# 'Effortless Perfection:'
# Do Chinese Cities Manipulate Air Pollution Data?

# Supplementary Appendix

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Table SA.1: t-Statistics for McCrary Test: $NO_2$

| | a | | | | a | | |
|---|---|---|---|---|---|---|---|
| | 10 | 15 | 20 | | 10 | 15 | 2 |
| Guangzhou | -3.516 | -3.409 | -3.824 | Hangzhou | 1.034 | 0.115 | -0.664 |
| Mudanjiang | -3.237 | -3.222 | -3.152 | Xianyang | NaN | 0.150 | 0.379 |
| Shenzhen | -2.502 | -3.145 | -3.678 | Weinan | 0.996 | 0.174 | -0.283 |
| Luoyang | -1.666 | -2.247 | -2.237 | Changzhi | 0.034 | 0.360 | 0.388 |
| Yinchuan | NaN | -1.741 | -6.336 | Lanzhou | 0.795 | 0.409 | 0.046 |
| Anyang | -1.850 | -1.562 | -1.451 | Shijiazhuang | 1.074 | 0.418 | 0.657 |
| Kaifeng | -1.392 | -1.402 | -1.276 | Xiamen | -2.523 | 0.475 | 0.259 |
| Nanning | NaN | -1.318 | -1.252 | Nanjing | 0.987 | 0.547 | 0.263 |
| Beijing | -1.425 | -1.314 | -1.378 | Wuhan | 0.848 | 0.558 | 0.309 |
| Fushun | NaN | -1.207 | -1.300 | Linfen | 0.311 | 0.741 | 0.474 |
| Ningbo | -0.929 | -1.140 | -1.275 | Tianjin | 0.524 | 0.871 | 1.029 |
| Haerbin | -1.775 | -1.104 | -0.692 | Chongqing | 1.067 | 0.921 | 0.643 |
| Wuxi | NaN | -1.000 | -2.413 | Huhehaote | 0.890 | 1.121 | 1.440 |
| Huzhou | -0.518 | -0.732 | -0.741 | Yangquan | NaN | 1.135 | 0.789 |
| Xuzhou | NaN | -0.357 | Inf | Datong | 0.366 | 1.200 | 1.326 |
| Wenzhou | 0.217 | -0.351 | -0.248 | Suzhou | 0.717 | 1.213 | 1.659 |
| Zhenjiang | NaN | -0.042 | NaN | Baoding | 1.300 | 1.255 | 1.381 |
| Wuhu | NaN | -0.042 | 0.000 | Zigong | 1.401 | 1.324 | 1.375 |
| Zunyi | NaN | 0.000 | 0.000 | Jiaozuo | 1.071 | 1.502 | 1.398 |
| Pingdingshan | 0.000 | 0.000 | 0.281 | Yanan | 0.371 | 1.730 | 2.198 |
| Yueyang | 0.000 | 0.000 | 1.158 | Shanghai | 2.068 | 1.790 | 1.589 |
| Benxi | 0.000 | 0.000 | -0.595 | Wulumuqi | 1.278 | 1.799 | 1.843 |
| Shenyang | 0.000 | 0.000 | 0.000 | Handan | 1.496 | 1.883 | 2.164 |
| Changde | NaN | 0.000 | 0.000 | Nantong | -4.747 | 1.939 | 2.249 |
| Panzhihua | NaN | 0.005 | 0.846 | | | | |

This table reports the McCrary t-statistic for each city using the $NO_2$ concentration data.
*Notes*: $a = h/\hat{b}$, $h$ is the bandwidth and $\hat{b} = 2\hat{\sigma}/\sqrt{n}$ where $\hat{\sigma}$ of the pollutant concentration.

Table SA.2: Kaifeng-Zhengzhou I

| VSB | SPD | Temp | PCP | Subs 1 | Subs 2 | KS | Z | T | KS | Z | T |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 40 | 0 | 67 | 71 | 0.0625 | 0.0193 | 0.0208 | DNR | DNR | DNR |
| 1 | 5 | 60 | 0 | 27 | 28 | 0.4027 | 0.4698 | 0.4730 | DNR | DNR | DNR |
| 1 | 5 | 80 | 0 | 36 | 36 | 0.6585 | 0.3389 | 0.3422 | DNR | DNR | DNR |
| 1 | 10 | 40 | 0 | 32 | 32 | 0.9509 | 0.8767 | 0.8772 | DNR | DNR | DNR |
| 1 | 10 | 60 | 0 | 11 | 11 | 0.7358 | 0.9653 | 0.9657 | DNR | DNR | DNR |
| 2 | 5 | 40 | 0 | 60 | 51 | 0.0228 | 0.0147 | 0.0163 | DNR | DNR | DNR |
| 2 | 5 | 60 | 0 | 73 | 76 | 0.1498 | 0.0196 | 0.0210 | DNR | DNR | DNR |
| 2 | 5 | 80 | 0 | 97 | 99 | 0.9859 | 0.3739 | 0.3750 | DNR | DNR | DNR |
| 2 | 5 | 100 | 0 | 26 | 26 | 0.1383 | 0.0057 | 0.0079 | DNR | DNR | DNR |
| 2 | 10 | 40 | 0 | 23 | 20 | 0.6491 | 0.4628 | 0.4669 | DNR | DNR | DNR |
| 2 | 10 | 60 | 0 | 31 | 32 | 0.9078 | 0.3176 | 0.3215 | DNR | DNR | DNR |
| 2 | 10 | 80 | 0 | 36 | 38 | 0.8405 | 0.9974 | 0.9974 | DNR | DNR | DNR |
| 3 | 5 | 40 | 0 | 53 | 41 | 0.0753 | 0.0040 | 0.0050 | DNR | DNR | DNR |
| 3 | 5 | 60 | 0 | 87 | 93 | 0.0934 | 0.0365 | 0.0379 | DNR | DNR | DNR |
| 3 | 5 | 80 | 0 | 150 | 163 | 0.7569 | 0.1216 | 0.1227 | DNR | DNR | DNR |
| 3 | 5 | 100 | 0 | 40 | 44 | 0.3214 | 0.3613 | 0.3640 | DNR | DNR | DNR |
| 3 | 10 | 40 | 0 | 16 | 17 | 0.9469 | 0.5879 | 0.5918 | DNR | DNR | DNR |
| 3 | 10 | 60 | 0 | 59 | 62 | 0.5417 | 0.7185 | 0.7192 | DNR | DNR | DNR |
| 3 | 10 | 80 | 0 | 56 | 63 | 0.9860 | 0.9705 | 0.9705 | DNR | DNR | DNR |
| 3 | 10 | 100 | 0 | 16 | 17 | 0.1049 | 0.3295 | 0.3371 | DNR | DNR | DNR |
| 4 | 5 | 40 | 0 | 35 | 39 | 0.0080 | 0.0014 | 0.0020 | DNR | DNR | DNR |
| 4 | 5 | 60 | 0 | 51 | 53 | 0.0157 | 0.0011 | 0.0015 | DNR | DNR | DNR |
| 4 | 5 | 80 | 0 | 124 | 147 | 0.0064 | 0.0117 | 0.0123 | DNR | DNR | DNR |
| 4 | 5 | 100 | 0 | 26 | 35 | 0.0339 | 0.0013 | 0.0020 | DNR | DNR | DNR |
| 4 | 10 | 40 | 0 | 20 | 20 | 0.4973 | 0.9042 | 0.9049 | DNR | DNR | DNR |
| 4 | 10 | 60 | 0 | 66 | 64 | 0.9637 | 0.7458 | 0.7463 | DNR | DNR | DNR |
| 4 | 10 | 80 | 0 | 79 | 87 | 0.7162 | 0.6505 | 0.6511 | DNR | DNR | DNR |
| 4 | 10 | 100 | 0 | 20 | 23 | 0.7116 | 0.8739 | 0.8747 | DNR | DNR | DNR |
| 4 | 15 | 60 | 0 | 11 | 11 | 0.3744 | 0.7812 | 0.7841 | DNR | DNR | DNR |
| 5 | 5 | 40 | 0 | 31 | 33 | 0.0491 | 0.0127 | 0.0154 | DNR | DNR | DNR |
| 5 | 5 | 60 | 0 | 43 | 51 | 0.1422 | 0.0245 | 0.0269 | DNR | DNR | DNR |
| 5 | 5 | 80 | 0 | 86 | 125 | 0.0000 | 0.0022 | 0.0025 | R | DNR | DNR |
| 5 | 5 | 100 | 0 | 39 | 44 | 0.0639 | 0.0075 | 0.0091 | DNR | DNR | DNR |
| 5 | 10 | 40 | 0 | 25 | 20 | 0.0717 | 0.1633 | 0.1705 | DNR | DNR | DNR |
| 5 | 10 | 60 | 0 | 51 | 51 | 0.6902 | 0.2137 | 0.2166 | DNR | DNR | DNR |
| 5 | 10 | 80 | 0 | 40 | 51 | 0.0876 | 0.0420 | 0.0450 | DNR | DNR | DNR |
| 5 | 10 | 100 | 0 | 27 | 30 | 0.3178 | 0.5749 | 0.5771 | DNR | DNR | DNR |
| 5 | 15 | 60 | 0 | 11 | 13 | 0.9427 | 0.7800 | 0.7826 | DNR | DNR | DNR |

Note: KS denotes the two-sample Kolmogorov-Smirnov test, Z denotes the test based on the normal approximation, T denotes the test based on the t-distribution. P-values are reported for the three tests. DNR and R denote 'do not reject' and 'reject', respectively. We correct for multiple testing using $\alpha = 0.05$, see Appendix B for details.

Table SA.3: Kaifeng-Zhengzhou II

| VSB | SPD | Temp | PCP | Subs 1 | Subs 2 | KS | Z | T | KS | Z | T |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 5 | 40 | 0 | 35 | 43 | 0.0112 | 0.0101 | 0.0120 | DNR | DNR | DNR |
| 6 | 5 | 60 | 0 | 51 | 86 | 0.0003 | 0.0004 | 0.0005 | R | R | DNR |
| 6 | 5 | 80 | 0 | 93 | 133 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 6 | 5 | 100 | 0 | 51 | 65 | 0.0017 | 0.0002 | 0.0004 | DNR | R | R |
| 6 | 10 | 40 | 0 | 16 | 19 | 0.7035 | 0.3203 | 0.3275 | DNR | DNR | DNR |
| 6 | 10 | 60 | 0 | 48 | 60 | 0.8959 | 0.8536 | 0.8539 | DNR | DNR | DNR |
| 6 | 10 | 80 | 0 | 60 | 77 | 0.5433 | 0.1698 | 0.1721 | DNR | DNR | DNR |
| 6 | 10 | 100 | 0 | 19 | 23 | 0.6399 | 0.6476 | 0.6501 | DNR | DNR | DNR |
| 7 | 5 | 40 | 0 | 33 | 45 | 0.0009 | 0.0001 | 0.0002 | DNR | R | R |
| 7 | 5 | 60 | 0 | 55 | 83 | 0.0000 | 0.0002 | 0.0003 | R | R | R |
| 7 | 5 | 80 | 0 | 75 | 111 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 7 | 5 | 100 | 0 | 40 | 66 | 0.0001 | 0.0000 | 0.0000 | R | R | R |
| 7 | 10 | 40 | 0 | 37 | 45 | 0.0000 | 0.0001 | 0.0001 | R | R | R |
| 7 | 10 | 60 | 0 | 60 | 89 | 0.0035 | 0.0002 | 0.0003 | DNR | R | R |
| 7 | 10 | 80 | 0 | 79 | 98 | 0.0034 | 0.0049 | 0.0055 | DNR | DNR | DNR |
| 7 | 10 | 100 | 0 | 32 | 37 | 0.1033 | 0.0098 | 0.0120 | DNR | DNR | DNR |
| 7 | 15 | 40 | 0 | 14 | 12 | 0.9533 | 0.4093 | 0.4174 | DNR | DNR | DNR |
| 7 | 15 | 60 | 0 | 11 | 14 | 0.7322 | 0.4488 | 0.4565 | DNR | DNR | DNR |

Note: KS denotes the two-sample Kolmogorov-Smirnov test, Z denotes the test based on the normal approximation, T denotes the test based on the t-distribution. P-values are reported for the three tests. DNR and R denote 'do not reject' and 'reject', respectively. We correct for multiple testing using $\alpha = 0.05$, see Appendix B for details.

Table SA.4: Zhuzhou-Xiangtan

| VSB | SPD | Temp | PCP | Subs 1 | Subs 2 | KS | Z | T | KS | Z | T |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 40 | 0 | 28 | 26 | 0.7573 | 0.7322 | 0.7335 | DNR | DNR | DNR |
| 1 | 5 | 60 | 0 | 50 | 51 | 0.4248 | 0.4811 | 0.4828 | DNR | DNR | DNR |
| 1 | 5 | 80 | 0 | 15 | 16 | 0.7925 | 0.6536 | 0.6570 | DNR | DNR | DNR |
| 1 | 10 | 40 | 0 | 17 | 22 | 0.0228 | 0.0871 | 0.0954 | DNR | DNR | DNR |
| 1 | 10 | 60 | 0 | 49 | 50 | 0.4558 | 0.1964 | 0.1994 | DNR | DNR | DNR |
| 1 | 10 | 80 | 0 | 18 | 21 | 0.6233 | 0.9315 | 0.9320 | DNR | DNR | DNR |
| 2 | 5 | 60 | 0 | 71 | 65 | 0.0230 | 0.1160 | 0.1184 | DNR | DNR | DNR |
| 2 | 5 | 80 | 0 | 48 | 48 | 0.4803 | 0.3849 | 0.3871 | DNR | DNR | DNR |
| 2 | 10 | 40 | 0 | 24 | 22 | 0.2500 | 0.5233 | 0.5266 | DNR | DNR | DNR |
| 2 | 10 | 60 | 0 | 60 | 60 | 0.4766 | 0.5376 | 0.5388 | DNR | DNR | DNR |
| 2 | 10 | 80 | 0 | 40 | 43 | 0.1353 | 0.0932 | 0.0971 | DNR | DNR | DNR |
| 3 | 5 | 60 | 0 | 39 | 38 | 0.0118 | 0.2559 | 0.2596 | DNR | DNR | DNR |
| 3 | 5 | 80 | 0 | 44 | 52 | 0.2878 | 0.0476 | 0.0505 | DNR | DNR | DNR |
| 3 | 10 | 60 | 0 | 26 | 27 | 0.3274 | 0.9595 | 0.9597 | DNR | DNR | DNR |
| 3 | 10 | 80 | 0 | 40 | 42 | 0.9999 | 0.6264 | 0.6277 | DNR | DNR | DNR |
| 4 | 5 | 60 | 0 | 50 | 47 | 0.0350 | 0.4529 | 0.4547 | DNR | DNR | DNR |
| 4 | 5 | 80 | 0 | 37 | 42 | 0.1975 | 0.1394 | 0.1435 | DNR | DNR | DNR |
| 4 | 5 | 100 | 0 | 14 | 15 | 0.2118 | 0.1114 | 0.1230 | DNR | DNR | DNR |
| 4 | 10 | 60 | 0 | 24 | 21 | 0.1315 | 0.4035 | 0.4081 | DNR | DNR | DNR |
| 4 | 10 | 80 | 0 | 22 | 27 | 0.8399 | 0.4443 | 0.4481 | DNR | DNR | DNR |
| 5 | 5 | 60 | 0 | 44 | 46 | 0.1810 | 0.6914 | 0.6924 | DNR | DNR | DNR |
| 5 | 5 | 80 | 0 | 79 | 78 | 0.0073 | 0.0248 | 0.0262 | DNR | DNR | DNR |
| 5 | 5 | 100 | 0 | 21 | 18 | 0.2577 | 0.0704 | 0.0785 | DNR | DNR | DNR |
| 5 | 10 | 80 | 0 | 29 | 32 | 0.9683 | 0.9895 | 0.9895 | DNR | DNR | DNR |
| 6 | 5 | 60 | 0 | 37 | 38 | 0.0124 | 0.0072 | 0.0089 | DNR | DNR | DNR |
| 6 | 5 | 80 | 0 | 79 | 75 | 0.2991 | 0.2315 | 0.2334 | DNR | DNR | DNR |
| 6 | 5 | 100 | 0 | 32 | 38 | 0.5879 | 0.0914 | 0.0960 | DNR | DNR | DNR |
| 6 | 10 | 80 | 0 | 31 | 31 | 0.9439 | 0.6632 | 0.6648 | DNR | DNR | DNR |
| 6 | 10 | 100 | 0 | 19 | 19 | 0.9563 | 0.9112 | 0.9118 | DNR | DNR | DNR |
| 7 | 5 | 40 | 0 | 19 | 21 | 0.8778 | 0.7544 | 0.7561 | DNR | DNR | DNR |
| 7 | 5 | 60 | 0 | 183 | 173 | 0.0000 | 0.0005 | 0.0006 | R | R | R |
| 7 | 5 | 80 | 0 | 256 | 273 | 0.0000 | 0.0001 | 0.0001 | R | R | R |
| 7 | 5 | 100 | 0 | 242 | 208 | 0.0496 | 0.0232 | 0.0236 | DNR | DNR | DNR |
| 7 | 10 | 40 | 0 | 23 | 19 | 0.2185 | 0.0501 | 0.0571 | DNR | DNR | DNR |
| 7 | 10 | 60 | 0 | 64 | 56 | 0.0256 | 0.3158 | 0.3178 | DNR | DNR | DNR |
| 7 | 10 | 80 | 0 | 100 | 98 | 0.1975 | 0.2279 | 0.2294 | DNR | DNR | DNR |
| 7 | 10 | 100 | 0 | 140 | 96 | 0.0066 | 0.0018 | 0.0020 | DNR | DNR | DNR |

Note: KS denotes the two-sample Kolmogorov-Smirnov test, Z denotes the test based on the normal approximation, T denotes the test based on the t-distribution. P-values are reported for the three tests. DNR and R denote 'do not reject' and 'reject', respectively. We correct for multiple testing using $\alpha = 0.05$, see Appendix B for details.

