SLO COUNTY apcd | Air Pollution Control District San Luis Obispo County

San Luis Obispo County Air Pollution Control District Review of September 2020 Scripps Report

Dated October 30, 2020

Executive Summary

The most recent preliminary Scripps Report was not designed to measure PM_{10}, the pollutant being regulated, and it used unproven measurement methods. The preliminary report does not alter the understanding of the dust issue on the Nipomo Mesa or undermine the previous studies that were conducted over the last decade by APCD, State Parks, DRI, and other independent researchers.

The Oceano Dunes dust issue is driven by the dozens of exceedances of the PM_{10} standard that occur each year downwind of the ODSVRA, yet the Scripps study measured $PM_{2.5}$, the standards for which are only rarely exceeded. Therefore, even if their samples had been collected using standard methods, the results would still only be of limited value.

Scripps collected their $PM_{2.5}$ samples using a novel sampler, which is not EPA-approved for $PM_{2.5}$ sampling and to our knowledge has never been tested; in fact, we are unaware of any other $PM_{2.5}$ studies using this method. Scripps's measurements are systematically lower than and correlate poorly with our measurements, which were made using industry-standard BAM monitors at the same site (the District's CDF monitoring station downwind of the ODSVRA). Scripps argues this discrepancy is due to water evaporating from their $PM_{2.5}$ filters prior to them being weighed by the EPA-approved gravimetric method. The District finds this explanation unlikely, since samples collected and weighed according to the full EPA-approved method generally show good correlation with collocated BAM measurements. The major difference between what Scripps did and the full EPA method is Scripps's sampling apparatus; their filter analysis was reportedly done according to the EPA protocol. Thus, the discrepancy between their $PM_{2.5}$ measurements and the District's is likely due to their sampling method. This may also explain why the Scripps speciation results are different from previous speciation studies of Oceano Dunes dust.

The District also identified several inconsistencies in the figures in the report. For example, from one figure to the next, the same samples are often depicted as starting at different times. One figure shows concentrations from the District's $PM_{2.5}$ BAM instrument, but some of the values depicted do not appear to match the values we measured.

Finally, the report fails to recognize the science of how OHV activity contributes to the dust issue, stating: "The association of high PM_{10} and $PM_{2.5}$ with high wind conditions, even when recreational vehicles were not allowed at Oceano Dunes, indicates that dune-derived mineral dust is more likely to be caused by natural forces (i.e. wind) rather than human activities," and "[T]he high dust concentrations measured on high wind days in and downwind of Oceano Dunes are likely dominated by natural saltation processes associated with the indigenous geomorphological dune structure." As the District has stated elsewhere, "it is not the dust kicked up by OHV activity (i.e. 'rooster tails') that causes poor air quality downwind, nor is it their tailpipe emissions. Rather, it is the secondary effects to vegetation and dune shapes that leads to greater wind erosion and more dust when the wind blows." And as the SAG noted in a letter shortly after the ODSVRA was closed to OHV activity, "decades of OHV activity have fundamentally altered the natural beach-dune landscape, making the dunes significantly more susceptible to PM emissions than they would be in a natural state. The SAG does not expect a few weeks or months of temporary OHV restrictions to substantially alter the balance of human versus natural contributions to PM emissions at ODSVRA."

Introduction and Background

The subject of this review is the "Scripps Report" released on September 23rd, titled "UCSD Supplemental Report 2020: Preliminary Results from May 2020 Aerosol Measurements."[1] Prof. Lynn Russell, the report's author, discussed its findings at the OHMVR Commission's meeting the following day.[2] The report describes sampling conducted at CDF and within the ODSVRA in April and May 2020.

The current report follows up on two previous reports, the most recent of which described sampling conducted in 2019 and is titled "First Year (2019) Summary Report: Investigation of Aerosol Particulates in a Coastal Setting, South San Luis Obispo County, California."[3] Members of the Scientific Advisory Group (SAG) and APCD staff previously reviewed that report, and the reviews are compiled in Attachment 7 of State Parks' 2020 Annual Report and Work Plan.[4] Those reviews noted several methodological and other issues with the study and its findings, and they provided suggestions for improving future sampling campaigns.

The first report in the series, "Marine Contributions to Aerosol Particulates in a Coastal Environment,"[5] described the results of DNA analysis of E-BAM filter tapes. While the report was touted in some circles as evidence that OHV activity is not the cause of the PM_{10} issue, the District did not find the study to be

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[1] L. Russell (2020). "UCSD Supplemental Report 2020: Preliminary Results from May 2020 Aerosol Measurements," September 20, 2020. Available online at https://ohv.parks.ca.gov/pages/1140/files/03-Scripps%20Report.pdf.
[2] Video of September 24 OHMVR Commission meeting—including Prof. Russell's presentation and responses to questions from Commissions—is available online at https://cal-span.org/unipage/?site=cal-span&owner=OHMVR&date=2020-09-24.
[3] L. Russell, M. Kahru, B. Palenik (2020). "First Year (2019) Summary Report: Investigation of Aerosol Particulates in a Coastal Setting, South San Luis Obispo County, California," February 21, 2020. Not online.
[4] State of California. Department of Parks and Recreation, Off-Highway Motor Vehicle Recreation Division (2020). "Oceano Dunes State Vehicular Recreation Area Dust Control Program 2020 Annual Report and Work Plan (Draft)," August 2020. Available online at https://storage.googleapis.com/slocleanair-org/images/cms/upload/files/2020%20Draft%20ARWP%208-1-2020%20w%20exhibits.pdf (main document) and https://storage.googleapis.com/slocleanair-org/images/cms/upload/files/2020%20ARWP%20Attachments%208-1-2020%20%28002%29.pdf (attachments).
[5] B. Palentik, M. Nagarkar (2018). "Report: Marine Contributions to Aerosol Particulates in a Coastal Environment," March 3, 2018. Not online.

relevant to the issue, as we described in a June 2019 FAQ[6] and a comment letter to State Parks.[7] The District also offered suggestions for how future investigations along the same lines could be made more relevant to the PM_{10} issue.

