

Supplementary Materials: In-Situ Drift Correction for a Low-cost NO₂ Sensor Network

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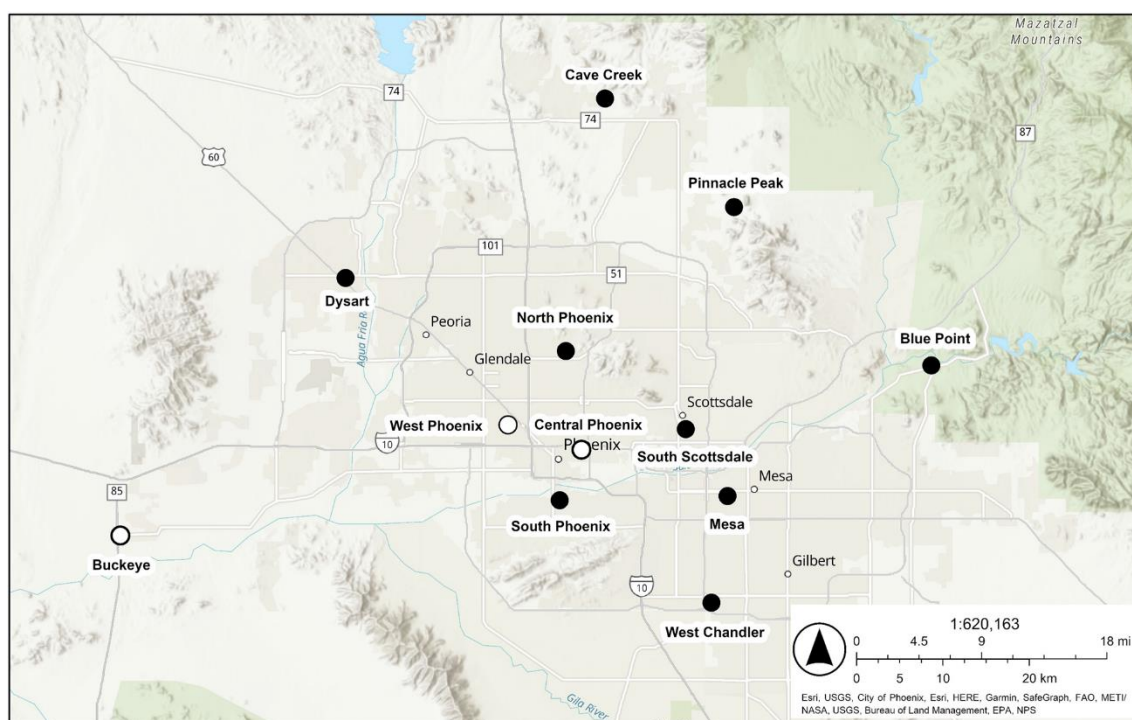


Figure S1. Map of deployment locations (black circles) for the low-cost NO₂ sensors. All sites have O₃ FRMs and sites in white have NO₂ FRMs and were used for routine calibration verification.

Sensor #	Site	Start Date	End Date
5	West Phoenix	4/28/2021 8:25	5/17/2021 7:43
2	West Phoenix	5/17/2021 12:28	5/28/2021 8:19
8	West Phoenix	5/28/2021 12:12	6/15/2021 6:10
11	West Phoenix	6/15/2021 10:23	6/28/2021 8:01

5	West Phoenix	6/28/2021 12:47	7/9/2021 7:50
2	West Phoenix	7/9/2021 11:25	7/27/2021 10:05
8	West Phoenix	7/27/2021 10:06	8/6/2021 7:46
11	West Phoenix	8/6/2021 12:14	8/19/2021 7:42
5	West Phoenix	8/19/2021 11:13	9/3/2021 9:43
2	West Phoenix	9/3/2021 9:44	9/17/2021 7:42
8	West Phoenix	9/17/2021 11:56	10/1/2021 10:46
4	Central Phoenix	4/28/2021 9:42	5/17/2021 7:19
1	Central Phoenix	5/17/2021 12:03	5/28/2021 7:54
7	Central Phoenix	5/28/2021 11:15	6/15/2021 7:04
10	Central Phoenix	6/15/2021 9:53	6/28/2021 7:32
4	Central Phoenix	6/28/2021 12:19	7/9/2021 7:28
1	Central Phoenix	7/9/2021 10:32	7/27/2021 7:06
7	Central Phoenix	7/27/2021 9:42	8/6/2021 7:25
10	Central Phoenix	8/6/2021 11:49	8/19/2021 7:20
4	Central Phoenix	8/19/2021 10:24	9/3/2021 6:50
1	Central Phoenix	9/3/2021 9:20	9/17/2021 7:20
7	Central Phoenix	9/17/2021 11:34	10/4/2021 7:22
6	Buckeye	4/28/2021 12:22	5/17/2021 8:30
3	Buckeye	5/17/2021 8:31	5/28/2021 9:05
9	Buckeye	5/28/2021 9:06	6/15/2021 11:06
12	Buckeye	6/15/2021 11:07	6/28/2021 8:51
6	Buckeye	6/28/2021 8:52	7/9/2021 8:37
3	Buckeye	7/9/2021 8:38	7/27/2021 10:49
9	Buckeye	7/27/2021 10:50	8/6/2021 8:30
12	Buckeye	8/6/2021 8:31	8/19/2021 8:29
6	Buckeye	8/19/2021 8:30	9/3/2021 10:31
3	Buckeye	9/3/2021 10:32	9/17/2021 8:26
9	Buckeye	9/17/2021 8:27	10/1/2021 10:03
10	Blue Point	4/29/2021 11:39	6/15/2021 8:57
7	Blue Point	6/15/2021 9:03	7/27/2021 8:50
1	Blue Point	7/27/2021 8:58	9/3/2021 8:30
4	Blue Point	9/3/2021 8:35	10/4/2021 9:20
1	Cave Creek	4/29/2021 8:41	5/17/2021 9:53
4	Cave Creek	5/17/2021 10:01	6/28/2021 10:18
10	Cave Creek	6/28/2021 10:23	8/6/2021 9:55
7	Cave Creek	8/6/2021 10:02	9/17/2021 9:40
1	Cave Creek	9/17/2021 9:50	10/1/2021 8:28
7	Dysart	4/28/2021 13:12	5/28/2021 9:54
1	Dysart	5/28/2021 9:55	7/9/2021 9:20
4	Dysart	7/9/2021 9:21	8/19/2021 9:12
10	Dysart	8/19/2021 9:13	10/1/2021 9:16
11	Mesa	4/29/2021 12:23	6/15/2021 7:44
8	Mesa	6/15/2021 7:45	7/27/2021 7:35
2	Mesa	7/27/2021 11:51	9/3/2021 7:23