Table SA.5: Wuhu-Maanshan

| VSB | SPD | Temp | PCP | Subs 1 | Subs 2 | KS | Z | T | KS | Z | T |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 5 | 60 | 0 | 13 | 106 | 0.5487 | 0.8655 | 0.8658 | DNR | DNR | DNR |
| 3 | 5 | 60 | 0 | 16 | 65 | 0.7582 | 0.4673 | 0.4695 | DNR | DNR | DNR |
| 3 | 5 | 80 | 0 | 11 | 84 | 0.9126 | 0.2646 | 0.2675 | DNR | DNR | DNR |
| 4 | 5 | 40 | 0 | 13 | 20 | 0.7181 | 0.5097 | 0.5145 | DNR | DNR | DNR |
| 4 | 5 | 60 | 0 | 41 | 53 | 0.1476 | 0.6236 | 0.6248 | DNR | DNR | DNR |
| 4 | 5 | 80 | 0 | 20 | 66 | 0.9683 | 0.6243 | 0.6256 | DNR | DNR | DNR |
| 4 | 10 | 60 | 0 | 20 | 52 | 0.1043 | 0.0034 | 0.0046 | DNR | DNR | DNR |
| 4 | 10 | 80 | 0 | 13 | 94 | 0.8048 | 0.5232 | 0.5246 | DNR | DNR | DNR |
| 5 | 5 | 40 | 0 | 22 | 19 | 0.1159 | 0.5460 | 0.5495 | DNR | DNR | DNR |
| 5 | 5 | 60 | 0 | 57 | 29 | 0.7715 | 0.6866 | 0.6876 | DNR | DNR | DNR |
| 5 | 5 | 80 | 0 | 61 | 58 | 0.9391 | 0.9543 | 0.9544 | DNR | DNR | DNR |
| 5 | 10 | 60 | 0 | 33 | 34 | 0.9092 | 0.7046 | 0.7058 | DNR | DNR | DNR |
| 5 | 10 | 80 | 0 | 24 | 82 | 0.1363 | 0.9957 | 0.9957 | DNR | DNR | DNR |
| 6 | 5 | 40 | 0 | 18 | 27 | 0.8118 | 0.6364 | 0.6388 | DNR | DNR | DNR |
| 6 | 5 | 60 | 0 | 84 | 24 | 0.0377 | 0.1528 | 0.1558 | DNR | DNR | DNR |
| 6 | 5 | 80 | 0 | 104 | 32 | 0.9095 | 0.4026 | 0.4041 | DNR | DNR | DNR |
| 6 | 5 | 100 | 0 | 35 | 13 | 0.4935 | 0.2005 | 0.2070 | DNR | DNR | DNR |
| 6 | 10 | 40 | 0 | 17 | 15 | 0.7471 | 0.9640 | 0.9643 | DNR | DNR | DNR |
| 6 | 10 | 60 | 0 | 57 | 41 | 0.7058 | 0.8936 | 0.8939 | DNR | DNR | DNR |
| 6 | 10 | 80 | 0 | 78 | 52 | 0.8807 | 0.9414 | 0.9415 | DNR | DNR | DNR |
| 6 | 10 | 100 | 0 | 22 | 28 | 0.7090 | 0.0702 | 0.0765 | DNR | DNR | DNR |
| 7 | 5 | 40 | 0 | 73 | 15 | 0.4402 | 0.8398 | 0.8402 | DNR | DNR | DNR |
| 7 | 10 | 40 | 0 | 50 | 34 | 0.6852 | 0.3332 | 0.3360 | DNR | DNR | DNR |
| 7 | 10 | 60 | 0 | 119 | 25 | 0.6665 | 0.4891 | 0.4902 | DNR | DNR | DNR |
| 7 | 10 | 80 | 0 | 167 | 29 | 0.5148 | 0.9954 | 0.9954 | DNR | DNR | DNR |
| 7 | 10 | 100 | 0 | 56 | 31 | 0.2858 | 0.9412 | 0.9414 | DNR | DNR | DNR |
| 7 | 15 | 100 | 0 | 15 | 12 | 0.0752 | 0.0666 | 0.0785 | DNR | DNR | DNR |

Note: KS denotes the two-sample Kolmogorov-Smirnov test, Z denotes the test based on the normal approximation, T denotes the test based on the t-distribution. P-values are reported for the three tests. DNR and R denote 'do not reject' and 'reject', respectively. We correct for multiple testing using $\alpha = 0.05$, see Appendix B for details.

Table SA.6: Quanzhou-Xiamen

| VSB | SPD | Temp | PCP | Subs 1 | Subs 2 | KS | Z | T | KS | Z | T |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 80 | 0 | 12 | 12 | 0.9913 | 0.5232 | 0.5298 | DNR | DNR | DNR |
| 2 | 5 | 80 | 0 | 27 | 30 | 0.9477 | 0.8047 | 0.8056 | DNR | DNR | DNR |
| 3 | 5 | 80 | 0 | 67 | 70 | 0.5121 | 0.5612 | 0.5622 | DNR | DNR | DNR |
| 3 | 10 | 80 | 0 | 20 | 20 | 0.4973 | 0.7779 | 0.7794 | DNR | DNR | DNR |
| 4 | 5 | 80 | 0 | 87 | 108 | 0.3514 | 0.0896 | 0.0913 | DNR | DNR | DNR |
| 4 | 5 | 100 | 0 | 14 | 15 | 0.0022 | 0.0019 | 0.0044 | DNR | DNR | DNR |
| 4 | 10 | 60 | 0 | 12 | 15 | 0.3725 | 0.7690 | 0.7714 | DNR | DNR | DNR |
| 4 | 10 | 80 | 0 | 44 | 45 | 0.1632 | 0.7548 | 0.7555 | DNR | DNR | DNR |
| 5 | 5 | 60 | 0 | 15 | 22 | 0.8380 | 0.5844 | 0.5879 | DNR | DNR | DNR |
| 5 | 5 | 80 | 0 | 97 | 125 | 0.2688 | 0.0432 | 0.0444 | DNR | DNR | DNR |
| 5 | 5 | 100 | 0 | 30 | 38 | 0.0120 | 0.0003 | 0.0005 | DNR | R | R |
| 5 | 10 | 60 | 0 | 33 | 36 | 0.3630 | 0.8608 | 0.8613 | DNR | DNR | DNR |
| 5 | 10 | 80 | 0 | 76 | 93 | 0.4593 | 0.0655 | 0.0673 | DNR | DNR | DNR |
| 5 | 15 | 80 | 0 | 12 | 12 | 0.4333 | 0.2306 | 0.2433 | DNR | DNR | DNR |
| 6 | 5 | 60 | 0 | 25 | 35 | 0.0892 | 0.1698 | 0.1751 | DNR | DNR | DNR |
| 6 | 5 | 80 | 0 | 77 | 114 | 0.9568 | 0.7187 | 0.7191 | DNR | DNR | DNR |
| 6 | 5 | 100 | 0 | 52 | 56 | 0.0037 | 0.0003 | 0.0005 | DNR | R | R |
| 6 | 10 | 60 | 0 | 40 | 60 | 0.7569 | 0.7920 | 0.7925 | DNR | DNR | DNR |
| 6 | 10 | 80 | 0 | 116 | 154 | 0.0922 | 0.0932 | 0.0943 | DNR | DNR | DNR |
| 6 | 10 | 100 | 0 | 46 | 41 | 0.0037 | 0.0001 | 0.0001 | DNR | R | R |
| 6 | 15 | 60 | 0 | 17 | 22 | 0.2700 | 0.2260 | 0.2337 | DNR | DNR | DNR |
| 6 | 15 | 80 | 0 | 19 | 25 | 0.3033 | 0.2033 | 0.2103 | DNR | DNR | DNR |
| 7 | 5 | 60 | 0 | 12 | 22 | 0.7611 | 0.5816 | 0.5854 | DNR | DNR | DNR |
| 7 | 5 | 80 | 0 | 50 | 65 | 0.0025 | 0.0314 | 0.0335 | DNR | DNR | DNR |
| 7 | 5 | 100 | 0 | 94 | 48 | 0.0001 | 0.0000 | 0.0000 | R | R | R |
| 7 | 10 | 60 | 0 | 73 | 109 | 0.1008 | 0.3148 | 0.3161 | DNR | DNR | DNR |
| 7 | 10 | 80 | 0 | 181 | 307 | 0.2900 | 0.7290 | 0.7291 | DNR | DNR | DNR |
| 7 | 10 | 100 | 0 | 292 | 132 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 7 | 15 | 60 | 0 | 31 | 48 | 0.7224 | 0.1639 | 0.1679 | DNR | DNR | DNR |
| 7 | 15 | 80 | 0 | 64 | 91 | 0.1804 | 0.4771 | 0.4781 | DNR | DNR | DNR |

Note: KS denotes the two-sample Kolmogorov-Smirnov test, Z denotes the test based on the normal approximation, T denotes the test based on the t-distribution. P-values are reported for the three tests. DNR and R denote 'do not reject' and 'reject', respectively. We correct for multiple testing using $\alpha = 0.05$, see Appendix B for details.

Table SA.7: Zhenjiang-Yangzhou

| VSB | SPD | Temp | PCP | Subs 1 | Subs 2 | KS | Z | T | KS | Z | T |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 40 | 0 | 14 | 23 | 0.8120 | 0.3968 | 0.4025 | DNR | DNR | DNR |
| 1 | 5 | 60 | 0 | 71 | 85 | 0.6679 | 0.5075 | 0.5085 | DNR | DNR | DNR |
| 1 | 5 | 80 | 0 | 50 | 53 | 0.9781 | 0.7284 | 0.7291 | DNR | DNR | DNR |
| 1 | 10 | 60 | 0 | 35 | 44 | 0.8856 | 0.5603 | 0.5620 | DNR | DNR | DNR |
| 1 | 10 | 80 | 0 | 13 | 16 | 0.8811 | 0.4607 | 0.4671 | DNR | DNR | DNR |
| 2 | 5 | 40 | 0 | 28 | 43 | 0.2455 | 0.1794 | 0.1838 | DNR | DNR | DNR |
| 2 | 5 | 60 | 0 | 98 | 122 | 0.5607 | 0.4785 | 0.4793 | DNR | DNR | DNR |
| 2 | 5 | 80 | 0 | 89 | 104 | 0.7897 | 0.9044 | 0.9045 | DNR | DNR | DNR |
| 2 | 5 | 100 | 0 | 24 | 29 | 0.8157 | 0.6734 | 0.6752 | DNR | DNR | DNR |
| 2 | 10 | 40 | 0 | 19 | 27 | 0.7318 | 0.7817 | 0.7830 | DNR | DNR | DNR |
| 2 | 10 | 60 | 0 | 68 | 86 | 0.9782 | 0.8893 | 0.8895 | DNR | DNR | DNR |
| 2 | 10 | 80 | 0 | 59 | 80 | 0.7626 | 0.6522 | 0.6529 | DNR | DNR | DNR |
| 2 | 10 | 100 | 0 | 27 | 30 | 0.9680 | 0.8359 | 0.8366 | DNR | DNR | DNR |
| 3 | 5 | 40 | 0 | 19 | 27 | 0.5722 | 0.5288 | 0.5320 | DNR | DNR | DNR |
| 3 | 5 | 60 | 0 | 65 | 78 | 0.7321 | 0.5281 | 0.5292 | DNR | DNR | DNR |
| 3 | 5 | 80 | 0 | 76 | 97 | 0.6844 | 0.2391 | 0.2408 | DNR | DNR | DNR |
| 3 | 5 | 100 | 0 | 57 | 70 | 0.9912 | 0.8622 | 0.8625 | DNR | DNR | DNR |
| 3 | 10 | 40 | 0 | 16 | 23 | 0.8069 | 0.5568 | 0.5604 | DNR | DNR | DNR |
| 3 | 10 | 60 | 0 | 49 | 63 | 0.3699 | 0.4071 | 0.4089 | DNR | DNR | DNR |
| 3 | 10 | 80 | 0 | 74 | 91 | 0.7134 | 0.8436 | 0.8438 | DNR | DNR | DNR |
| 3 | 10 | 100 | 0 | 25 | 30 | 0.8441 | 0.6971 | 0.6986 | DNR | DNR | DNR |
| 4 | 5 | 40 | 0 | 14 | 22 | 0.1349 | 0.0914 | 0.1005 | DNR | DNR | DNR |
| 4 | 5 | 60 | 0 | 48 | 56 | 0.7372 | 0.3547 | 0.3569 | DNR | DNR | DNR |
| 4 | 5 | 80 | 0 | 57 | 81 | 0.6976 | 0.7861 | 0.7866 | DNR | DNR | DNR |
| 4 | 5 | 100 | 0 | 27 | 27 | 0.4656 | 0.8790 | 0.8796 | DNR | DNR | DNR |
| 4 | 10 | 60 | 0 | 51 | 53 | 0.9203 | 0.9195 | 0.9197 | DNR | DNR | DNR |
| 4 | 10 | 80 | 0 | 81 | 99 | 0.5775 | 0.2602 | 0.2618 | DNR | DNR | DNR |
| 4 | 10 | 100 | 0 | 27 | 35 | 0.9859 | 0.6564 | 0.6580 | DNR | DNR | DNR |
| 5 | 5 | 40 | 0 | 14 | 18 | 0.2120 | 0.1927 | 0.2026 | DNR | DNR | DNR |
| 5 | 5 | 60 | 0 | 27 | 42 | 0.6549 | 0.9746 | 0.9747 | DNR | DNR | DNR |
| 5 | 5 | 80 | 0 | 50 | 59 | 0.4997 | 0.1796 | 0.1824 | DNR | DNR | DNR |
| 5 | 5 | 100 | 0 | 22 | 22 | 0.9786 | 0.6450 | 0.6473 | DNR | DNR | DNR |
| 5 | 10 | 60 | 0 | 31 | 40 | 0.7884 | 0.2329 | 0.2369 | DNR | DNR | DNR |
| 5 | 10 | 80 | 0 | 79 | 96 | 0.9690 | 0.5792 | 0.5799 | DNR | DNR | DNR |
| 5 | 10 | 100 | 0 | 33 | 40 | 0.7976 | 0.3886 | 0.3915 | DNR | DNR | DNR |
| 6 | 5 | 40 | 0 | 17 | 27 | 0.9121 | 0.8383 | 0.8393 | DNR | DNR | DNR |
| 6 | 5 | 60 | 0 | 25 | 26 | 0.7969 | 0.9496 | 0.9499 | DNR | DNR | DNR |
| 6 | 5 | 80 | 0 | 25 | 25 | 0.6485 | 0.3830 | 0.3874 | DNR | DNR | DNR |
| 6 | 5 | 100 | 0 | 19 | 20 | 0.1748 | 0.0412 | 0.0484 | DNR | DNR | DNR |
| 6 | 10 | 60 | 0 | 39 | 45 | 0.7092 | 0.5945 | 0.5959 | DNR | DNR | DNR |
| 6 | 10 | 80 | 0 | 53 | 53 | 0.9646 | 0.7828 | 0.7834 | DNR | DNR | DNR |
| 6 | 10 | 100 | 0 | 33 | 39 | 0.4404 | 0.3402 | 0.3435 | DNR | DNR | DNR |
| 7 | 5 | 100 | 0 | 11 | 11 | 0.9852 | 0.7312 | 0.7348 | DNR | DNR | DNR |
| 7 | 10 | 40 | 0 | 29 | 27 | 0.6859 | 0.4594 | 0.4626 | DNR | DNR | DNR |
| 7 | 10 | 60 | 0 | 21 | 22 | 0.9156 | 0.9328 | 0.9332 | DNR | DNR | DNR |
| 7 | 10 | 80 | 0 | 23 | 24 | 0.9400 | 0.3782 | 0.3829 | DNR | DNR | DNR |
| 7 | 10 | 100 | 0 | 43 | 55 | 0.9691 | 0.6984 | 0.6993 | DNR | DNR | DNR |
| 7 | 15 | 100 | 0 | 14 | 12 | 0.8900 | 0.9693 | 0.9696 | DNR | DNR | DNR |

Note: KS denotes the two-sample Kolmogorov-Smirnov test, Z denotes the test based on the normal approximation, T denotes the test based on the t-distribution. P-values are reported for the three tests. DNR and R denote 'do not reject' and 'reject', respectively. We correct for multiple testing using $\alpha = 0.05$, see Appendix B for details.