Relevance of $PM_{2.5}$ vis-à-vis PM_{10}

The dust issue in south San Luis Obispo County is a PM_{10} issue. The California PM_{10} standard is exceeded dozens of times per year on the Nipomo Mesa,[8] including on 51 occasions in 2019 at CDF. While some of these exceedances are due to wildfire smoke, regional dust transport, and other sources, the bulk are due to windblown dust from the ODSVRA. In contrast, exceedances of the $PM_{2.5}$ standards are rare (most years, including 2019, have none) and often occur in association with wildfires rather than windblown dust events.[8]

The latest Scripps study, like the last one, did not measure PM_{10} at CDF but instead measured $PM_{2.5}$. In her presentation to the OHMVR Commission, Prof. Russell explained that they focused on $PM_{2.5}$ because it is associated with more deleterious health impacts than PM_{10}. We agree that $PM_{2.5}$ is generally a greater health hazard than PM_{10}, but if the research goal is to inform the dust mitigation process (as it seems to be, since the study was commissioned by the OHMVR Division, paid for out of the OHV Trust Fund, and presented in this context), then sampling PM_{10} would have been far more informative. During windblown dust events, $PM_{2.5}$ is only about 21% of PM_{10}, and the chemical composition of the $PM_{10-2.5}$ fraction may be very different from the composition of the $PM_{2.5}$ fraction.

Several reviewers of the previous Scripps report made this same point.[4] In her presentation to the OHMVR Commission, Prof. Russell mentioned that they had also planned to conduct PM_{10} sampling at CDF this spring, but due to the global COVID-19 pandemic they were unable to. Nonetheless, they were able to accomplish other elements of their sampling plan, so clearly PM_{10} was not the priority.

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[6] SLOCAPCD (2019). "Response to Comments on the May 1st Workshop Version of the Draft Particulate Matter Reduction Plan Required by Stipulated Order of Abatement 17-01," June 12, 2019. Available online at https://storage.googleapis.com/slocleanair-org/images/cms/upload/files/Response%20to%20Comments_FINAL_PostedJune122019.pdf.

[7] Gary E Willey to Dan Canfield (2019). "California Department of Parks and Recreation's February 1, 2017 Oceano Dunes SVRA Concept Draft Particulate Matter Reduction Plan in Response to Stipulated Order of Abatement Number 17-01," February 25, 2019. Available online at: https://storage.googleapis.com/slocleanair-org/images/cms/upload/files/Feb%2025%202019%20APCD%20Response%20to%20SP-Feb%201%202019%20PMRP%20%28Signed%29%20%281%29.pdf

[8] SLOCAPCD (2019). "2018 Annual Air Quality Report," November 2019. Available online at https://storage.googleapis.com/slocleanair-org/images/cms/upload/files/2018aqrt-FINAL.pdf.

Evaporative Loss Does Not Explain the Discrepancy in $PM_{2.5}$ Mass

The Scripps researchers collected 26 multi-hour $PM_{2.5}$ filter samples at CDF, a short distance from the District's regulatory $PM_{2.5}$ monitor, which is a continuous BAM 1020 instrument. The report states that the "concentration measurements tracked reasonably well … and showed a moderate correlation (R2~0.7). [Scripps's] offline gravimetric method is 26% lower on average than the [the District's] online BAM instrument" and even lower (38%) during wind events. These results are plotted in Figure 2 of the report, shown below. The report argues that "[i]t is likely that the 38% difference in mass on high PM_{10} days is due to water evaporating, although other semi-volatile components (ammonium nitrate and organic mass) could also be included in the BAM method and not in the gravimetric method."

The District does not agree that evaporative loss is the likely cause of the discrepancy. While the gravimetric method is known to be subject to losses of water and semi-volatiles, the BAM 1020 instrument was designed to mimic this effect and thus produce comparable results. This was accomplished by incorporating an inlet heater which maintains the relative humidity of the incoming air flow at or below 35%. Through rigorous field trials at geographically diverse test sites around the county, the BAM 1020 was demonstrated to yield very comparable results to the established gravimetric method, and it was thus designated a Federal