5	Mesa	9/3/2021 11:32	10/4/2021 8:11
8	North Phoenix	4/28/2021 9:06	5/28/2021 10:45
2	North Phoenix	5/28/2021 10:46	7/9/2021 10:06
5	North Phoenix	7/9/2021 10:07	8/19/2021 10:00
11	North Phoenix	8/19/2021 10:01	10/1/2021 7:04
2	Pinnacle Peak	4/29/2021 9:31	5/17/2021 10:40
5	Pinnacle Peak	5/17/2021 10:41	6/28/2021 11:03
11	Pinnacle Peak	6/28/2021 11:05	8/6/2021 10:40
8	Pinnacle Peak	8/6/2021 10:43	9/17/2021 10:28
2	Pinnacle Peak	9/17/2021 10:31	10/1/2021 7:48
9	South Phoenix	4/28/2021 10:17	5/28/2021 7:29
3	South Phoenix	5/28/2021 11:43	7/9/2021 7:02
6	South Phoenix	7/9/2021 10:58	8/19/2021 6:57
12	South Phoenix	8/19/2021 10:47	10/4/2021 6:59
3	South Scottsdale	4/29/2021 10:26	5/17/2021 6:55
6	South Scottsdale	5/17/2021 11:37	6/28/2021 7:03
12	South Scottsdale	6/28/2021 11:46	8/6/2021 6:56
9	South Scottsdale	8/6/2021 11:21	9/17/2021 6:53
3	South Scottsdale	9/17/2021 11:08	10/4/2021 7:51
12	West Chandler	4/28/2021 11:09	6/15/2021 8:09
9	West Chandler	6/15/2021 12:15	7/27/2021 7:56
3	West Chandler	7/27/2021 12:13	9/3/2021 7:42
6	West Chandler	9/3/2021 11:55	10/4/2021 8:33

Table S1. Summary of sensor locations and start & end dates for FRM NO₂ & FEM O₃ sites.

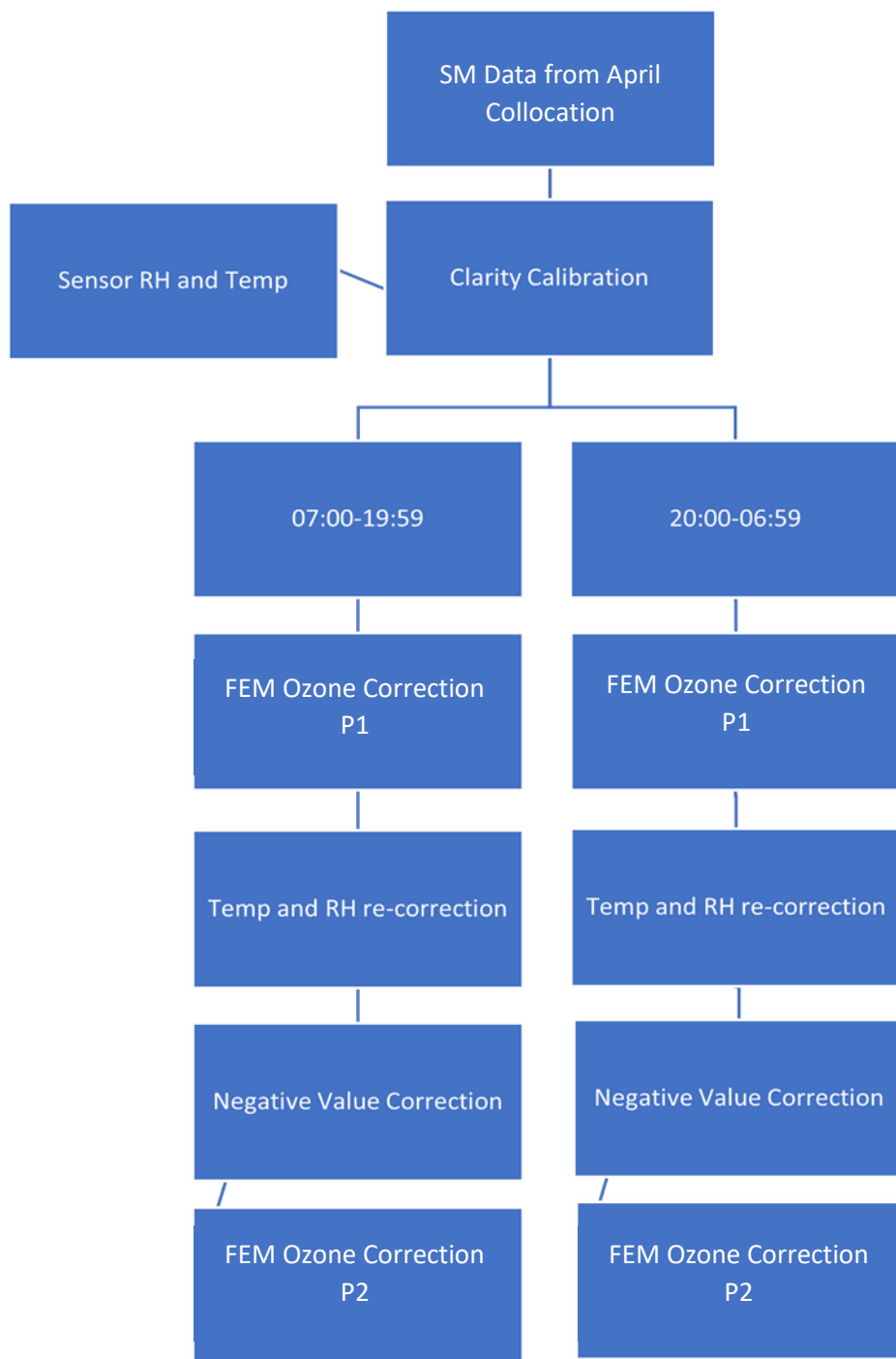


Figure S2. Overview of Model 1.0 calibration process.

Sensors	Period 1	Period 2	Period 3	Period 4
1, 2, 3	04/12-04/28, 05/17-05/28	05/17-05/28, 07/09-07/27	07/09-07/27, 09/03-09/17	09/03-09/17, 10/01-10/19
4, 5, 6	04/28-05/17, 06/28-07/09	06/28-07/09, 08/19-09/03	08/19-09/03, 10/01-10/19	N/A
7, 8, 9	04/12-04/28, 05/28-06/15	05/28-06/15, 07/27-08/06	07/27-08/06, 09/17-10/01	N/A
10, 11, 12	04/12-04/28, 06/15-06/28	06/15-06/28, 08/06-08/19	08/06-08/19, 10/01-10/19	N/A

Table S2. Summary of calibration period intervals for the twelve sensors.