Table SA.8: Changzhou-Wuxi

| VSB | SPD | Temp | PCP | Subs 1 | Subs 2 | KS | Z | T | KS | Z | T |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 60 | 0 | 14 | 13 | 0.6139 | 0.4343 | 0.4416 | DNR | DNR | DNR |
| 2 | 5 | 60 | 0 | 25 | 22 | 0.9975 | 0.4736 | 0.4773 | DNR | DNR | DNR |
| 3 | 5 | 40 | 0 | 16 | 12 | 0.7193 | 0.3112 | 0.3205 | DNR | DNR | DNR |
| 3 | 5 | 60 | 0 | 40 | 34 | 0.9252 | 0.6589 | 0.6602 | DNR | DNR | DNR |
| 3 | 5 | 80 | 0 | 34 | 33 | 0.9790 | 0.8987 | 0.8991 | DNR | DNR | DNR |
| 3 | 10 | 60 | 0 | 24 | 24 | 0.6216 | 0.4190 | 0.4232 | DNR | DNR | DNR |
| 4 | 5 | 40 | 0 | 19 | 13 | 0.5109 | 0.1336 | 0.1440 | DNR | DNR | DNR |
| 4 | 5 | 60 | 0 | 66 | 55 | 0.9280 | 0.7815 | 0.7820 | DNR | DNR | DNR |
| 4 | 5 | 80 | 0 | 39 | 37 | 0.2888 | 0.1790 | 0.1831 | DNR | DNR | DNR |
| 4 | 10 | 60 | 0 | 21 | 24 | 0.8857 | 0.7477 | 0.7492 | DNR | DNR | DNR |
| 4 | 10 | 60 | 0.5 | 11 | 11 | 0.7358 | 0.7414 | 0.7448 | DNR | DNR | DNR |
| 4 | 10 | 80 | 0 | 14 | 13 | 0.9410 | 0.6197 | 0.6240 | DNR | DNR | DNR |
| 5 | 5 | 40 | 0 | 21 | 17 | 0.8064 | 0.1417 | 0.1504 | DNR | DNR | DNR |
| 5 | 5 | 60 | 0 | 78 | 74 | 0.2797 | 0.4316 | 0.4329 | DNR | DNR | DNR |
| 5 | 5 | 80 | 0 | 67 | 69 | 0.2734 | 0.1035 | 0.1059 | DNR | DNR | DNR |
| 5 | 5 | 100 | 0 | 23 | 24 | 0.9962 | 0.8966 | 0.8971 | DNR | DNR | DNR |
| 5 | 10 | 60 | 0 | 26 | 24 | 0.8110 | 0.8012 | 0.8023 | DNR | DNR | DNR |
| 5 | 10 | 80 | 0 | 26 | 23 | 0.7694 | 0.9638 | 0.9640 | DNR | DNR | DNR |
| 6 | 5 | 40 | 0 | 30 | 22 | 0.5276 | 0.6185 | 0.6207 | DNR | DNR | DNR |
| 6 | 5 | 60 | 0 | 110 | 95 | 0.8838 | 0.6282 | 0.6287 | DNR | DNR | DNR |
| 6 | 5 | 80 | 0 | 118 | 113 | 0.0965 | 0.0630 | 0.0643 | DNR | DNR | DNR |
| 6 | 5 | 100 | 0 | 50 | 50 | 0.0951 | 0.1180 | 0.1212 | DNR | DNR | DNR |
| 6 | 10 | 60 | 0 | 36 | 29 | 0.9887 | 0.8685 | 0.8690 | DNR | DNR | DNR |
| 6 | 10 | 80 | 0 | 39 | 38 | 0.3007 | 0.0768 | 0.0809 | DNR | DNR | DNR |
| 7 | 5 | 40 | 0 | 147 | 113 | 0.9164 | 0.4551 | 0.4558 | DNR | DNR | DNR |
| 7 | 5 | 60 | 0 | 257 | 233 | 0.1258 | 0.4931 | 0.4934 | DNR | DNR | DNR |
| 7 | 5 | 80 | 0 | 444 | 412 | 0.0763 | 0.0455 | 0.0459 | DNR | DNR | DNR |
| 7 | 5 | 100 | 0 | 295 | 258 | 0.0423 | 0.0094 | 0.0097 | DNR | DNR | DNR |
| 7 | 5 | 100 | 0.5 | 14 | 13 | 0.8124 | 0.6101 | 0.6146 | DNR | DNR | DNR |
| 7 | 10 | 40 | 0 | 56 | 45 | 0.3585 | 0.4092 | 0.4112 | DNR | DNR | DNR |
| 7 | 10 | 60 | 0 | 126 | 119 | 0.9074 | 0.8903 | 0.8905 | DNR | DNR | DNR |
| 7 | 10 | 80 | 0 | 176 | 168 | 0.1355 | 0.0843 | 0.0852 | DNR | DNR | DNR |
| 7 | 10 | 100 | 0 | 116 | 97 | 0.1525 | 0.0896 | 0.0911 | DNR | DNR | DNR |

Note: KS denotes the two-sample Kolmogorov-Smirnov test, Z denotes the test based on the normal approximation, T denotes the test based on the t-distribution. P-values are reported for the three tests. DNR and R denote 'do not reject' and 'reject', respectively. We correct for multiple testing using $\alpha = 0.05$, see Appendix B for details.

Table SA.9: Jinan-Taian

| VSB | SPD | Temp | PCP | Subs 1 | Subs 2 | KS | Z | T | KS | Z | T |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 40 | 0 | 41 | 33 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 1 | 5 | 60 | 0 | 17 | 12 | 0.0000 | 0.0000 | 0.0002 | R | R | R |
| 2 | 5 | 40 | 0 | 17 | 14 | 0.0002 | 0.0000 | 0.0000 | R | R | R |
| 2 | 5 | 80 | 0 | 28 | 18 | 0.0458 | 0.0091 | 0.0124 | DNR | DNR | DNR |
| 3 | 5 | 40 | 0 | 21 | 21 | 0.0003 | 0.0000 | 0.0002 | R | R | R |
| 3 | 5 | 80 | 0 | 39 | 25 | 0.0858 | 0.0396 | 0.0438 | DNR | DNR | DNR |
| 3 | 5 | 100 | 0 | 14 | 13 | 0.0051 | 0.1064 | 0.1190 | DNR | DNR | DNR |
| 3 | 10 | 40 | 0 | 15 | 11 | 0.0678 | 0.0050 | 0.0097 | DNR | DNR | DNR |
| 3 | 10 | 80 | 0 | 24 | 17 | 0.1816 | 0.0216 | 0.0271 | DNR | DNR | DNR |
| 4 | 5 | 60 | 0 | 21 | 15 | 0.0097 | 0.0030 | 0.0054 | DNR | DNR | DNR |
| 4 | 5 | 80 | 0 | 36 | 29 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 4 | 10 | 40 | 0 | 23 | 14 | 0.0377 | 0.0099 | 0.0142 | DNR | DNR | DNR |
| 4 | 10 | 60 | 0 | 20 | 14 | 0.0090 | 0.0004 | 0.0012 | DNR | R | R |
| 4 | 10 | 80 | 0 | 37 | 31 | 0.0032 | 0.0003 | 0.0005 | DNR | R | R |
| 5 | 5 | 80 | 0 | 44 | 31 | 0.0002 | 0.0000 | 0.0000 | R | R | R |
| 5 | 10 | 40 | 0 | 26 | 22 | 0.0061 | 0.0013 | 0.0024 | DNR | R | DNR |
| 5 | 10 | 60 | 0 | 29 | 18 | 0.0000 | 0.0117 | 0.0154 | R | DNR | DNR |
| 5 | 10 | 80 | 0 | 44 | 24 | 0.0007 | 0.0006 | 0.0010 | R | R | R |
| 5 | 10 | 100 | 0 | 32 | 27 | 0.0002 | 0.0001 | 0.0003 | R | R | R |
| 6 | 5 | 40 | 0 | 16 | 13 | 0.1952 | 0.1235 | 0.1352 | DNR | DNR | DNR |
| 6 | 5 | 80 | 0 | 48 | 34 | 0.0078 | 0.0029 | 0.0039 | DNR | DNR | DNR |
| 6 | 5 | 100 | 0 | 13 | 12 | 0.0145 | 0.0096 | 0.0164 | DNR | DNR | DNR |
| 6 | 10 | 40 | 0 | 26 | 17 | 0.0116 | 0.0105 | 0.0142 | DNR | DNR | DNR |
| 6 | 10 | 60 | 0 | 34 | 19 | 0.0006 | 0.0162 | 0.0199 | R | DNR | DNR |
| 6 | 10 | 80 | 0 | 65 | 45 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 6 | 10 | 100 | 0 | 29 | 27 | 0.0000 | 0.0000 | 0.0001 | R | R | R |
| 7 | 5 | 40 | 0 | 83 | 82 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 7 | 5 | 60 | 0 | 86 | 55 | 0.0111 | 0.0014 | 0.0018 | DNR | R | DNR |
| 7 | 5 | 80 | 0 | 138 | 94 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 7 | 5 | 100 | 0 | 40 | 28 | 0.0001 | 0.0001 | 0.0003 | R | R | R |
| 7 | 10 | 40 | 0 | 252 | 204 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 7 | 10 | 60 | 0 | 433 | 310 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 7 | 10 | 80 | 0 | 518 | 388 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 7 | 10 | 100 | 0 | 193 | 147 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 7 | 15 | 40 | 0 | 28 | 18 | 0.7769 | 0.4379 | 0.4421 | DNR | DNR | DNR |
| 7 | 15 | 60 | 0 | 93 | 67 | 0.0000 | 0.0002 | 0.0002 | R | R | R |
| 7 | 15 | 80 | 0 | 136 | 106 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 7 | 15 | 100 | 0 | 59 | 47 | 0.0012 | 0.0133 | 0.0149 | R | DNR | DNR |
| 7 | 20 | 80 | 0 | 21 | 18 | 0.0048 | 0.0008 | 0.0019 | DNR | R | DNR |

Note: KS denotes the two-sample Kolmogorov-Smirnov test, Z denotes the test based on the normal approximation, T denotes the test based on the t-distribution. P-values are reported for the three tests. DNR and R denote 'do not reject' and 'reject', respectively. We correct for multiple testing using $\alpha = 0.05$, see Appendix B for details.

Table SA.10: Hangzhou-Shaoxing

| VSB | SPD | Temp | PCP | Subs 1 | Subs 2 | KS | Z | T | KS | Z | T |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 40 | 0 | 12 | 11 | 0.9727 | 0.7364 | 0.7398 | DNR | DNR | DNR |
| 1 | 5 | 60 | 0 | 141 | 111 | 0.1059 | 0.0466 | 0.0477 | DNR | DNR | DNR |
| 1 | 5 | 80 | 0 | 58 | 49 | 0.5123 | 0.1239 | 0.1269 | DNR | DNR | DNR |
| 1 | 10 | 60 | 0 | 28 | 18 | 0.1781 | 0.0907 | 0.0977 | DNR | DNR | DNR |
| 1 | 10 | 80 | 0 | 14 | 11 | 0.5044 | 0.9622 | 0.9626 | DNR | DNR | DNR |
| 2 | 5 | 40 | 0 | 36 | 30 | 0.4830 | 0.6945 | 0.6958 | DNR | DNR | DNR |
| 2 | 5 | 60 | 0 | 196 | 146 | 0.0091 | 0.0553 | 0.0561 | DNR | DNR | DNR |
| 2 | 5 | 80 | 0 | 157 | 124 | 0.0192 | 0.0094 | 0.0099 | DNR | DNR | DNR |
| 2 | 5 | 100 | 0 | 35 | 31 | 0.3738 | 0.0407 | 0.0448 | DNR | DNR | DNR |
| 2 | 10 | 40 | 0 | 13 | 14 | 0.7158 | 0.3001 | 0.3100 | DNR | DNR | DNR |
| 2 | 10 | 60 | 0 | 72 | 57 | 0.6735 | 0.9000 | 0.9002 | DNR | DNR | DNR |
| 2 | 10 | 60 | 0.5 | 19 | 12 | 0.6172 | 0.3176 | 0.3259 | DNR | DNR | DNR |
| 2 | 10 | 80 | 0 | 46 | 37 | 0.8626 | 0.9949 | 0.9950 | DNR | DNR | DNR |
| 3 | 5 | 40 | 0 | 19 | 14 | 0.9904 | 0.7114 | 0.7139 | DNR | DNR | DNR |
| 3 | 5 | 60 | 0 | 106 | 86 | 0.0237 | 0.0214 | 0.0225 | DNR | DNR | DNR |
| 3 | 5 | 80 | 0 | 144 | 107 | 0.0046 | 0.0030 | 0.0033 | DNR | DNR | DNR |
| 3 | 5 | 100 | 0 | 59 | 52 | 0.0089 | 0.0392 | 0.0415 | DNR | DNR | DNR |
| 3 | 10 | 60 | 0 | 58 | 46 | 0.4941 | 0.8655 | 0.8658 | DNR | DNR | DNR |
| 3 | 10 | 80 | 0 | 56 | 43 | 0.0015 | 0.0011 | 0.0016 | DNR | DNR | DNR |
| 3 | 10 | 100 | 0 | 15 | 14 | 0.2118 | 0.2278 | 0.2383 | DNR | DNR | DNR |
| 4 | 5 | 40 | 0 | 20 | 12 | 0.8251 | 0.8652 | 0.8663 | DNR | DNR | DNR |
| 4 | 5 | 60 | 0 | 89 | 66 | 0.2322 | 0.1983 | 0.2002 | DNR | DNR | DNR |
| 4 | 5 | 80 | 0 | 136 | 101 | 0.0039 | 0.0003 | 0.0004 | DNR | R | R |
| 4 | 5 | 100 | 0 | 68 | 53 | 0.0015 | 0.0011 | 0.0014 | DNR | DNR | DNR |
| 4 | 10 | 60 | 0 | 56 | 37 | 0.2934 | 0.0981 | 0.1016 | DNR | DNR | DNR |
| 4 | 10 | 80 | 0 | 93 | 73 | 0.1606 | 0.0360 | 0.0375 | DNR | DNR | DNR |
| 4 | 10 | 100 | 0 | 15 | 12 | 0.1462 | 0.0602 | 0.0719 | DNR | DNR | DNR |
| 5 | 5 | 40 | 0 | 24 | 16 | 0.6344 | 0.1257 | 0.1340 | DNR | DNR | DNR |
| 5 | 5 | 60 | 0 | 59 | 42 | 0.0022 | 0.0053 | 0.0064 | DNR | DNR | DNR |
| 5 | 5 | 80 | 0 | 128 | 87 | 0.0001 | 0.0008 | 0.0009 | R | DNR | DNR |
| 5 | 5 | 100 | 0 | 55 | 33 | 0.0033 | 0.0001 | 0.0002 | DNR | R | R |
| 5 | 10 | 60 | 0 | 50 | 38 | 0.5495 | 0.7592 | 0.7600 | DNR | DNR | DNR |
| 5 | 10 | 80 | 0 | 90 | 62 | 0.0587 | 0.0225 | 0.0239 | DNR | DNR | DNR |
| 5 | 10 | 100 | 0 | 27 | 20 | 0.8768 | 0.3209 | 0.3262 | DNR | DNR | DNR |
| 6 | 5 | 40 | 0 | 18 | 12 | 0.9782 | 0.8296 | 0.8311 | DNR | DNR | DNR |
| 6 | 5 | 60 | 0 | 41 | 29 | 0.9668 | 0.9181 | 0.9184 | DNR | DNR | DNR |
| 6 | 5 | 80 | 0 | 56 | 31 | 0.0006 | 0.0160 | 0.0181 | DNR | DNR | DNR |
| 6 | 5 | 100 | 0 | 74 | 43 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 6 | 10 | 40 | 0 | 23 | 18 | 0.9933 | 0.7897 | 0.7911 | DNR | DNR | DNR |
| 6 | 10 | 60 | 0 | 47 | 39 | 0.3332 | 0.3335 | 0.3362 | DNR | DNR | DNR |
| 6 | 10 | 80 | 0 | 98 | 67 | 0.1891 | 0.1249 | 0.1269 | DNR | DNR | DNR |
| 6 | 10 | 100 | 0 | 56 | 38 | 0.0010 | 0.0001 | 0.0002 | DNR | R | R |
| 7 | 10 | 40 | 0 | 20 | 17 | 0.3430 | 0.8766 | 0.8775 | DNR | DNR | DNR |
| 7 | 10 | 60 | 0 | 21 | 15 | 0.9379 | 0.9908 | 0.9908 | DNR | DNR | DNR |
| 7 | 10 | 80 | 0 | 37 | 20 | 0.3750 | 0.1791 | 0.1846 | DNR | DNR | DNR |
| 7 | 10 | 100 | 0 | 96 | 30 | 0.2236 | 0.1714 | 0.1739 | DNR | DNR | DNR |

Note: KS denotes the two-sample Kolmogorov-Smirnov test, Z denotes the test based on the normal approximation, T denotes the test based on the t-distribution. P-values are reported for the three tests. DNR and R denote 'do not reject' and 'reject', respectively. We correct for multiple testing using $\alpha = 0.05$, see Appendix B for details.

