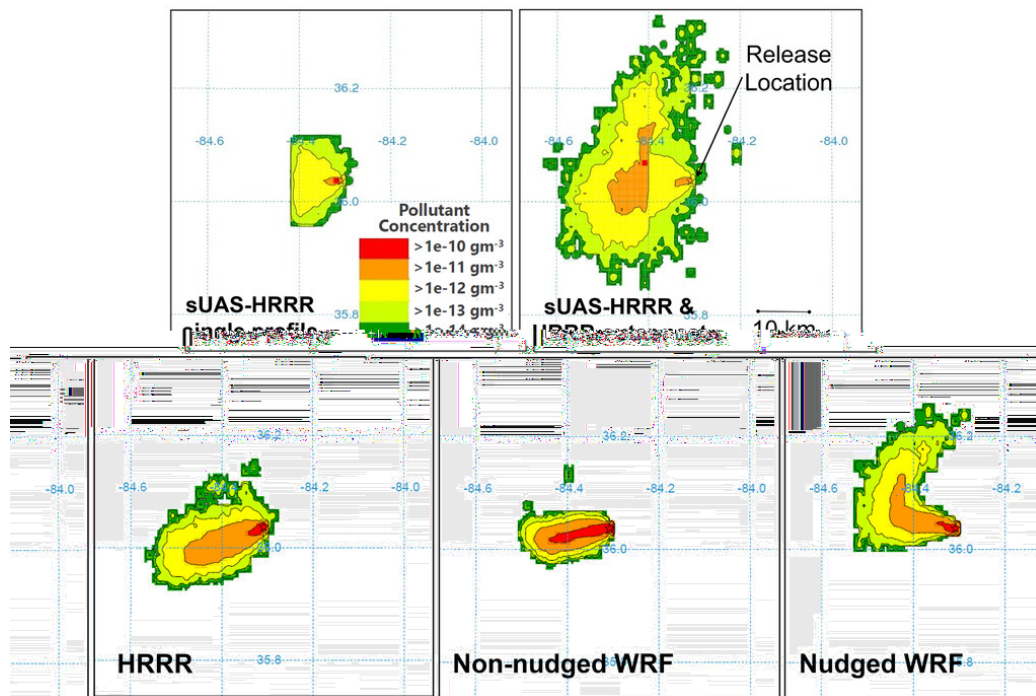


Air Resources Laboratory

Publications for Fiscal Year 2023



Spatial plots of HYSPLIT simulations using different meteorological data at 1500 UTC (top) 16 and (bottom) 18 Nov 2020 (g m⁻³).

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JAMC-D-22-0182.1



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Caldwell, T. G., Cosh, M. H., Evett, S. R., Edwards, N., Hofman, H., Illston, B. G., **Meyers, T.**, Skumanich, M., Sutcliffe, K. In situ Soil Moisture Sensors in Undisturbed Soils. *J. Vis. Exp.* (189), e64498, [doi:10.3791/64498](https://doi.org/10.3791/64498) (2022).

Crawford, A., Chai, T., Wang, B., Ring, A., **Stunder, B., Loughner, C. P.,** Pavolonis, M., and Sieglaff, J.: Evaluation and bias correction of probabilistic volcanic ash forecasts, *Atmos. Chem. Phys.*, 22, 13967–13996, <https://acp.copernicus.org/articles/22/13967/2022/>, 2022.

Gallo, K., & **Krishnan, P.** (2022). Evaluation of the Bias in the Use of Clear-Sky Compared with All-Sky Observations of Monthly and Annual Daytime Land Surface Temperature, *Journal of Applied Meteorology and Climatology*, 61(10), 1485-1495. Retrieved Dec 23, 2022, from <https://journals.ametsoc.org/view/journals/apme/61/10/JAMC-D-21-0240.1.xml>

