %
Fig. S1C,H,M,R (187)	sunny 7, perpendicular, North	16:14	20.36 %
Fig. S1D,I,N,S (180)	sunny 8, perpendicular, North	18:30	7.50 %
Fig. S1E,J,O,T (166)	sunny 9, perpendicular, North	20:15	14.29 %
Fig. 3A,E,I,M (468)	sunny 1, parallel, East	5:01	52.39 %
Fig. 3B,F,J,N (267)	sunny 2, parallel, East	7:01	58.46 %
Fig. 3C,G,K,O (214)	sunny 3, parallel, East	8:58	57.07 %
Fig. 3D,H,L,P (196)	sunny 4, parallel, East	10:58	46.20 %
Fig. S2A,F,K,P (184)	sunny 5, parallel, East	12:59	31.67 %
Fig. S2B,G,L,Q (184)	sunny 6, parallel, East	15:00	29.96 %
Fig. S2C,H,M,R (208)	sunny 7, parallel, East	16:14	29.88 %
Fig. S2D,I,N,S (199)	sunny 8, parallel, East	18:30	35.01 %
Fig. S2E,J,O,T (187)	sunny 9, parallel, East	20:15	25.98 %

Supplementary Table S2: Polarized light pollution *plp* (%) of solar panels versus time *t* (local summer time = UTC + 2 h) from sunrise to sunset on the overcast day (24 August 2022) when the drone-polarimeter's azimuth was perpendicular (pointing toward North) and parallel (pointing toward East) to the solar panel rows being parallel to East-West.