Table SA.11: Huhehaote-Baotou

| VSB | SPD | Temp | PCP | Subs 1 | Subs 2 | KS | Z | T | KS | Z | T |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | 5 | 20 | 0 | 85 | 174 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 7 | 5 | 40 | 0 | 165 | 260 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 7 | 5 | 60 | 0 | 209 | 238 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 7 | 5 | 80 | 0 | 391 | 314 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 7 | 10 | 20 | 0 | 87 | 189 | 0.0029 | 0.0011 | 0.0012 | R | R | R |
| 7 | 10 | 40 | 0 | 167 | 404 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 7 | 10 | 60 | 0 | 177 | 421 | 0.0000 | 0.0006 | 0.0006 | R | R | R |
| 7 | 10 | 80 | 0 | 237 | 605 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 7 | 10 | 100 | 0 | 18 | 15 | 0.2633 | 0.8051 | 0.8067 | DNR | DNR | DNR |
| 7 | 15 | 20 | 0 | 15 | 18 | 0.2297 | 0.2742 | 0.2826 | DNR | DNR | DNR |
| 7 | 15 | 40 | 0 | 25 | 44 | 0.0004 | 0.0021 | 0.0030 | R | R | R |
| 7 | 15 | 60 | 0 | 21 | 49 | 0.5676 | 0.6243 | 0.6258 | DNR | DNR | DNR |

Note: KS denotes the two-sample Kolmogorov-Smirnov test, Z denotes the test based on the normal approximation, T denotes the test based on the t-distribution. P-values are reported for the three tests. DNR and R denote 'do not reject' and 'reject', respectively. We correct for multiple testing using $\alpha = 0.05$, see Appendix B for details.

Table SA.12: Jilin-Changchun

| VSB | SPD | Temp | PCP | Subs 1 | Subs 2 | KS | Z | T | KS | Z | T |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 5 | 20 | 0 | 22 | 23 | 0.2876 | 0.0437 | 0.0500 | DNR | DNR | DNR |
| 3 | 5 | 20 | 0 | 55 | 55 | 0.2931 | 0.5001 | 0.5015 | DNR | DNR | DNR |
| 3 | 10 | 20 | 0 | 44 | 44 | 0.0019 | 0.0044 | 0.0055 | DNR | DNR | DNR |
| 3 | 10 | 40 | 0 | 22 | 21 | 0.5896 | 0.9046 | 0.9052 | DNR | DNR | DNR |
| 4 | 5 | 20 | 0 | 60 | 69 | 0.5941 | 0.6107 | 0.6116 | DNR | DNR | DNR |
| 4 | 5 | 40 | 0 | 14 | 16 | 0.9034 | 0.8758 | 0.8769 | DNR | DNR | DNR |
| 4 | 5 | 80 | 0 | 12 | 15 | 0.3725 | 0.8071 | 0.8091 | DNR | DNR | DNR |
| 4 | 10 | 20 | 0 | 78 | 80 | 0.1238 | 0.9665 | 0.9666 | DNR | DNR | DNR |
| 4 | 10 | 40 | 0 | 23 | 26 | 0.1220 | 0.2352 | 0.2411 | DNR | DNR | DNR |
| 4 | 10 | 60 | 0 | 14 | 14 | 0.8622 | 0.9148 | 0.9156 | DNR | DNR | DNR |
| 4 | 10 | 80 | 0 | 20 | 21 | 0.1090 | 0.2945 | 0.3010 | DNR | DNR | DNR |
| 5 | 5 | 20 | 0 | 27 | 37 | 0.6949 | 0.4855 | 0.4881 | DNR | DNR | DNR |
| 5 | 5 | 40 | 0 | 16 | 23 | 0.7231 | 0.4729 | 0.4774 | DNR | DNR | DNR |
| 5 | 5 | 80 | 0 | 23 | 28 | 0.0341 | 0.0223 | 0.0266 | DNR | DNR | DNR |
| 5 | 10 | 20 | 0 | 102 | 109 | 0.3150 | 0.9614 | 0.9615 | DNR | DNR | DNR |
| 5 | 10 | 40 | 0 | 35 | 42 | 0.2590 | 0.2268 | 0.2306 | DNR | DNR | DNR |
| 5 | 10 | 60 | 0 | 27 | 30 | 0.8707 | 0.7262 | 0.7275 | DNR | DNR | DNR |
| 5 | 10 | 80 | 0 | 41 | 48 | 0.5160 | 0.4272 | 0.4293 | DNR | DNR | DNR |
| 5 | 15 | 20 | 0 | 11 | 12 | 0.9094 | 0.4611 | 0.4693 | DNR | DNR | DNR |
| 5 | 15 | 40 | 0 | 18 | 20 | 0.0321 | 0.1370 | 0.1457 | DNR | DNR | DNR |
| 5 | 15 | 60 | 0 | 16 | 18 | 0.0265 | 0.4086 | 0.4147 | DNR | DNR | DNR |
| 6 | 5 | 40 | 0 | 19 | 24 | 0.9193 | 0.8686 | 0.8694 | DNR | DNR | DNR |
| 6 | 5 | 80 | 0 | 55 | 58 | 0.5082 | 0.1965 | 0.1992 | DNR | DNR | DNR |
| 6 | 10 | 20 | 0 | 111 | 117 | 0.0161 | 0.0091 | 0.0097 | DNR | DNR | DNR |
| 6 | 10 | 40 | 0 | 62 | 72 | 0.2833 | 0.3891 | 0.3907 | DNR | DNR | DNR |
| 6 | 10 | 60 | 0 | 42 | 47 | 0.1369 | 0.0392 | 0.0422 | DNR | DNR | DNR |
| 6 | 10 | 80 | 0 | 51 | 57 | 0.3393 | 0.4998 | 0.5013 | DNR | DNR | DNR |
| 6 | 15 | 20 | 0 | 22 | 23 | 0.8871 | 0.8464 | 0.8473 | DNR | DNR | DNR |
| 6 | 15 | 40 | 0 | 18 | 23 | 0.9592 | 0.8126 | 0.8138 | DNR | DNR | DNR |
| 6 | 15 | 60 | 0 | 18 | 21 | 0.1159 | 0.2557 | 0.2630 | DNR | DNR | DNR |
| 6 | 15 | 80 | 0 | 25 | 25 | 0.9896 | 0.8861 | 0.8867 | DNR | DNR | DNR |
| 7 | 5 | 60 | 0 | 47 | 73 | 0.6485 | 0.1894 | 0.1919 | DNR | DNR | DNR |
| 7 | 5 | 80 | 0 | 143 | 231 | 0.9707 | 0.3753 | 0.3759 | DNR | DNR | DNR |
| 7 | 10 | 20 | 0 | 55 | 136 | 0.0644 | 0.5915 | 0.5921 | DNR | DNR | DNR |
| 7 | 10 | 40 | 0 | 129 | 189 | 0.5809 | 0.4635 | 0.4640 | DNR | DNR | DNR |
| 7 | 10 | 60 | 0 | 167 | 199 | 0.6478 | 0.7768 | 0.7770 | DNR | DNR | DNR |
| 7 | 10 | 80 | 0 | 259 | 346 | 0.5969 | 0.4232 | 0.4235 | DNR | DNR | DNR |
| 7 | 10 | 100 | 0 | 13 | 20 | 0.8874 | 0.5906 | 0.5944 | DNR | DNR | DNR |
| 7 | 15 | 20 | 0 | 27 | 36 | 0.5563 | 0.9017 | 0.9021 | DNR | DNR | DNR |
| 7 | 15 | 40 | 0 | 47 | 76 | 0.0035 | 0.2769 | 0.2790 | DNR | DNR | DNR |
| 7 | 15 | 60 | 0 | 75 | 88 | 0.9792 | 0.8886 | 0.8888 | DNR | DNR | DNR |
| 7 | 15 | 80 | 0 | 74 | 97 | 0.9964 | 0.9079 | 0.9080 | DNR | DNR | DNR |
| 7 | 20 | 60 | 0 | 14 | 24 | 0.8439 | 0.4591 | 0.4639 | DNR | DNR | DNR |
| 7 | 20 | 80 | 0 | 20 | 27 | 0.0434 | 0.0754 | 0.0822 | DNR | DNR | DNR |

Note: KS denotes the two-sample Kolmogorov-Smirnov test, Z denotes the test based on the normal approximation, T denotes the test based on the t-distribution. P-values are reported for the three tests. DNR and R denote 'do not reject' and 'reject', respectively. We correct for multiple testing using $\alpha = 0.05$, see Appendix B for details.

Table SA.13: Shenyang-Fushun

| VSB | SPD | Temp | PCP | Subs 1 | Subs 2 | KS | Z | T | KS | Z | T |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 5 | 20 | 0 | 20 | 11 | 0.6791 | 0.7903 | 0.7922 | DNR | DNR | DNR |
| 3 | 5 | 20 | 0 | 52 | 18 | 0.2609 | 0.5721 | 0.5739 | DNR | DNR | DNR |
| 3 | 5 | 40 | 0 | 32 | 17 | 0.6064 | 0.2441 | 0.2499 | DNR | DNR | DNR |
| 3 | 5 | 80 | 0 | 17 | 14 | 0.6253 | 0.7506 | 0.7529 | DNR | DNR | DNR |
| 4 | 5 | 20 | 0 | 48 | 31 | 0.8645 | 0.5686 | 0.5703 | DNR | DNR | DNR |
| 4 | 5 | 40 | 0 | 54 | 30 | 0.0015 | 0.0054 | 0.0067 | DNR | DNR | DNR |
| 4 | 5 | 60 | 0 | 29 | 23 | 0.2930 | 0.4554 | 0.4589 | DNR | DNR | DNR |
| 4 | 5 | 80 | 0 | 57 | 43 | 0.1626 | 0.3612 | 0.3634 | DNR | DNR | DNR |
| 4 | 10 | 60 | 0 | 18 | 12 | 0.6927 | 0.3610 | 0.3688 | DNR | DNR | DNR |
| 4 | 10 | 80 | 0 | 25 | 16 | 0.1991 | 0.0396 | 0.0464 | DNR | DNR | DNR |
| 5 | 5 | 20 | 0 | 46 | 38 | 0.2011 | 0.2416 | 0.2450 | DNR | DNR | DNR |
| 5 | 5 | 40 | 0 | 44 | 27 | 0.0603 | 0.2445 | 0.2485 | DNR | DNR | DNR |
| 5 | 5 | 60 | 0 | 38 | 23 | 0.4710 | 0.0860 | 0.0912 | DNR | DNR | DNR |
| 5 | 5 | 80 | 0 | 129 | 89 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 5 | 10 | 20 | 0 | 29 | 14 | 0.8690 | 0.3804 | 0.3855 | DNR | DNR | DNR |
| 5 | 10 | 40 | 0 | 40 | 22 | 0.3137 | 0.8955 | 0.8959 | DNR | DNR | DNR |
| 5 | 10 | 60 | 0 | 36 | 23 | 0.5988 | 0.9515 | 0.9517 | DNR | DNR | DNR |
| 5 | 10 | 80 | 0 | 51 | 28 | 0.0005 | 0.0091 | 0.0109 | R | DNR | DNR |
| 6 | 5 | 20 | 0 | 70 | 70 | 0.4429 | 0.6010 | 0.6018 | DNR | DNR | DNR |
| 6 | 5 | 40 | 0 | 61 | 45 | 0.0637 | 0.0158 | 0.0176 | DNR | DNR | DNR |
| 6 | 5 | 60 | 0 | 53 | 40 | 0.0192 | 0.0170 | 0.0191 | DNR | DNR | DNR |
| 6 | 5 | 80 | 0 | 160 | 124 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 6 | 10 | 20 | 0 | 50 | 36 | 0.8603 | 0.9891 | 0.9892 | DNR | DNR | DNR |
| 6 | 10 | 40 | 0 | 62 | 54 | 0.0383 | 0.1368 | 0.1396 | DNR | DNR | DNR |
| 6 | 10 | 60 | 0 | 81 | 61 | 0.3513 | 0.8743 | 0.8745 | DNR | DNR | DNR |
| 6 | 10 | 80 | 0 | 169 | 114 | 0.0001 | 0.0000 | 0.0000 | R | R | R |
| 6 | 15 | 40 | 0 | 22 | 19 | 0.7941 | 0.2323 | 0.2396 | DNR | DNR | DNR |
| 6 | 15 | 60 | 0 | 26 | 18 | 0.1820 | 0.0982 | 0.1057 | DNR | DNR | DNR |
| 7 | 5 | 20 | 0 | 102 | 123 | 0.0113 | 0.1624 | 0.1638 | DNR | DNR | DNR |
| 7 | 5 | 40 | 0 | 96 | 97 | 0.2004 | 0.0385 | 0.0398 | DNR | DNR | DNR |
| 7 | 5 | 60 | 0 | 123 | 109 | 0.0045 | 0.0179 | 0.0188 | DNR | DNR | DNR |
| 7 | 5 | 80 | 0 | 264 | 207 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 7 | 10 | 20 | 0 | 66 | 79 | 0.7460 | 0.5636 | 0.5645 | DNR | DNR | DNR |
| 7 | 10 | 40 | 0 | 161 | 163 | 0.0007 | 0.0079 | 0.0083 | DNR | DNR | DNR |
| 7 | 10 | 60 | 0 | 169 | 149 | 0.0013 | 0.0312 | 0.0319 | DNR | DNR | DNR |
| 7 | 10 | 80 | 0 | 283 | 213 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 7 | 15 | 40 | 0 | 23 | 18 | 0.0725 | 0.3446 | 0.3504 | DNR | DNR | DNR |
| 7 | 15 | 60 | 0 | 26 | 16 | 0.3860 | 0.4585 | 0.4628 | DNR | DNR | DNR |
| 7 | 15 | 80 | 0 | 30 | 23 | 0.0637 | 0.0529 | 0.0584 | DNR | DNR | DNR |

Note: KS denotes the two-sample Kolmogorov-Smirnov test, Z denotes the test based on the normal approximation, T denotes the test based on the t-distribution. P-values are reported for the three tests. DNR and R denote 'do not reject' and 'reject', respectively. We correct for multiple testing using $\alpha = 0.05$, see Appendix B for details.

Table SA.14: Yinchuan-Shizuishan

| VSB | SPD | Temp | PCP | Subs 1 | Subs 2 | KS | Z | T | KS | Z | T |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 5 | 40 | 0.0 | 25 | 11 | 0.6907 | 0.4161 | 0.4217 | DNR | DNR | DNR |
| 6 | 5 | 40 | 0 | 39 | 14 | 0.9683 | 0.8619 | 0.8626 | DNR | DNR | DNR |
| 7 | 5 | 20 | 0 | 63 | 31 | 0.9496 | 0.5733 | 0.5747 | DNR | DNR | DNR |
| 7 | 5 | 40 | 0 | 334 | 115 | 0.4478 | 0.6296 | 0.6299 | DNR | DNR | DNR |
| 7 | 5 | 60 | 0 | 348 | 205 | 0.0434 | 0.1240 | 0.1246 | DNR | DNR | DNR |
| 7 | 5 | 80 | 0 | 593 | 416 | 0.0425 | 0.0007 | 0.0007 | DNR | R | R |
| 7 | 5 | 100 | 0 | 69 | 41 | 0.8509 | 0.5302 | 0.5315 | DNR | DNR | DNR |
| 7 | 10 | 20 | 0 | 22 | 14 | 0.419863 | 0.642193 | 0.645155 | DNR | DNR | DNR |
| 7 | 10 | 40 | 0 | 154 | 68 | 0.099932 | 0.397501 | 0.39842 | DNR | DNR | DNR |
| 7 | 10 | 60 | 0 | 289 | 145 | 0.000108 | 0.001937 | 0.002064 | R | R | DNR |
| 7 | 10 | 80 | 0 | 521 | 270 | 0.002098 | 0.009442 | 0.009618 | DNR | DNR | DNR |
| 7 | 10 | 100 | 0 | 40 | 16 | 0.211188 | 0.099758 | 0.105567 | DNR | DNR | DNR |
| 7 | 15 | 60 | 0 | 35 | 14 | 0.460835 | 0.844428 | 0.845274 | DNR | DNR | DNR |

Note: KS denotes the two-sample Kolmogorov-Smirnov test, Z denotes the test based on the normal approximation, T denotes the test based on the t-distribution. P-values are reported for the three tests. DNR and R denote 'do not reject' and 'reject', respectively. We correct for multiple testing using $\alpha = 0.05$, see Appendix B for details.