Lee, D., **H.C. Kim,** J.-H. Jeong, B. Kim, D. Lee, J.-Y. Choi, M.Y. Song, and J.-H. Yoon: Relationship between Synoptic Weather Pattern and Surface Particulate Matter (PM) Concentration During Winter and Spring Seasons Over South Korea, *Journal of Geophysical Research: Atmospheres*, 127, e2022JD037517, <https://doi.org/10.1029/2022JD037517>, 2022

Pleim, J. E., Ran, L., **Saylor, R. D.,** Willison, J., and Binkowski, F. S. (2022). A New Aerosol Dry Deposition Model for Air Quality and Climate Modeling. *Journal of Advances in Modeling Earth Systems*, 14, e2022MS003050. <https://doi.org/10.1029/2022MS003050>

Tang, Y., Campbell, P. C., Lee, P., Saylor, R., Yang, F., **Baker, B., Tong, D., Stein, A.,** Huang, J., Huang, H.-C., Pan, L., McQueen, J., Stajner, I., Tirado-Delgado, J., Jung, Y., Yang, M., Bourgeois, I., Peischl, J., Ryerson, T., Blake, D., Schwarz, J., Jimenez, J.-L., Crawford, J., Diskin, G., Moore, R., Hair, J., Huey, G., Rollins, A., Dibb, J., and Zhang, X.: Evaluation of the NAQFC driven by the NOAA Global Forecast System (version 16): comparison with the WRF-CMAQ during the summer 2019 FIREX-AQ campaign, *Geosci. Model Dev.*, 15, 7977–7999, <https://doi.org/10.5194/gmd-15-7977-2022>, 2022.

Wulfmeyer, V., Pineda, J.M.V., Otte, S., Karlbauer, M, Butz, M., **Lee, T.R.,** and Rajtschan, V. Estimation of the Surface Fluxes for Heat and Momentum in Unstable Conditions with Machine Learning and Similarity Approaches for the LAFE Data Set. *Boundary-Layer Meteorol* (2022). <https://doi.org/10.1007/s10546-022-00761-2>

Zhang, R., Wang, Y., Li, Z., Wang, Z., Dickerson, R. R., **Ren, X.,** He, H., Wang, F., Gao, Y., Chen, X., Xu, J., Cheng, Y., and Su, H.: Vertical profiles of cloud condensation nuclei number concentration and its empirical estimate from aerosol optical properties over the North China Plain, *Atmos. Chem. Phys.*, 22, 14879–14891, <https://doi.org/10.5194/acp-22-14879-2022>, 2022.

Q2 FY2023

Bhattacharjee, P., Zhang, L., **Baker, B.,** Pan, L., Montuoro, R., Grell, G. and McQueen, J. (2023). Evaluation of Aerosol Optical Depth Forecasts from NOAA's Global Aerosol Forecast Model (GEFS-Aerosols). *Weather and Forecasting* 38(2) pp. 225-249. Available at: <https://journals.ametsoc.org/view/journals/wefo/38/2/WAF-D-22-0083.1.xml>

Dreessen, J., **X. Ren,** J. T. Sullivan, R. Delgado, R. R. Dickerson, **P. Stratton,** D. Gardner. K. Green, VOC and Trace Gas Measurements and Ozone Chemistry Over the Chesapeake Bay During OWLETS-2, 2018, *J. Air & Waste Manag. Assoc.*, 2023, DOI: 10.1080/10962247.2022.2136782.

Hartig, K., E. Tziperman, and **C. P. Loughner**, 2023: Processes Contributing to North American Cold Air Outbreaks Based on Air Parcel Trajectory Analysis. *J. Climate*, 36, 931–943, <https://doi.org/10.1175/JCLI-D-22-0204.1>.