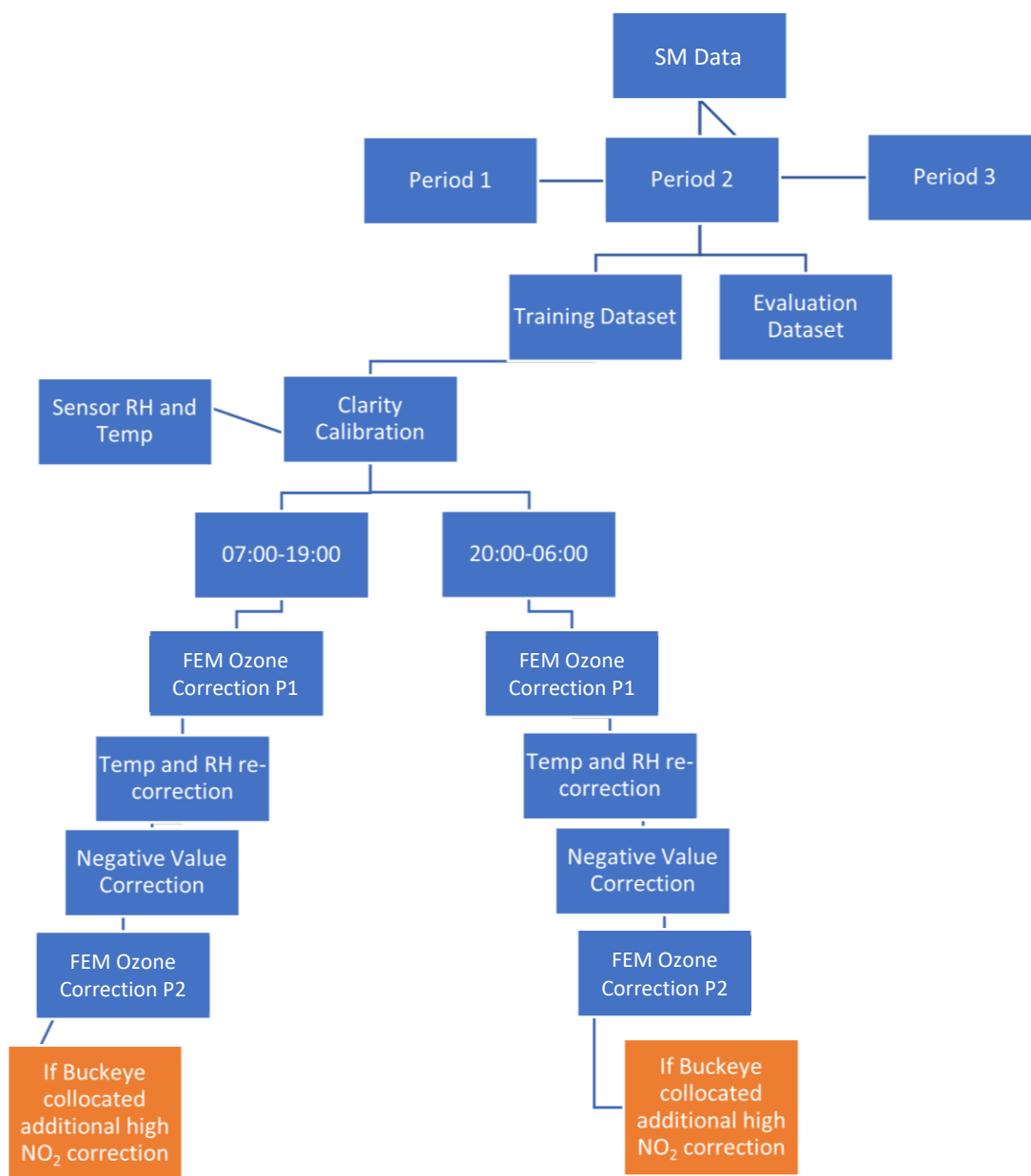


Figure S3. Recap of the period-specific calibration (Model 2.0) process developed for these sensors.

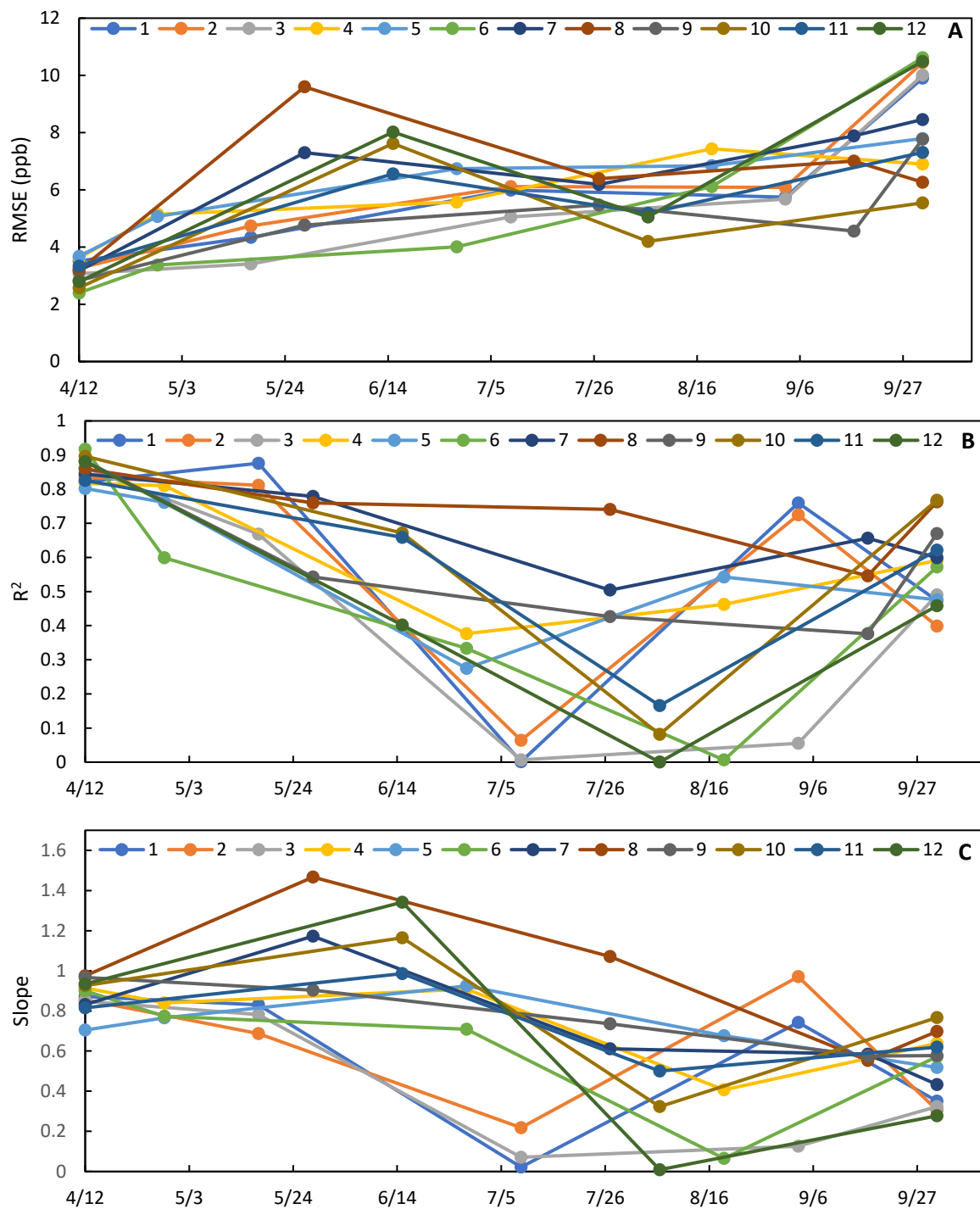


Figure S4. Individual LCS performance **(A)** RMSE, **(B)** R^2 , **(C)** slope over the deployment period with Model 1.0.