Table SA.15: Xian-Xianyang I

| VSB | SPD | Temp | PCP | Subs 1 | Subs 2 | KS | Z | T | KS | Z | T |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 40 | 0 | 153 | 152 | 0.0357 | 0.4504 | 0.4510 | DNR | DNR | DNR |
| 1 | 5 | 60 | 0 | 91 | 82 | 0.0932 | 0.2174 | 0.2191 | DNR | DNR | DNR |
| 1 | 5 | 80 | 0 | 66 | 62 | 0.0002 | 0.0000 | 0.0000 | R | R | R |
| 1 | 10 | 40 | 0 | 22 | 23 | 0.9321 | 0.9344 | 0.9348 | DNR | DNR | DNR |
| 1 | 10 | 60 | 0 | 16 | 15 | 0.8112 | 0.9337 | 0.9342 | DNR | DNR | DNR |
| 1 | 10 | 80 | 0 | 32 | 29 | 0.0032 | 0.0001 | 0.0003 | DNR | R | R |
| 2 | 5 | 40 | 0 | 96 | 88 | 0.0744 | 0.0230 | 0.0242 | DNR | DNR | DNR |
| 2 | 5 | 60 | 0 | 119 | 104 | 0.3121 | 0.6448 | 0.6452 | DNR | DNR | DNR |
| 2 | 5 | 80 | 0 | 54 | 40 | 0.0120 | 0.0011 | 0.0016 | DNR | DNR | DNR |
| 2 | 10 | 40 | 0 | 18 | 17 | 0.5377 | 0.4727 | 0.4778 | DNR | DNR | DNR |
| 2 | 10 | 60 | 0 | 37 | 33 | 0.0425 | 0.0171 | 0.0199 | DNR | DNR | DNR |
| 2 | 10 | 80 | 0 | 66 | 59 | 0.0005 | 0.0015 | 0.0019 | DNR | DNR | DNR |
| 2 | 10 | 100 | 0 | 23 | 21 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 2 | 15 | 80 | 0 | 18 | 16 | 0.0018 | 0.0000 | 0.0002 | DNR | R | R |
| 3 | 5 | 40 | 0 | 120 | 93 | 0.0000 | 0.0000 | 0.0000 | R | R | R |
| 3 | 5 | 60 | 0 | 121 | 94 | 0.2578 | 0.0772 | 0.0786 | DNR | DNR | DNR |
| 3 | 5 | 80 | 0 | 99 | 71 | 0.1335 | 0.2693 | 0.2709 | DNR | DNR | DNR |
| 3 | 10 | 40 | 0 | 27 | 19 | 0.4742 | 0.2610 | 0.2671 | DNR | DNR | DNR |
| 3 | 10 | 60 | 0 | 39 | 35 | 0.4048 | 0.1966 | 0.2007 | DNR | DNR | DNR |
| 3 | 10 | 80 | 0 | 65 | 49 | 0.0047 | 0.0063 | 0.0073 | DNR | DNR | DNR |
| 3 | 10 | 100 | 0 | 13 | 13 | 0.0280 | 0.0943 | 0.1073 | DNR | DNR | DNR |
| 3 | 15 | 80 | 0 | 19 | 13 | 0.1115 | 0.7014 | 0.7041 | DNR | DNR | DNR |
| 3 | 15 | 100 | 0 | 16 | 15 | 0.0001 | 0.0000 | 0.0001 | R | R | R |
| 4 | 5 | 40 | 0 | 97 | 76 | 0.1567 | 0.0143 | 0.0153 | DNR | DNR | DNR |
| 4 | 5 | 60 | 0 | 127 | 93 | 0.2021 | 0.0565 | 0.0578 | DNR | DNR | DNR |
| 4 | 5 | 80 | 0 | 104 | 77 | 0.0778 | 0.8732 | 0.8734 | DNR | DNR | DNR |
| 4 | 5 | 100 | 0 | 17 | 14 | 0.1909 | 0.5901 | 0.5942 | DNR | DNR | DNR |
| 4 | 10 | 40 | 0 | 30 | 26 | 0.6331 | 0.2689 | 0.2738 | DNR | DNR | DNR |
| 4 | 10 | 60 | 0 | 67 | 50 | 0.1752 | 0.5326 | 0.5338 | DNR | DNR | DNR |
| 4 | 10 | 80 | 0 | 86 | 67 | 0.0012 | 0.1289 | 0.1310 | DNR | DNR | DNR |
| 4 | 10 | 100 | 0 | 14 | 12 | 0.0300 | 0.2191 | 0.2310 | DNR | DNR | DNR |
| 5 | 5 | 40 | 0 | 56 | 45 | 0.0429 | 0.0013 | 0.0017 | DNR | DNR | DNR |
| 5 | 5 | 60 | 0 | 92 | 67 | 0.0001 | 0.3793 | 0.3807 | R | DNR | DNR |
| 5 | 5 | 80 | 0 | 116 | 88 | 0.0058 | 0.2991 | 0.3004 | DNR | DNR | DNR |
| 5 | 5 | 100 | 0 | 13 | 11 | 0.1208 | 0.4876 | 0.4949 | DNR | DNR | DNR |
| 5 | 10 | 40 | 0 | 21 | 19 | 0.9074 | 0.6547 | 0.6573 | DNR | DNR | DNR |
| 5 | 10 | 60 | 0 | 42 | 39 | 0.2323 | 0.3831 | 0.3857 | DNR | DNR | DNR |
| 5 | 10 | 80 | 0 | 74 | 60 | 0.0018 | 0.5990 | 0.5999 | DNR | DNR | DNR |
| 5 | 10 | 100 | 0 | 20 | 16 | 0.0461 | 0.7430 | 0.7450 | DNR | DNR | DNR |

Note: KS denotes the two-sample Kolmogorov-Smirnov test, Z denotes the test based on the normal approximation, T denotes the test based on the t-distribution. P-values are reported for the three tests. DNR and R denote 'do not reject' and 'reject', respectively. We correct for multiple testing using $\alpha = 0.05$, see Appendix B for details.

Table SA.16: Xian-Xianyang II

| VSB | SPD | Temp | PCP | Subs 1 | Subs 2 | KS | Z | T | KS | Z | T |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 5 | 40 | 0 | 41 | 35 | 0.0491 | 0.0184 | 0.0211 | DNR | DNR | DNR |
| 6 | 5 | 60 | 0 | 76 | 65 | 0.1816 | 0.4096 | 0.4110 | DNR | DNR | DNR |
| 6 | 5 | 80 | 0 | 128 | 105 | 0.0252 | 0.8945 | 0.8947 | DNR | DNR | DNR |
| 6 | 5 | 100 | 0 | 46 | 37 | 0.1707 | 0.5414 | 0.5431 | DNR | DNR | DNR |
| 6 | 10 | 40 | 0 | 39 | 40 | 0.2456 | 0.4660 | 0.4682 | DNR | DNR | DNR |
| 6 | 10 | 60 | 0 | 71 | 60 | 0.1010 | 0.8141 | 0.8145 | DNR | DNR | DNR |
| 6 | 10 | 80 | 0 | 90 | 75 | 0.0009 | 0.0174 | 0.0186 | DNR | DNR | DNR |
| 6 | 10 | 100 | 0 | 47 | 41 | 0.0013 | 0.1373 | 0.1410 | DNR | DNR | DNR |
| 6 | 15 | 80 | 0 | 23 | 18 | 0.0963 | 0.3057 | 0.3120 | DNR | DNR | DNR |
| 7 | 5 | 60 | 0 | 28 | 18 | 0.9672 | 0.5727 | 0.5756 | DNR | DNR | DNR |
| 7 | 5 | 80 | 0 | 99 | 59 | 0.0298 | 0.0374 | 0.0390 | DNR | DNR | DNR |
| 7 | 5 | 100 | 0 | 70 | 50 | 0.5321 | 0.7907 | 0.7912 | DNR | DNR | DNR |
| 7 | 10 | 60 | 0 | 26 | 15 | 0.4083 | 0.2688 | 0.2756 | DNR | DNR | DNR |
| 7 | 10 | 80 | 0 | 73 | 50 | 0.0375 | 0.1524 | 0.1550 | DNR | DNR | DNR |
| 7 | 10 | 100 | 0 | 71 | 45 | 0.3448 | 0.2232 | 0.2257 | DNR | DNR | DNR |

Note: KS denotes the two-sample Kolmogorov-Smirnov test, Z denotes the test based on the normal approximation, T denotes the test based on the t-distribution. P-values are reported for the three tests. DNR and R denote 'do not reject' and 'reject', respectively. We correct for multiple testing using $\alpha = 0.05$, see Appendix B for details.

Table SA.17: Robustness Checks for $PM_{10}$ McCrary Test: Discontinuity at $c = 0.1$ I

| | a | | | $\hat{P}(PM_{10} > c)$ | $\#(PM_{10} > c)$ | | a | | | $\hat{P}(PM_{10} > c)$ | $\#(PM_{10} > c)$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10 | 15 | 20 | | | | 10 | 15 | 20 | | |
| Shenzhen | NaN | -2.11 | -2.31 | 0.002 | 8 | Zhenjiang | -0.18 | -0.31 | -0.32 | 0.058 | 160 |
| Deyang | -1.79 | -1.62 | -1.26 | 0.008 | 21 | Changzhi | 0.27 | -0.26 | -0.14 | 0.153 | 480 |
| Zhengzhou | -1.44 | -1.50 | -1.05 | 0.057 | 207 | Baoji | -0.13 | -0.24 | 0.72 | 0.091 | 286 |
| Anshan | -0.87 | -1.43 | -1.99 | 0.074 | 206 | Mudanjiang | 0.46 | -0.22 | -0.43 | 0.047 | 148 |
| Qiqihaer | -1.29 | -1.34 | -1.60 | 0.022 | 69 | Shaoxing | -0.29 | -0.20 | -0.09 | 0.050 | 157 |
| Jiujiang | -0.74 | -1.28 | -1.57 | 0.023 | 65 | Guiyang | -1.10 | -0.20 | 0.79 | 0.013 | 46 |
| Mianyang | -1.20 | -1.22 | -0.65 | 0.016 | 51 | Maanshan | 0.22 | -0.19 | -0.12 | 0.016 | 44 |
| Xianyang | -1.43 | -1.21 | 1.57 | 0.123 | 385 | Shantou | NaN | -0.17 | -0.22 | 0.001 | 3 |
| Wuhu | -1.08 | -1.08 | -1.21 | 0.006 | 17 | Kunming | NaN | -0.16 | 1.22 | 0.001 | 3 |
| Nanning | -0.86 | -1.00 | -0.85 | 0.003 | 12 | Dalian | -0.32 | -0.16 | -0.08 | 0.016 | 58 |
| Jinan | -0.65 | -0.99 | -1.34 | 0.113 | 408 | Rizhao | -0.14 | -0.13 | -0.48 | 0.005 | 17 |
| Benxi | -0.96 | -0.77 | -0.79 | 0.050 | 137 | Baotou | -0.64 | -0.13 | 0.98 | 0.207 | 650 |
| Luzhou | -0.77 | -0.74 | -0.83 | 0.100 | 316 | Jinchang | -0.38 | -0.13 | -0.12 | 0.058 | 183 |
| Datong | -0.32 | -0.69 | -0.22 | 0.168 | 528 | Lianyungang | 0.01 | -0.13 | -0.09 | 0.053 | 191 |
| Xining | -0.47 | -0.66 | 0.30 | 0.099 | 359 | Changde | 0.15 | -0.07 | 0.16 | 0.037 | 116 |
| Zibo | -1.16 | -0.65 | 0.33 | 0.024 | 76 | Lasa | -0.25 | 0.00 | -0.17 | 0.011 | 40 |
| Yinchuan | 0.14 | -0.58 | -0.77 | 0.049 | 177 | Weifang | 0.31 | 0.00 | -0.10 | 0.014 | 39 |
| Changchun | -0.36 | -0.58 | -0.82 | 0.032 | 116 | Liuzhou | 0.00 | 0.06 | 0.30 | 0.004 | 11 |
| Suzhou | -0.08 | -0.53 | -0.94 | 0.071 | 257 | Yueyang | 0.81 | 0.07 | -0.11 | 0.104 | 327 |
| Zunyi | -0.49 | -0.51 | 0.15 | 0.032 | 102 | Baoding | 0.29 | 0.17 | -0.50 | 0.058 | 181 |
| Changzhou | 0.11 | -0.49 | -0.95 | 0.046 | 145 | Lanzhou | -0.09 | 0.18 | 0.54 | 0.265 | 958 |
| Hefei | 1.05 | -0.45 | -1.11 | 0.072 | 261 | Yangquan | -0.33 | 0.20 | 0.60 | 0.089 | 245 |
| Zigong | -0.38 | -0.36 | -0.50 | 0.005 | 10 | Xiangtan | 0.81 | 0.22 | -0.12 | 0.127 | 398 |
| Zaozhuang | 0.20 | -0.35 | -0.44 | 0.044 | 137 | Shenyang | 1.05 | 0.25 | 0.08 | 0.110 | 397 |
| Fuzhou | 0.45 | -0.34 | -0.61 | 0.006 | 21 | Wuxi | 0.47 | 0.26 | 0.50 | 0.039 | 124 |

This table reports the McCrary t-statistic for each city using the $PM_{10}$ concentration data with cutoff for discontinuity at $c = 0.1$.

*Notes*: $a = h/\hat{b}$, $h$ is the bandwidth and $\hat{b} = 2\hat{\sigma}/\sqrt{n}$, where $\hat{\sigma}$ is the standard deviation of the pollutant concentration. For more details, please see the appendix in the paper.

Table SA.18: Robustness Checks for $PM_{10}$ McCrary Test: Discontinuity at $c = 0.1$ II

