



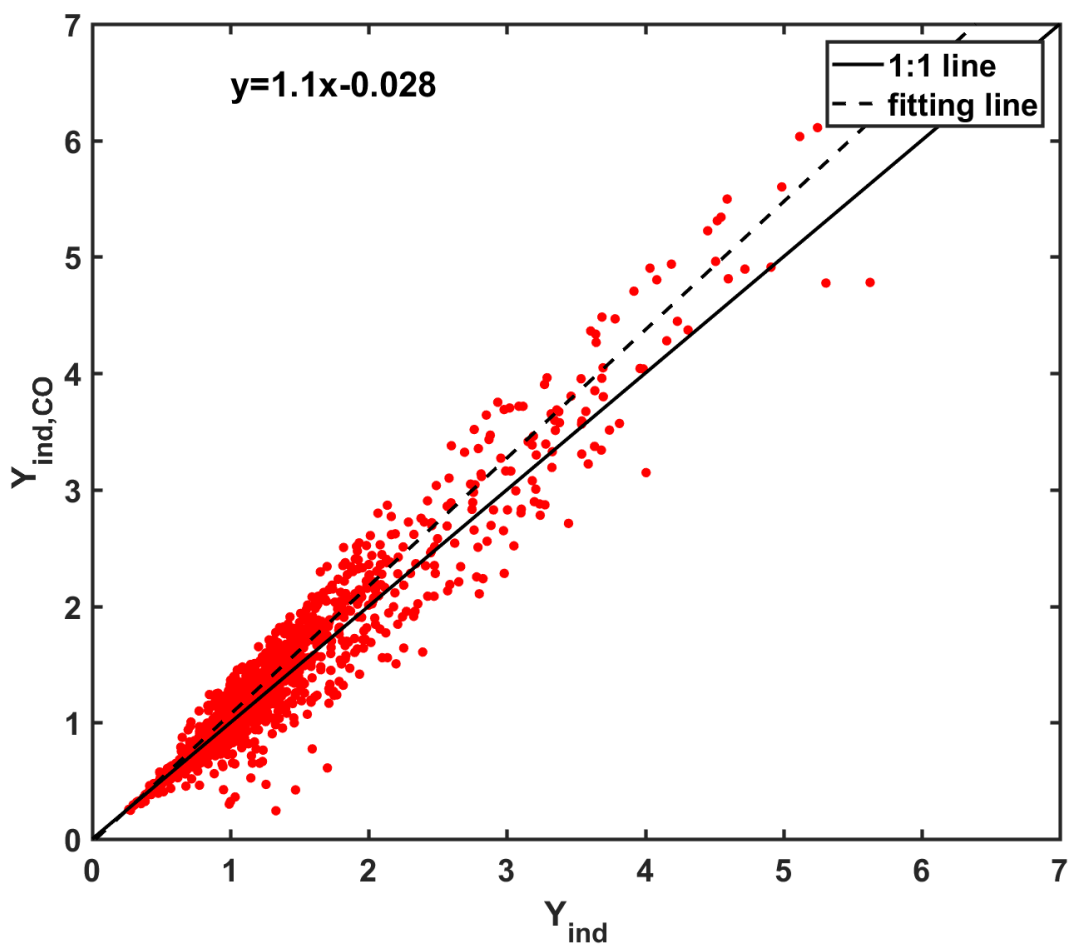
Supplement of

O₃ and PAN in southern Tibetan Plateau determined by distinct physical and chemical processes

Wanyun Xu et al.

Correspondence to: Gen Zhang (zhanggen@cma.gov.cn) and Chunxiang Ye (c.ye@pku.edu.cn)

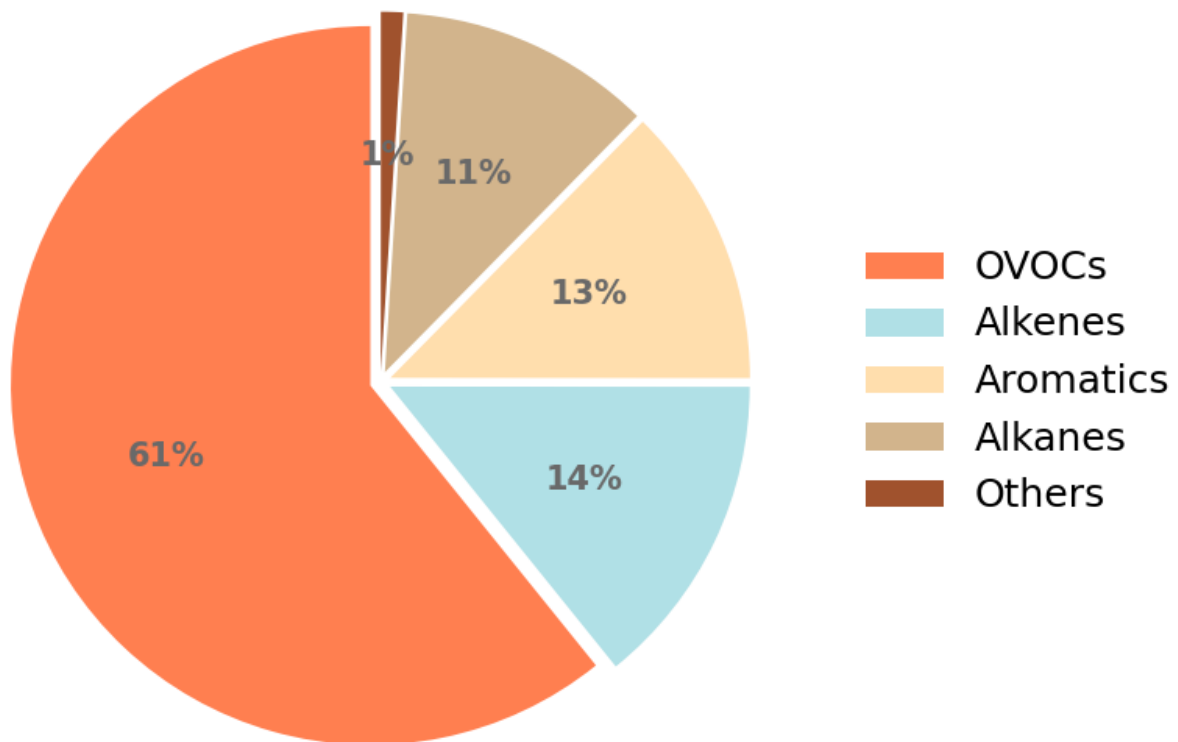
The copyright of individual parts of the supplement might differ from the article licence.



