Supplementary Information

The CU Mobile Solar Occultation Flux instrument: structure functions and emission rates of NH_3, NO_2 and C_2H_6

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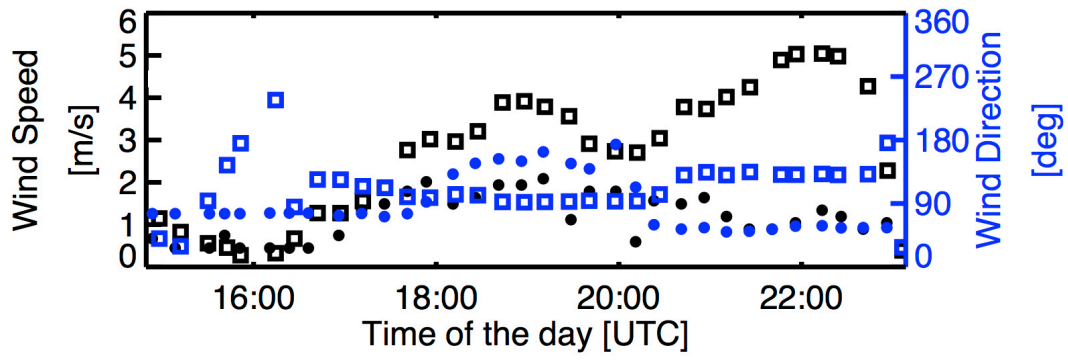
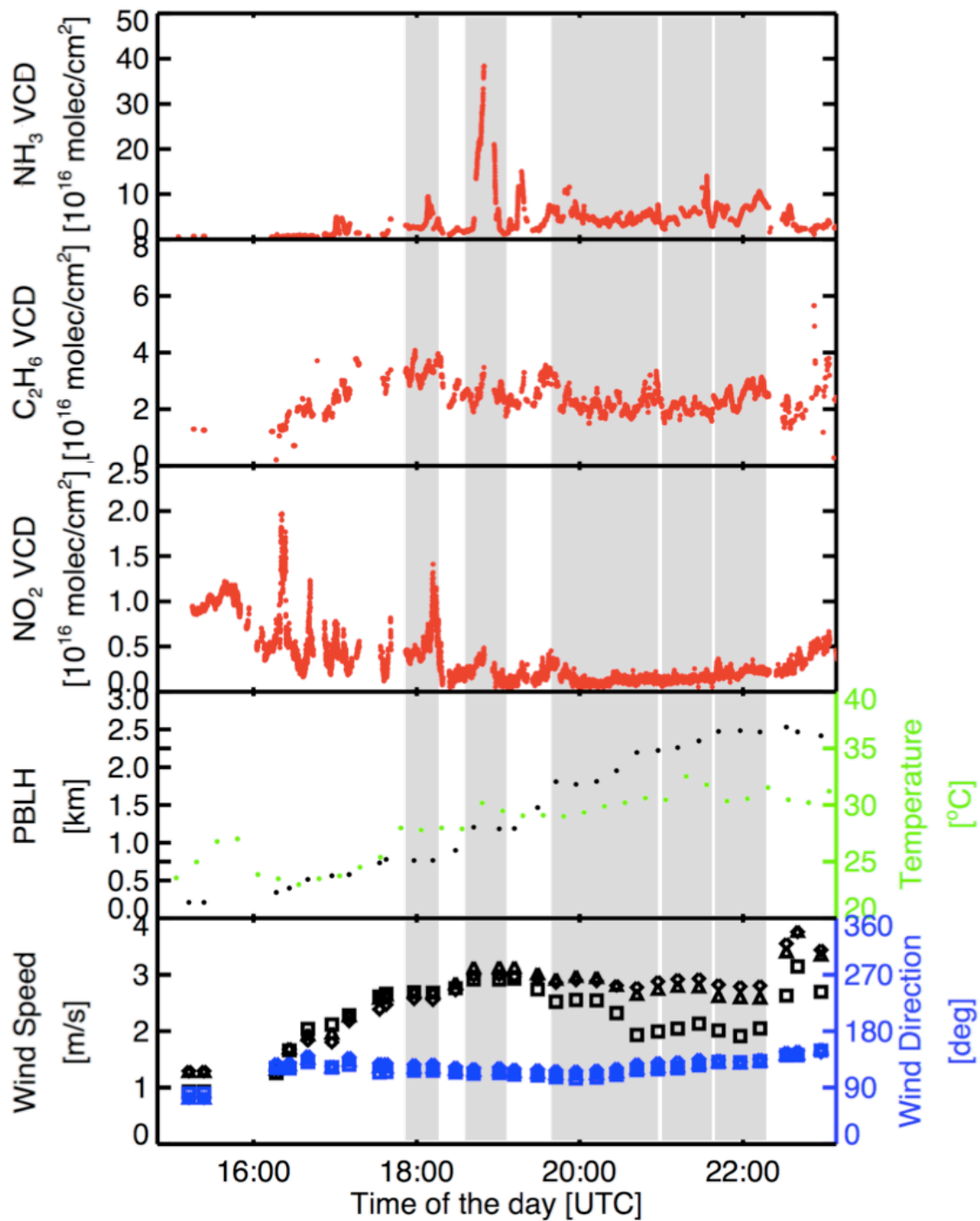

24

25   Figure S1: Timeseries of the surface layer model wind (squares) and ground measurement at the

26   nearby Eaton, CO measurement station (dots) for RD11.