| | a | | | | | | a | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10 | 15 | 20 | $\hat{P}(PM_{10} > c)$ | $\#(PM_{10} > c)$ | | 10 | 15 | 20 | $\hat{P}(PM\_10 > c)$ | $\#(PM\_10 > c)$ |
| 'Taian' | 0.04 | 0.30 | 0.07 | 0.010 | 31 | 'Panzhihua' | 1.91 | 1.53 | 1.32 | 0.078 | 245 |
| 'Hangzhou' | 1.10 | 0.30 | 0.15 | 0.082 | 298 | 'Xuzhou' | 1.49 | 1.60 | 2.00 | 0.164 | 515 |
| 'Wenzhou' | NaN | 0.38 | 0.34 | 0.004 | 14 | 'Pingdingshan' | 1.56 | 1.60 | 1.77 | 0.137 | 429 |
| 'Shanghai' | 0.17 | 0.38 | 0.47 | 0.052 | 189 | 'Yangzhou' | 1.94 | 1.70 | 1.31 | 0.068 | 213 |
| 'Xian' | 0.74 | 0.46 | 0.26 | 0.123 | 445 | 'Chifeng' | 1.47 | 1.79 | 2.41 | 0.082 | 258 |
| 'Yichang' | 0.43 | 0.52 | 0.89 | 0.034 | 95 | 'Ningbo' | 1.56 | 1.79 | 1.80 | 0.033 | 116 |
| 'Changsha' | 1.23 | 0.53 | -0.14 | 0.106 | 384 | 'Qingdao' | 1.91 | 1.80 | 1.53 | 0.033 | 119 |
| 'Jining' | 0.45 | 0.54 | 0.64 | 0.014 | 39 | 'Anyang' | 2.06 | 1.92 | 1.93 | 0.136 | 428 |
| 'Guangzhou' | 0.79 | 0.55 | 0.67 | 0.018 | 65 | 'Zhuzhou' | 2.39 | 1.95 | 2.45 | 0.088 | 277 |
| 'Nantong' | 0.08 | 0.57 | 0.57 | 0.056 | 201 | 'Fushun' | 1.47 | 1.97 | 2.39 | 0.067 | 184 |
| 'Sanmenxia' | 0.84 | 0.63 | 0.88 | 0.072 | 199 | 'Tongchuan' | 2.33 | 2.04 | 1.72 | 0.121 | 380 |
| 'Luoyang' | 1.51 | 0.69 | 0.05 | 0.160 | 504 | 'Handan' | 2.37 | 2.12 | 1.79 | 0.079 | 218 |
| 'Yibin' | 0.74 | 0.82 | 0.48 | 0.045 | 140 | 'Taiyuan' | 2.17 | 2.21 | 2.38 | 0.169 | 611 |
| 'Shijiazhuang' | 1.04 | 0.85 | 0.43 | 0.151 | 548 | 'Shaoguan' | 2.10 | 2.24 | 2.27 | 0.017 | 54 |
| 'Haerbin' | 0.70 | 0.91 | 1.17 | 0.074 | 268 | 'Tangshan' | 2.46 | 2.63 | 2.59 | 0.045 | 142 |
| 'Shizuishan' | 1.24 | 0.96 | 1.28 | 0.041 | 103 | 'Wuhan' | 2.81 | 2.68 | 2.37 | 0.107 | 389 |
| 'Chongqing' | 1.07 | 0.97 | 1.15 | 0.119 | 422 | 'Quanzhou' | 2.62 | 2.69 | 2.56 | 0.015 | 48 |
| 'Yantai' | 0.42 | 0.99 | 1.08 | 0.008 | 30 | 'Wulumuqi' | 2.86 | 3.98 | 4.69 | 0.200 | 724 |
| 'Nanchang' | 1.22 | 1.03 | 0.94 | 0.043 | 156 | 'Qinhuangdao' | 2.56 | 5.17 | -0.51 | 0.005 | 18 |
| 'Huzhou' | 1.03 | 1.08 | 1.15 | 0.020 | 64 | 'Linfen' | 3.37 | 5.49 | 4.43 | 0.238 | 748 |
| 'Tianjin' | 1.29 | 1.12 | 0.54 | 0.092 | 334 | 'Beihai' | NaN | NaN | NaN | 0.000 | 1 |
| 'Jinzhou' | 0.66 | 1.12 | 1.46 | 0.049 | 136 | 'Guilin' | NaN | NaN | NaN | 0.000 | 1 |
| 'Beijing' | 1.61 | 1.17 | 1.72 | 0.197 | 712 | 'Haikou' | NaN | NaN | NaN | 0.000 | 0 |
| 'Weinan' | 1.28 | 1.19 | 1.63 | 0.152 | 420 | 'Kelamayi' | NaN | NaN | NaN | 0.004 | 13 |
| 'Nanjing' | 1.36 | 1.21 | 0.94 | 0.094 | 340 | 'Nanchong' | NaN | NaN | NaN | 0.001 | 1 |
| 'Jiaozuo' | 0.86 | 1.21 | 1.90 | 0.073 | 203 | 'Qujing' | NaN | NaN | NaN | 0.000 | 0 |
| 'Huhehaote' | 1.64 | 1.29 | 1.80 | 0.076 | 275 | 'Xiamen' | NaN | NaN | NaN | 0.002 | 6 |
| 'Chengdou' | 1.23 | 1.35 | 1.51 | 0.065 | 233 | 'Yuxi' | NaN | NaN | NaN | 0.000 | 0 |
| 'Kaifeng' | 1.85 | 1.35 | 1.49 | 0.142 | 448 | 'Zhanjiang' | NaN | NaN | NaN | 0.000 | 0 |
| 'Yanan' | 1.51 | 1.43 | 1.03 | 0.083 | 262 | 'Zhuhai' | NaN | NaN | NaN | 0.000 | 0 |
| 'Jilin' | 1.65 | 1.45 | 1.37 | 0.044 | 123 | | | | | | |

This table reports the McCrary t-statistic for each city using the $PM_{10}$ concentration data with cutoff for discontinuity at $c = 0.1$.

*Notes*: $a = h/\hat{b}$, $h$ is the bandwidth and $\hat{b} = 2\hat{\sigma}/\sqrt{n}$, where $\hat{\sigma}$ is the standard deviation of the pollutant concentration. For more details, please see the appendix in the paper. $\hat{P}(PM_{10} > c)$ and $\#(PM_{10} > c)$ denote the empirical probability and the number of observations, respectively, that $PM_{10}$ is greater than the cutoff $c$ specified above.

Table SA.19: Robustness Checks for $PM_{10}$ McCrary Test: Discontinuity at $c = 0.2$ I

| | 10 | 15 | 20 | P($PM_{10} > c$) | $\sum(PM\_10 > c)$ | | 10 | 15 | 20 | $P(PM_{10} > c)$ | $\sum(PM_{10} > c)$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 'Shenzhen' | NaN | -2.11 | -2.31 | 0.002 | 8 | 'Zhenjiang' | -0.18 | -0.31 | -0.32 | 0.058 | 160 |
| 'Deyang' | -1.79 | -1.62 | -1.26 | 0.008 | 21 | 'Changzhi' | 0.27 | -0.26 | -0.14 | 0.153 | 480 |
| 'Zhengzhou' | -1.44 | -1.50 | -1.05 | 0.057 | 207 | 'Baoji' | -0.13 | -0.24 | 0.72 | 0.091 | 286 |
| 'Anshan' | -0.87 | -1.43 | -1.99 | 0.074 | 206 | 'Mudanjiang' | 0.46 | -0.22 | -0.43 | 0.047 | 148 |
| 'Qiqihaer' | -1.29 | -1.34 | -1.60 | 0.022 | 69 | 'Shaoxing' | -0.29 | -0.20 | -0.09 | 0.050 | 157 |
| 'Jiujiang' | -0.74 | -1.28 | -1.57 | 0.023 | 65 | 'Guiyang' | -1.10 | -0.20 | 0.79 | 0.013 | 46 |
| 'Mianyang' | -1.20 | -1.22 | -0.65 | 0.016 | 51 | 'Maanshan' | 0.22 | -0.19 | -0.12 | 0.016 | 44 |
| 'Xianyang' | -1.43 | -1.21 | 1.57 | 0.123 | 385 | 'Shantou' | NaN | -0.17 | -0.22 | 0.001 | 3 |
| 'Wuhu' | -1.08 | -1.08 | -1.21 | 0.006 | 17 | 'Kunming' | NaN | -0.16 | 1.22 | 0.001 | 3 |
| 'Nanning' | -0.86 | -1.00 | -0.85 | 0.003 | 12 | 'Dalian' | -0.32 | -0.16 | -0.08 | 0.016 | 58 |
| 'Jinan' | -0.65 | -0.99 | -1.34 | 0.113 | 408 | 'Rizhao' | -0.14 | -0.13 | -0.48 | 0.005 | 17 |
| 'Benxi' | -0.96 | -0.77 | -0.79 | 0.050 | 137 | 'Baotou' | -0.64 | -0.13 | 0.98 | 0.207 | 650 |
| 'Luzhou' | -0.77 | -0.74 | -0.83 | 0.100 | 316 | 'Jinchang' | -0.38 | -0.13 | -0.12 | 0.058 | 183 |
| 'Datong' | -0.32 | -0.69 | -0.22 | 0.168 | 528 | 'Lianyungang' | 0.01 | -0.13 | -0.09 | 0.053 | 191 |
| 'Xining' | -0.47 | -0.66 | 0.30 | 0.099 | 359 | 'Changde' | 0.15 | -0.07 | 0.16 | 0.037 | 116 |
| 'Zibo' | -1.16 | -0.65 | 0.33 | 0.024 | 76 | 'Lasa' | -0.25 | 0.00 | -0.17 | 0.011 | 40 |
| 'Yinchuan' | 0.14 | -0.58 | -0.77 | 0.049 | 177 | 'Weifang' | 0.31 | 0.00 | -0.10 | 0.014 | 39 |
| 'Changchun' | -0.36 | -0.58 | -0.82 | 0.032 | 116 | 'Liuzhou' | 0.00 | 0.06 | 0.30 | 0.004 | 11 |
| 'Suzhou' | -0.08 | -0.53 | -0.94 | 0.071 | 257 | 'Yueyang' | 0.81 | 0.07 | -0.11 | 0.104 | 327 |
| 'Zunyi' | -0.49 | -0.51 | 0.15 | 0.032 | 102 | 'Baoding' | 0.29 | 0.17 | -0.50 | 0.058 | 181 |
| 'Changzhou' | 0.11 | -0.49 | -0.95 | 0.046 | 145 | 'Lanzhou' | -0.09 | 0.18 | 0.54 | 0.265 | 958 |
| 'Hefei' | 1.05 | -0.45 | -1.11 | 0.072 | 261 | 'Yangquan' | -0.33 | 0.20 | 0.60 | 0.089 | 245 |
| 'Zigong' | -0.38 | -0.36 | -0.50 | 0.005 | 10 | 'Xiangtan' | 0.81 | 0.22 | -0.12 | 0.127 | 398 |
| 'Zaozhuang' | 0.20 | -0.35 | -0.44 | 0.044 | 137 | 'Shenyang' | 1.05 | 0.25 | 0.08 | 0.110 | 397 |
| 'Fuzhou' | 0.45 | -0.34 | -0.61 | 0.006 | 21 | 'Wuxi' | 0.47 | 0.26 | 0.50 | 0.039 | 124 |

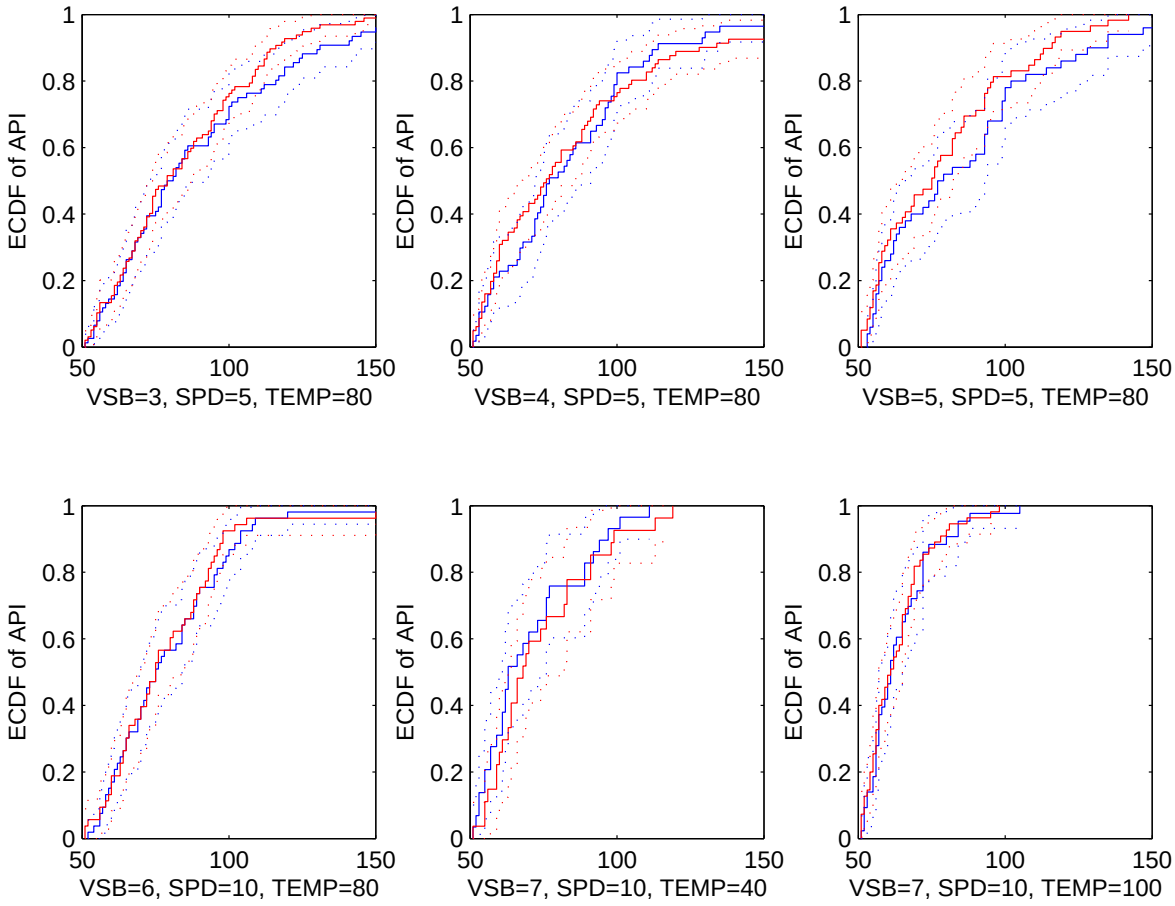


Figure SA.1: **Panel Matching Approach: Zhenjiang-Yangzhou.** The red lines represent Zhenjiang, the blue Yangzhou. The solid lines are the empirical cdfs of API conditional on the weather variables specified in the plot, the dotted lines give 95% point-wise confidence intervals for the empirical cdf. VSB denotes visibility, WSP wind speed, and TEMP temperature. The values for the weather variables are the discretized versions of the actual data for details on the discretization see Appendix C.

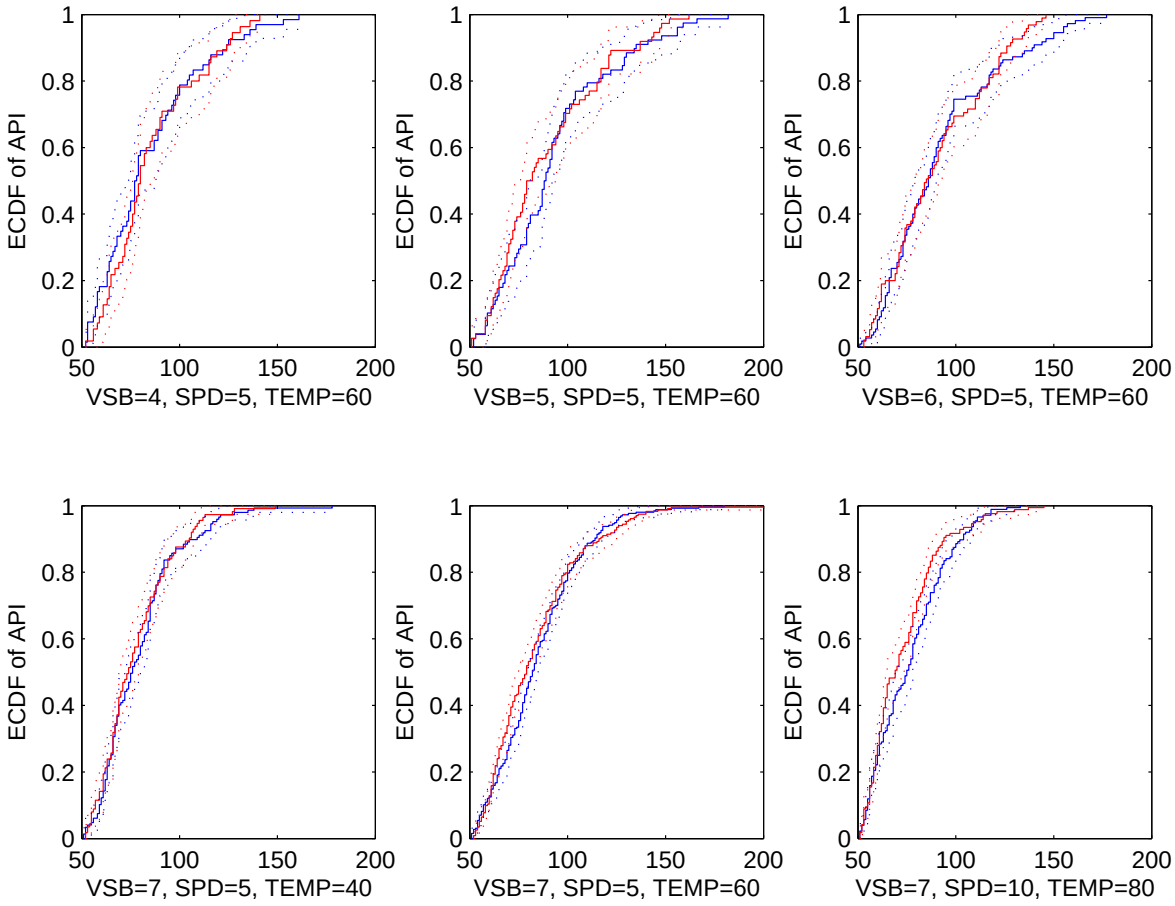


Figure SA.2: **Panel Matching Approach: Changzhou-Wuxi.** The red lines represent Changzhou, the blue Wuxi. The solid lines are the empirical cdfs of API conditional on the weather variables specified in the plot, the dotted lines give 95% point-wise confidence intervals for the empirical cdf. VSB denotes visibility, WSP wind speed, and TEMP temperature. The values for the weather variables are the discretized versions of the actual data for details on the discretization see Appendix C.