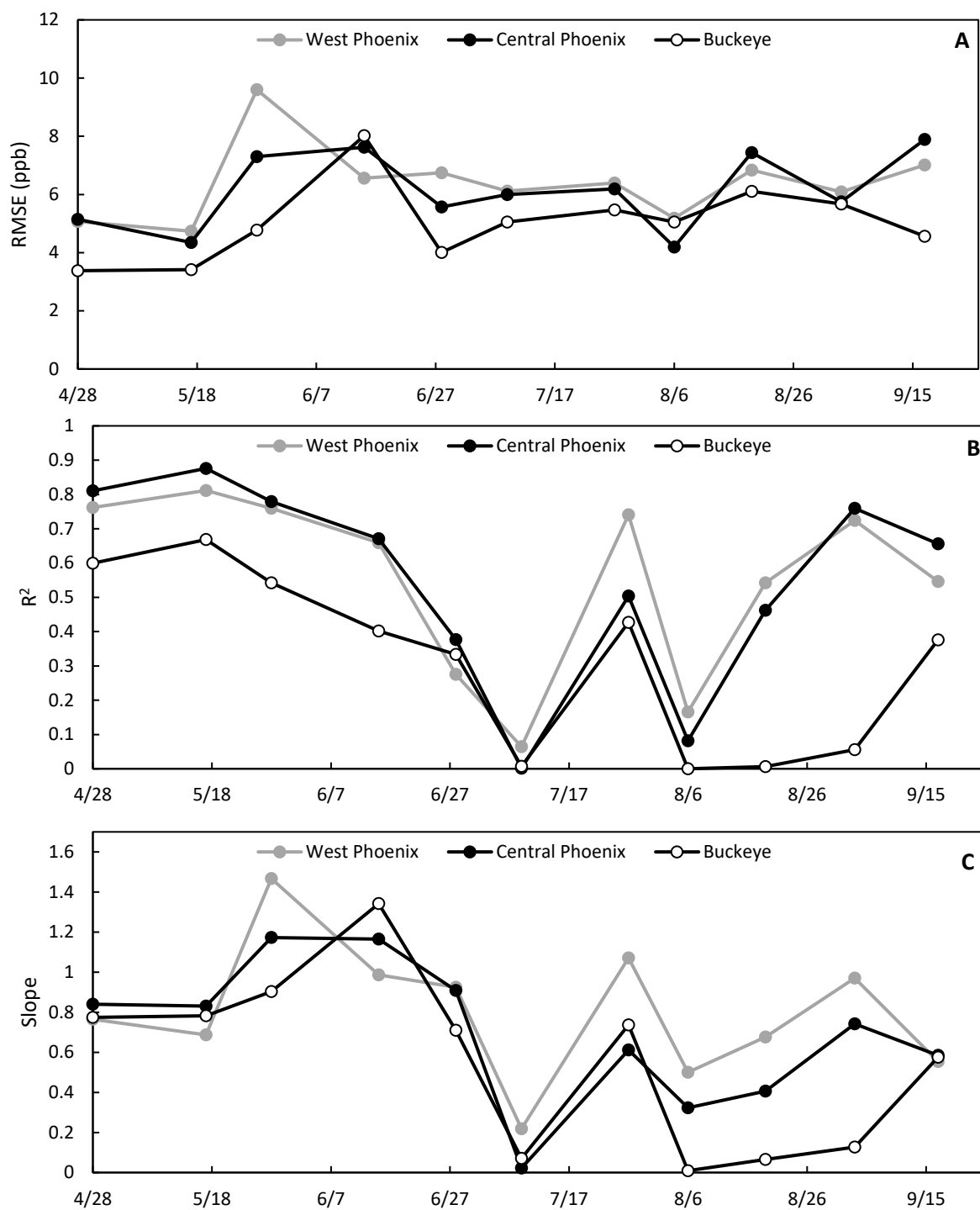


Figure S5. Site performance **(A)** RMSE, **(B)** R², **(C)** slope over the deployment period with Model 1.0.

