

Supplementary Information

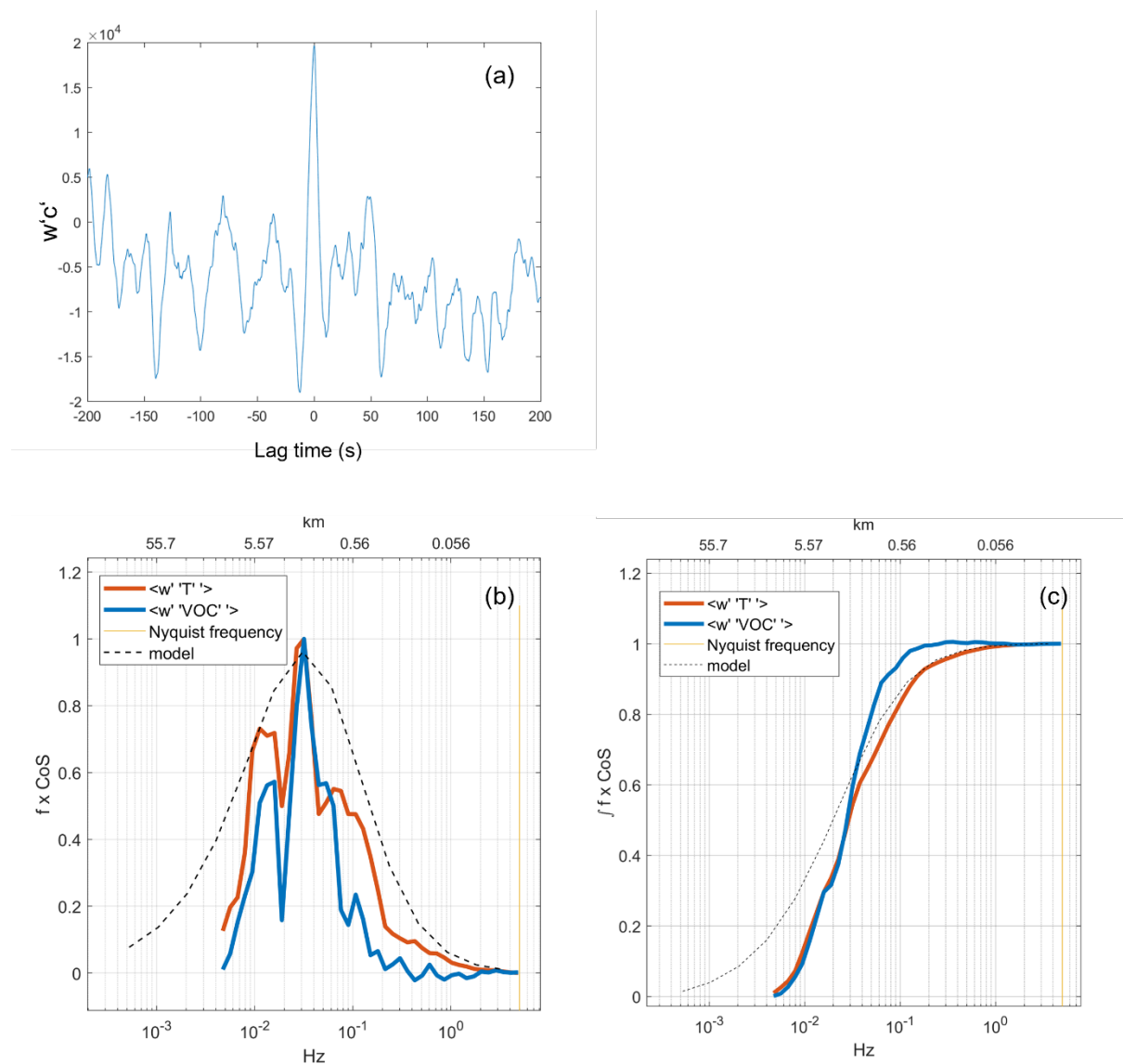


Figure S1: Spectral quality control. (a) Covariance peak for methanol (as an example for a sticky VOC) for one flight segment. (b) Cospectra for wind and temperature ($w'T''$), wind and C_3 -benzenes ($w'VOC''$), and from a cospectral model (Massman et al., 2005). The Nyquist frequency is half the sampling frequency. (c) Same as in b), but cumulative cospectra.