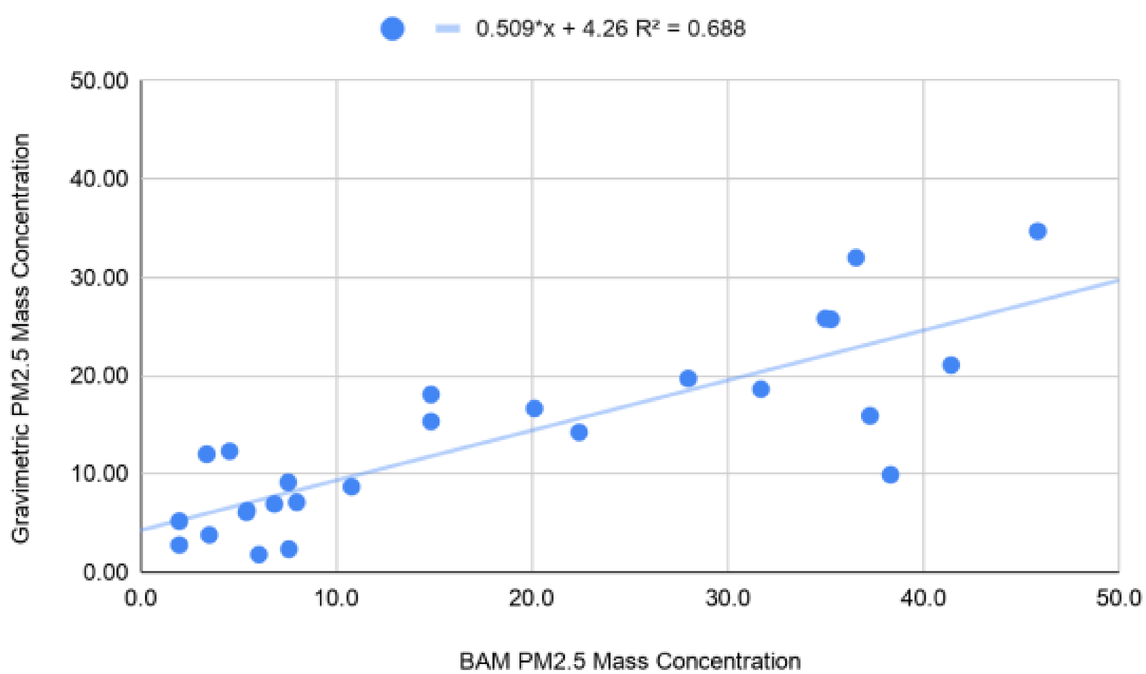
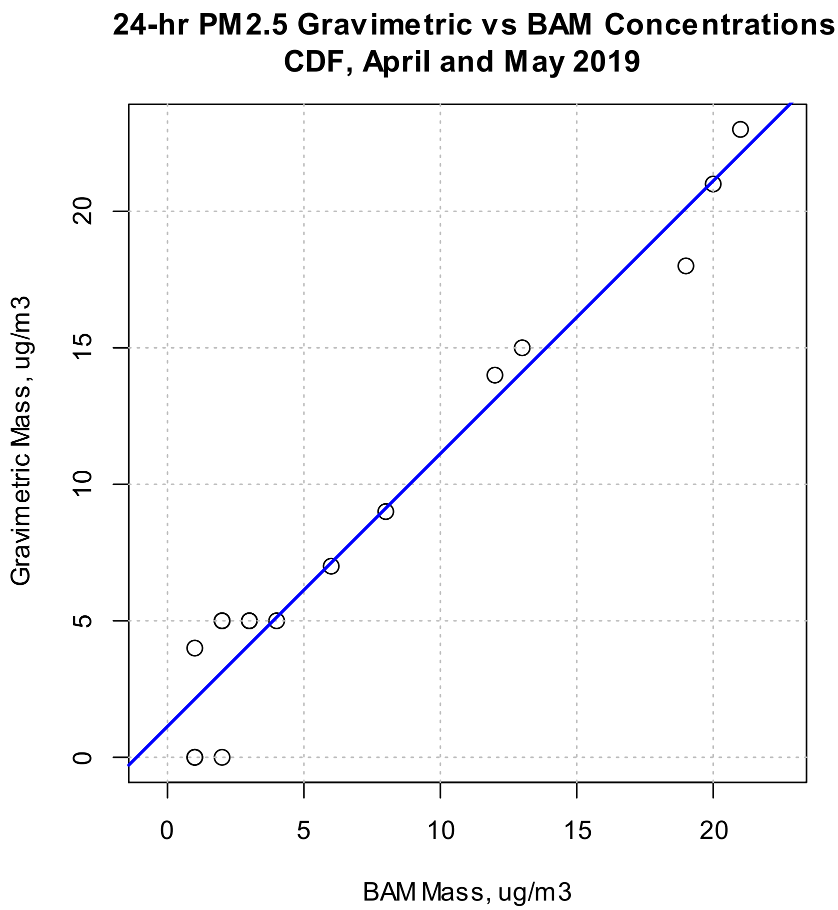


Figure 2. Scatter plot of PM2.5 mass concentrations [μg m^{-3}] by Gravimetric and BAM methods at CDF for sampling from 27 April to 17 May 2020. The fitted trendline indicates that the Gravimetric concentrations correlate to BAM concentrations with R^2=0.687.

Equivalent Method by the EPA.[9] Today, BAM 1020 instruments measure $PM_{2.5}$ at hundreds of regulatory sites across the United States.

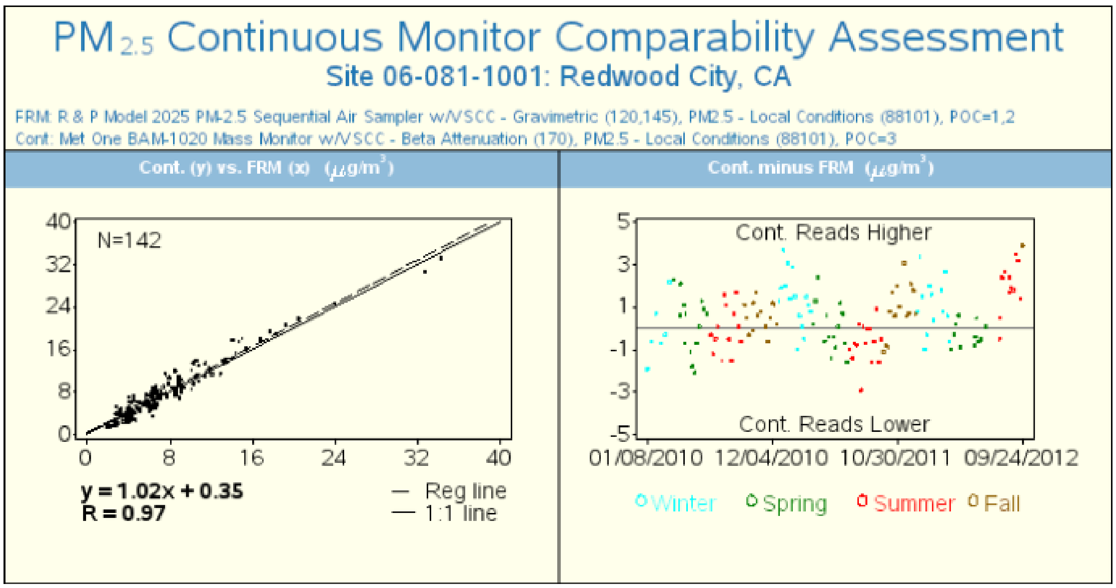
Numerous studies and trials have run BAM instruments alongside gravimetric samplers, and in general, these have shown much better correlation and much less bias than what Scripps reports. In fact, the District collocated a filter-based $PM_{2.5}$ sampler with the BAM 1020 at CDF in the spring of 2019, and the results are plotted below. Like the Scripps samples, these samples were weighed according to the EPA protocol.[10] For these data, the least squares fit (shown in blue) has slope = 0.999, intercept = 1.13, and R^2 = 0.955; the Scripps results are significantly poorer with slope = 0.509, intercept = 4.26, and R^2 = 0.688. The Scripps samples were shorter in duration (8 or 16 hours vs 24 hours), so somewhat more scatter is expected in their results; however, this difference in sample duration cannot account for the marked difference in R^2 values or for Scripps's low slope and high intercept.