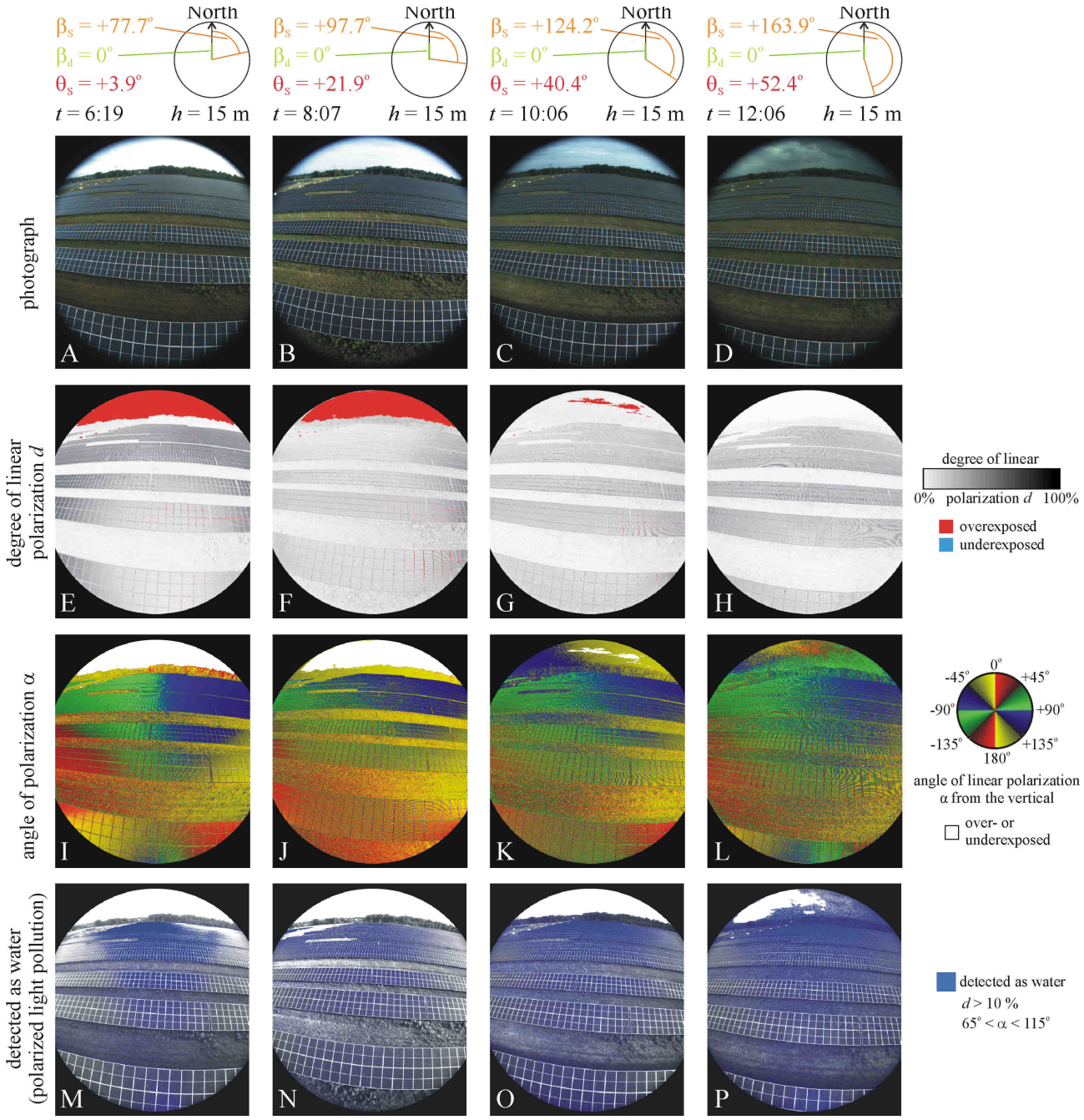
Figure (ID number)	**situation**	**time (UTC + 2 h)**	***plp*** **(d > 10 %, 65° < α < 115°)**
Fig. S3A,E,I,M (238)	overcast 1, perpendicular, North	6:19	27.41 %
Fig. S3B,F,J,N (208)	overcast 2, perpendicular, North	8:07	17.23 %
Fig. S3C,G,K,O (139)	overcast 3, perpendicular, North	10:06	28.38 %
Fig. S3D,H,L,P (079)	overcast 4, perpendicular, North	12:06	34.57 %
Fig. S4A,E,I,M (164)	overcast 5, perpendicular, North	14:11	28.17 %
Fig. S4B,F,J,N (148)	overcast 6, perpendicular, North	16:05	31.69 %
Fig. S4C,G,K,O (103)	overcast 7, perpendicular, North	18:05	26.22 %
Fig. S4D,H,L,P (118)	overcast 8, perpendicular, North	19:34	12.13 %
Fig. S5A,E,I,M (263)	overcast 1, parallel, East	6:20	36.82 %
Fig. S5B,F,J,N (241)	overcast 2, parallel, East	8:08	49.15 %
Fig. S5C,G,K,O (172)	overcast 3, parallel, East	10:07	38.20 %
Fig. S5D,H,L,P (103)	overcast 4,_parallel, East	12:05	32.40 %