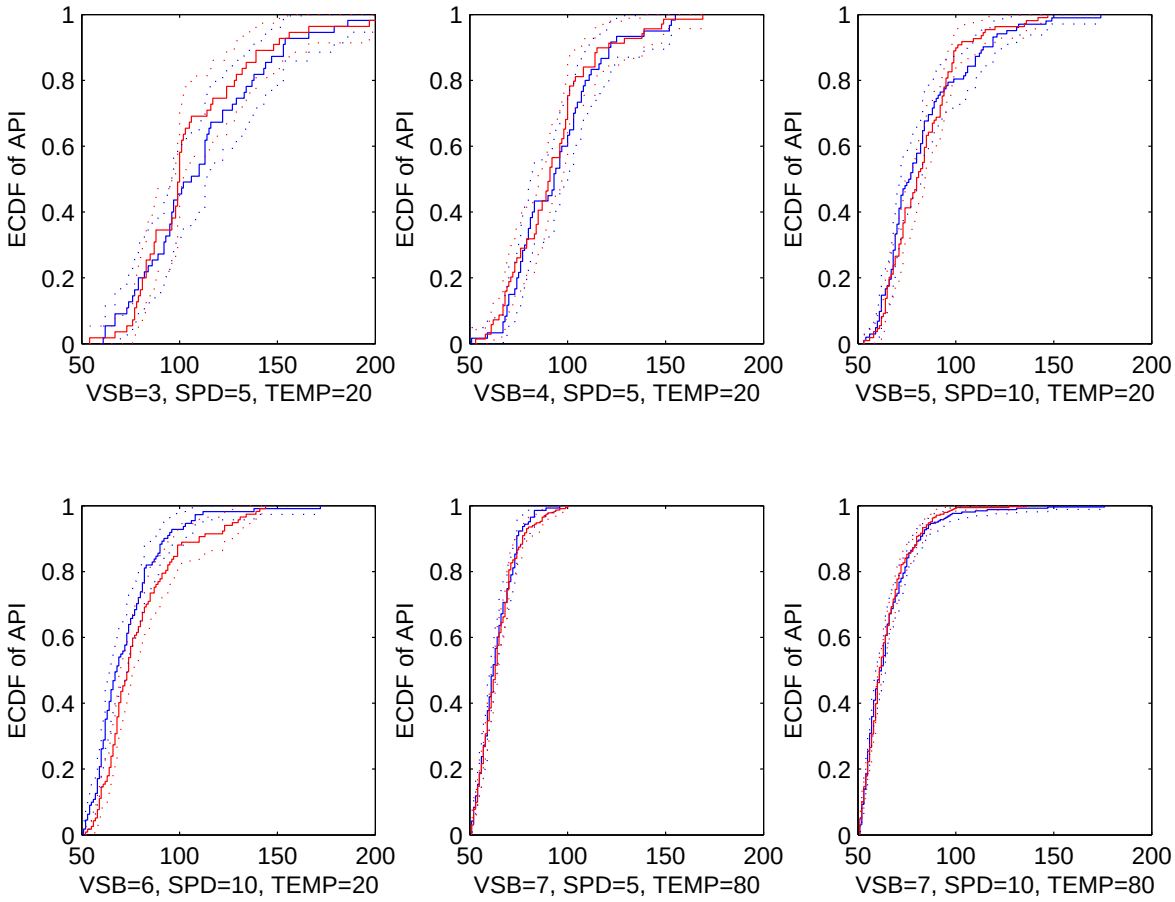


Figure SA.3: **Panel Matching Approach: Jilin-Changchun.** The red lines represent Jilin, the blue Changchun. The solid lines are the empirical cdfs of API conditional on the weather variables specified in the plot, the dotted lines give 95% point-wise confidence intervals for the empirical cdf. VSB denotes visibility, WSP wind speed, and TEMP temperature. The values for the weather variables are the discretized versions of the actual data for details on the discretization see Appendix C.

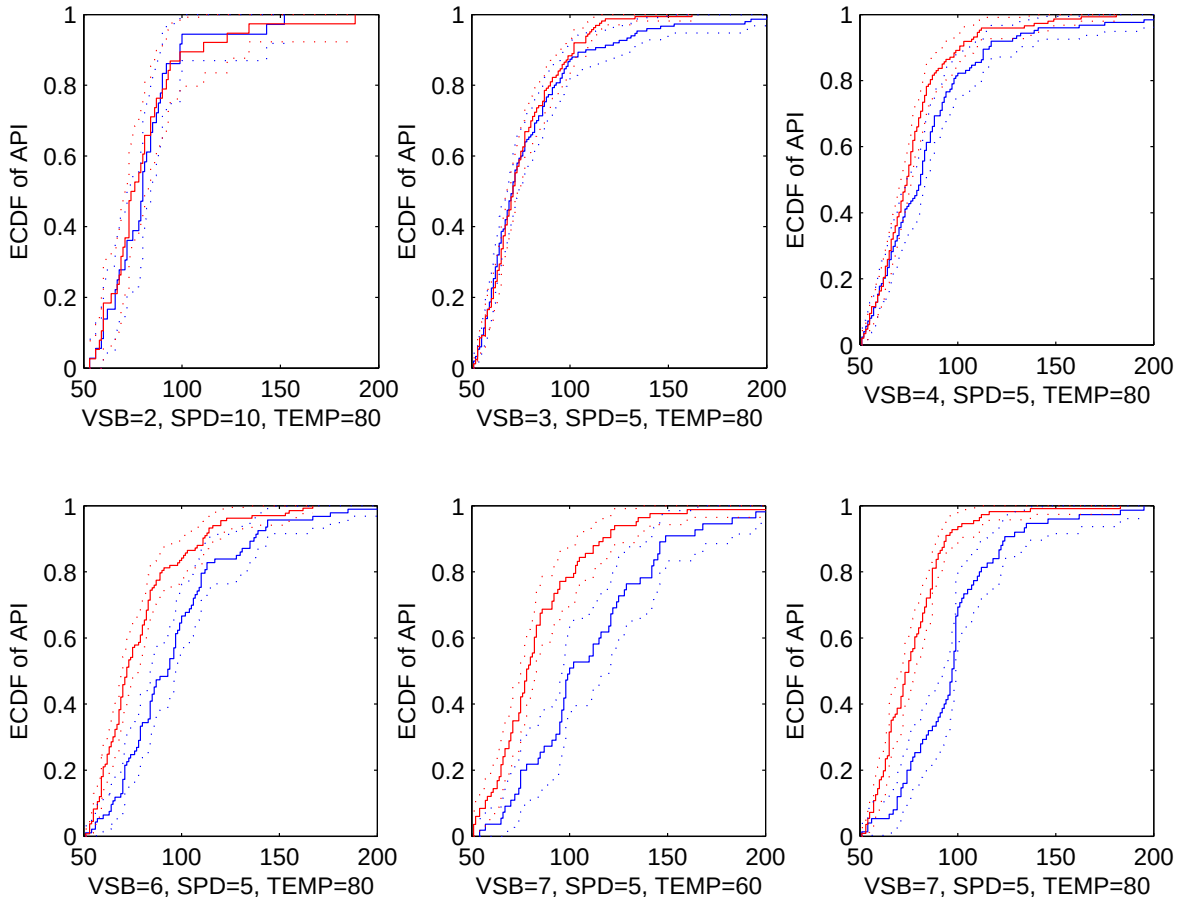


Figure SA.4: **Panel Matching Approach: Kaifeng-Zhengzhou.** The red lines represent Kaifeng, the blue Zhengzhou. The solid lines are the empirical cdfs of API conditional on the weather variables specified in the plot, the dotted lines give 95% point-wise confidence intervals for the empirical cdf. VSB denotes visibility, WSP wind speed, and TEMP temperature. The values for the weather variables are the discretized versions of the actual data for details on the discretization see Appendix C.

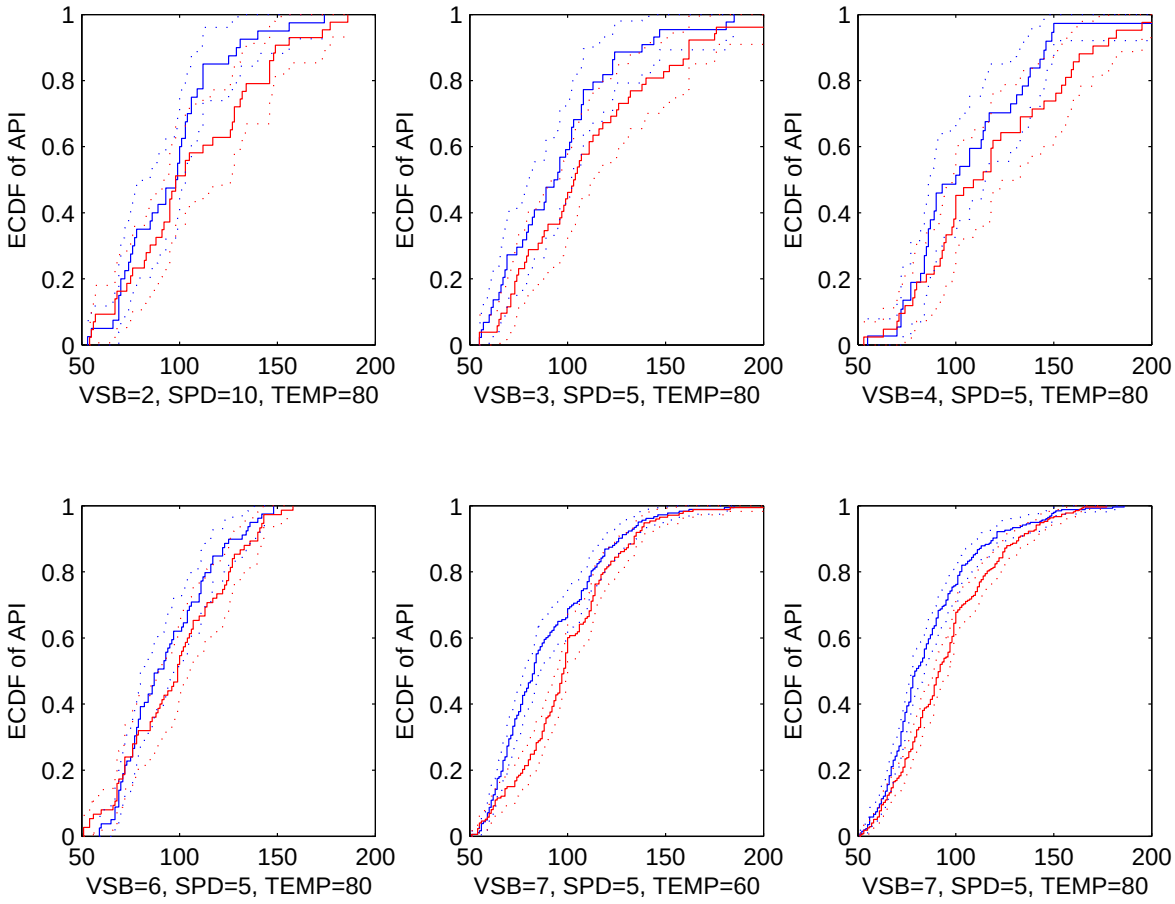


Figure SA.5: **Panel Matching Approach: Zhuzhou-Xiangtan.** The red lines represent Zhuzhou, the blue Xiangtan. The solid lines are the empirical cdfs of API conditional on the weather variables specified in the plot, the dotted lines give 95% point-wise confidence intervals for the empirical cdf. VSB denotes visibility, WSP wind speed, and TEMP temperature. The values for the weather variables are the discretized versions of the actual data for details on the discretization see Appendix C.

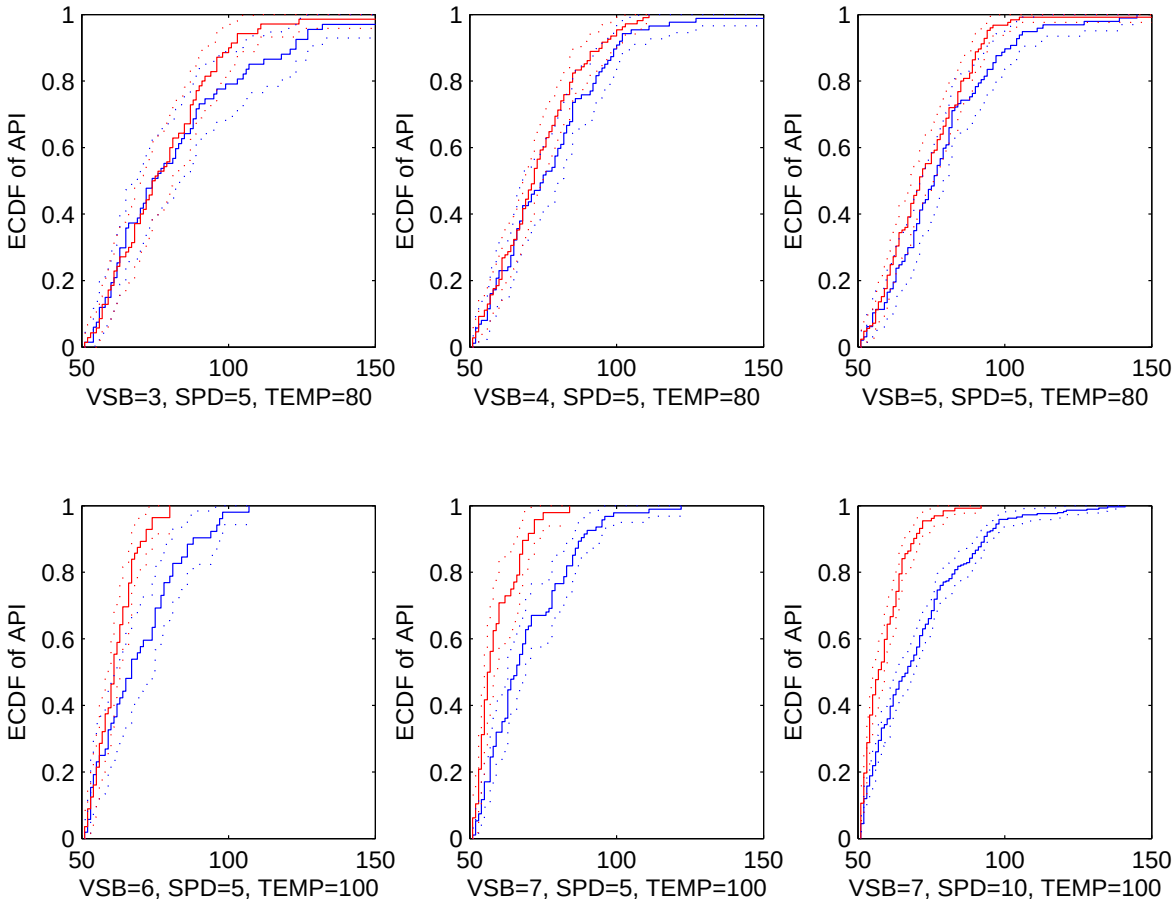


Figure SA.6: **Panel Matching Approach: Quanzhou-Xiamen.** The red lines represent Quanzhou, the blue Xiamen. The solid lines are the empirical cdfs of API conditional on the weather variables specified in the plot, the dotted lines give 95% point-wise confidence intervals for the empirical cdf. VSB denotes visibility, WSP wind speed, and TEMP temperature. The values for the weather variables are the discretized versions of the actual data for details on the discretization see Appendix C.

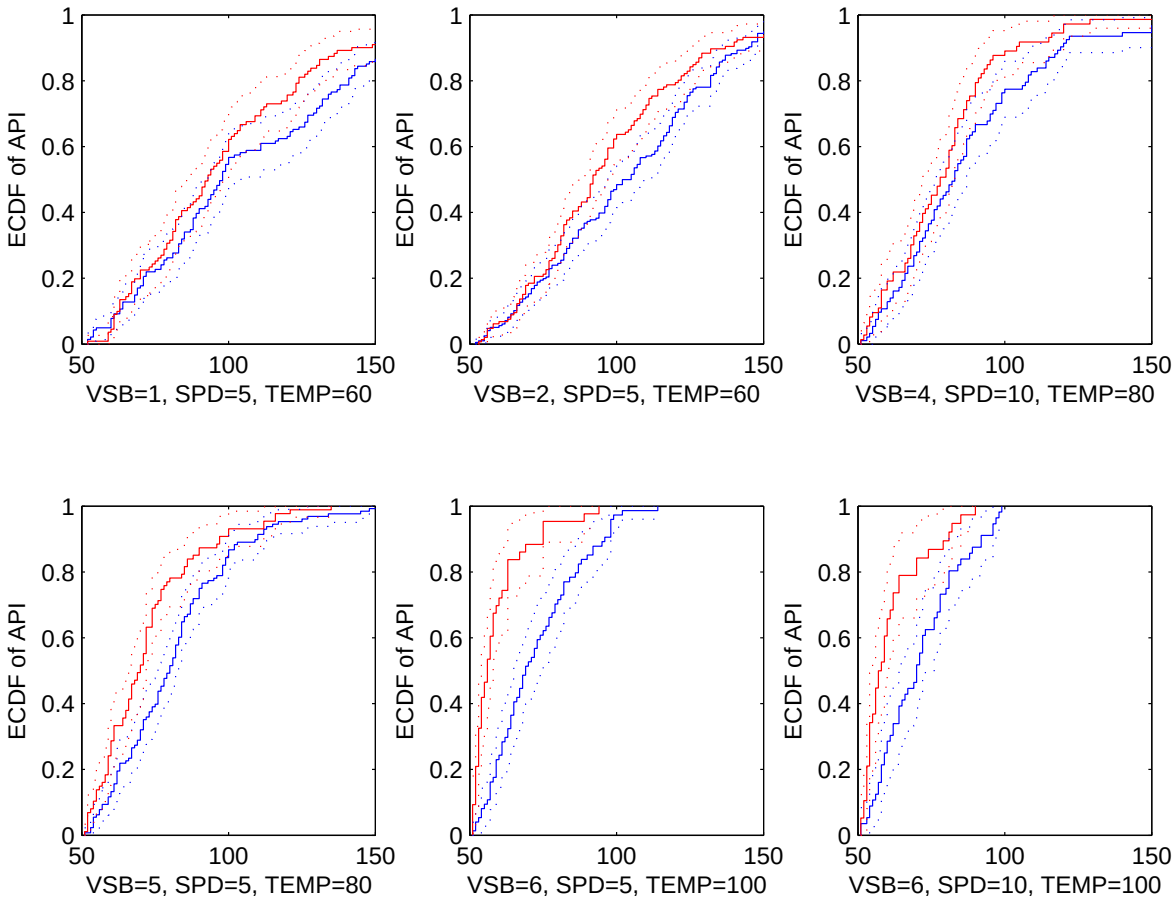


Figure SA.7: **Panel Matching Approach: Hangzhou-Shaoxing.** The red lines represent Hangzhou, the blue Shaoxing. The solid lines are the empirical cdfs of API conditional on the weather variables specified in the plot, the dotted lines give 95% point-wise confidence intervals for the empirical cdf. VSB denotes visibility, WSP wind speed, and TEMP temperature. The values for the weather variables are the discretized versions of the actual data for details on the discretization see Appendix C.