20

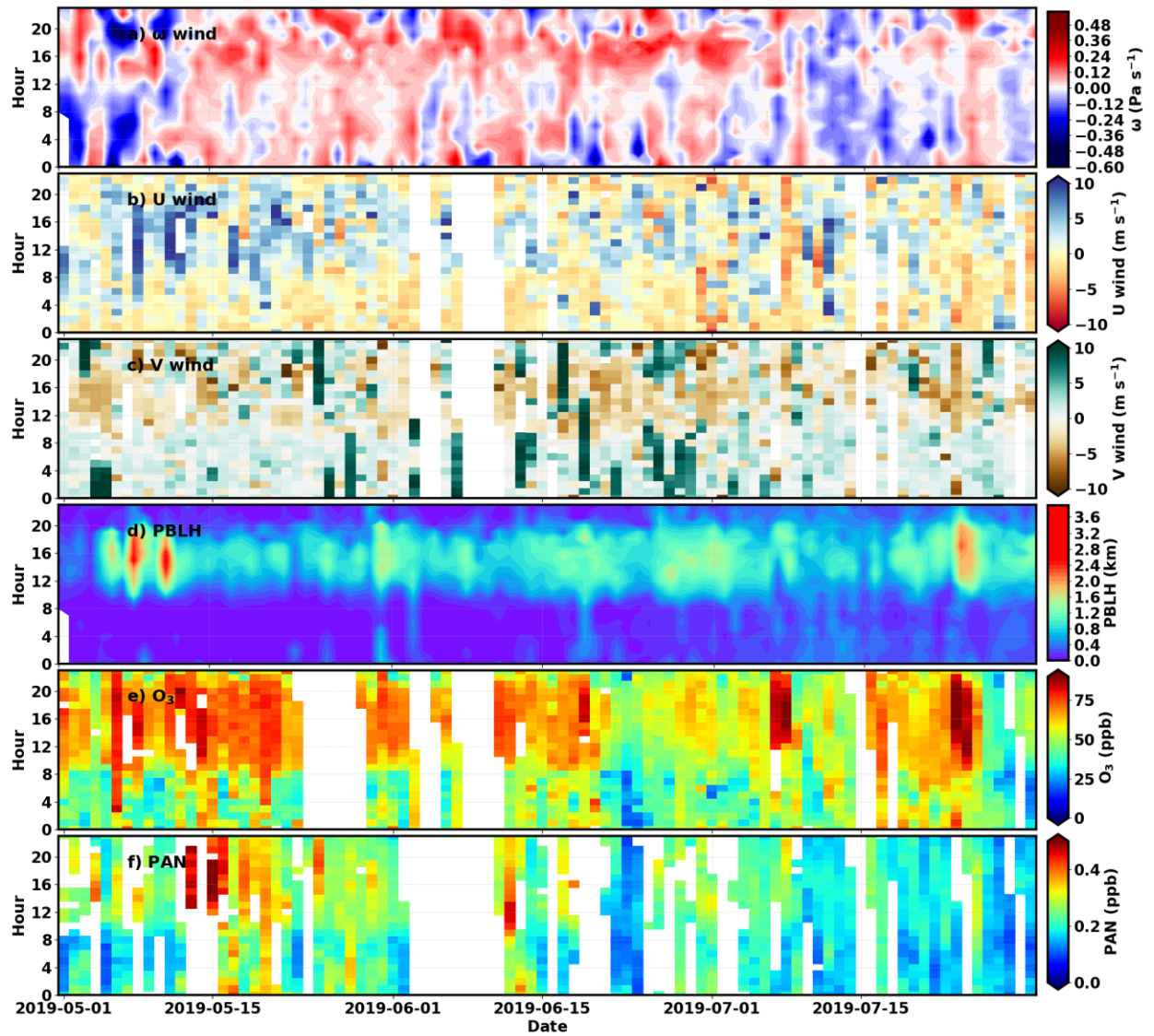
21 **Figure S1.** Comparison between Y indices calculated using or without using normalized CO
22 concentrations.

23

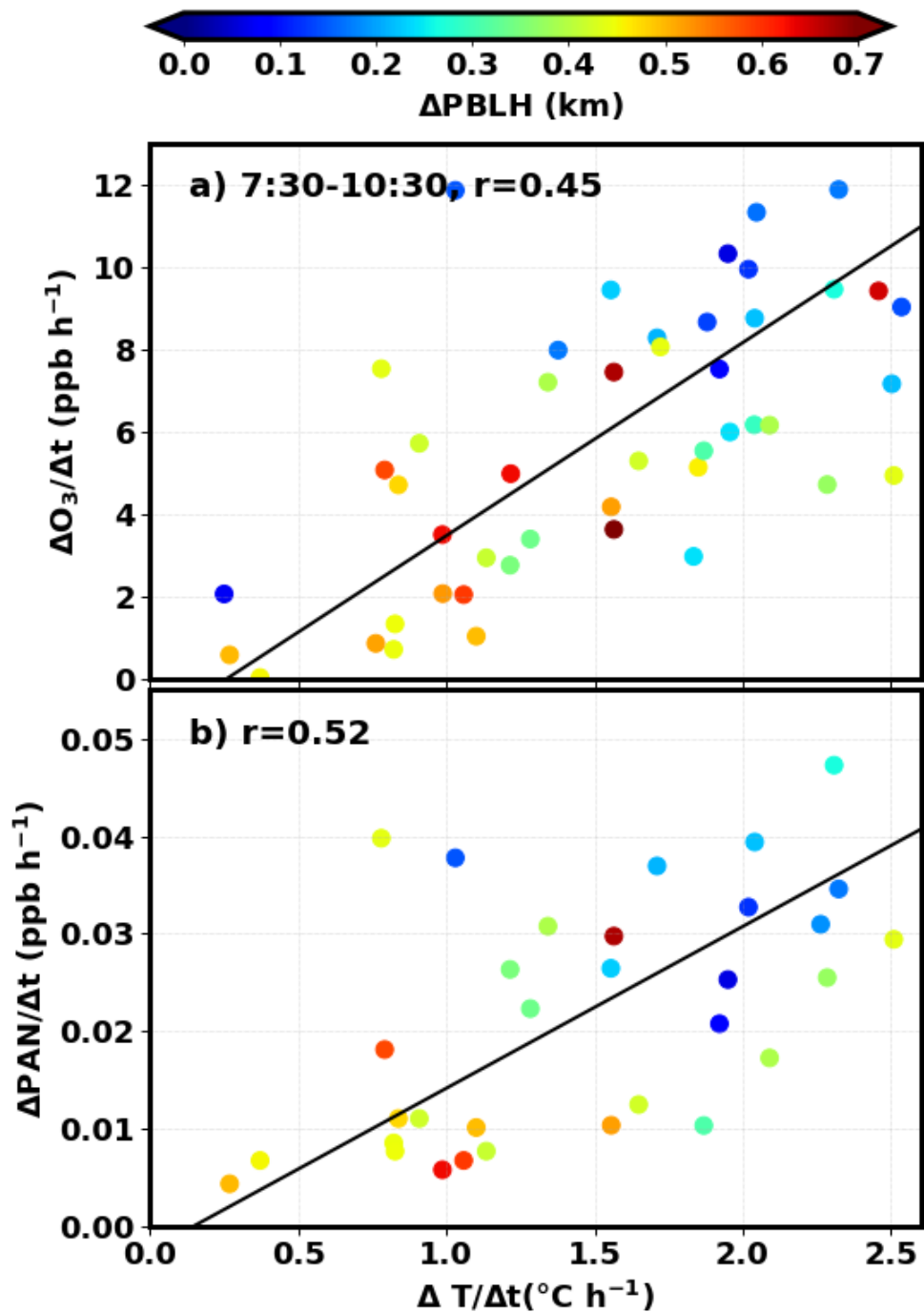


24
25
26
27
28

Figure S2. Contributions of distinct types of VOCs to total concentrations (concentrations in Propy-Equiv. ppbC).

