Supplement of

Dust Radiative Effects and Impact on Energy Production over the Mediterranean Basin

Dimitra Kouklaki[1,2], Georgia Charalampous[3,4], Anna Moustaka[5,6], Alkistis Papetta[7], Celia Herrero del Barrio[8,9], Rizos-Theodoros Chadoulis[6], S. Yeşer Aslanoğlu[10], Sara Herrero-Anta[8,9], Michail Mytilinaios[11], Nikolaos Papadimitriou[12], Katerina Anyfanti[12], Christos Spyrou[12], Daniela Meloni[13], Konstantinos Fragkos[7], Yevgeny Derimian[14], Tatiana Di Iorio[15], Rodanthi-Elisavet Mamouri[2,3], Vassilis Amiridis[1], Stavros Solomos[12], Stelios Kazadzis[5], and Ilias Fountoulakis[12]

[1] Institute for Astronomy, Astrophysics, Space Applications and Remote Sensing, National Observatory of Athens, Athens, Greece
[2] Department of Geology and Geoenvironment, National and Kapodistrian University of Athens, Greece
[3] Eratosthenes Centre of Excellence, Limassol, Cyprus
[4] Department of Civil Engineering Geomatics, Cyprus University of Technology, Limassol, Cyprus
[5] Physicalisch Meteorologisches Observatorium, World Radiation Center, Davos, Switzerland
[6] Department of Physics, Aristotle University of Thessaloniki, 54124, Greece
[7] Climate and Atmosphere Research Centre (CARE-C), The Cyprus Institute, Nicosia, Cyprus
[8] Group of Atmospheric Optics (GOA-UVa), Universidad de Valladolid, Valladolid, Spain
[9] Laboratory of Disruptive Interdisciplinary Science (LaDIS), Universidad de Valladolid, Valladolid, Spain
[10] Department of Environmental Engineering, Hacettepe University, Ankara, Türkiye
[11] Consiglio Nazionale delle Ricerche - Istituto di Metodologie per l'Analisi Ambientale (CNR-IMAA), Tito, Italy
[12] Research Centre for Atmospheric Physics and Climatology of the Academy of Athens, Greece
[13] Sustainable Department, National Agency for New Technologies, Energy and Sustainable Economic Development, Rome, Italy
[14] Univ. Lille, CNRS, UMR 8518 - LOA - Laboratoire d'Optique Atmosphérique, F-59000 Lille, France
[15] Laboratory for Models and Measurements for Air Quality and Climate Observations, ENEA, Rome, Italy

S1 Additional figure

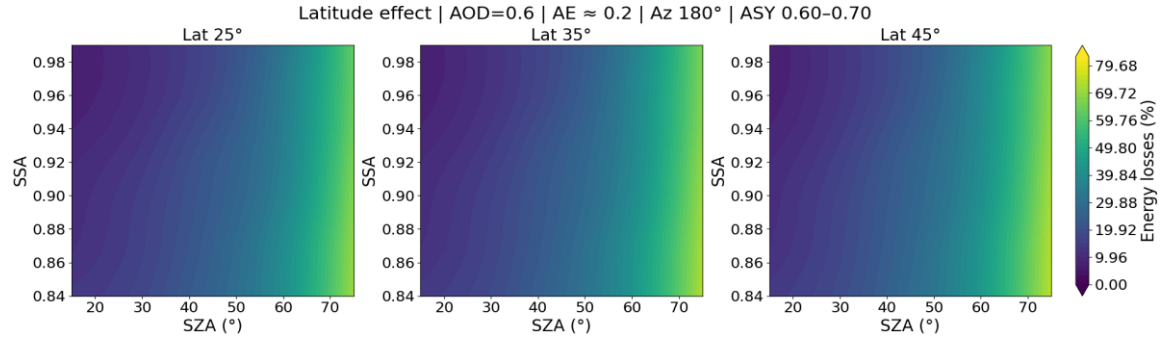

Figure S1. Sensitivity of PV energy losses (%) to latitude under fixed aerosol and geometric conditions. Results are presented for three latitudes (25°, 35°, and 45° N) for AOD = 0.6, AE ≈ 0.2, single scattering albedo varying between 0.84 and 0.99, and south-oriented PV panels (azimuth = 180°). The horizontal axis corresponds to the SZA, while the vertical axis represents SSA.