Fig. S6A,E,I,M (191)	overcast 5, parallel, East	14:12	29.56 %
Fig. S6B,F,J,N (178)	overcast 6, parallel, East	16:06	39.29 %
Fig. S6C,G,K,O (130)	overcast 7, parallel, East	18:06	35.19 %
Fig. S6D,H,L,P (145)	overcast 8, parallel, East	19:35	48.20 %



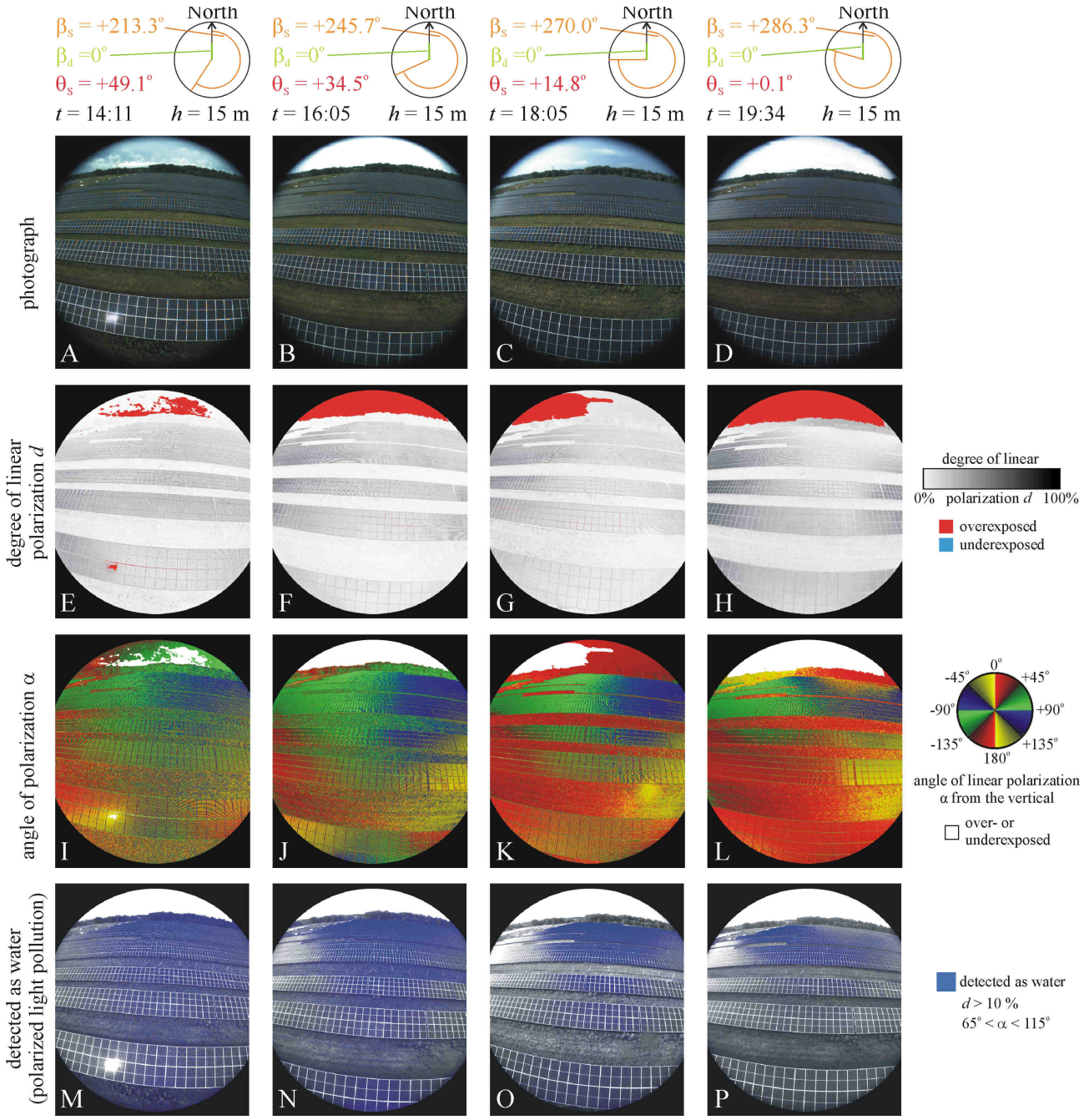
Supplementary Figure S1: Continuation of Fig. 2. From noon to sunset: (A, F, K, P) t = 12:59, h = 15 m, β_S = +190.41°, θ_S = +65.16°, β_d = 0°. (B, G, L, Q) t = 15:00, h = 15 m, β_S = +240.84°, θ_S = +52.98°, β_d = 0°. (C, H, M, R) t = 16:14, h = 15 m, β_S = +259.01°, θ_S = +41.41°, β_d = 0°. (D, I, N, S) t = 18:30, h = 15 m, β_S = +284.14°, θ_S = +18.7°, β_d = +0°. (E, J, O, T) t = 20:15, h = 15 m, β_S = +303.09°, θ_S = +1.98°, β_d = +0°.



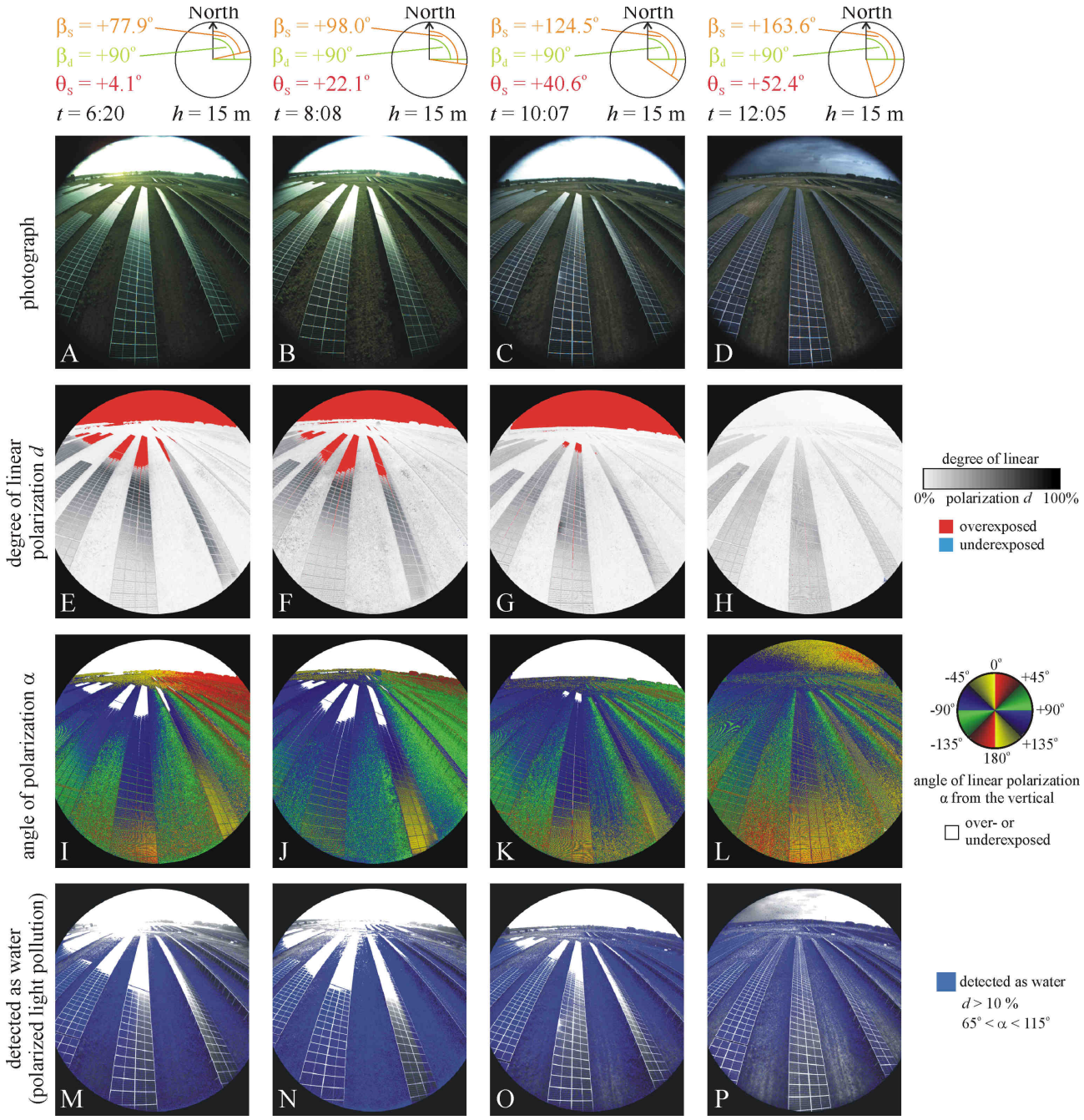
Supplementary Figure S2: Continuation of Fig. 3. From noon to sunset: (A, F, K, P) t = 12:59, h = 15 m, β_S = +190.79°, θ_S = +65.14°, β_d = +90°. (B, G, L, Q) t = 15:00, h = 15 m, β_S = +241.01°, θ_S = +52.89°, β_d = +90°. (C, H, M, R) t = 16:14, h = 15 m, β_S = +259.16°, θ_S = +41.29°, β_d = +90°. (D, I, N, S) t = 18:30, h = 15 m, β_S = +284.25°, θ_S = +18.6°, β_d = +90°. (E, J, O, T) t = 20:15, h = 15 m, β_S = +303.22°, θ_S = +1.88°, β_d = +90°.



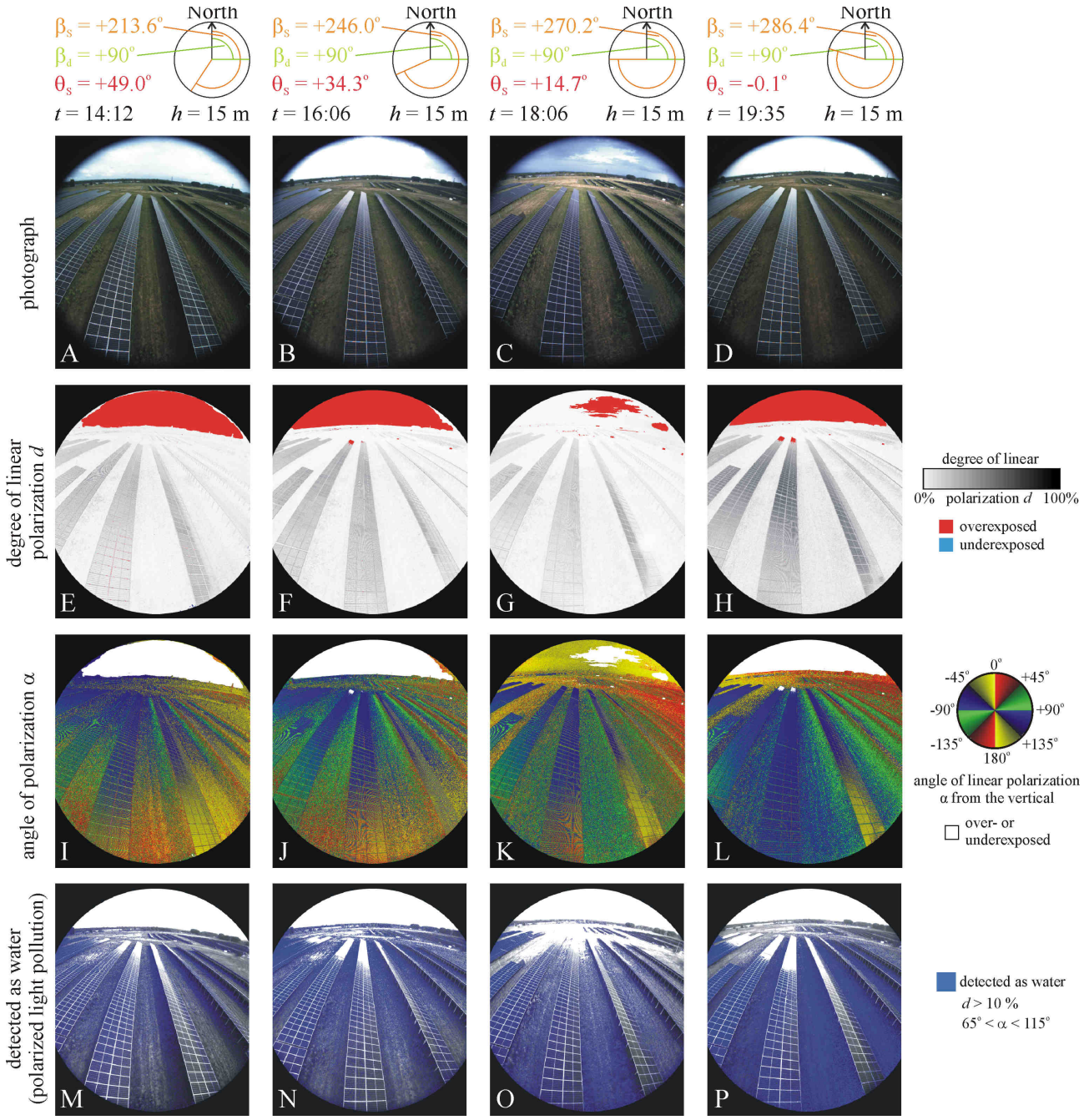
Supplementary Figure S3: As Supplementary Fig. S1 measured on an overcast day (24 August 2022) when the azimuth of the drone's optical axis was perpendicular to the panel rows. From sunrise to noon: (A, E, I, M) t = 6:19, h = 15 m, β_S = +77.73°, θ_S = +3.88°, β_d = +0°. (B, F, J, N) t = 8:07, h = 15 m, β_S = +97.73°, θ_S = +21.94°, β_d = +0°. (C, G, K, O) t = 10:06, h = 15 m, β_S = +124.17°, θ_S = +40.42°, β_d = +0°. (D, H, L, P) t = 12:06, h = 15 m, β_S = +163.92°, θ_S = +52.39°, β_d = +0°.



Supplementary Figure S4: Continuation of Supplementary Fig. S3. From noon to sunset: (A, E, I, M) t = 14:11, h = 15 m, β_S = +213.32°, θ_S = +49.1°, β_d = 0°. (B, F, J, N) t = 16:05, h = 15 m, β_S = +245.73°, θ_S = +34.45°, β_d = 