27

28   Figure S2: Timeseries of the VCDs measured for A) NH_3, B) C_2H_6, C) NO_2, during RD10. D)

29   PBLH and temperature, E) model wind; (diamonds) model wind averaged over approximately 10

30   − 50 m above ground level, (triangles) over half PBLH, (squares) over the full PBLH. Shaded

31   areas indicate times at each site.

32

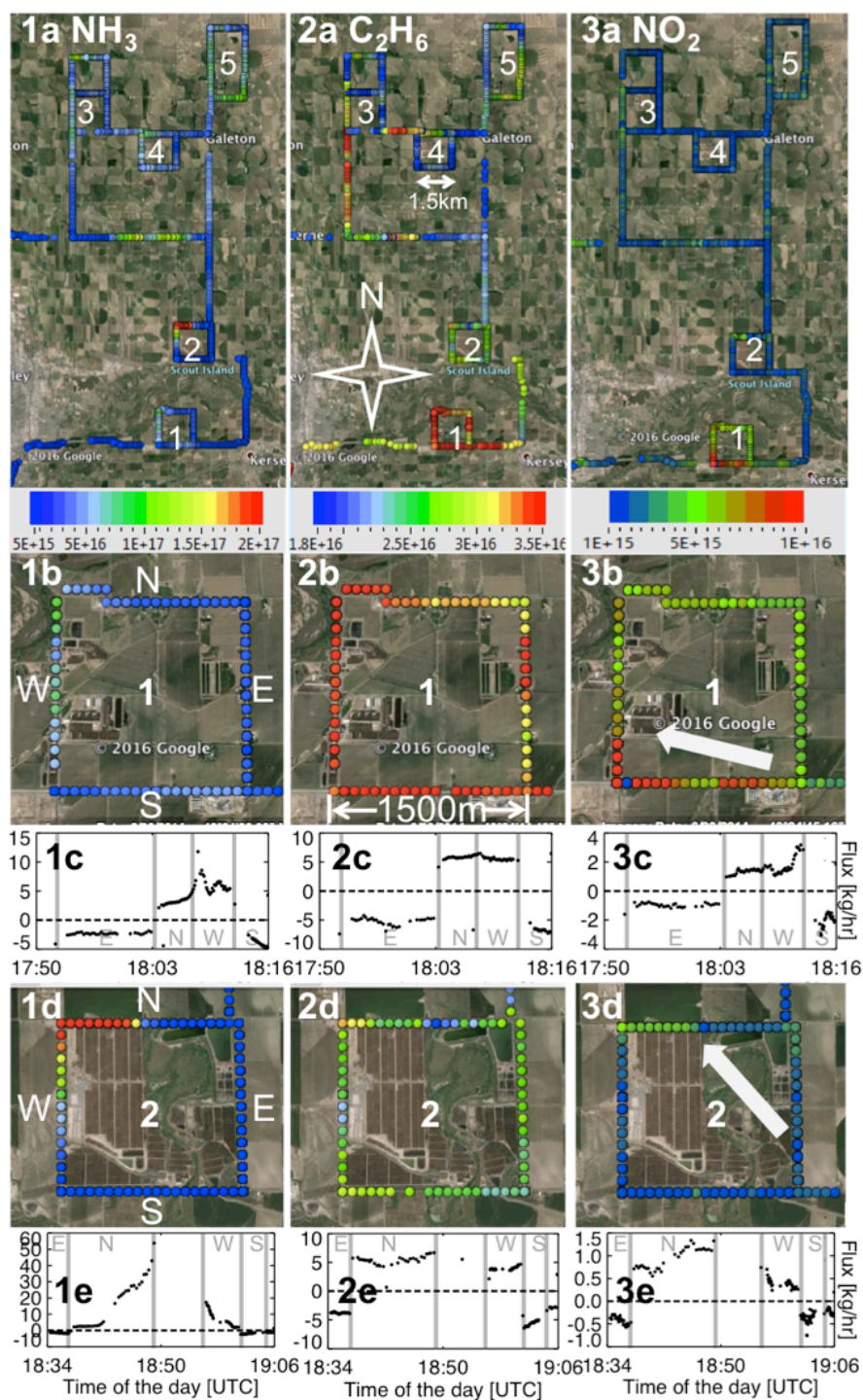
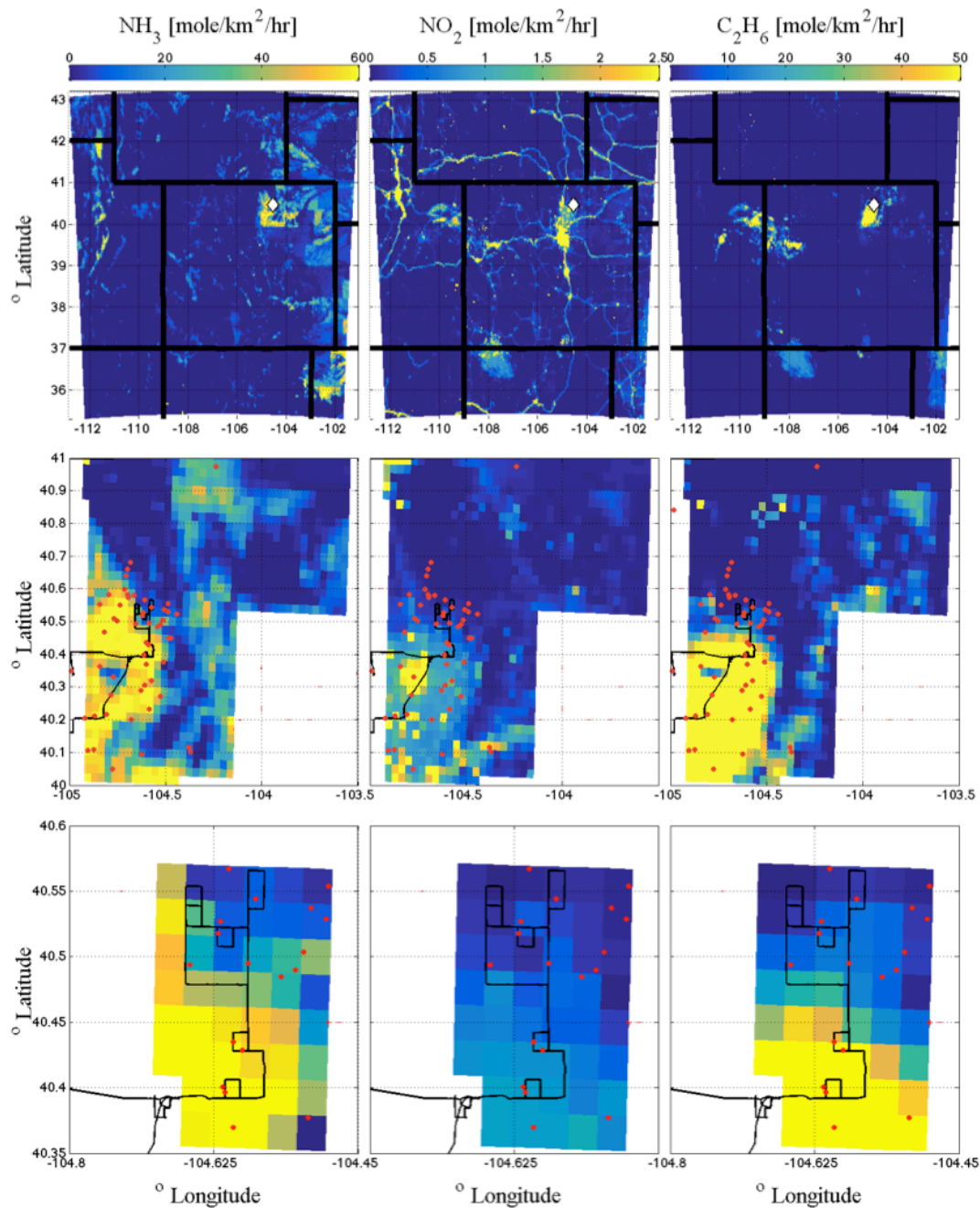



Figure S3: Zoom of the area east of Greeley, CO with the RD10 drive track color coded by the VCD of (left column, 1) NH_3, (middle, 2) C_2H_6, and (right, 3) NO_2. Row (a) shows the 5 sites of interest, (b) site 1, (d) site 2 from Fig. 6. Rows (c) and (e) show a timeseries of the flux, calculated using equation (1); the arrows in 3b and 3d indicate the mean wind direction at each site. (Background image from Google Earth 2016)

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39   Figure S4: Emission Inventory (EPA, 2015) based on the July midday hourly emission rate

40   during which NH_3 emission is larger than during other hours. NH_3 (left), NO_2 (center), and C_2H_6

41   (right); the bold black lines in the top panel indicate the state borders with Colorado in the center;

42   the red dots in the middle and bottom panels indicate cattle and dairy farm locations, and the

43   black line the research drive track.