S2 Additional figure

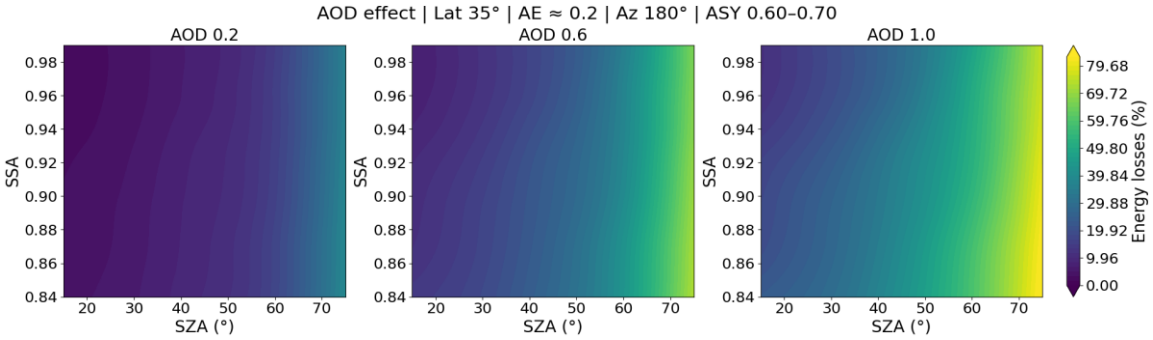

Figure S2. Sensitivity of PV energy losses (%) to aerosol optical depth (AOD = 0.2, 0.6, and 1.0) at latitude 35° N for AE ≈ 0.2 and south-oriented PV panels (azimuth = 180°).

S3 Additional figure

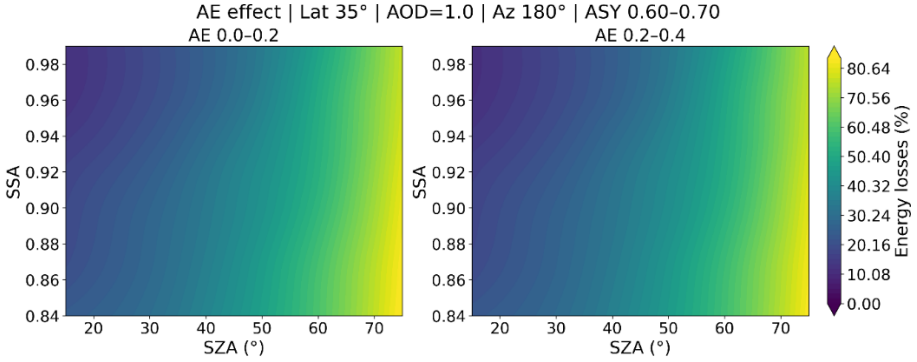

Figure S3. Sensitivity of PV energy losses (%) to the Ångström exponent (AE = 0.0–0.2 and 0.2–0.4) at latitude 35° N for AOD = 1.0 and south-oriented PV panels (azimuth 180°).