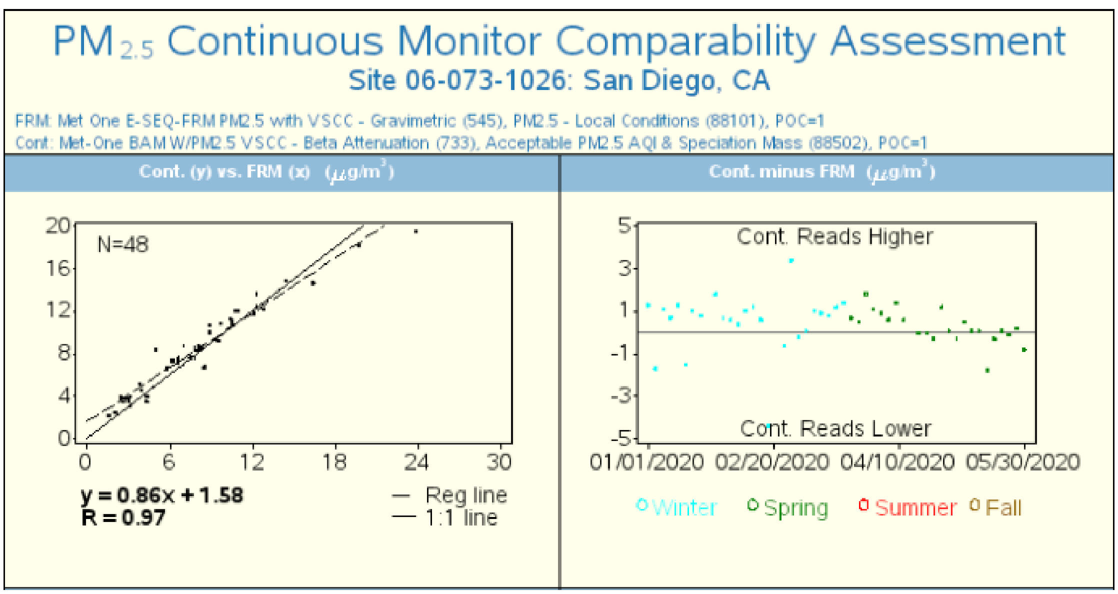


[9] Environmental Protection Agency, Office of Research and Development (2008). "Ambient Air Monitoring Reference and Equivalent Methods: Designation of One New Equivalent Method," 73 Fed. Reg. 13224, March 12, 2008. Available online at https://www.govinfo.gov/content/pkg/FR-2008-03-12/pdf/E8-4905.pdf.

[10] These are unpublished data. The BAM data are from the regulatory instrument at the site, and the gravimetric samples were collected with a Rupprecht & Pataschnick Partisol-FRM Model 2025i. Gravimetry was performed by the Bay Area Air Quality Management District according to the FRM method.

