



Air Quality Measurements in Ephraim, UT

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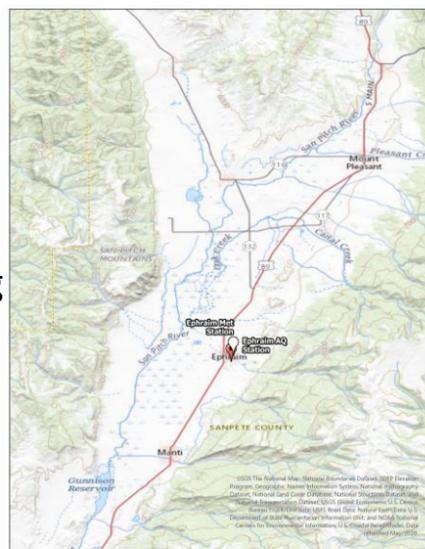
Introduction:

Standard Air Quality indicators: NO, NO_x, SO₂, CO, O₃ and PM_{2.5} were measured in Ephraim, Sanpete county, Utah from Dec 16, 2020 - Mar 6, 2021. The Air quality monitoring station was installed in December 2020 and is currently operating. Ephraim is located in a high mountain valley at 5541 feet elevation. Events of interest were evaluated using backtrajectories and wind rose analysis.

Experimental

The station was placed in Ephraim near to Snow College campus in December and we monitored the site and took measurements for O₃, (TECO-49i) NO_x(TECO 42i-TLE). CO (TECO 48i), SO₂ (TECO-43i-TLE, and PM_{2.5} (Sharp 5030). Met data was

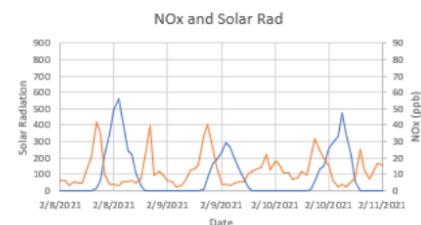
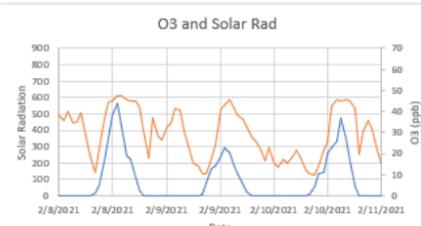
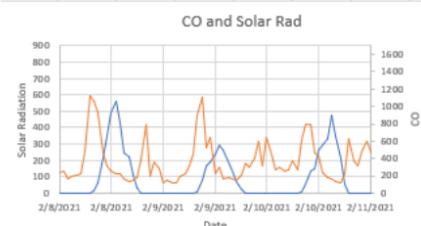
retrieved from the Mesowest portal. We went every couple of days to check on the station and make sure that the instruments were calibrating correctly. The instruments were background corrected (zero) weekly and calibrated monthly. The data was baseline corrected and then



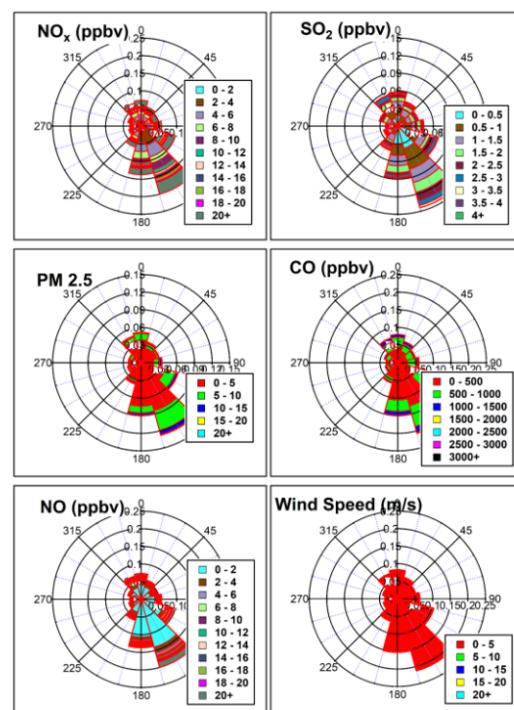
reviewed for quality control. Episodes of high or anomalous air quality indicators were evaluated using wind direction and HYSPLIT back-trajectories.