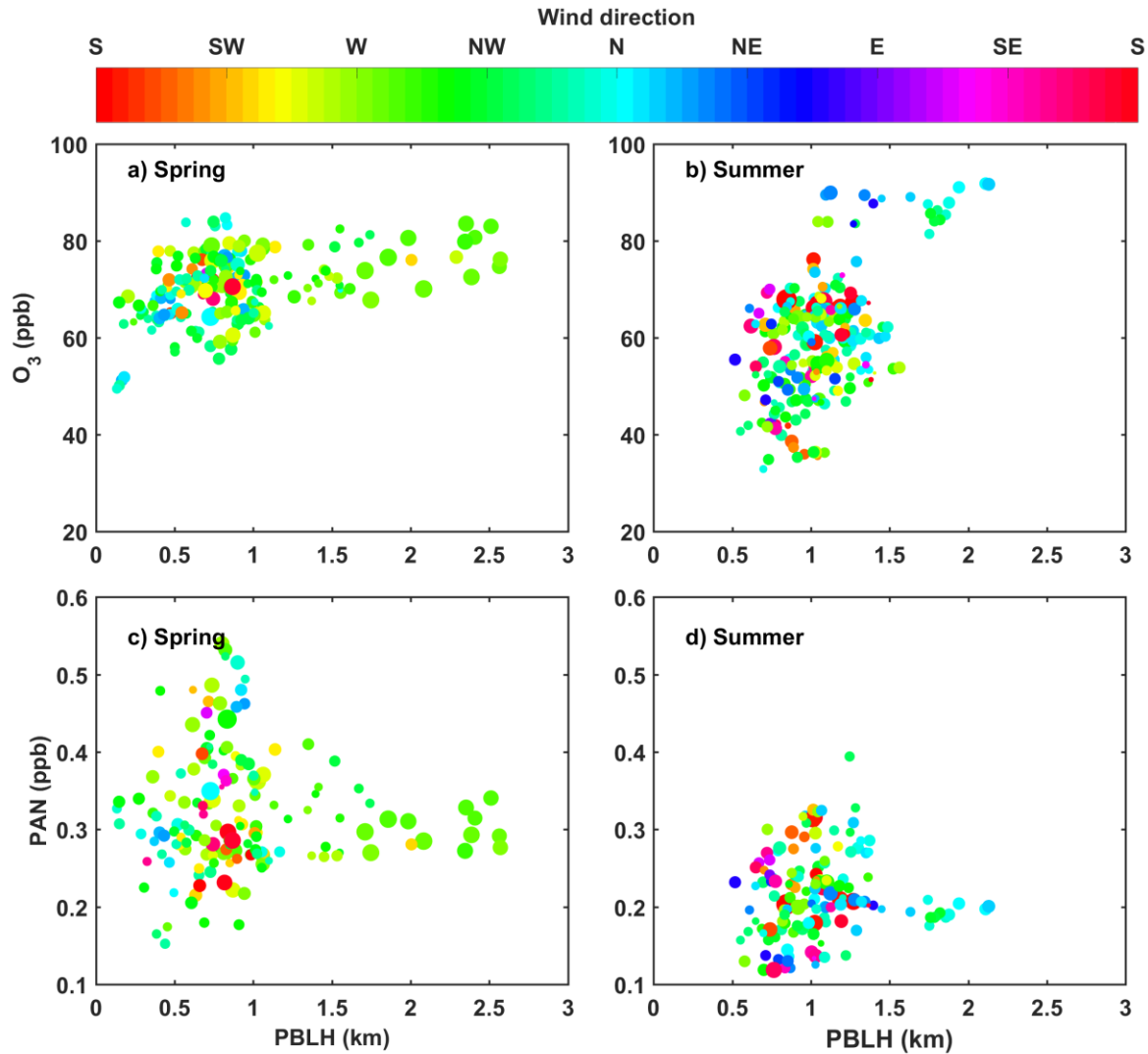


29
 30 **Figure S3.** Season-diurnal variations of a) ω wind (ERA5), b) surface U wind, c) surface V
 31 wind, d) PBLH (ERA5), e) surface O_3 and f) PAN between 1 May and 31 Jul 2019 at Nam Co.



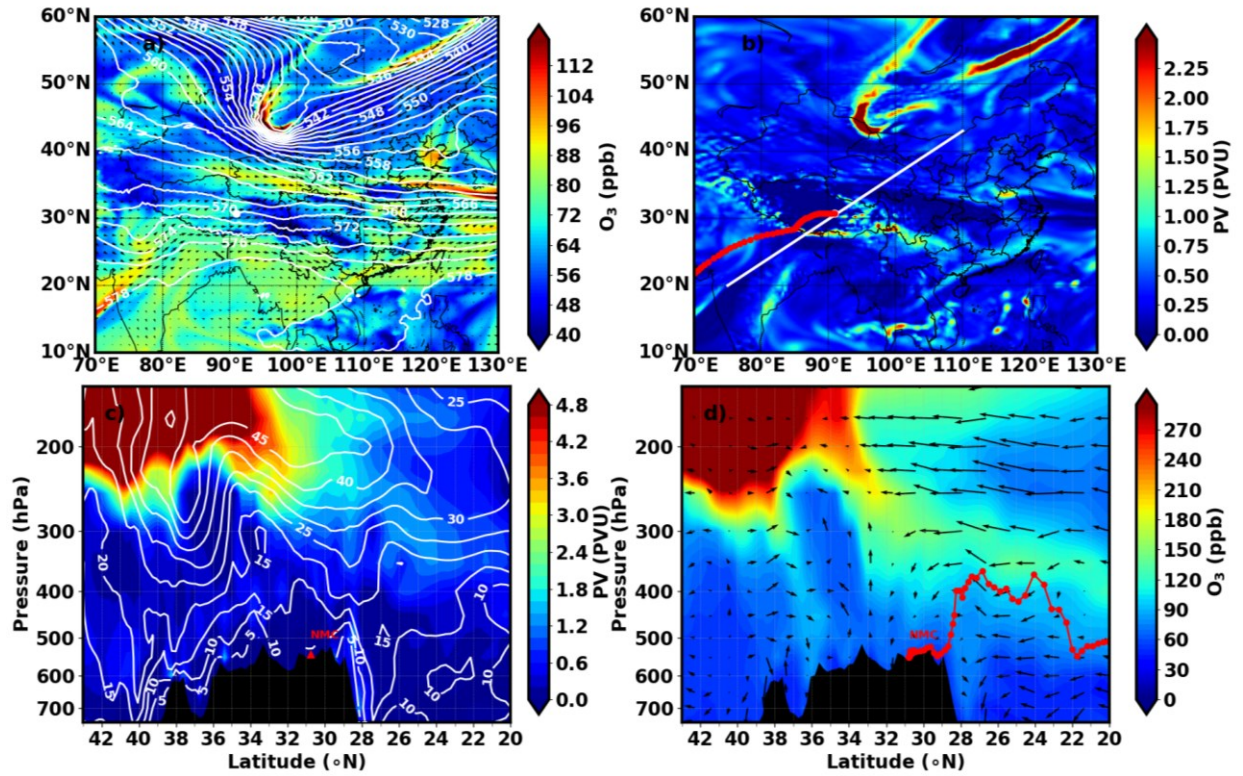
32

33 **Figure S4** Variation of the a) O_3 and b) PAN morning (7:30 to 10:30 LT) growth rates with
 34 temperature growth rates, with colors representing morning time averaged PBLH (from ERA5
 35 reanalysis data)

