Figure S1. Multi-monthly variations over the period 2010-2022 of the solar zenith angle (green line) and cumulative yearly energies for different cloud cover states: (a) all-sky, (b) cloudy-sun, (c) clear-sun with clouds and (d) clear-sky. Only values during daytime between [sunrise + 30 minutes; sunset - 30 minutes] are considered. The global energy is represented as columns with the lower blue part corresponding to the diffuse energy and the upper yellow part to the direct energy. The grey dashed lines represent the yearly energy over 2010-2020. Note that the percentages reflect the diffuse fraction of the overall yearly energy which values are reported above each column.
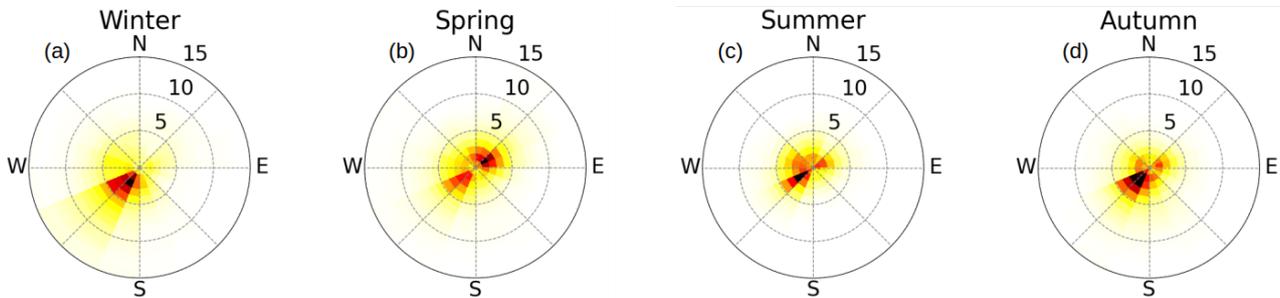

Figure S2. Seasonal wind roses based on additional ATOLL measurements over the period 2010-2022. Note that these wind roses correspond to clear-sun conditions as only observations coincident with AERONET measurements are considered here.
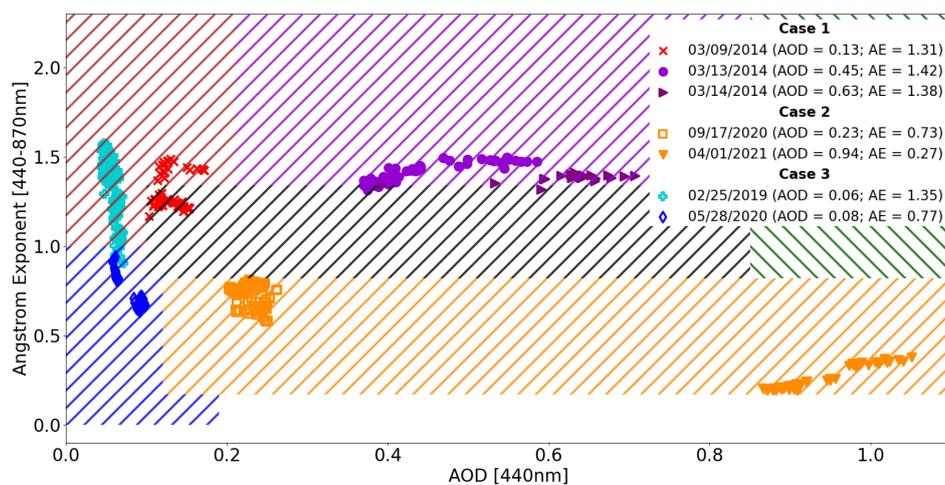
Figure S3. Scatter plot of AOD_{440} against AE for the AERONET level 2.0 measurements in clear-sky for the days considered in the different case studies of Section 4.1.2. As in Figure 2, the colored boxes represent the class thresholds from table 2.

		AOD_{440}	AE	SSA_{440}	PWV (cm)	Main aerosol class	CSKY TP score
	03/09/2014	0.13	1.31	0.97	0.62	Mixed	0.97
Case 1	03/13/2014	0.45	1.41	0.93	0.83	Continental poll.	0.77
	03/14/2014	0.63	1.38	0.95	0.75	Continental poll.	0.68
Case 2	09/17/2020	0.23	0.73	0.96	0.87	Desert dust	0.95
	04/01/2021	0.94	0.26	0.93	1.86	Desert dust	0
Case 3	02/25/2019	0.06	1.35	0.91	0.96	Continental	0.99
	05/28/2020	0.07	0.74	0.96	0.98	Maritime	0.84

Table S1. Summary of the daily mean values of several parameters for the days considered in the case studies of Section 4.1.2. The main aerosol class as defined in Table 2 is also represented for each day. Moreover, as the days were manually cloud cleared, the performances of the clear-sky detection method were investigated through the analysis of the percentage of clear-sky irradiance measurements for each day.