Influence of Various Criteria on Identifying the Springtime Tropospheric Ozone Depletion Events (ODEs) at Utqiaġvik, Arctic: Supplementary Information

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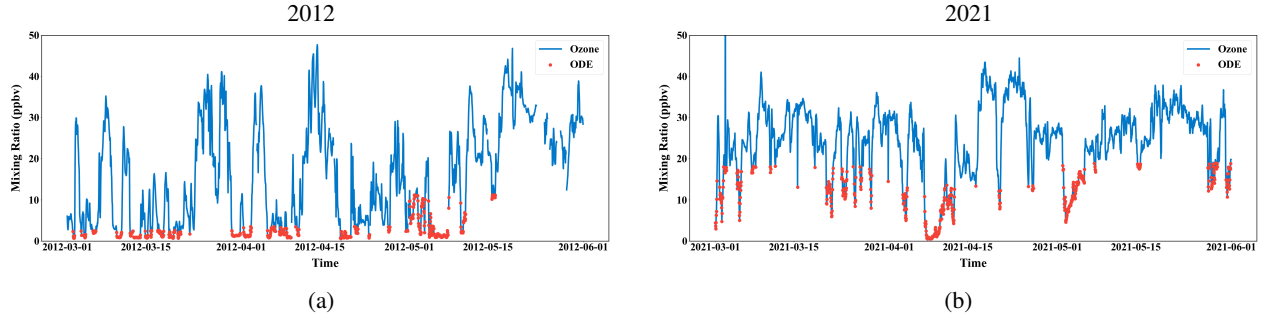


Figure S1. Screened results for the years 2012 and 2021 using the modified VM criteria, in which α in the equation $([O_3]_i - \overline{[O_3]} < \alpha \cdot \sigma)$ is set to -0.8. The blue curve represents the hourly time series of the ozone mixing ratio, and the red dots denote the ODE hours identified by the criterion.

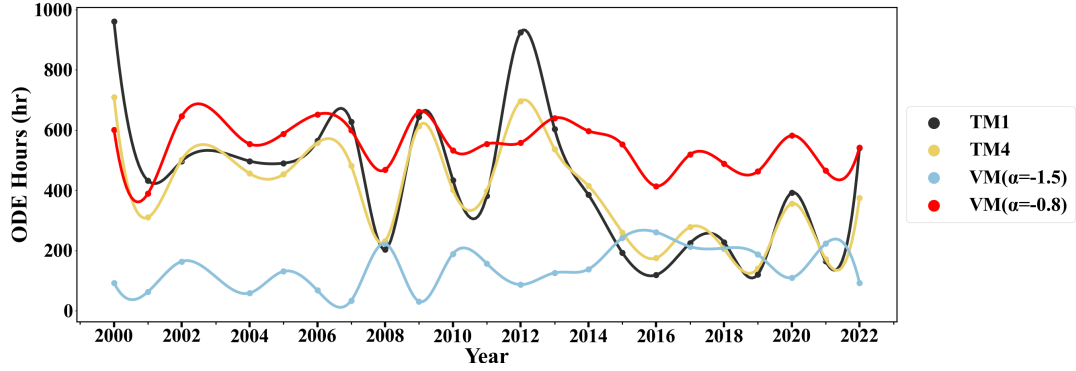



Figure S2. Number of ODE hours identified by each criterion from 2000 to 2022. VM($\alpha = -1.5$) denotes that α in the equation $([O_3]_i - \overline{[O_3]} < \alpha \cdot \sigma)$ is set to -1.5, and VM($\alpha = -0.8$) denotes that α is set to -0.8.