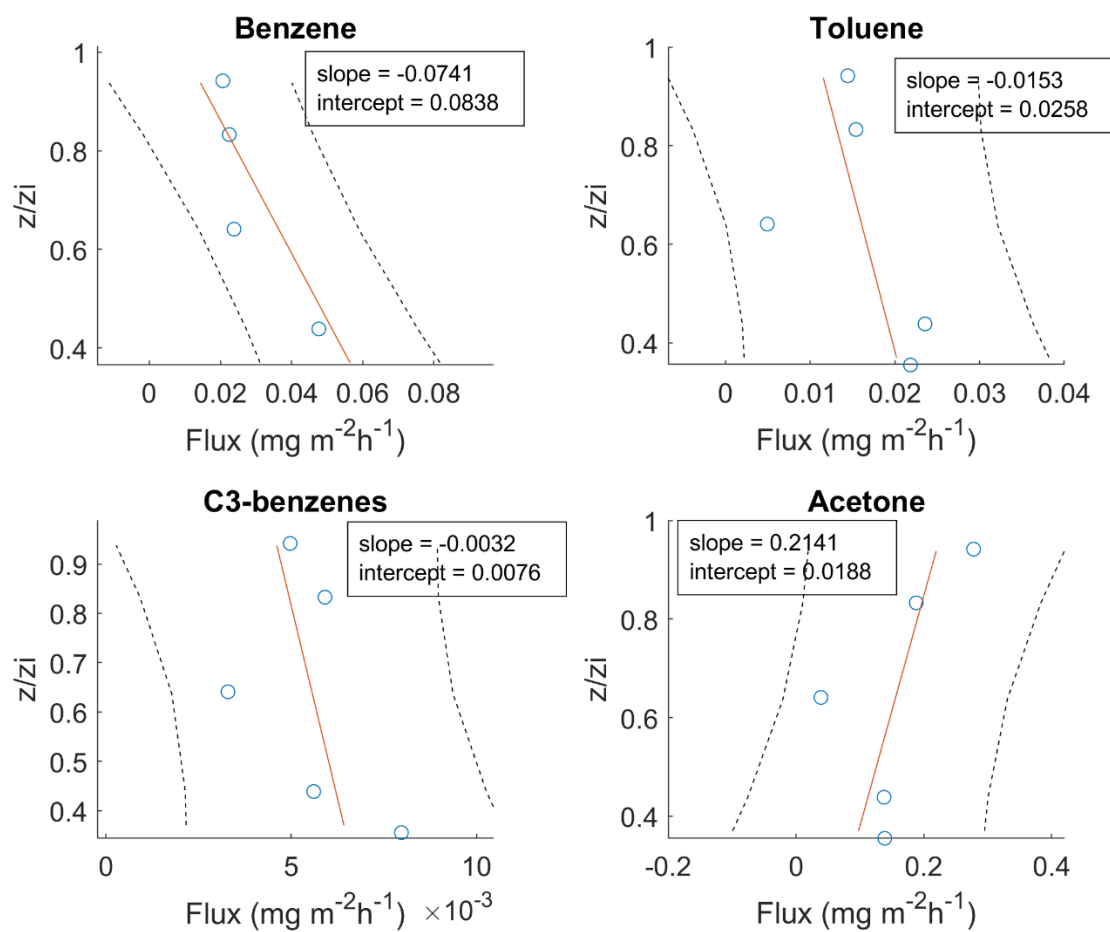


Figure S2: Physical vertical flux divergence for a selection of VOCs.