S4 Additional figure

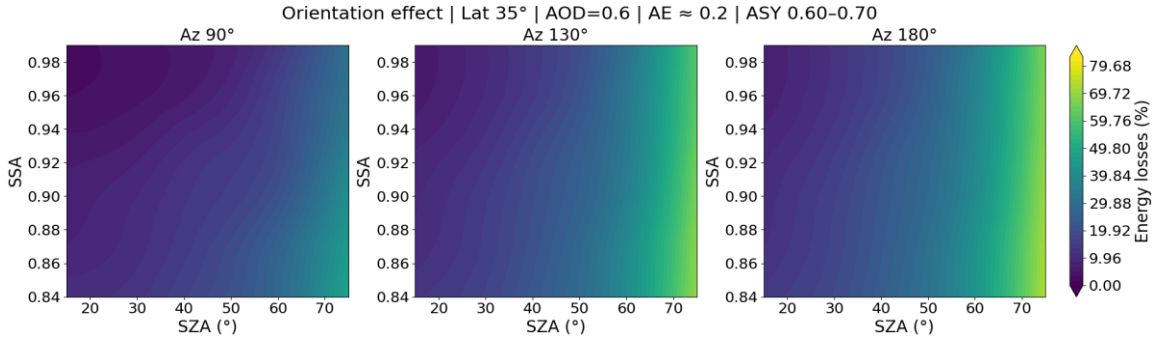

Figure S4. Sensitivity of PV energy losses (%) to PV panel orientation (azimuth 90°, 130°, and 180°) at latitude 35° N under moderate dust conditions (AOD = 0.6, AE ≈ 0.2).

S5 Additional figure

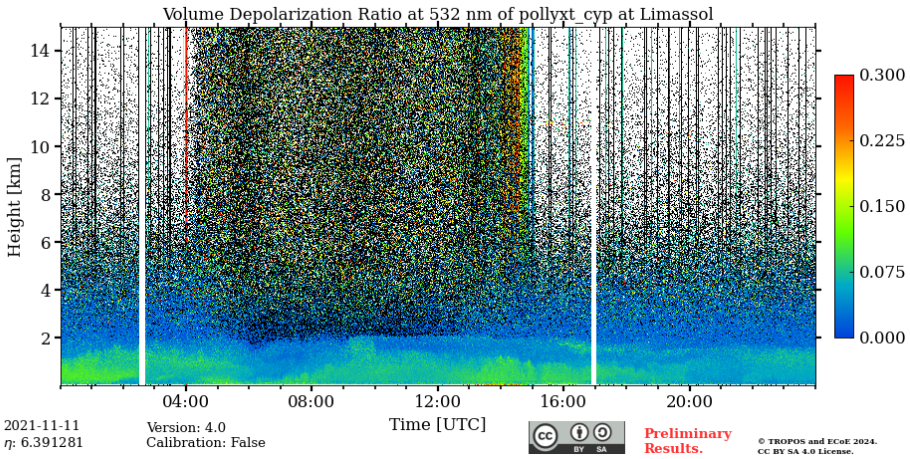

Figure S5. Depolarization ratio from ground-based lidar observations at 532 nm at Limassol during the second day of the event, on 11/11/2021.

S6 Additional figure

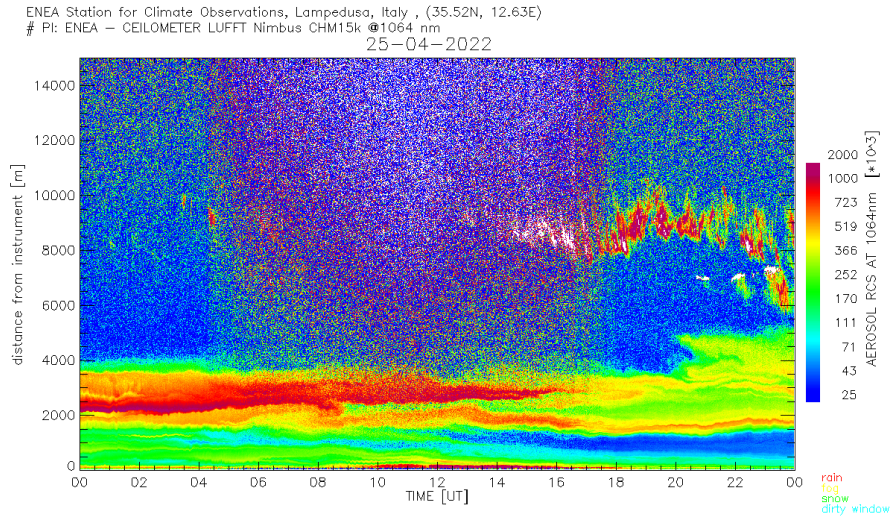

Figure S6. Ground-based ceilometer observations at 1064 nm at Lampedusa station during the fifth day of the event, on 25/04/2022.