Jena, C.; Zhang, Y.; Wang, K.; **Campbell, P.C.** Decadal Application of WRF/Chem under Future Climate and Emission Scenarios: Impacts of Technology-Driven Climate and Emission Changes on Regional Meteorology and Air Quality. *Atmosphere* 2023, 14, 225. <https://doi.org/10.3390/atmos14020225>

Jeong, G.-R.; **Baker, B.; Campbell, P.C.; Saylor, R.**; Pan, L.; Bhattacharjee, P.S.; Smith, S.J.; **Tong, D.; Tang, Y.** Updating and Evaluating Anthropogenic Emissions for NOAA's Global Ensemble Forecast Systems for Aerosols (GEFS-Aerosols): Application of an SO₂ Bias-Scaling Method. *Atmosphere* 2023, 14, 234. <https://doi.org/10.3390/atmos14020234>

Kim, E., B.-U.Kim, Y.-H.Kang, **H.C.Kim**, and S.Kim: Role of vertical advection and diffusion in long-range PM_{2.5} transport in Northeast Asia, *Environmental Pollution*, (320) 120997, [doi:10.1016/j.envpol.2022.120997](https://doi.org/10.1016/j.envpol.2022.120997)

Lee, Temple R., and Tilden P. Meyers. New Parameterizations of Turbulence Statistics for the Atmospheric Surface Layer, *Monthly Weather Review* 151, 1 (2023): 85-103, accessed Jan 6, 2023, <https://doi.org/10.1175/MWR-D-22-0071.1>

Li, Y., Tong, D., Ma, S., Freitas, S. R., Ahmadov, R., Sofiev, M., Zhang, X., Kondragunta, S., Kahn, R., Tang, Y., **Baker, B., Campbell, P., Saylor, R.,** Grell, G., and Li, F.: Impacts of estimated plume rise on PM_{2.5} exceedance prediction during extreme wildfire events: a comparison of three schemes (Briggs, Freitas, and Sofiev), *Atmos. Chem. Phys.*, 23, 3083–3101, <https://doi.org/10.5194/acp-23-3083-2023>, 2023.

Lichiheb, N., Hicks, B.B., **Myles, L.,** (2023). "An evaluation of meteorological data prediction over Washington, D.C.: Comparison of DCNet observations and NAM model outputs." *Urban Climate* 48: 101410. <http://doi.org/10.1016/j.uclim.2023.101410>

Ring, A. M., R. R. Dickerson, A. E. Sebol, **X. Ren**, S. E. Benish, R. J. Salawitch A. Galasyn, P. J. Miller, and T. P. Canty, Anthropogenic VOCs in the Long Island Sound, NY Airshed and their Role in Ozone Production, *Atmos. Environ.*, 296, 119583, 2023. <https://doi.org/10.1016/j.atmosenv.2023.119583>.

Tong, D., I. Feng, T. E. Gill, K. Schepanski, and **J. Wang**, 2023: How Many People Were Killed by Windblown Dust Events in the United States?. *Bull. Amer. Meteor. Soc.*, 104, E1067–E1084, <https://doi.org/10.1175/BAMS-D-22-0186.1>.

Watts, J. D., Farina, M., Kimball, J. S., Schiferl, L. D., Liu, Z., Arndt, K. A., Zona, D., Ballantyne, A., Euskirchen, E. S., Parmentier, F.-J., Helbig, M., Sonnentag, O., Tagesson, T., Rinne, J., Ikawa, H., Ueyama, M., Kobayashi, H., Sachs, T., Nadeau, D. F., **Kochendorfer, J.,** et al, (2023). Carbon uptake in Eurasian boreal forests dominates the high-latitude net ecosystem carbon budget. *Global Change Biology*, 00, 1– 20. <https://doi.org/10.1111/gcb.16553>

Wilson, T. B, Kochendorfer, J., Diamond, H. J., Meyers, T. P., Hall, M., French, B., Myles, L., & Saylor, R. D. (2022). A field evaluation of the SoilVUE10 soil moisture sensor. *Vadose Zone Journal*, 00, e220241. <https://doi.org/10.1002/vzj2.20241>

Adler, B., Wilczak, J. M., Bianco, L., Bariteau, L., Cox, C. J., de Boer, G., Djalalova, I., Gallagher, M.R., Intrieri, J.M., **Meyers, T.P.**, Myers, T.A., Olson, J.B., Pezoa, S., Sedlar, J., Smith, E., Turner, D.D., and White, A.B. (2023). Impact of seasonal snow-cover change on the observed and simulated state of the atmospheric boundary layer in a high-altitude mountain valley. *Journal of Geophysical Research: Atmospheres*, 128, e2023JD038497. <https://doi.org/10.1029/2023JD038497>