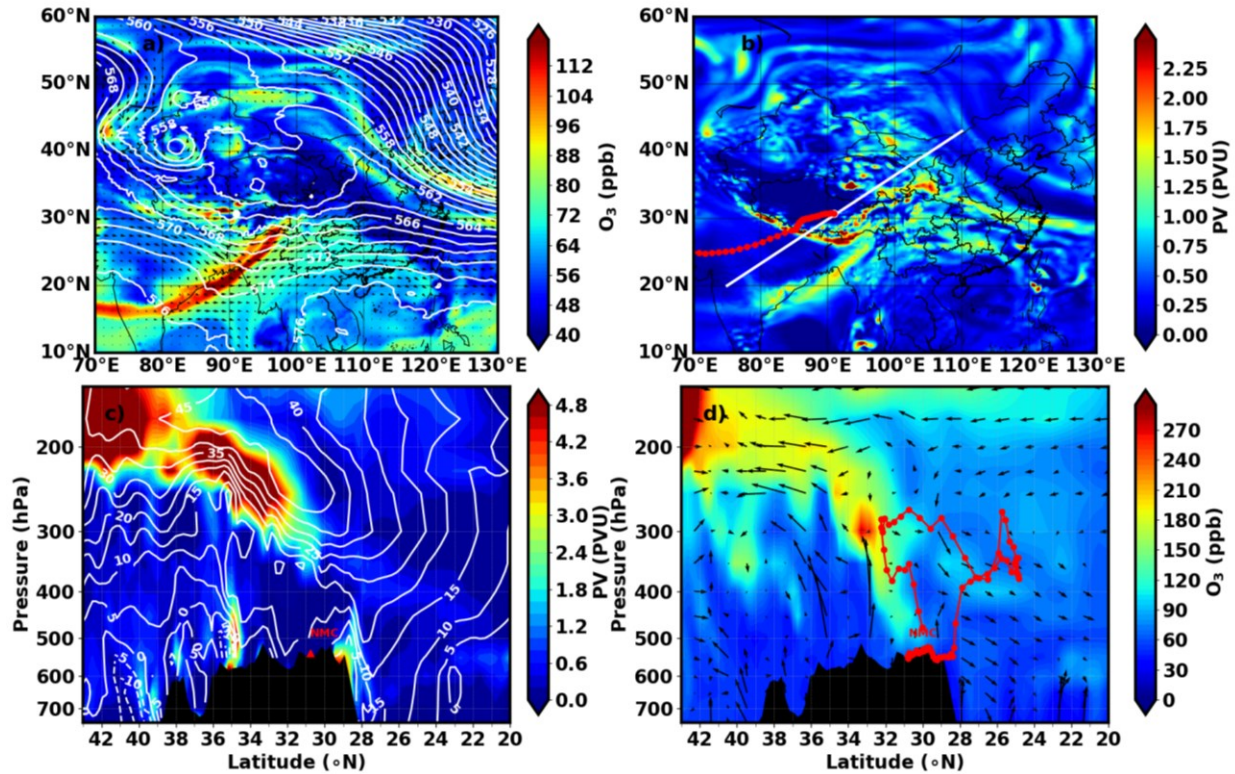


36
 37
 38
 39
 40
 41
 42
 43

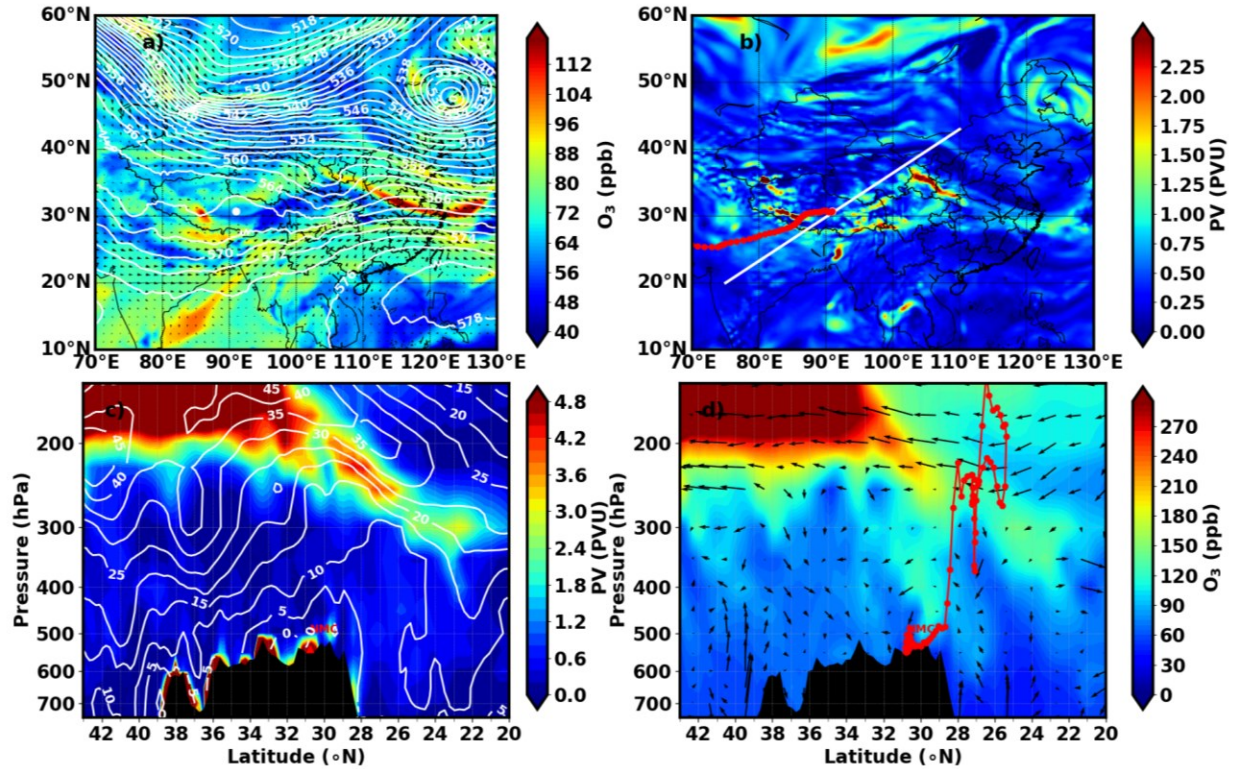
Figure S5. Variation of afternoon (12:00-18:00) O_3 (a,b) and PAN (c,d) with PBLH (from ERA5 reanalysis data) during spring (a,c) and summer (b,d) periods, with wind speeds and directions indicated by sizes and colors of scattered dots (precipitation associated data points excluded).



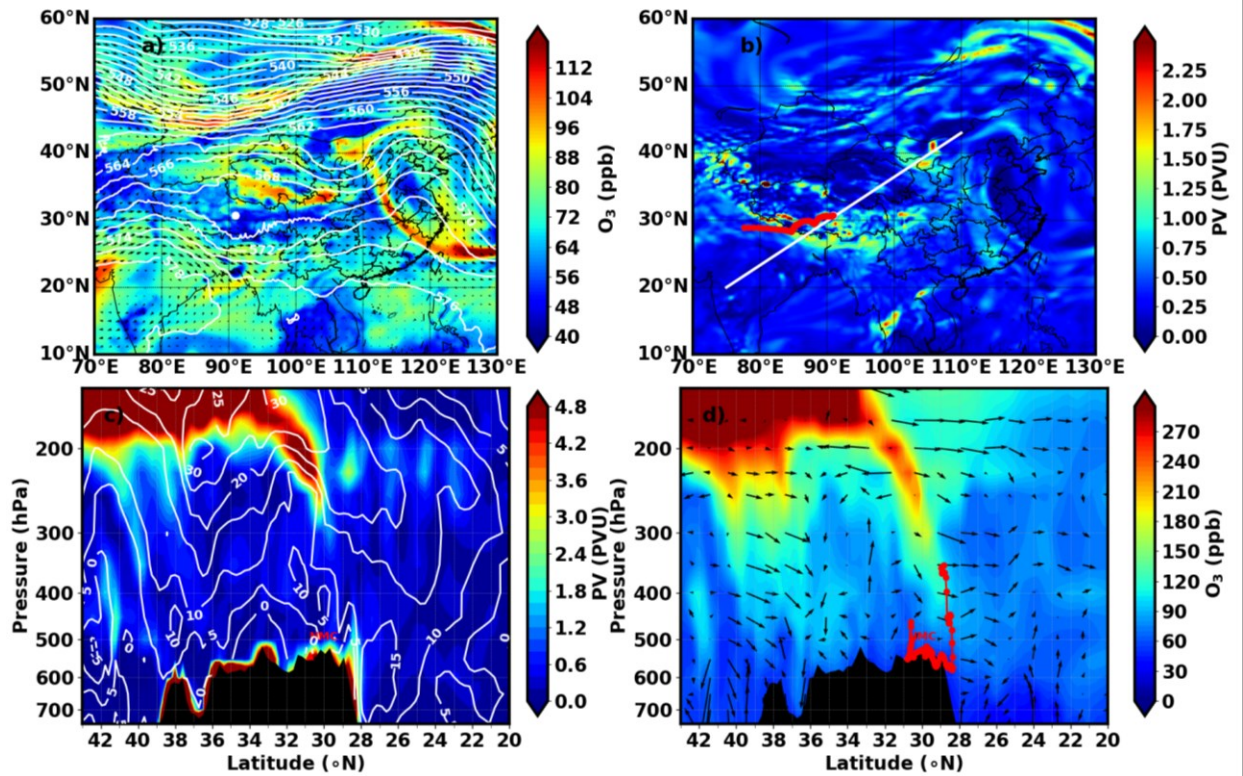
44
 45 **Figure S6.** 500hPa ERA5 a) O₃ mixing ratio (shading), geopotential height (white contour lines),
 46 horizontal winds (black arrows), b) potential vorticity (shading), 72h backward trajectory
 47 (starting from Nam Co station, red dotted line), and a white line along which the cross section of
 48 c) potential vorticity, u winds, d) O₃ mixing ratio, v winds and vertical velocity were calculated
 49 for 4:00 LT 11 May 2019
 50