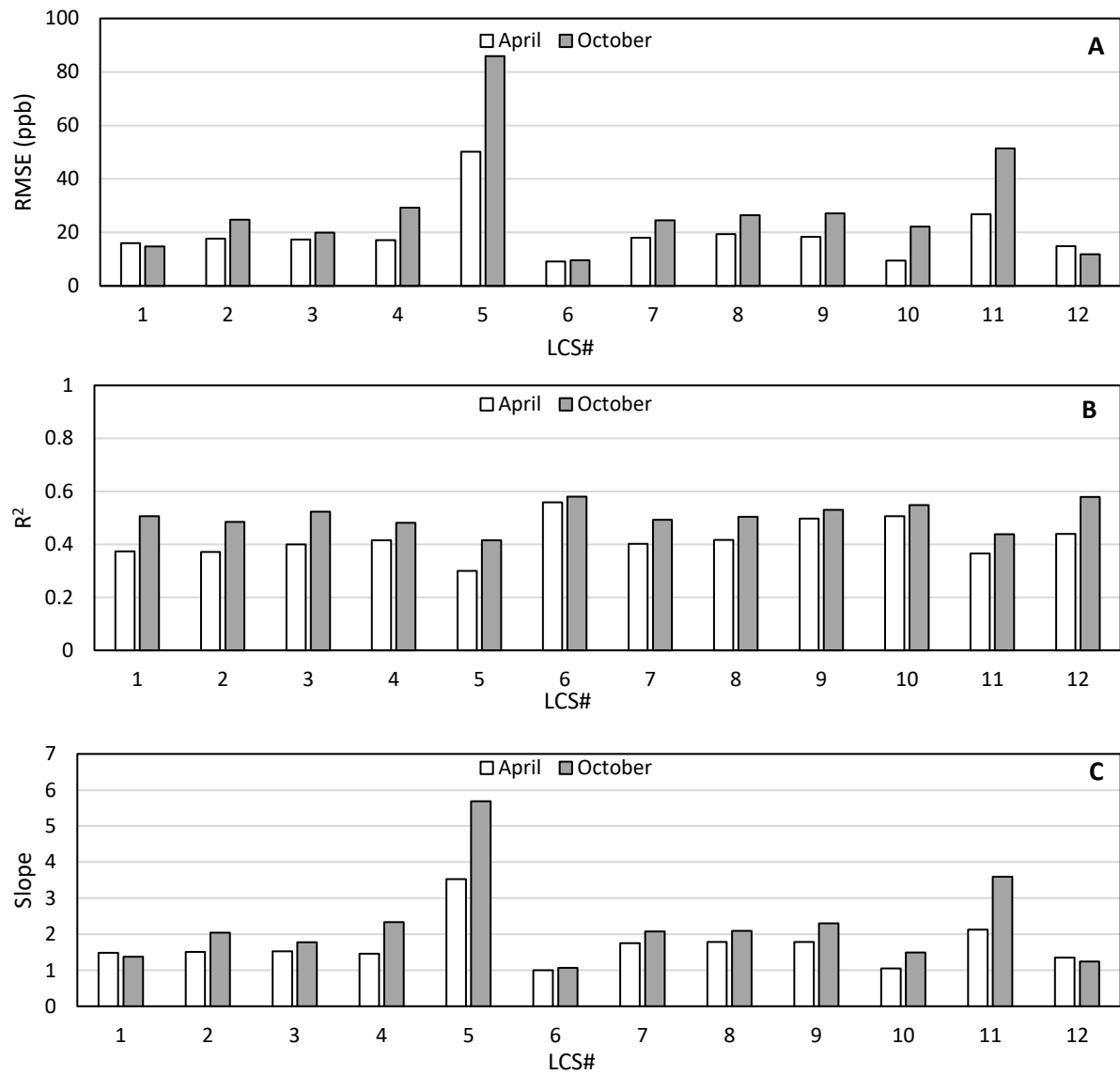


Figure S6. (A) RMSE, (B) R², and (C) slope values for all 12 sensors over the April 2021 and October 2021 collocation periods at West Phoenix using the SM calibration.

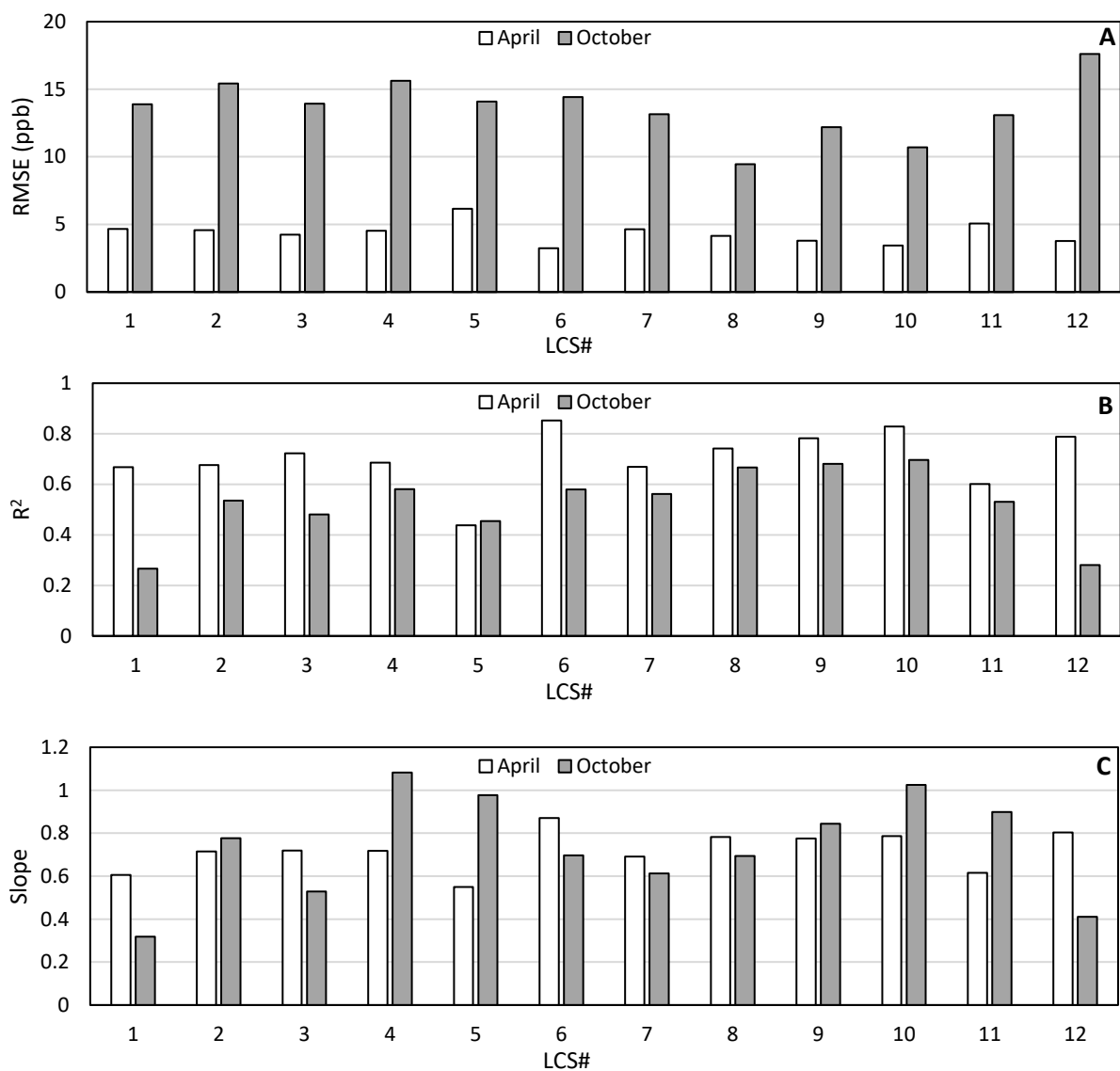


Figure S7. (A) RMSE, (B) R², and (C) slope values for all 12 sensors over the April 2021 and October 2021 collocation periods at West Phoenix using the Clarity Baseline calibration.

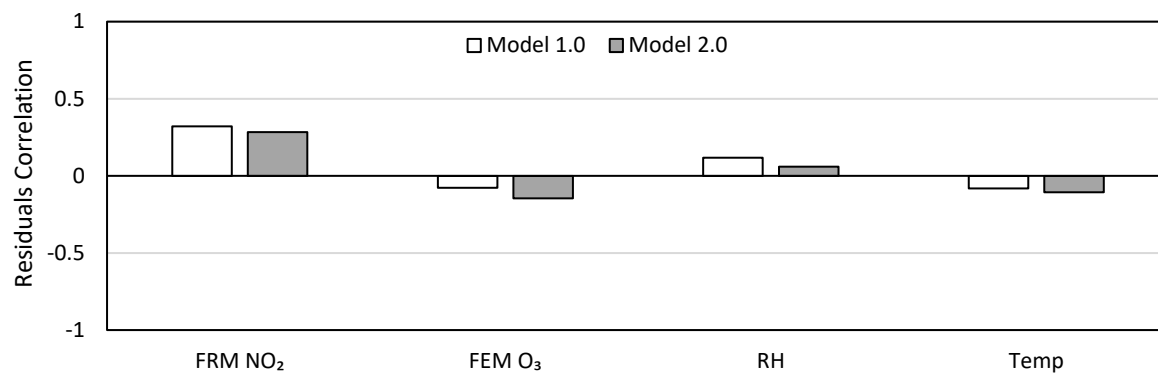


Figure S8. NO₂ residual correlations for the Model 1.0 and Model 2.0 calibrations to FRM NO₂, FEM O₃, internal sensor relative humidity, and internal sensor temperature.