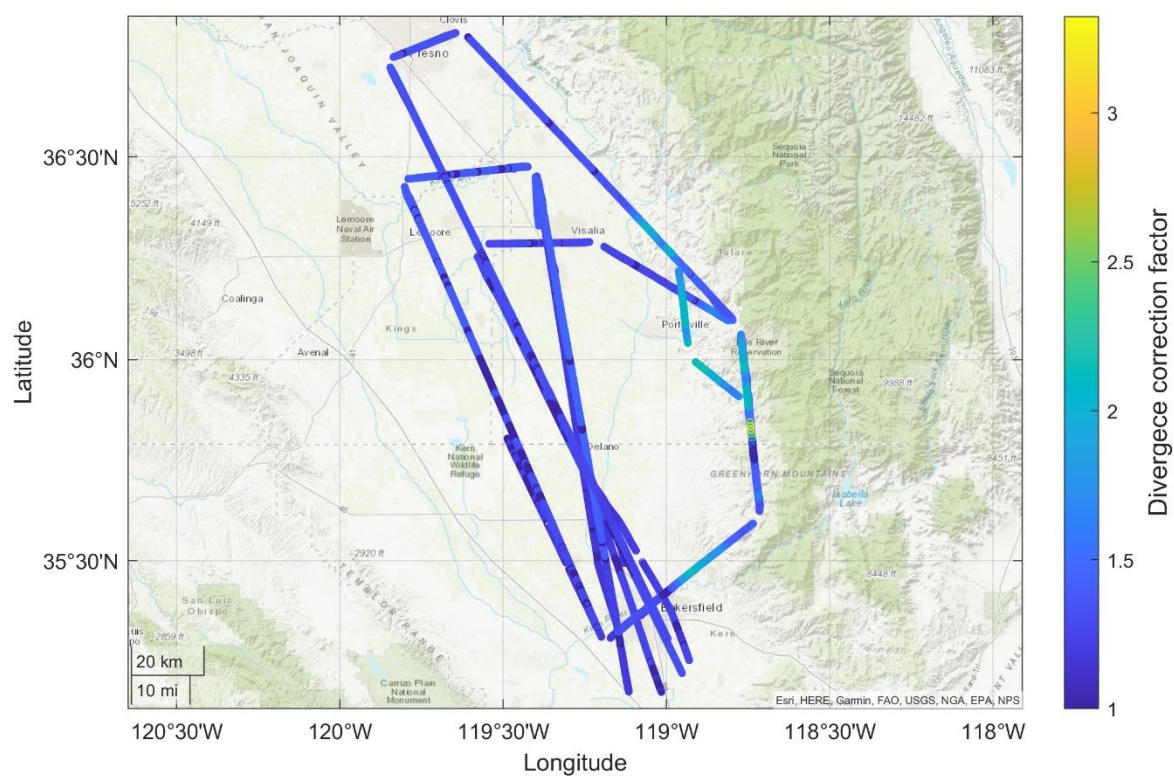


Figure S3: Size of the isoprene physical vertical divergence correction along the flight tracks.