0°. (C, G, K, O) t = 18:05, h = 15 m, β_S = +270.04°, θ_S = +14.83°, β_d = 0°. (D, H, L, P) t = 19:34, h = 15 m, β_S = +286.27°, θ_S = +0.07°, β_d = 0°.



Supplementary Figure S5: As Supplementary Fig. S3 when the azimuth of the drone's optical axis was parallel to the panel rows. From sunrise to noon: (A, E, I, M) t = 6:20, h = 15 m, β_S = +77.91°, θ_S = +4.05°, β_d = +90°. (B, F, J, N) t = 8:08, h = 15 m, β_S = +97.95°, θ_S = +22.12°, β_d = +90°. (C, G, K, O) t = 10:07, h = 15 m, β_S = +124.47°, θ_S = +40.58°, β_d = +90°. (D, H, L, P) t = 12:05, h = 15 m, β_S = +163.61°, θ_S = +52.36°, β_d = +90°.



Supplementary Figure S6: Continuation of Supplementary Fig. S5. From noon to sunset: (A, E, I, M) t = 14:12, h = 15 m, β_S = +213.63°, θ_S = +49.01°, β_d = +90°. (B, F, J, N) t = 16:06, h = 15 m, β_S = +245.96°, θ_S = +34.3°, β_d = +90°. (C, G, K, O) t = 18:06, h = 15 m, β_S = +270.21°, θ_S = +14.68°, β_d = +90°. (D, H, L, P) t = 19:35, h = 15 m, β_S = +286.43°, θ_S = -0.07°, β_d = +90°.