51
 52 **Figure S7.** 500hPa ERA5 a) O₃ mixing ratio (shading), geopotential height (white contour lines),
 53 horizontal winds (black arrows), b) potential vorticity (shading), 72h backward trajectory
 54 (starting from Nam Co station, red dotted line), and a white line along which the cross section of
 55 c) potential vorticity, u winds, d) O₃ mixing ratio, v winds and vertical velocity were calculated
 56 for 12:00 LT 6 May 2019

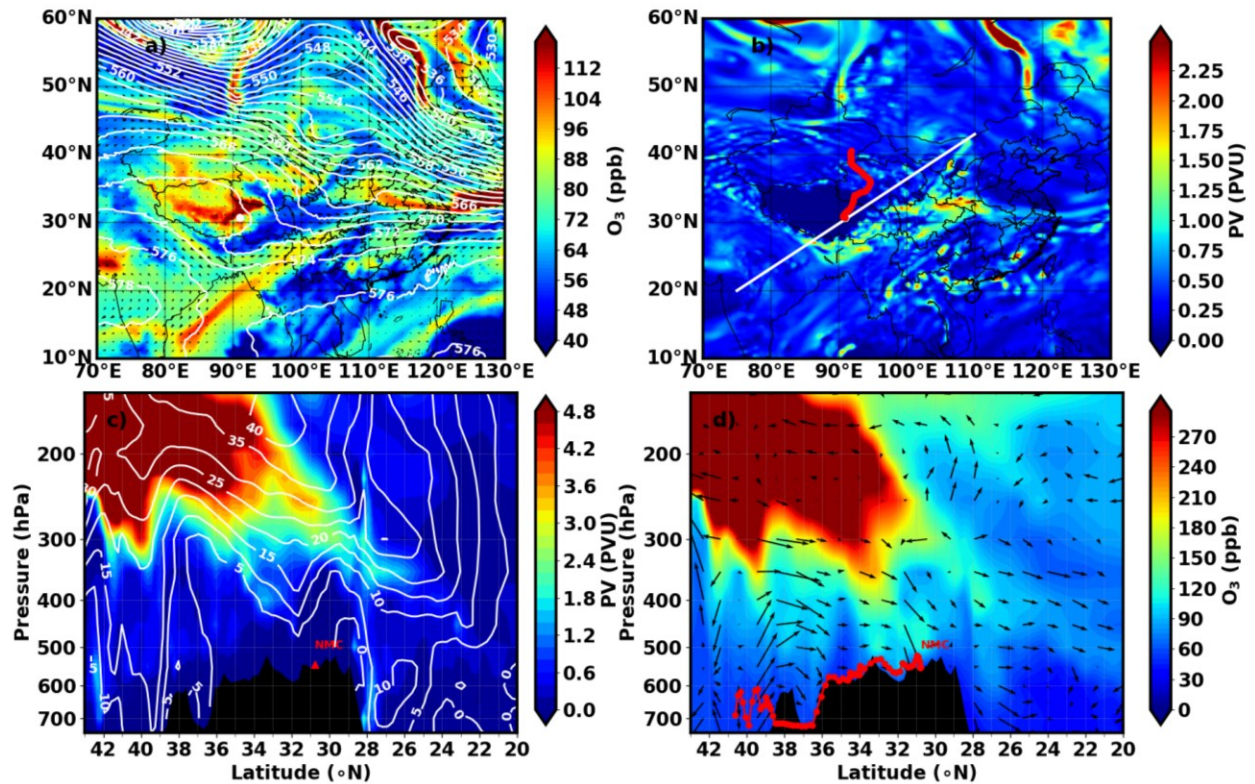


57
 58 **Figure S8.** 500hPa ERA5 a) O₃ mixing ratio (shading), geopotential height (white contour lines),
 59 horizontal winds (black arrows), b) potential vorticity (shading), 72h backward trajectory
 60 (starting from Nam Co station, red dotted line), and a white line along which the cross section of
 61 c) potential vorticity, u winds, d) O₃ mixing ratio, v winds and vertical velocity were calculated
 62 for 23:00 LT 13 May 2019
 63



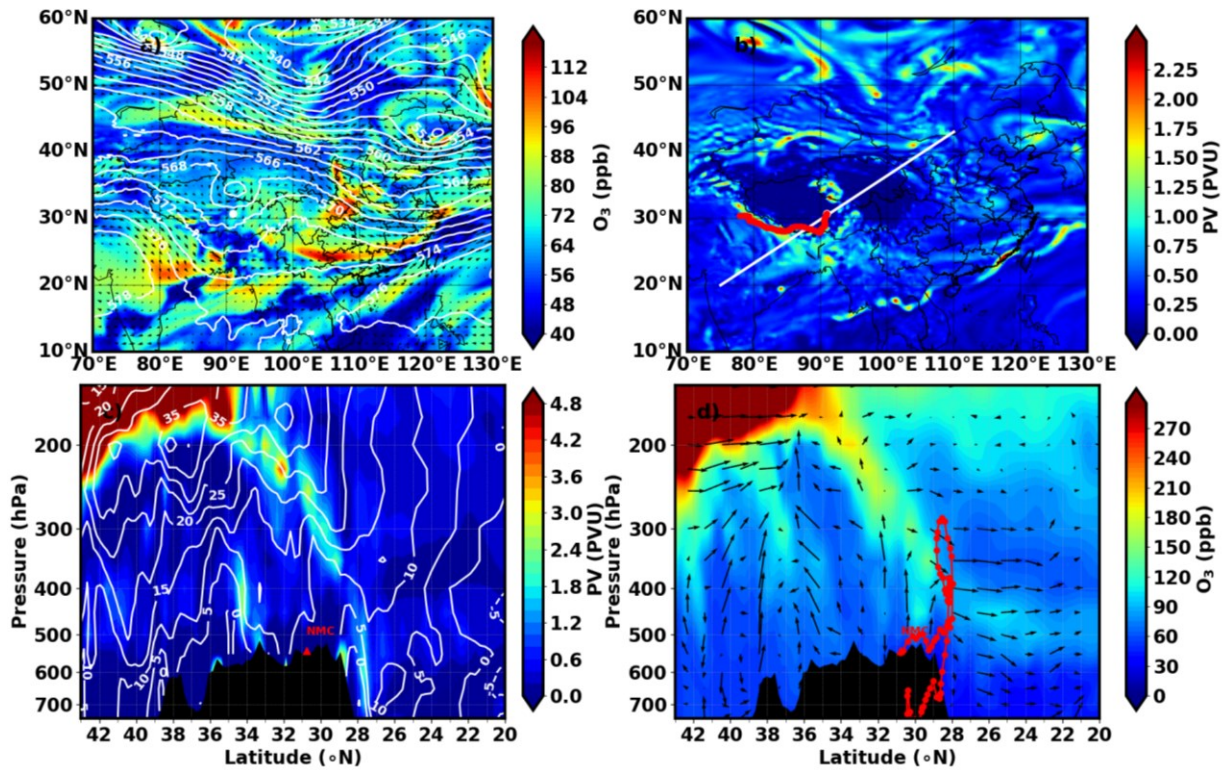
64
 65 **Figure S9.** 500hPa ERA5 a) O₃ mixing ratio (shading), geopotential height (white contour lines),
 66 horizontal winds (black arrows), b) potential vorticity (shading), 72h backward trajectory
 67 (starting from Nam Co station, red dotted line), and a white line along which the cross section of
 68 c) potential vorticity, u winds, d) O₃ mixing ratio, v winds and vertical velocity were calculated
 69 for 18:00 LT 23 May 2019