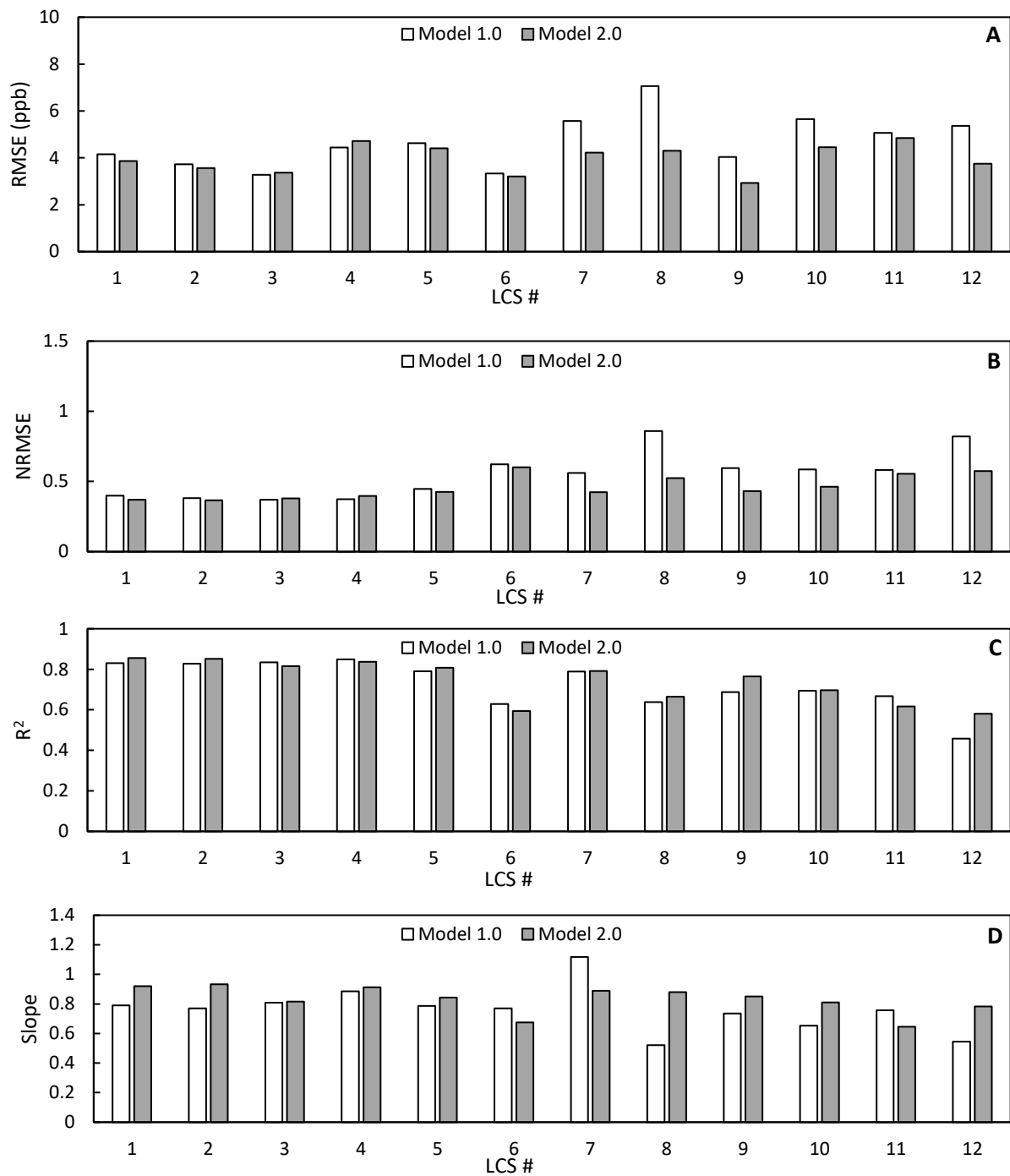


Figure S9. (A) RMSE, (B) NRMSE, (C) R^2 , and (D) slope, for all sensors with Model 1.0 and Model 2.0 for Period 1.