Campbell, P.C.; Jiang, W.; Moon, Z.; Zinn, S.; Tang, Y. NOAA's Global Forecast System Data in the Cloud for Community Air Quality Modeling. *Atmosphere* 2023, 14, 1110. <https://doi.org/10.3390/atmos14071110>

Chai, T., Ren, X., Ngan, F., Cohen, M., and Crawford, A.: Estimation of power plant SO₂ emissions using HYSPLIT dispersion model and airborne observations with plume rise ensemble runs, *EGUsphere* [preprint], <https://doi.org/10.5194/egusphere-2023-329>, 2023. <https://doi.org/10.5194/egusphere-2023-329>

Chappell A, Webb NP, Hennen M, Schepanski K, Ciais P, Balkanski Y, Zender CS, Tegen I, Zeng Z, **Tong D, Baker B**, Ekström M, Baddock M, Eckardt FD, Kandakji T, Lee JA, Nobakht M, von Holdt J, Leys JF. Satellites reveal Earth's seasonally shifting dust emission sources. *Sci Total Environ.* 2023 Jul 20;883:163452. doi: 10.1016/j.scitotenv.2023.163452.

Hall-Quinlan, DL, He, H., **Ren, X.**, Canty, TP, Salawitch, RJ., **Stratton, P.**, Dickerson, RR. Inferred vehicular emissions at a near-road site: Impacts of COVID-19 restrictions, traffic patterns, and ambient air temperature, *Atmospheric Environment*. V. 299, 2023, 119649, <https://doi.org/10.1016/j.atmosenv.2023.119649>.

Lee, T. R., R. D. Leeper, **T. Wilson, H. Diamond, T. P. Meyers**, and D. D. Turner, 2023: Identifying biases in near- and sub-surface meteorological fields in the High-Resolution Rapid Refresh (HRRR) weather prediction model. *Weather and Forecasting*, 38(6), 879-900, <https://doi.org/10.1175/WAF-D-22-0213.1>.

Nauth, D., **C. P. Loughner**, and M. Tzortziou, 2023: The Influence of Synoptic-Scale Wind Patterns on Column-Integrated Nitrogen Dioxide, Ground-Level Ozone, and the Development of Sea-Breeze Circulations in the New York City Metropolitan Area. *J. Appl. Meteor. Climatol.*, 62, 645–655, <https://doi.org/10.1175/JAMC-D-22-0145.1>.

Ngan, F., Loughner, C. P., Zinn, S., Cohen, M., Lee, T. R., Dumas, E., Schuyler, T. J., Baker, C. B., Maloney, J., Hotz, D., & Mathews, G., 2023: The Use of Small Uncrewed Aircraft System Observations in Meteorological and Dispersion Modeling. *Journal of Applied Meteorology and Climatology*, 62(7), 817-834. doi: <https://doi.org/10.1175/JAMC-D-22-0182.1>

Salinger M.J., **Diamond H.J.**, Bell J., Behrens E., Blair Fitzharris B., Herod N., McLuskie M., Parker AK., Ratz H., Renwick J., Scofield C., Shears NT., Smith RO., Sutton PJ. and Troigh MCT. Coupled ocean-atmosphere summer heatwaves in the New Zealand region: an update, *Weather and Climate*, 42, 2023

Sullivan, J. T., Stauffer, R. M., Thompson, A. M., Tzortziou, M. A., **Loughner, C. P.**, Jordan, C. E., & Santanello, J. A. (2023). Surf, turf, and above the Earth: Unmet needs for coastal air quality science in the planetary boundary layer (PBL). *Earth's Future*, 11, e2023EF003535. <https://doi.org/10.1029/2023EF003535>