70

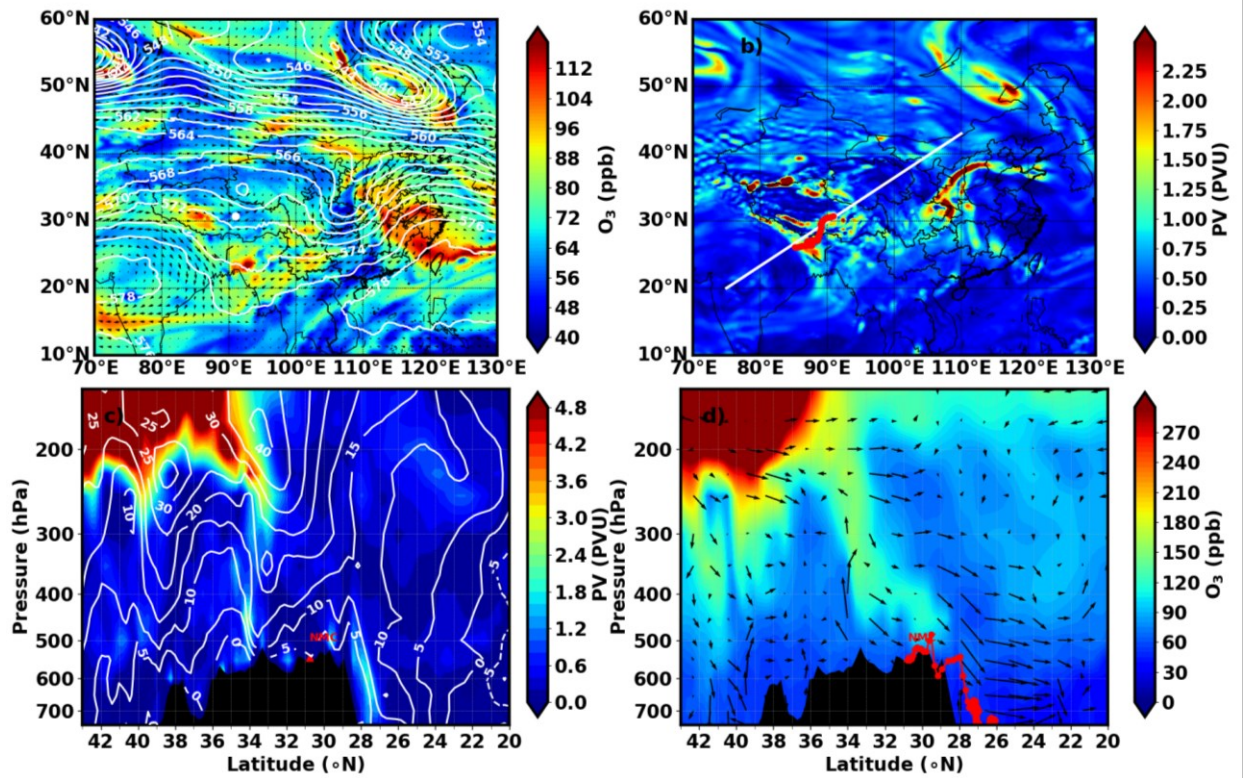


71
 72 **Figure S10.** 500hPa ERA5 a) O₃ mixing ratio (shading), geopotential height (white contour
 73 lines), horizontal winds (black arrows), b) potential vorticity (shading), 72h backward trajectory
 74 (starting from Nam Co station, red dotted line), and a white line along which the cross section of
 75 c) potential vorticity, u winds, d) O₃ mixing ratio, v winds and vertical velocity were calculated
 76 for 6:00 LT 31 May 2019