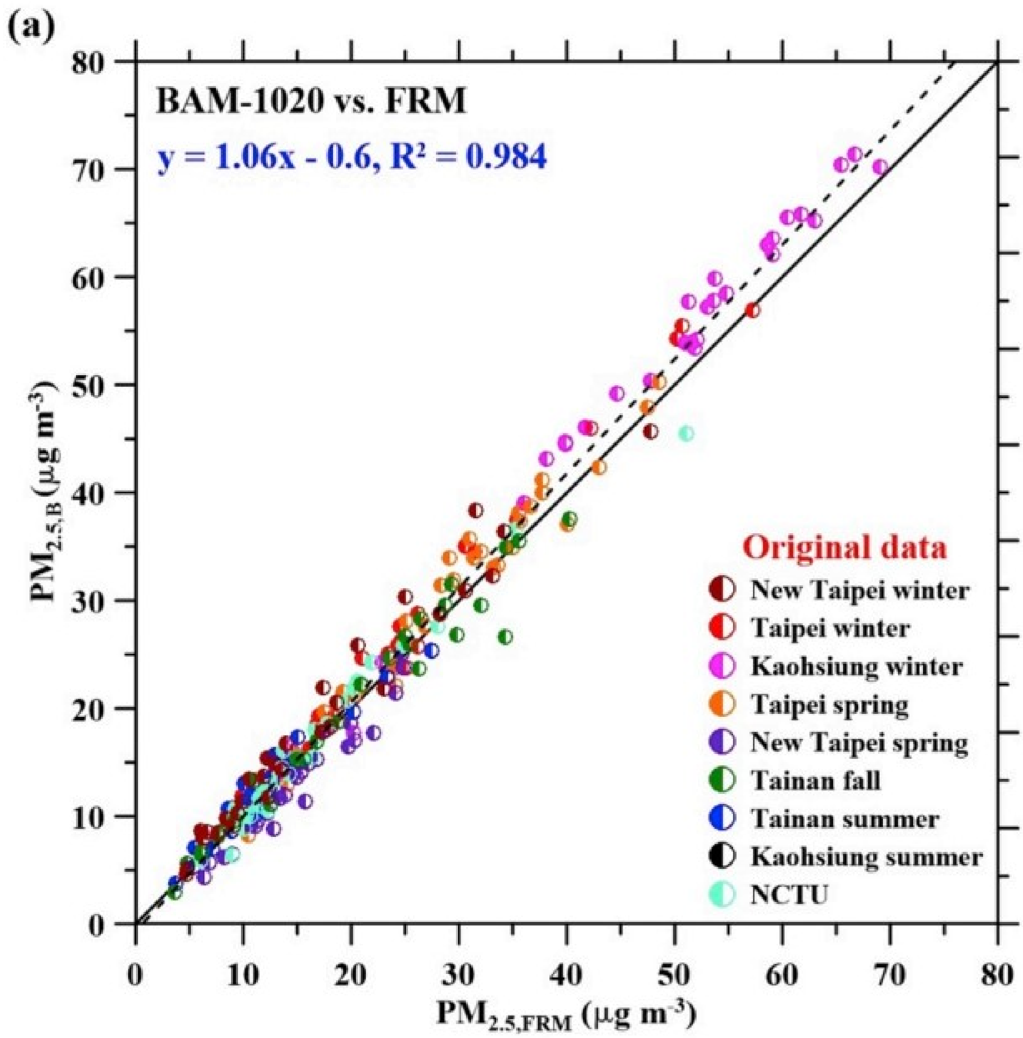
Other examples abound. For example, the EPA hosts a "PM2.5 Continuous Monitor Comparability Assessments" webpage which facilitates comparisons between collocated BAM and gravimetric monitors.[11] Shown below are plots comparing PM2.5 results from collocated BAM and gravimetric samplers in San Diego and Redwood City. These sites were chosen because, like CDF, they are coastal California sites hosting BAM monitors using VSCC cyclones (the same method used at CDF); however, unlike CDF they were operated independently of the District. The most recent year with available data is shown for each. Note that the axes are switched in these plots compared to how the data are presented in the figure above and Figure 2 of the Scripps report. These examples also show much better correlation and less bias than the Scripps results.





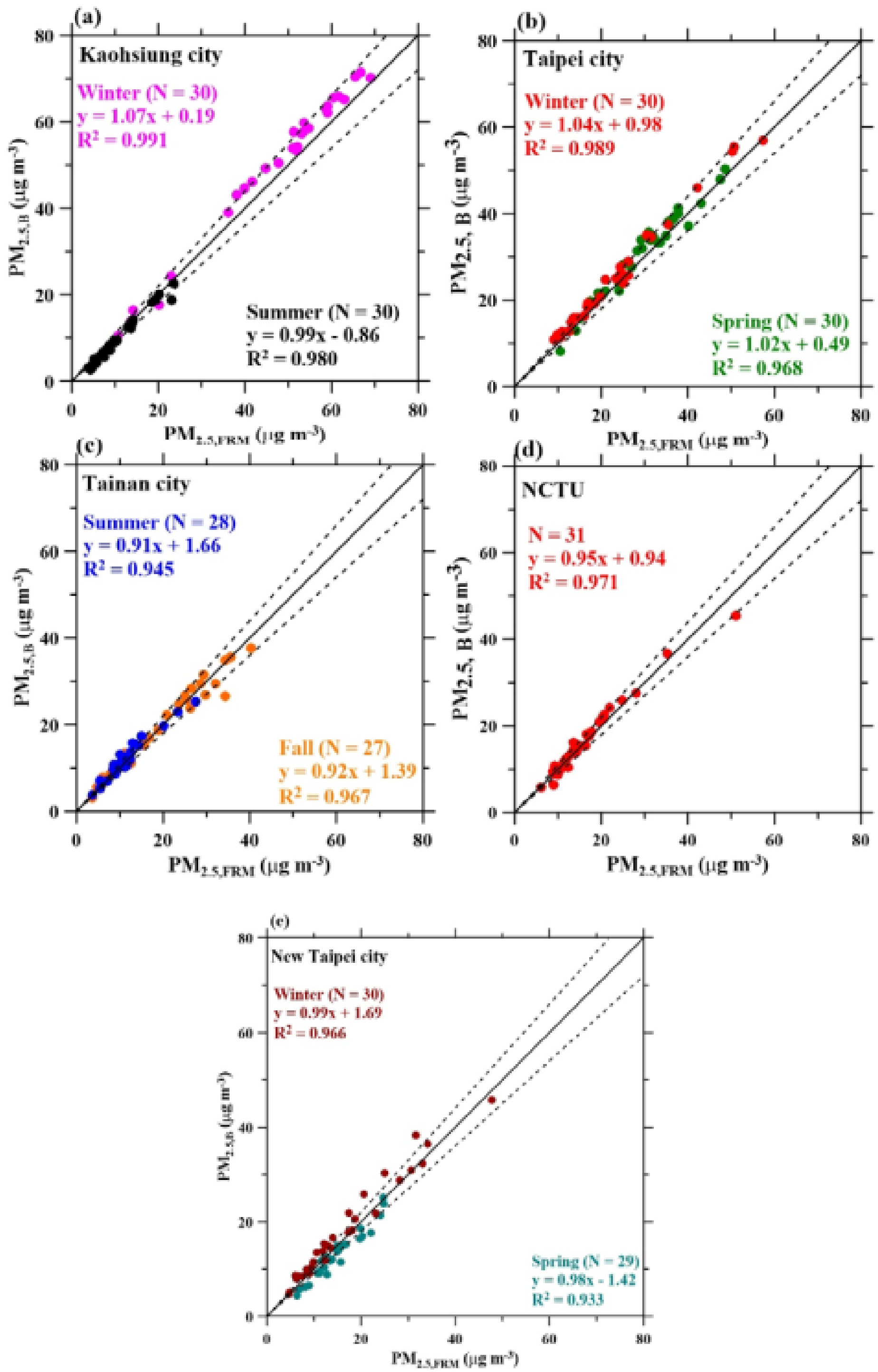
[11] Online at https://www.epa.gov/outdoor-air-quality-data/pm25-continuous-monitor-comparability-assessments. In browsing these assessments, care should be taken to ensure that the continuous monitor being assessed is a BAM-1020 with a VSCC rather than SCC.