Yorks, John E., Jun Wang, Matthew J. McGill, Melanie Follette-Cook, Edward P. Nowottnick, Jeffrey S. Reid, Peter R. Colarco, Jianglong Zhang, Olga Kalashnikova, Hongbin Yu, Franco Marengo, Joseph A. Santanello, Tammy M. Weckwerth, Zhanqing Li, James R. Campbell, Ping Yang, Minghui Diao, Vincent Noel, Kerry G. Meyer, James L. Carr, Michael Garay, Kenneth Christian, Angela Bennedetti, Allison M. Ring, **Alice Crawford**, Michael J. Pavolonis, Valentina Aquila, Jhoon Kim, and Shobha Kondragunta. "A SmallSat Concept to Resolve Diurnal and Vertical Variations of Aerosols, Clouds, and Boundary Layer Height", *Bull. Amer. Meteor. Soc.*, 104, E815–E836, <https://doi.org/10.1175/BAMS-D-21-0179.1>.

Q4 FY2023

Chen, D., Billmire, M., **Loughner, C.P.**, Bredder, A., French, N.H.F., **Kim, H-C.**, Loboda, T.V. 2023: Simulating spatio-temporal dynamics of surface PM2.5 emitted from Alaskan wildfires. *Science of The Total Environment*, 898, 165594, <https://doi.org/10.1016/j.scitotenv.2023.165594>.

Christopoulos, J., **Tong, D.**, **Campbell, P.C.**, Ma, S. 2023 Impacts of the COVID-19 economic slowdown on soybean crop yields in the United States. *Sci Rep* 13, 12574 (2023). <https://doi.org/10.1038/s41598-023-39531-6>

Hicks, B.B., **Lichihib, N.**, Eash, N.S., Oetting, J.N., **Pendergrass, W.R.**, On the transfer of dense gases from a forest sub-canopy into the wind field above, *Atmospheric Environment* (2023), doi: <https://doi.org/10.1016/j.atmosenv.2023.120056>

Joyce, E., Balint, S., Walters, W., **Lichiheb, N.**, **Heuer, M.**, **Myles, L.**, et al.(2023). Discerning the concentration and bi-directional flux of ammonia in an urban estuary using the relaxed eddy accumulation method. *Journal of Geophysical Research: Biogeosciences*, 128, e2023JG007414. <https://doi.org/10.1029/2023JG007414>

Lee, T. R., S. Pal, **P. Krishnan**, B. Hirth, **M. Heuer**, **T. P. Meyers**, **R. D. Saylor**, and J. Schroeder, 2023: On the efficacy of Monin-Obukhov and bulk Richardson surface-layer parameterizations over drylands. *Journal of Applied Meteorology and Climatology*, in press.

Tzortziou, M., **Loughner, C.P.**, Goldberg, D., Judd, L., **Nauth, D.** Intimately tracking NO2 pollution over the NYC - Long Island Sound land-water continuum: an integration of ship-board, airborne, satellite observations, and models. *Sci. Total Env.*, 897, 165144. <https://doi.org/10.1016/j.scitotenv.2023.165144>

Walker, J., Schroeder, J., **Campbell, P.C.**, **Saylor, R.** 2023: Fire emissions are an important source of atmospheric deposition to downwind ecosystems, *WMO Air Quality and Climate Bulletin*, 3. <https://library.wmo.int/viewer/62090>

Zhang, L., Montuoro, R., McKeen, S. A., **Baker, B.**, Bhattacharjee, P. S., Grell, G. A., Henderson, J., Pan, L., Frost, G. J., McQueen, J., **Saylor, R.**, Li, H., Ahmadov, R., Wang, J., Stajner, I., Kondragunta, S., Zhang, X., and Li, F.: Development and evaluation of the Aerosol Forecast Member in the National Center for Environment Prediction (NCEP)'s Global Ensemble Forecast System (GEFS-Aerosols v1), *Geosci. Model Dev.*, 15, 5337–5369, <https://doi.org/10.5194/gmd-15-5337-2022>, 2022.