77

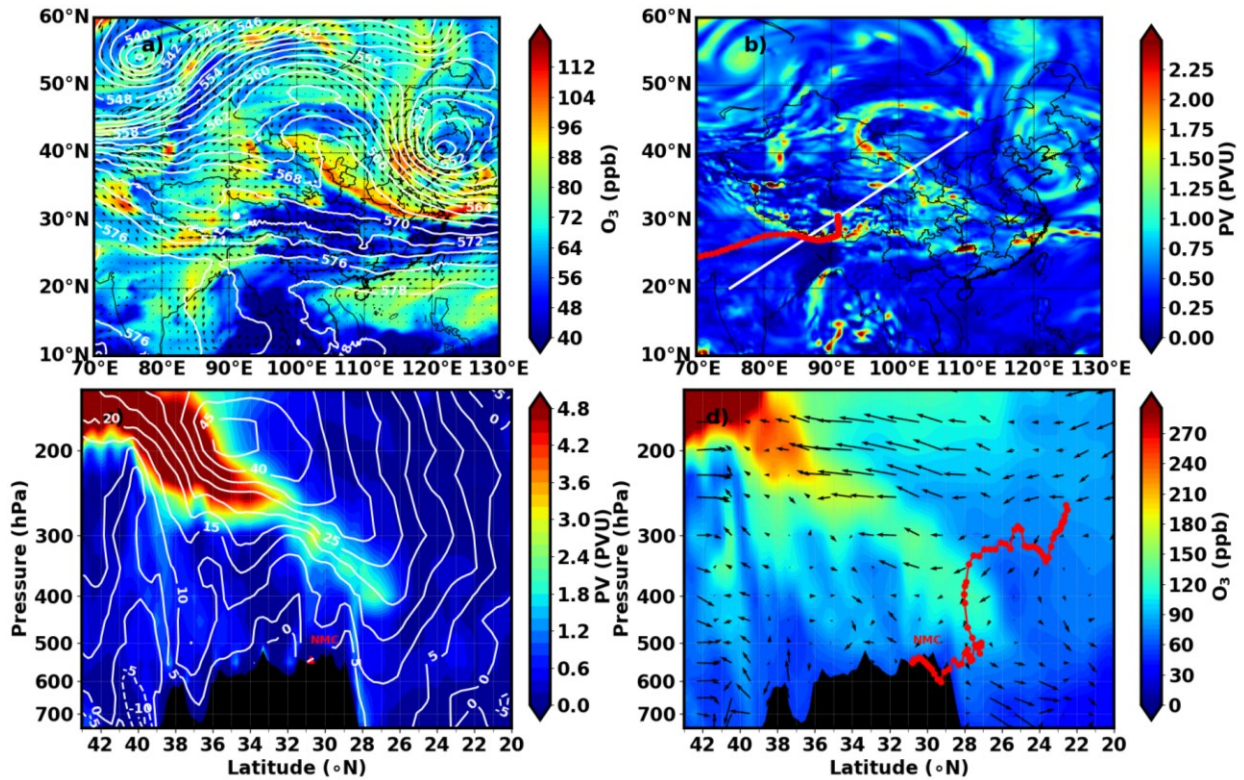


78
 79 **Figure S11.** 500hPa ERA5 a) O₃ mixing ratio (shading), geopotential height (white contour
 80 lines), horizontal winds (black arrows), b) potential vorticity (shading), 72h backward trajectory
 81 (starting from Nam Co station, red dotted line), and a white line along which the cross section of
 82 c) potential vorticity, u winds, d) O₃ mixing ratio, v winds and vertical velocity were calculated
 83 for 8:00 LT 3 Jun 2019
 84



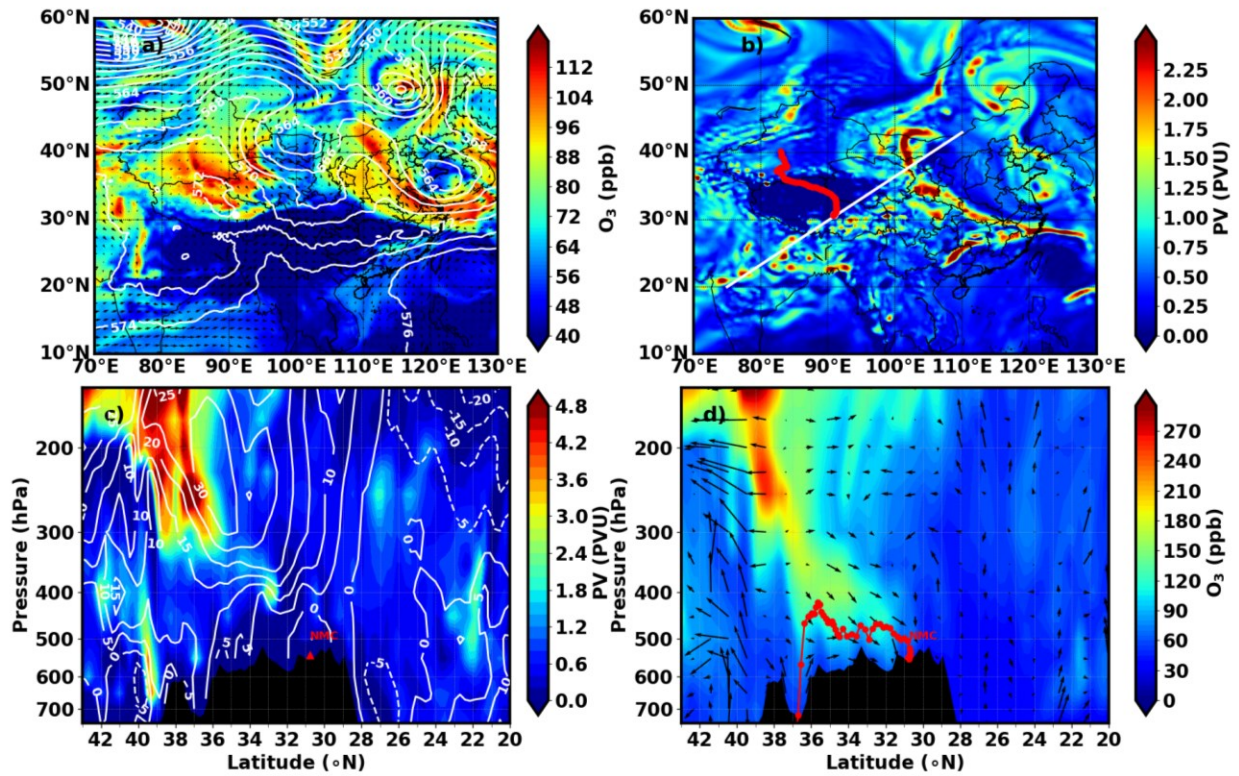
85
 86 **Figure S12.** 500hPa ERA5 a) O₃ mixing ratio (shading), geopotential height (white contour
 87 lines), horizontal winds (black arrows), b) potential vorticity (shading), 72h backward trajectory
 88 (starting from Nam Co station, red dotted line), and a white line along which the cross section of
 89 c) potential vorticity, u winds, d) O₃ mixing ratio, v winds and vertical velocity were calculated
 90 for 2:00 LT 5 Jun 2019

91
 92



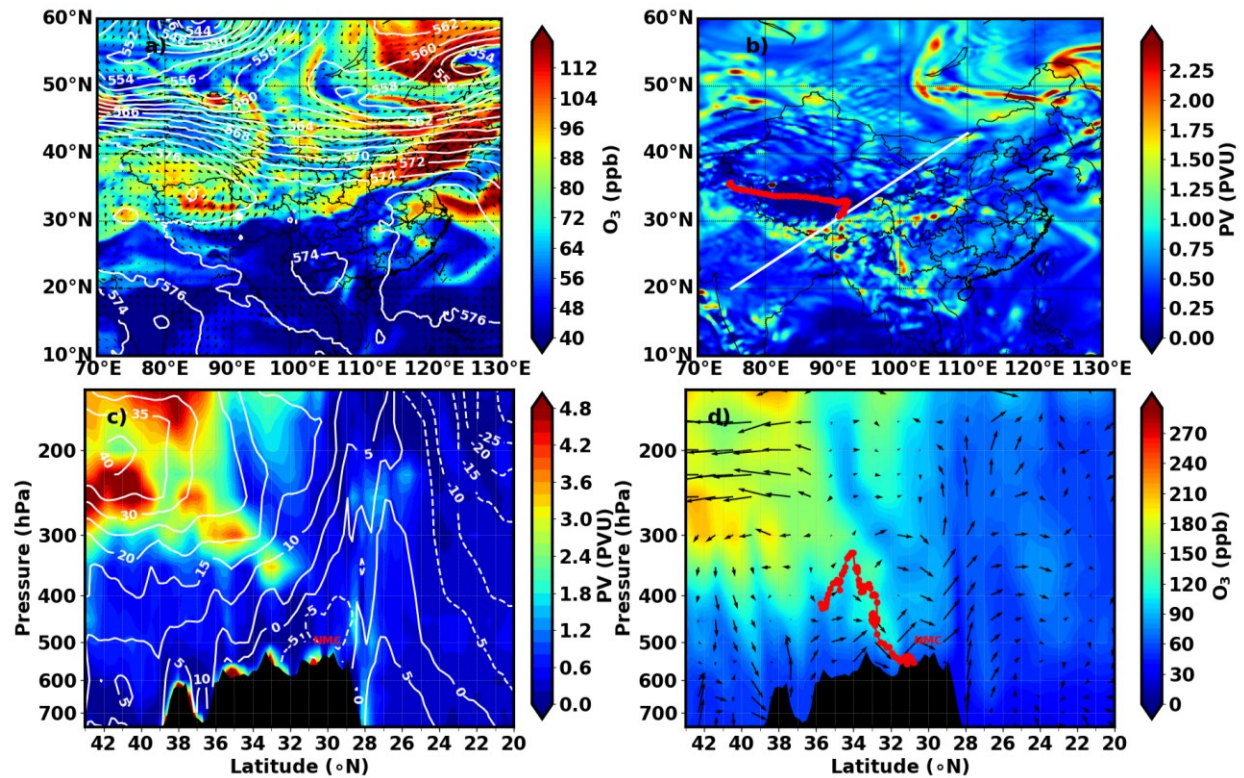
93
 94
 95
 96
 97
 98
 99

Figure S13. 500hPa ERA5 a) O₃ mixing ratio (shading), geopotential height (white contour lines), horizontal winds (black arrows), b) potential vorticity (shading), 72h backward trajectory (starting from Nam Co station, red dotted line), and a white line along which the cross section of c) potential vorticity, u winds, d) O₃ mixing ratio, v winds and vertical velocity were calculated for 2:00 LT 9 Jun 2019