A recent academic study, Le 2020,[12] investigated the differences between BAM and gravimetric $PM_{2.5}$ measurements in Taiwan. While the researchers did find systematic differences between collocated BAM and gravimetric measurements, which they attributed "mainly … to the aerosol water content," the bias they observed was much smaller than that reported by Scripps and more in line with the collocation studies mentioned above. Figure 2a from the study is shown below. It plots 24-hr $PM_{2.5}$ BAM concentrations from all sites in the study against the corresponding collocated gravimetric concentrations. As shown in the figure, the R^2 was 0.984, the slope was close to one and the intercept close to zero.



[12] T.-C. Le, K. K. Shukla, Y.-T. Chen, *et al.*, (2020). "On the concentration differences between PM2.5 FEM monitors and FRM samplers," Atmospheric Environment, 222, 117138. Available online at https://doi.org/10.1016/j.atmosenv.2019.117138.

Le 2020 found that differences between the BAM and gravimetric concentrations were influenced by ambient temperature and relative humidity, and that some sites had greater average differences than others. This is depicted in Figure S3 of the study's supplemental information, shown below. Even breaking the data down by site and season, all the individual correlations (as indicated by the *R^2* values) and biases (as indicated by the slopes and intercepts) are much better than those reported by Scripps.



Finally, if evaporative loss was the primary cause of the mass discrepancy, then we would expect the BAM masses to always exceed the gravimetric masses, or at least to only observe BAM masses less than gravimetric masses on days when the ambient relative humidity was less than 35% (the humidity level that the Scripps samples were equilibrated at prior to weighing, per the EPA protocol). This is not what is observed. According to Figure 1of the Scripps Report, there are at least 5 samples where the gravimetric mass exceeds the BAM measurement, but ambient relatively humidity did not vary much during the sampling campaign, and hourly average relative humidity was never less than 40%.

In summary, while evaporative loss is a known source of bias between BAM and gravimetric methods, this cannot explain the large difference between the Scripps gravimetric masses and the District's BAM measurements. Many researchers and regulators across the United States and around the world have run BAMs and gravimetric methods side by side and obtained much better correlations with much less bias.

The Discrepancy in $PM_{2.5}$ Mass is Likely Due to Scripps's Sampling Methodology

If evaporative loss does not explain the discrepancy in $PM_{2.5}$ mass between the District's measurements and Scripps's samples, then what does? The District believes sampling methodology is the most likely explanation—specifically differences in the $PM_{2.5}$ size separators and flow rates used by the District and Scripps. The District operates its BAM 1020 at CDF in full accordance with state and federal requirements, including the use if a BGI VSCC as the $PM_{2.5}$ size separator,[13] operated at a flow of 16.7 L/min. In contrast, Scripps employed a BGI SCC 2.229 operated at 7.5 L/min as their $PM_{2.5}$ size separator.[14] The SCC 2.229 was designed for sampling PM_1 at a flow rate of 16.7; while it can achieve a nominal 2.5 micron cut point when operated at 7.5 L/min,[15] it was not designed for $PM_{2.5}$ sampling and it is not a part of any EPA-approved $PM_{2.5}$ measurement method.[16]

As we wrote in our critique of the previous Scripps report, "These differences in methodology are not mere technicalities. While many cyclones can achieve a 2.5 micron cut point, only the VSCC operated at 16.7 lpm has been approved for regulatory sampling since other parameters in addition to the cut point are important. … [P]articulate sampling can be biased in windy conditions, but the EPA-approved methods have been shown to be unbiased in high wind conditions like those seen at CDF." The District suspects that Scripps's method is under sampling particulates from the ambient air, particularly when winds are high, and that this effect is much more important than evaporative loss in explaining why the gravimetric masses are consistently lower than the BAM masses. This is consistent with Scripps's observation that "[t]he gravimetric fraction of BAM $PM_{2.5}$ is lower at 62% on high PM_{10} afternoons [i.e. when winds are high] compared to 74% for all samples measured."

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[13] BGI, Inc. (2014). "VERY SHARP CUT CYCLONE VSCC® INSTRUCTIONS FOR USE AND MAINTENANCE." Available online at https://bgi.mesalabs.com/wp-content/uploads/sites/35/2014/10/vscc_manual.pdf.

[14] BGI, Inc. (2001). "SHARP CUT CYCLONE - SCC-2.229 FOR PM1 NSTRUCTIONS FOR USE AND MAINTENANCE." Available online at https://bgi.mesalabs.com/wp-content/uploads/sites/35/2014/10/SCC-2.229_PM1_MANUAL.pdf.

[15] BGI, Inc. (2014). "BGI Cyclone Selector Chart." Available online at https://bgi.mesalabs.com/wp-content/uploads/sites/35/2014/12/BGI_CycloneSelectorChart_2.pdf

[16] EPA (2020). "LIST OF DESIGNATED REFERENCE AND EQUIVALENT METHODS," June 15, 2020. Available online at https://www.epa.gov/sites/production/files/2019-08/documents/designated_reference_and-equivalent_methods.pdf.