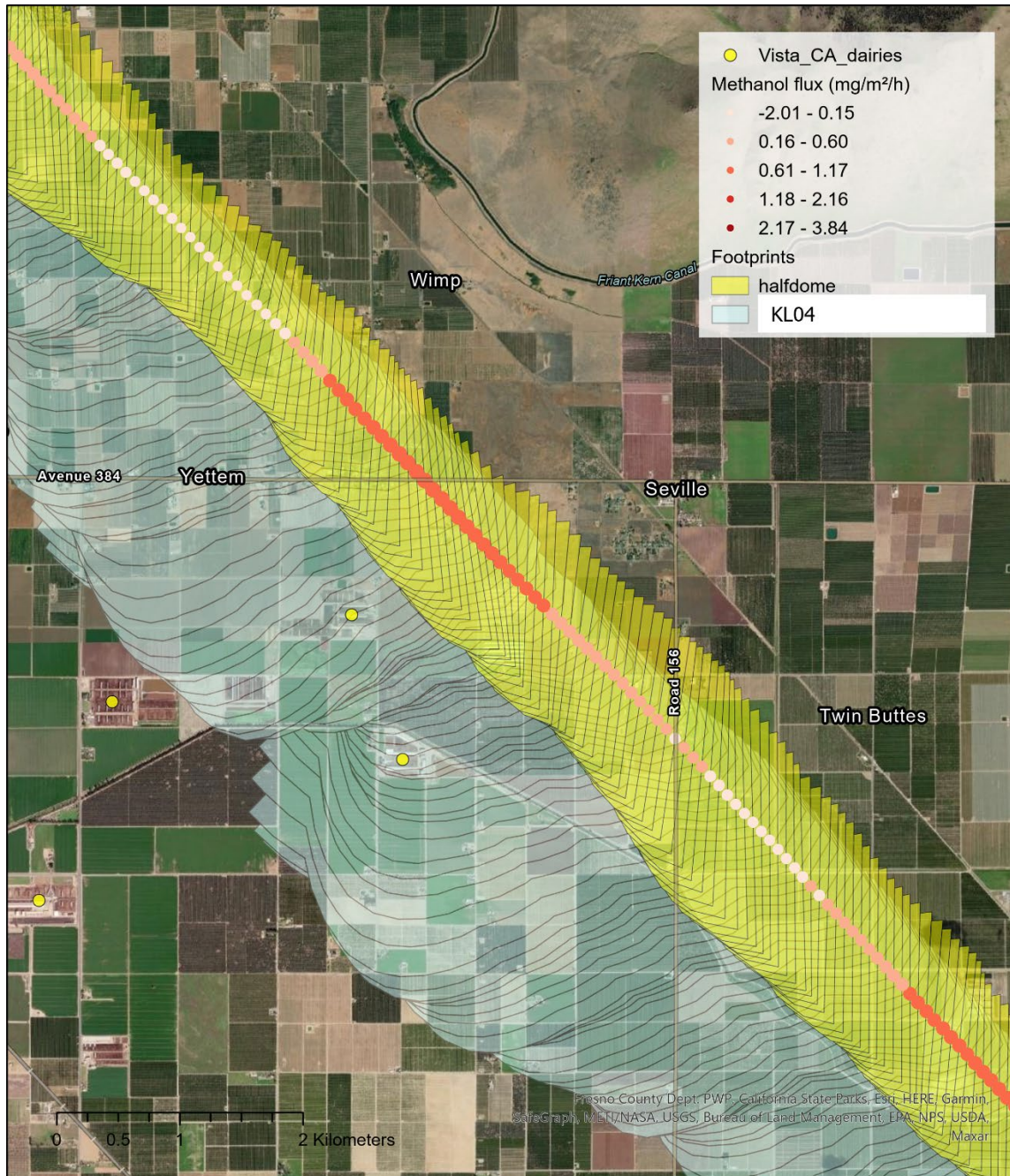


Figure S4: Footprint model comparison between KL04+2D and the half dome footprints (Weil and Horst, 1992). 90th percentile footprints calculated from both models shown. The increase in methanol flux seen in the flux measurements cannot be explained by the smaller half dome footprints (yellow), which do not contain the dairy farms. The KL04+ footprints (blue) contain the dairy farms which are most likely responsible for the methanol emission enhancement observed. Vista_CA_dairies: Dairy farm locations from Vista-CA inventory.