Results

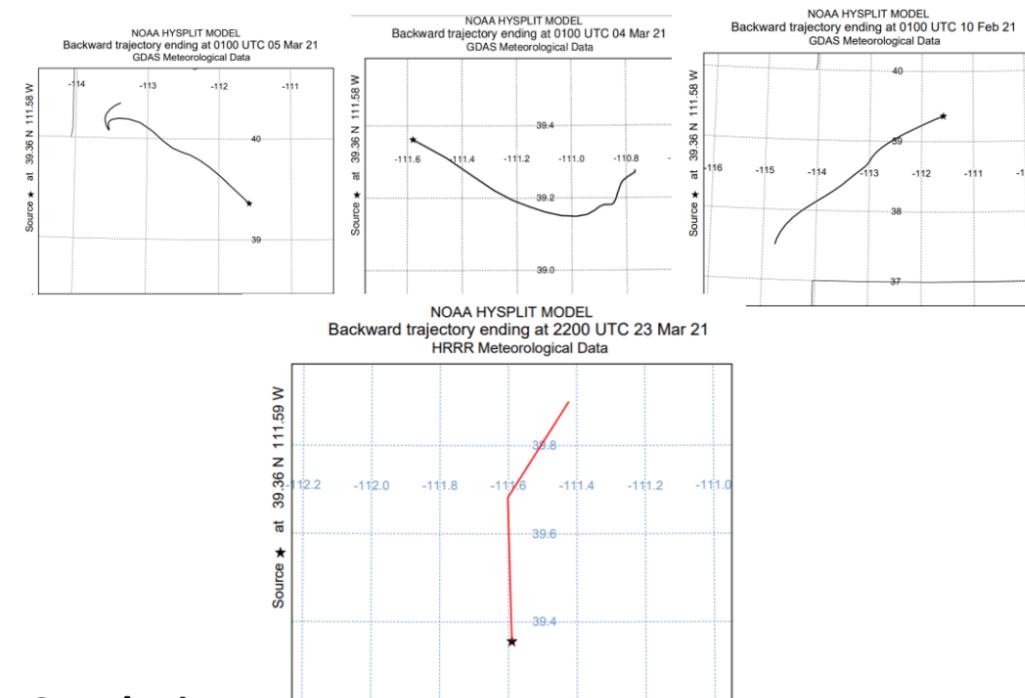
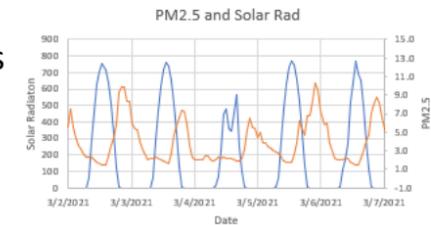
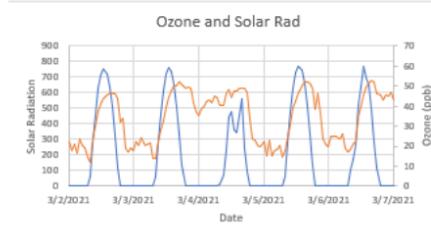
Wind-rose analysis (right) shows that the prevailing wind direction is SSE and that all of the measured species also have their highest values when winds are from the SSE as well.



February 10 (above) had some interesting combinations of species. A HYSPLIT back-trajectory was calculated for this day.



We also looked at March 5 which had high Ozone that did not decay overnight but normal PM_{2.5} in the air.



Conclusions:

Ephraim is in a rural area and has a clean air background. Most of the pollution that we find is coming into the valley from other places. Having a station in Ephraim allows us to see where the air is coming from and allows us to see the impact and solve the problem of the pollution that is bringing brought into Ephraim everyday.

Acknowledgements:

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References:

Horel, J., and Coauthors, 2002: MESOWEST: COOPERATIVE MESONETS IN THE WESTERN UNITED STATES. Bull. Amer. Meteor. Soc., 83, 211–226, [https://doi.org/10.1175/1520-0477\(2002\)083<0211:MCMITW>2.3.CO;2](https://doi.org/10.1175/1520-0477(2002)083<0211:MCMITW>2.3.CO;2). <https://www.ready.noaa.gov/hypub-bin/trajtype.pl>