The $PM_{2.5}$ method employed by the District is used at hundreds of regulatory sites across the United States and even more around the world. In contrast, we know of no examples of the use of the SCC 2.229 at 7.5 L/min for ambient $PM_{2.5}$ sampling, other than the recent Scripps studies at CDF. The District has requested the author to provide other examples, but we have not yet received any such examples.

Inconsistencies in the Scripps Report

In reviewing the Scripps Report, the District has noticed several inconsistencies in the figures:

- **Figures 1 & 3: Sample Dates of Gravimetric Masses.** Figure 1 is a timeseries plotting Scripps's gravimetric masses and E-BAM results along with the District's BAM measurements. Figure 3 is a timeseries plotting those same gravimetric masses along with the speciation results for "dust" and "salt". In both, the gravimetric masses are shown in green. Figure 1 shows data for 24 sampling periods, while Figure 3 shows data for 26, and each figure contains at least a couple samples not included in the other. It is not explained why some samples are included in one figure but not the other. More critically, **the same samples are shown as starting at different times in the figures.** For example, the first sample in Figure 1, which has a gravimetric mass about 10 µg/m³, is shown as starting in the afternoon of April 28th. In Figure 3, this same sample is show as starting on the

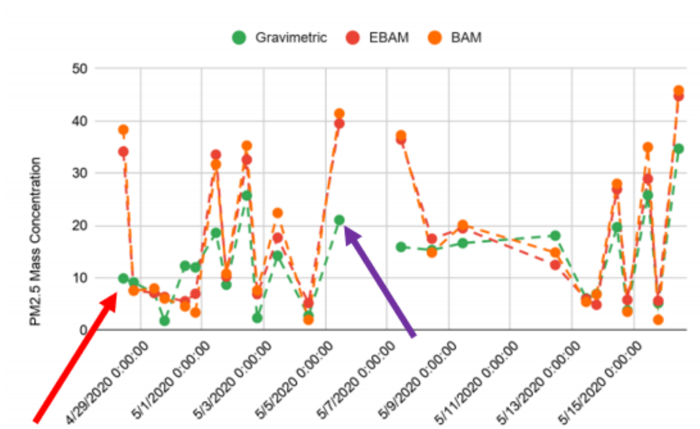

Figure 1. Time series of PM2.5 mass concentrations [µg m⁻³] by Gravimetric, EBAM, and BAM methods at CDF for sampling from 27 April to 17 May 2020.

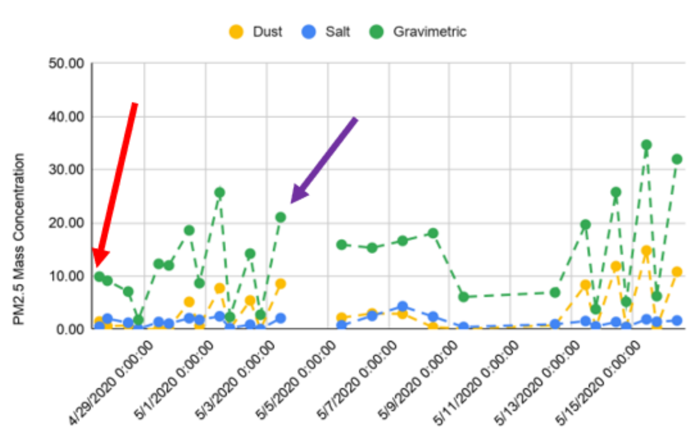

Figure 3. Time series of PM2.5 mass concentrations [µg m⁻³] for Dust, Salt and Gravimetric (total) concentrations at CDF for sampling from 27 April to 17 May 2020.

afternoon of April 27th. See red arrows in the figure above. Similarly, in Figure 1 the last sample before the discontinuity in the middle of the graph has a gravimetric mass of about 21 or 22 μg/m^3 and appears to start in the afternoon of May 5th. The corresponding sample in Figure 3 is shown as starting in the afternoon of May 3rd. (Purple arrows).

- **Figure 1: BAM Masses.** Values from the District's BAM at CDF are shown in orange in this figure and presumably they were downloaded from the CARB website; however, at least some of these values are incorrect. For example, the very first BAM concentration in Figure 1 is depicted as about 38 or 39 μg/m^3, but there are not six to eight consecutive hours on April 27th or 28th which average to this value. Similarly, the figure depicts a BAM value about 36 μg/m^3 for a sample starting on the afternoon of May 3, but there are not six to eight consecutive hours on May 2nd through 5th which average to this value.

- **Figure 2: Gravimetric Masses and R^2.** Figure 2 is a scatter plot of Scripps's gravimetric masses plotted against the District's BAM masses. Figure 1 shows only one sample in which the gravimetric mass exceeded 30 μg/m^3 yet Figure 2 shows two samples with gravimetric masses greater than 30 μg/m^3. Also, according the figure legend, the R^2 of the correlation is 0.688, but the caption says it 0.687.

- **Figure 5: Sample Dates.** According to the text, "[t]he Beach site was sampled from 28 April to 16 May 2020;" however, Figure 5 shows the first sample as starting on April 30th.

In addition to these inconsistencies with certain figures, we note that the report's References section lists 29 references, but only 13 of them are cited in the report.