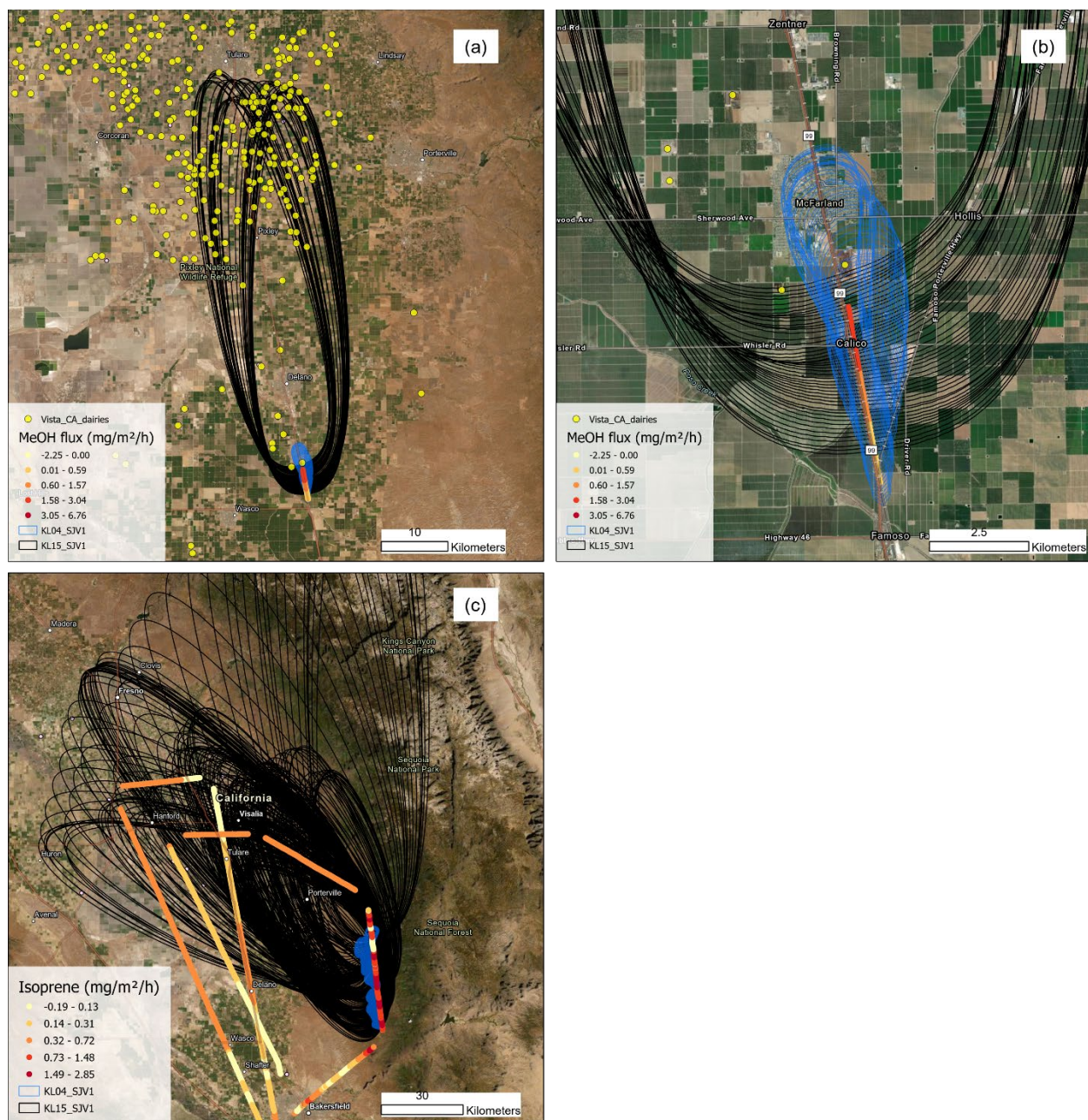


Figure S5: Footprint model comparison between KL04+2D and KL15. 90th percentile footprint contours shown. (a) The KL15 footprints (black) are extremely large, encompassing almost the entire study area, due to a bias that increases the footprint size strongly when the point of observation is close to the top of the boundary layer. (b) shows a zoom into the southern part of (a). The methanol emission increase observed can not be explained by the KL15 footprints, which always include the dairy farms, but the KL04+ footprints (blue) explain the flux increase well. (c) The strong isoprene fluxes observed in the Sierra Nevada foothills are explained well by the size of the KL04+ footprints, which contain almost exclusively the oak woodlands in the area with strong isoprene fluxes. The KL15 footprints are too large to explain the isoprene emissions observed. Vista_CA_dairies: Dairy farm locations from Vista CA inventory.



Figure S6: Swaths of dead oak trees in the Sierra Nevada foothills.

References

Massman, J. W., and Clement, R.: Uncertainty in eddy covariance flux estimates resulting from spectral attenuation [Chapter 4]: A Guide to Surface Flux Measurements, in: Handbook of Micrometeorology, edited by: Lee, X., Massman, W. J., and Law, B. E., Springer, Dordrecht, Netherlands, 39–71, 2005.

Weil, J. C. and Horst, T. W.: Footprint estimates for atmospheric flux measurements in the convective boundary layer, in:
Precipitation scavenging and atmosphere surface exchange: Proceedings of the Fifth International Conference on
Precipitation Scavenging and Atmosphere Surface Exchange Processes, Richland, Washington, 15 - 19 July 1991, edited by:
Schwartz, S. E., Hemisphere Publ. Co, Washington, 717–728, 1992.