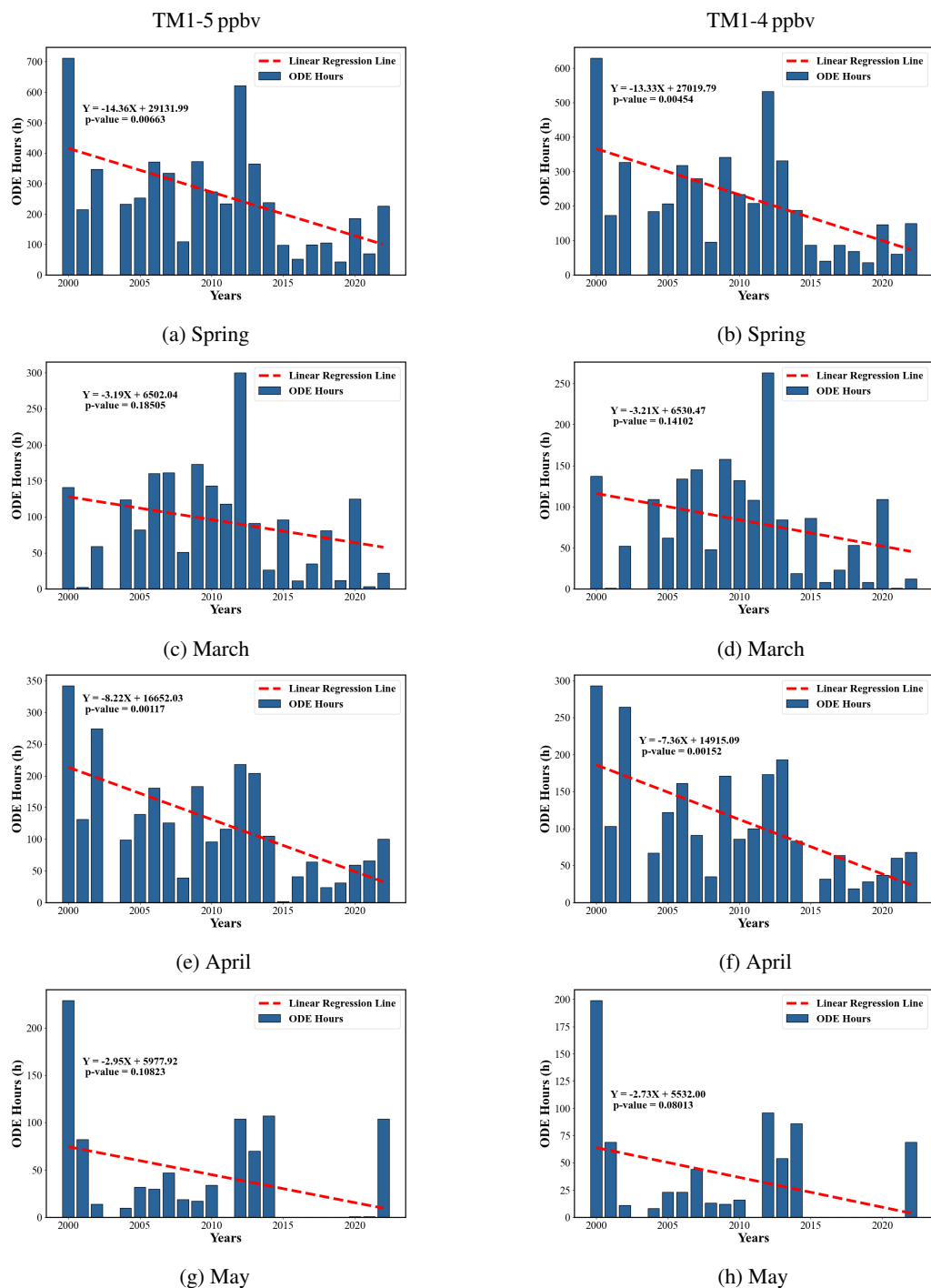



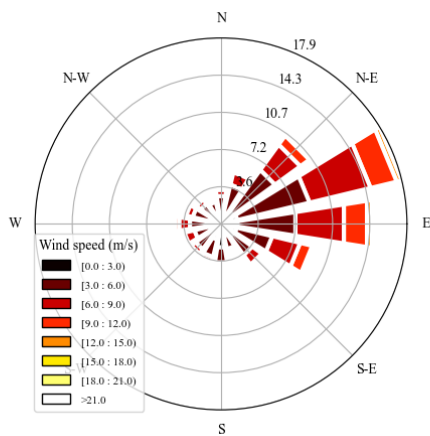
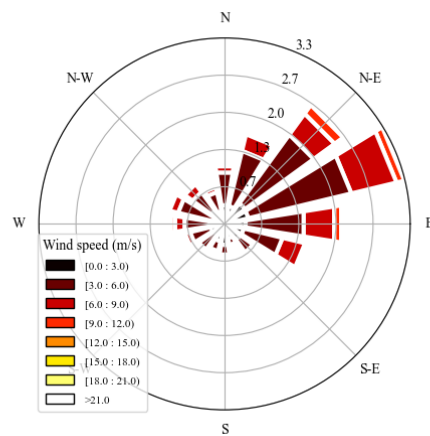
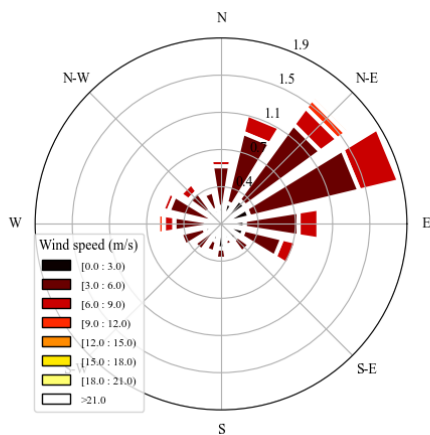
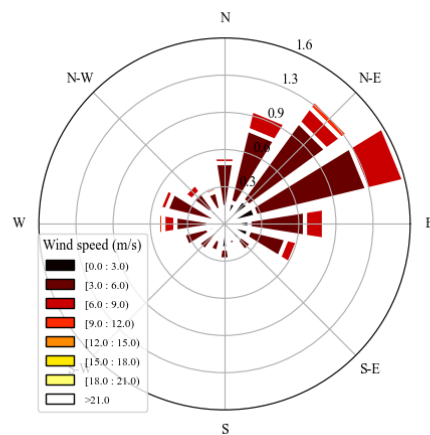
Figure S3. Yearly variability of the ODE hours at the BRW station, identified by two criteria with different constant thresholds (5 ppbv and 4 ppbv). Subplots (a), (c), (e) and (g) show the ODE hours screened by the TM1-5 ppbv method for the whole spring, March, April and May, respectively, and subplots (b), (d), (f) and (h) show the hours screened by the TM1-4 ppbv method. Red dashed lines represent linear regressions of the ODE hours. The regression equations and p-values are also given.

(a) Spring

(b) ODE hours (TM1)

(c) ODE hours (TM1-5 ppbv)

(d) ODE hours (TM1-4 ppbv)

Figure S4. Wind rose diagrams during (a) the investigated spring seasons from 2000 to 2022, and ODE time periods identified by (b) TM1, (c) TM1-5 ppbv and (d) TM1-4 ppbv.