Reconciling the Scripps Results with Previous Studies

The Scripps Study is not the first to speciate $PM_{2.5}$ samples collected downwind of the Oceano Dunes, and its results are inconsistent with previous studies. The District's "Phase 1 Study,"[17] speciated $PM_{2.5}$ samples collected at three sites in 2004 and 2005. While none were collected at CDF, the Bendita and Mesa2 sites were nearby. On days with high wind and high PM_{10} levels, speciation of $PM_{2.5}$ samples from these sites indicated that about half of the $PM_{2.5}$ mass was from crustal materials, consistent with being derived from sand or soil. On the day with the highest $PM_{2.5}$ mass in the study (May 9, 2004), 60 to 70% of the $PM_{2.5}$ mass at these sites was from crustal materials, and less than 20% was from sulfate, nitrate, and sea salt. In contrast, on non-windy days with low PM_{10} concentrations, the crustal contribution to $PM_{2.5}$ mass was low to nonexistent, and on an annual average basis, crustal materials contributed about 20 to 25% of $PM_{2.5}$ mass.

[17] SLOCAPCD (2007). "NIPOMO MESA PARTICULATE STUDY." Available online at https://storage.googleapis.com/slocleanair-org/images/cms/upload/files/APCD%20Exhibit%201%20-%20APCD_Phase1_SouthCountyPMStudy-2007%281%29.pdf.

The District's "Phase 2 Study,"[18] released in 2010, found similar results: "Elemental analysis from drum sampler data … showed a preponderance of earth crustal elements during episode periods, similar to the Phase 1 analysis; sea salt was also present in the samples."

When describing their elemental analysis results, the Scripps Study uses the term "dust", while the District studies use the term "crustal." Presuming these terms refer to the same thing—namely, particulates derived from sand and/or soil—the Scripps results are inconsistent with these previous studies. As discussed in the report, they found dust contributes only 20% of $PM_{2.5}$ mass on high wind days. In fact, these results appear to be at odds even with the previous Scripps Report, which reported that "[f]or those sample collection days in May 2019, when the BAM $PM_{2.5}$ exceeded 20 µg m-3, … dust [varied] from 4.1 to 14.4 µg m-3, corresponding to 26% to 46% of BAM $PM_{2.5}$."[3]

Miscellaneous Issues

- The cover letter states their results show "that it is incorrect to assume that all $PM_{2.5}$ measured at CDF monitors is mineral dust." The District has never assumed nor stated that 100% of $PM_{2.5}$ measured at CDF (or anywhere else) is dust. On the contrary and as discussed above, the District has published studies showing that non-crustal materials contribute to $PM_{2.5}$ mass at CDF even on windy days.

- The introduction states that "It is important to note that recreational vehicles were not allowed during this period because of COVID-19 restrictions that had been in place since March 2020." Later, in the conclusions it states, "The association of high PM_{10} and $PM_{2.5}$ with high wind conditions, even when recreational vehicles were not allowed at Oceano Dunes, indicates that dune-derived mineral dust is more likely to be caused by natural forces (i.e. wind) rather than human activities. … [T]he high dust concentrations measured on high wind days in and downwind of Oceano Dunes are likely dominated by natural saltation processes associated with the indigenous geomorphological dune structure."

  The author appears to misunderstand how OHV activity contributes to the high PM_{10} levels measured downwind of the ODSVRA. As the District has stated elsewhere, "it is not the dust kicked up by OHV activity (i.e. 'rooster tails') that causes poor air quality downwind, nor is it their tailpipe emissions. Rather, it is the secondary effects to vegetation and dune shapes that leads to greater wind erosion and more dust when the wind blows. It is true that without wind, there would be no significant dust, but changes to key vegetation areas and dune structures caused by OHVs result in more sand movement and more dust emissions when the wind blows."[19]

  The ODSVRA closed to OHV activity on March 27th, just one month before Scripps began sampling,

[18] SLOCAPCD (2010). "SOUTH COUNTY PHASE 2 PARTICULATE STUDY," February 2010. Available online at https://storage.googleapis.com/slocleanair-org/images/cms/upload/files/PM2-final_report_with_appendices.pdf.
[19] SLOCAPCD (2020). "Frequently Asked Questions: Air Quality and the Temporary Closure of Oceano Dunes," June 30, 2020. Available online at https://storage.googleapis.com/slocleanair-org/images/cms/upload/files/June2020FAQ-42.pdf.

so it unlikely that surface emissivity during their study differed significantly from when OHV activity is allowed. As the SAG noted in a letter dated April 5th, "decades of OHV activity have fundamentally altered the natural beach-dune landscape, making the dunes significantly more susceptible to PM emissions than they would be in a natural state. The SAG does not expect a few weeks or months of temporary OHV restrictions to substantially alter the balance of human versus natural contributions to PM emissions at ODSVRA."[20]

Additionally, if—as the Scripps Report seems to suggest—the dust downwind of the ODSVRA is simply a natural phenomenon unrelated to the long history of OHV activity, this does not explain the observed spatial pattern of PM_{10} in the region. Specifically, the PM_{10} levels observed downwind of the riding area of the ODSVRA (i.e. at the CDF and Mesa2 monitoring stations) are systematically higher than the levels observed downwind of non-riding areas (i.e. at the District's current Oso Flaco site or previous Morro Bay site.)[8,21] This pattern was also documented in the District's "South County Community Monitoring Project" [22] which blanketed the Nipomo Mesa in PM_{10} samplers, as well as in the previously mentioned Phase 1 and Phase 2 studies.[17,18]

- The report discusses 7 PM_{10} samples collected at the "Beach" site, and states that the collocated gravimetric and E-BAM samples showed a moderate correlation. As discussed in the report for the South County Community Monitoring Project,[22] E-BAMs are known to be biased when sampling PM_{10}. Therefore, both District and State Parks have always applied an empirical correction factor to PM_{10} E-BAM data. No correction factor seems to have been applied by Scripps to their E-BAM data.

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[20] Scientific Advisory Group, "Memo: SAG comments on the temporary closure of Oceano Dunes State Vehicular Recreation Area (ODSVRA) and impacts on particulate matter (PM) emissions," April 6, 2020. Available online at https://storage.googleapis.com/slocleanair-org/images/cms/upload/files/SAG%20Letter.pdf.

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