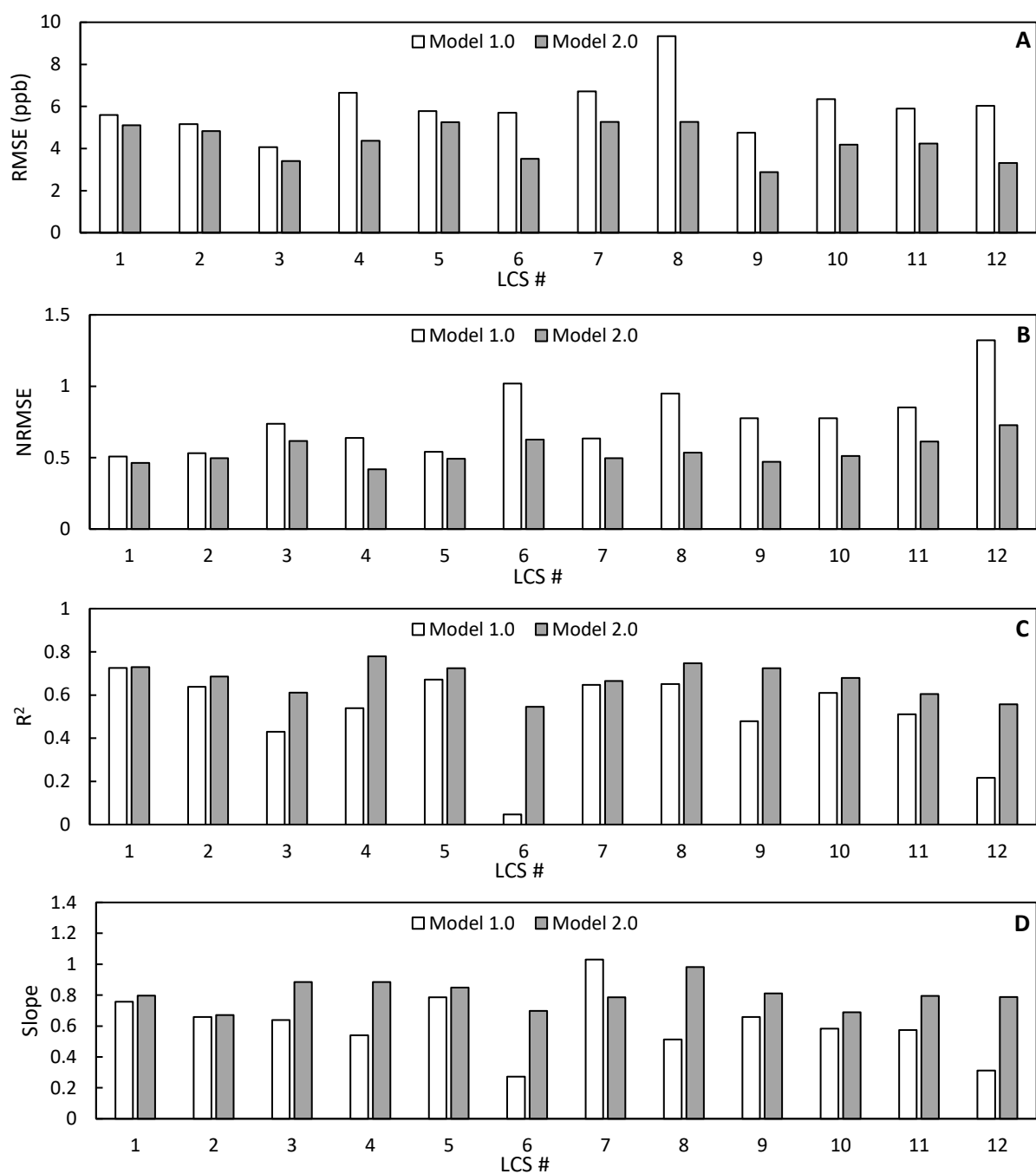


Figure S10. (A) RMSE, (B) NRMSE, (C) R^2 , and (D) slope, for all sensors with Model 1.0 and Model 2.0 for Period 2.

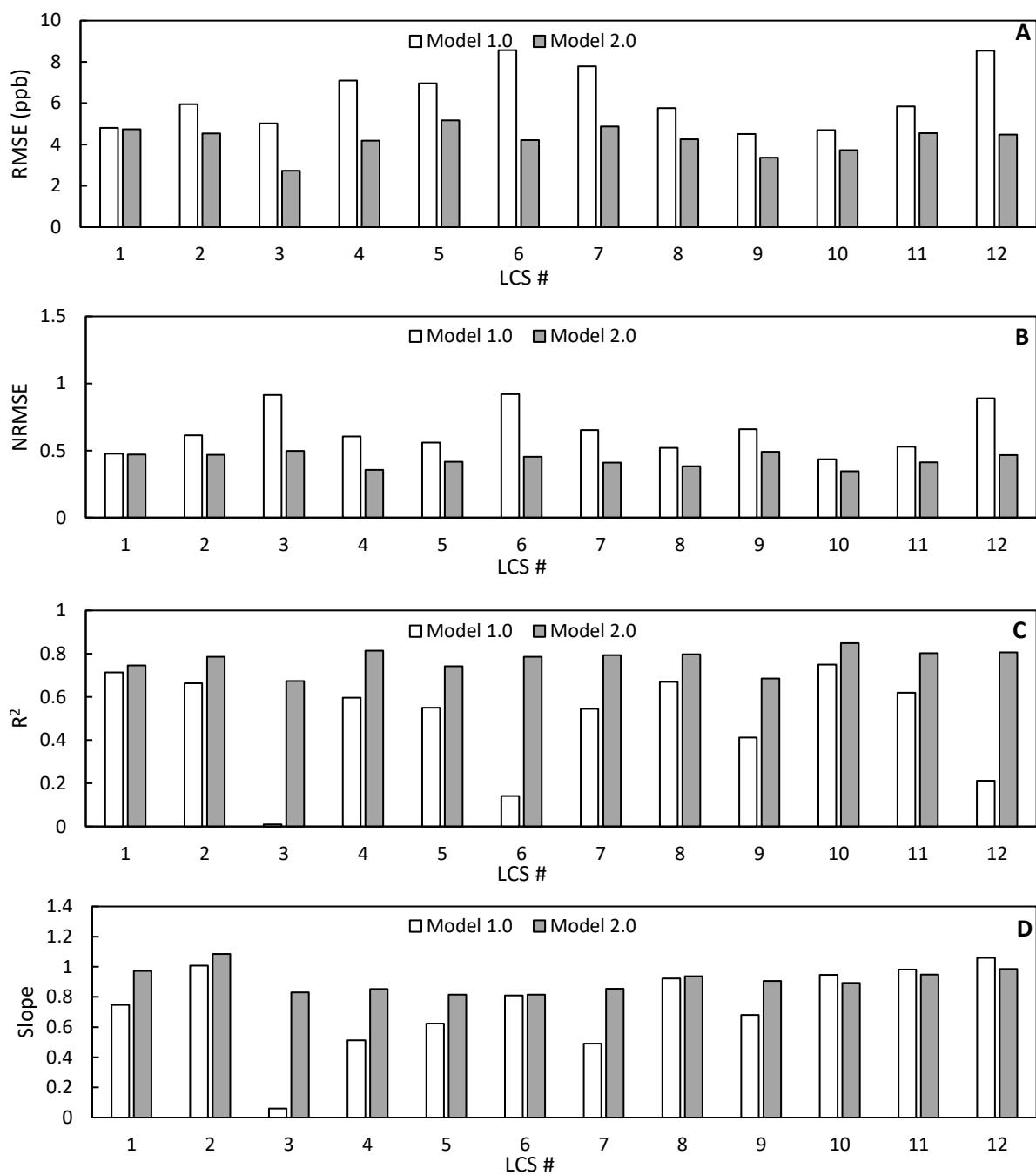


Figure S11. (A) RMSE, (B) NRMSE, (C) R^2 , and (D) slope, for all sensors with Model 1.0 and Model 2.0 for Period 3.