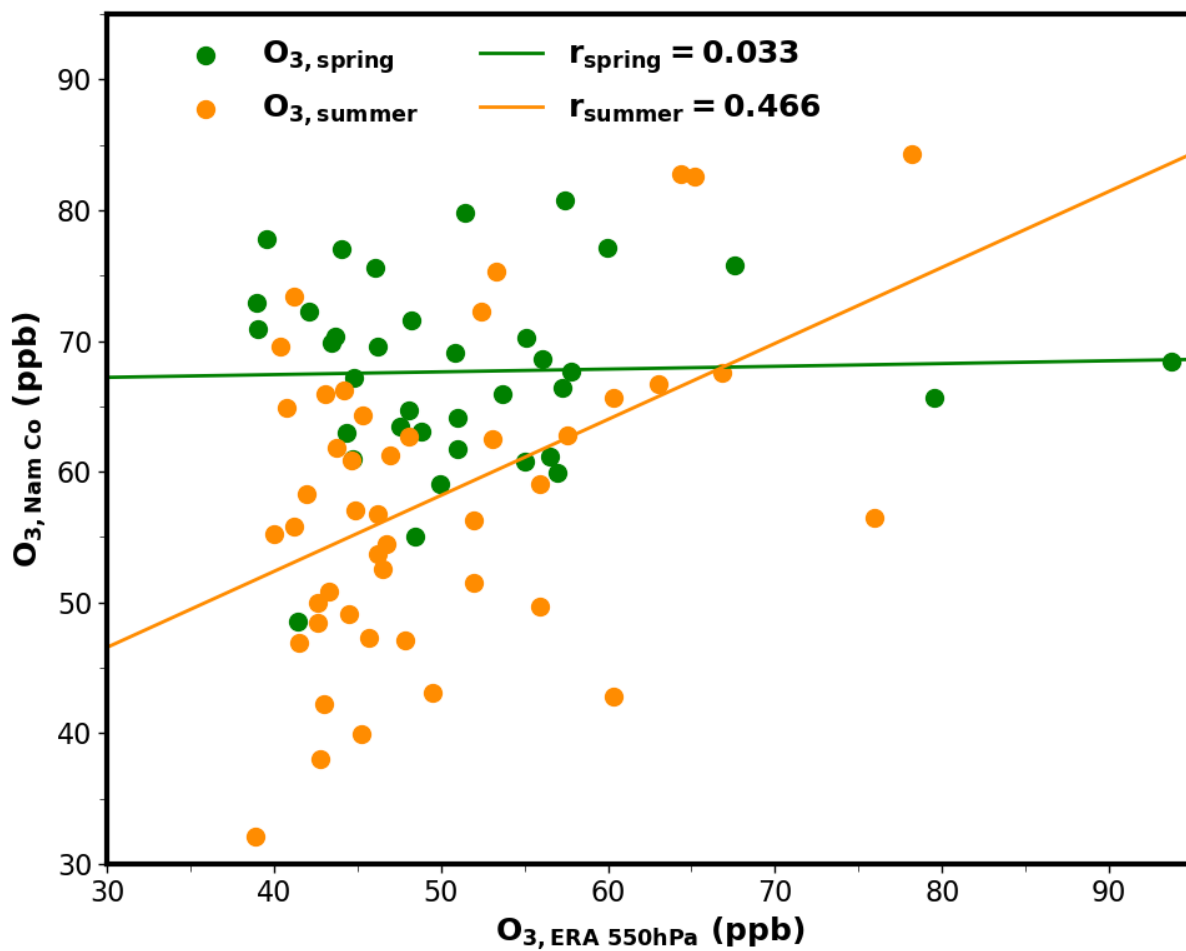
100
 101
 102
 103
 104
 105
 106

Figure S14. 500hPa ERA5 a) O₃ mixing ratio (shading), geopotential height (white contour lines), horizontal winds (black arrows), b) potential vorticity (shading), 72h backward trajectory (starting from Nam Co station, red dotted line), and a white line along which the cross section of c) potential vorticity, u winds, d) O₃ mixing ratio, v winds and vertical velocity were calculated for 9:00 LT 7 Jul 2019



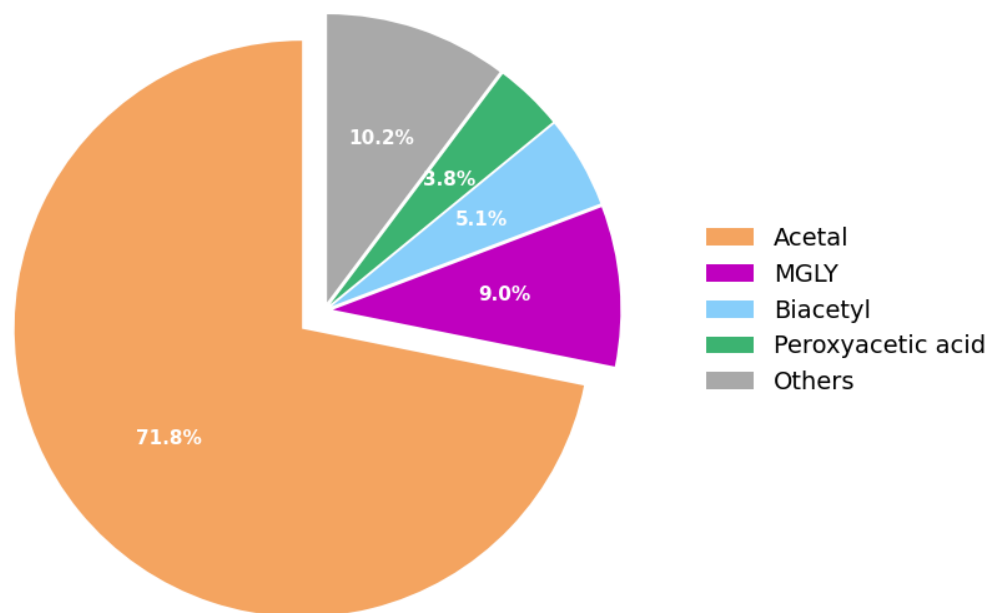
107
 108 **Figure S15.** 500hPa ERA5 a) O₃ mixing ratio (shading), geopotential height (white contour
 109 lines), horizontal winds (black arrows), b) potential vorticity (shading), 72h backward trajectory
 110 (starting from Nam Co station, red dotted line), and a white line along which the cross section of
 111 c) potential vorticity, u winds, d) O₃ mixing ratio, v winds and vertical velocity were calculated
 112 for 16:00 LT 23 Jul 2019

113
 114



115
 116
 117
 118

Figure S16. Correlation between spring (green) and summertime (orange) O₃ observations at Nam Co (O₃, Nam Co) and O₃ mixing ratio at 550 hPa from the ERA5 reanalysis data



119
120

Figure S17. Average relative contribution of first-generation precursors to PA radical formation.