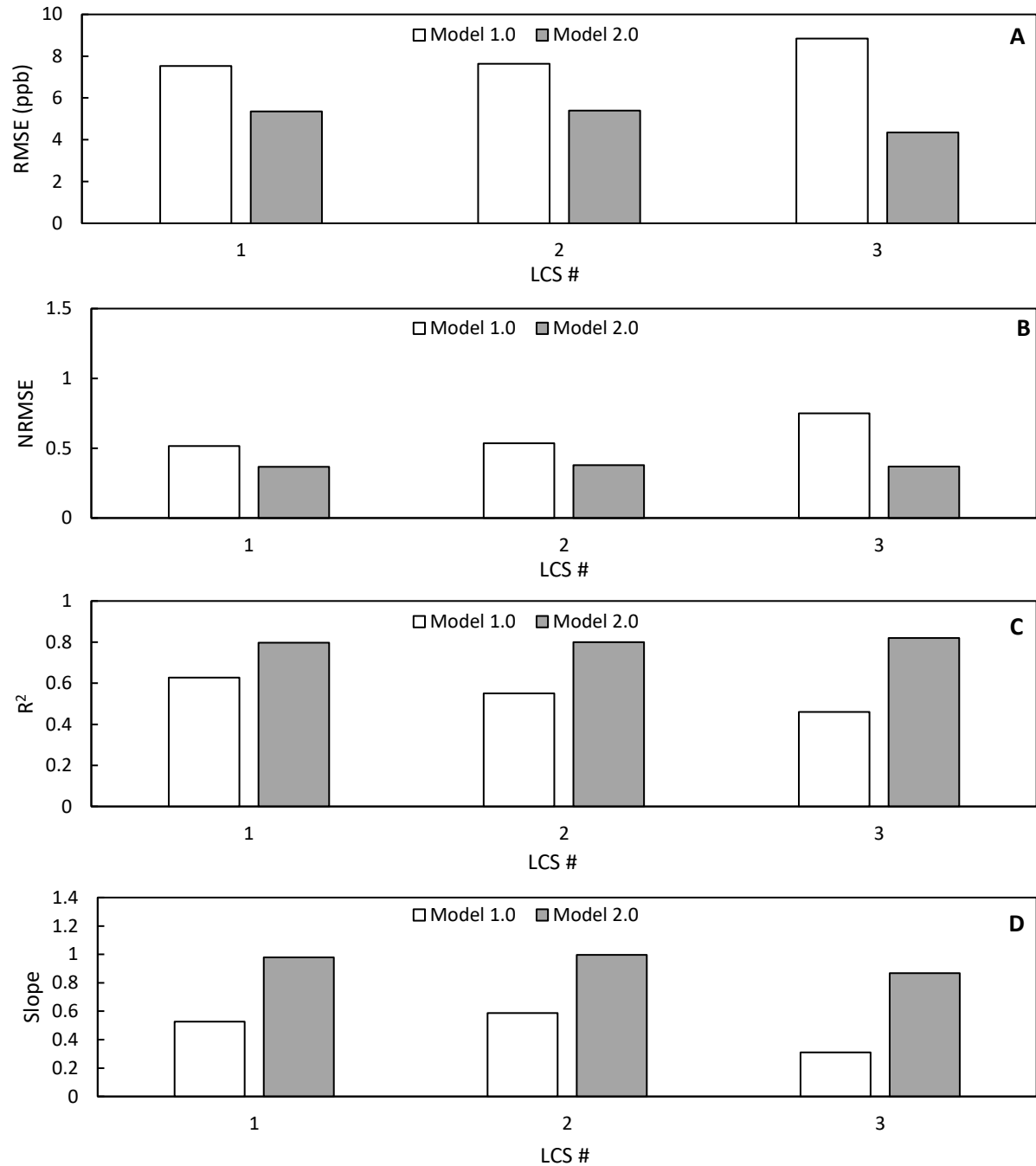


Figure S12. (A) RMSE, (B) NRMSE, (C) R², and (D) slope, for all sensors with Model 1.0 and Model 2.0 for Period 4.

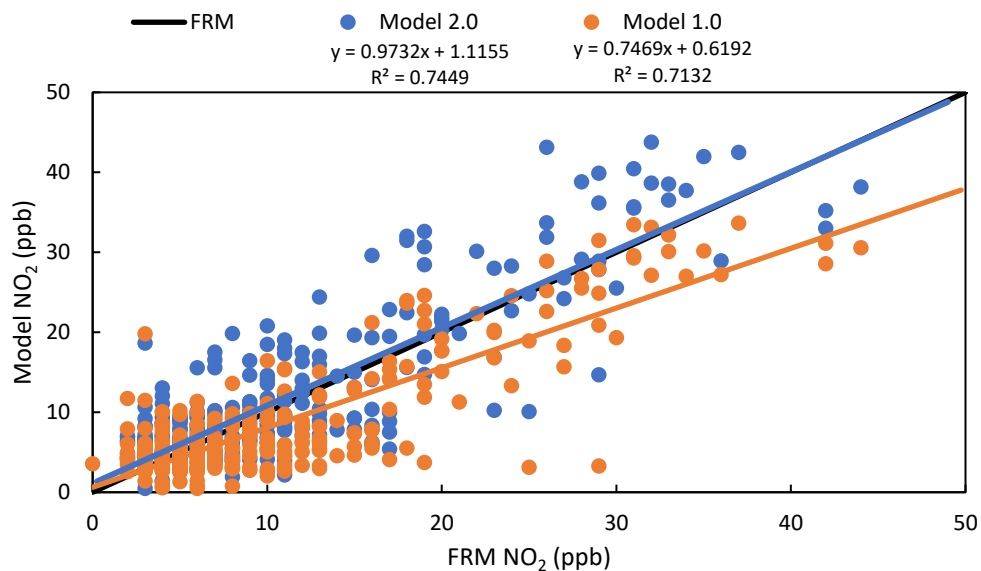


Figure S13. Comparison of Model 2.0 and Model 1.0 evaluation dataset for Sensor 1 during Period 3 collocation at Central Phoenix.

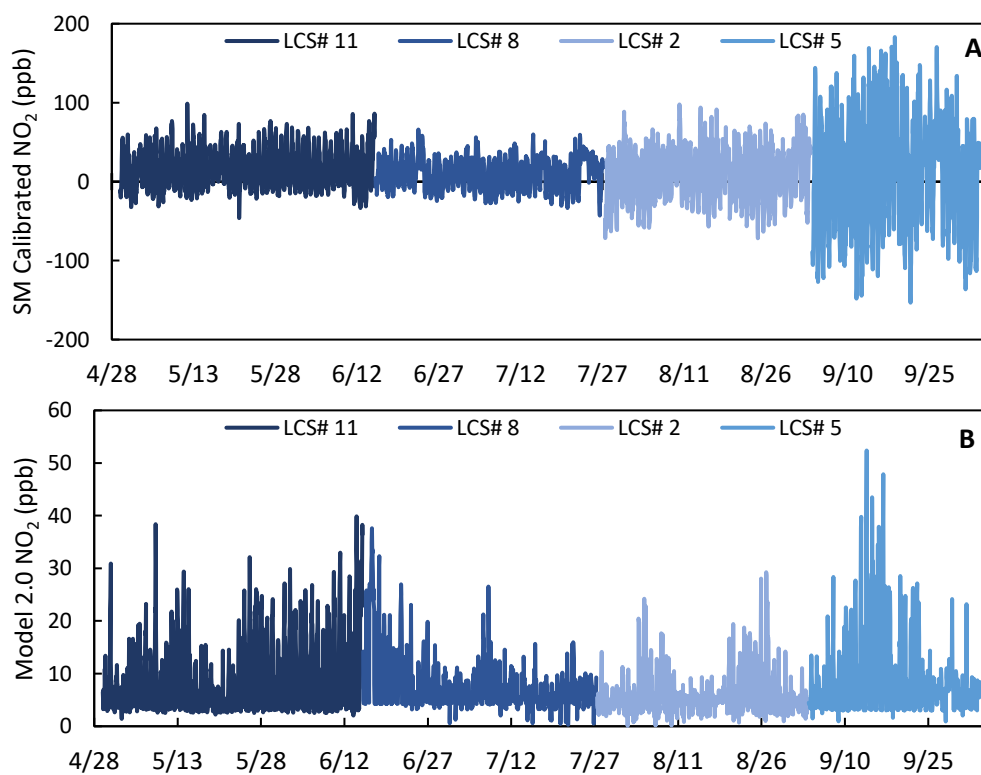


Figure S14. Time series plots of SM calibrated (A) and Model 2.0 (B) NO₂ data for the Mesa site for the entire deployment period.