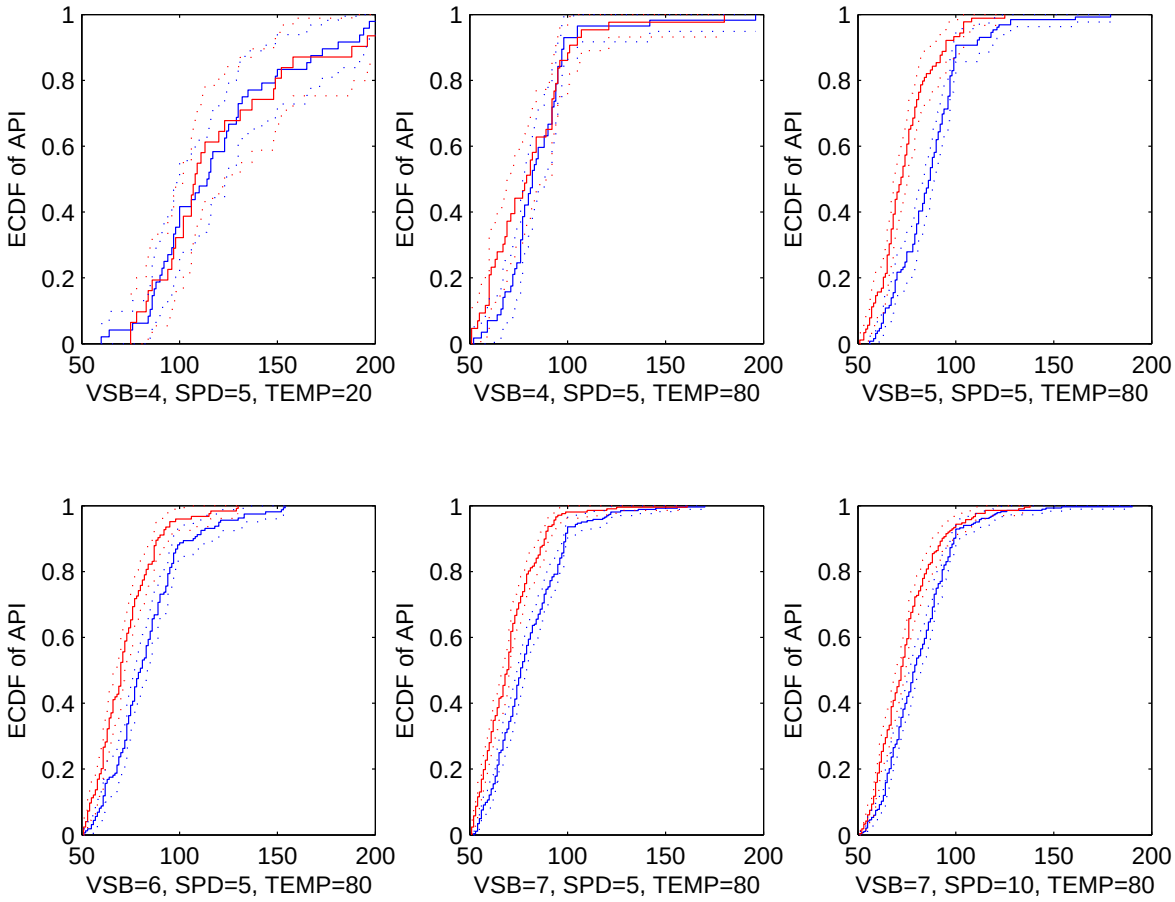


Figure SA.8: **Panel Matching Approach: Shenyang-Fushun.** The red lines represent Shenyang, the blue Fushun. The solid lines are the empirical cdfs of API conditional on the weather variables specified in the plot, the dotted lines give 95% point-wise confidence intervals for the empirical cdf. VSB denotes visibility, WSP wind speed, and TEMP temperature. The values for the weather variables are the discretized versions of the actual data for details on the discretization see Appendix C.

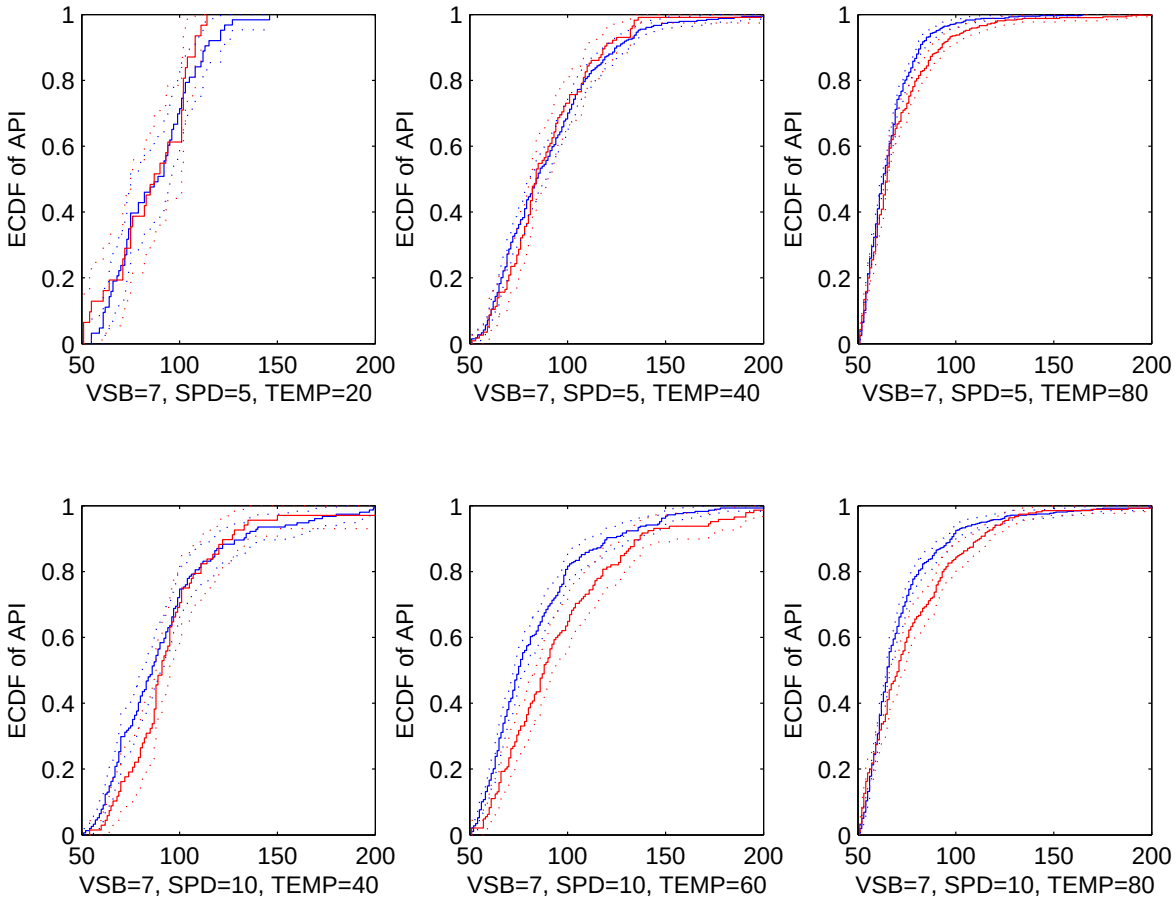


Figure SA.9: **Panel Matching Approach: Yinchuan-Shizuishan.** The red lines represent Yinchuan, the blue Shizuishan. The solid lines are the empirical cdfs of API conditional on the weather variables specified in the plot, the dotted lines give 95% point-wise confidence intervals for the empirical cdf. VSB denotes visibility, WSP wind speed, and TEMP temperature. The values for the weather variables are the discretized versions of the actual data for details on the discretization see Appendix C.

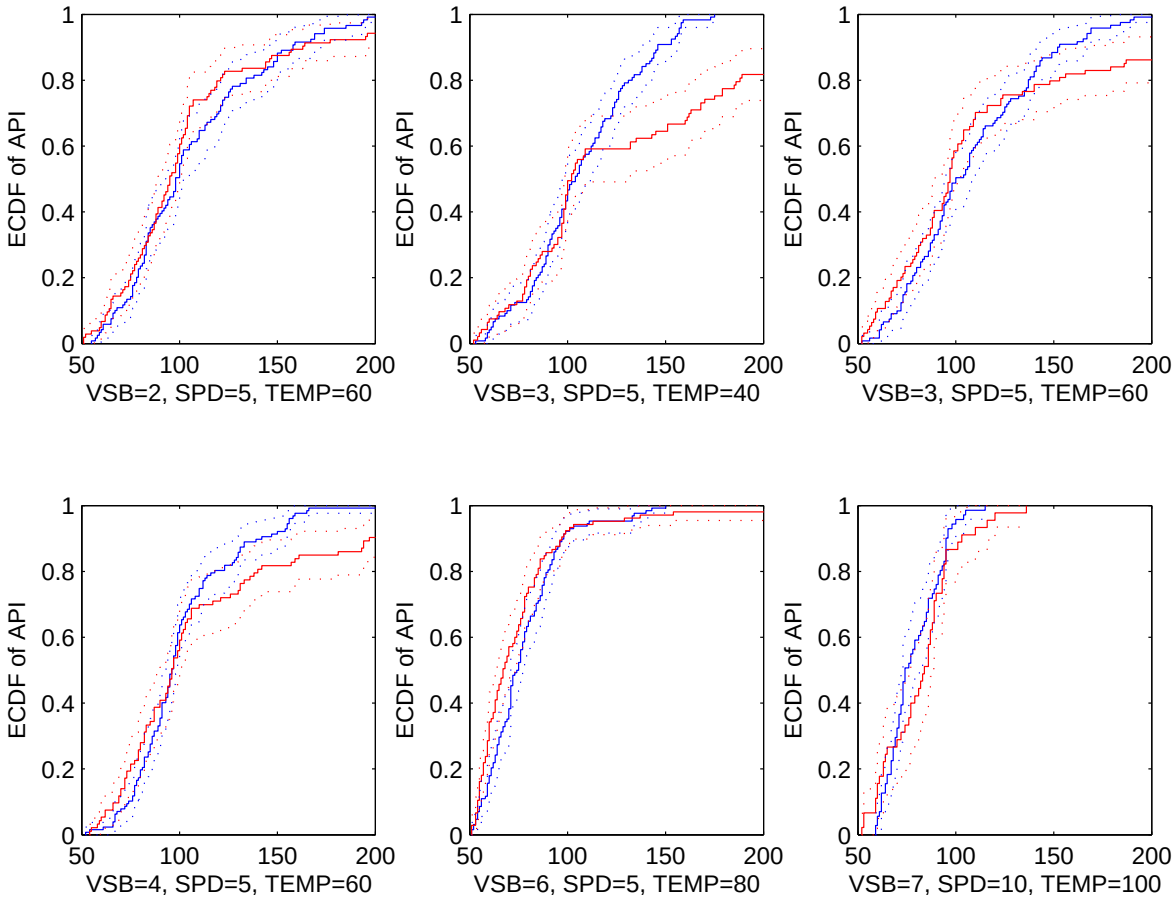


Figure SA.10: **Panel Matching Approach: Xian-Xianyang.** The red lines represent Xian, the blue Xianyang. The solid lines are the empirical cdfs of API conditional on the weather variables specified in the plot, the dotted lines give 95% point-wise confidence intervals for the empirical cdf. VSB denotes visibility, WSP wind speed, and TEMP temperature. The values for the weather variables are the discretized versions of the actual data for details on the discretization see Appendix C.

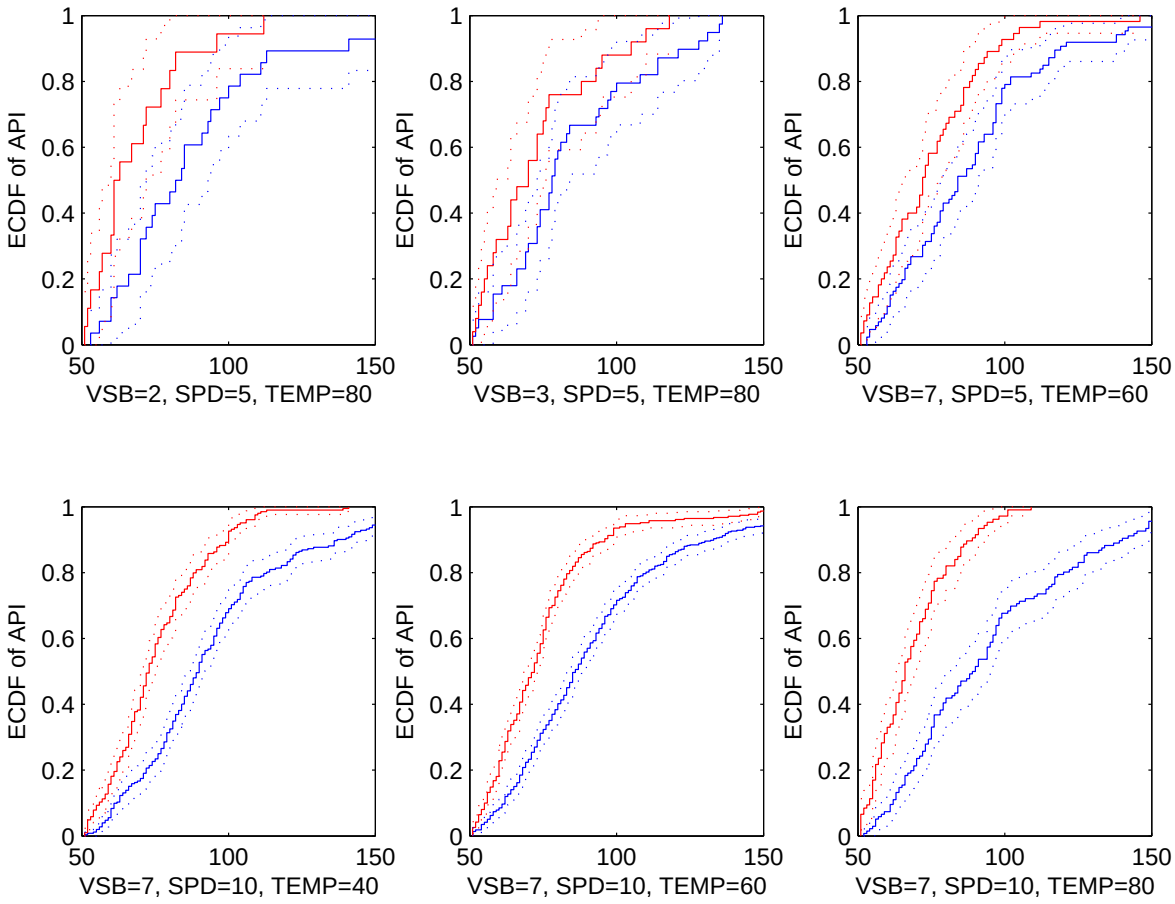


Figure SA.11: **Panel Matching Approach: Jinan-Taian.** The red lines represent Jinan, the blue Taian. The solid lines are the empirical cdfs of API conditional on the weather variables specified in the plot, the dotted lines give 95% point-wise confidence intervals for the empirical cdf. VSB denotes visibility, WSP wind speed, and TEMP temperature. The values for the weather variables are the discretized versions of the actual data for details on the discretization see Appendix C.

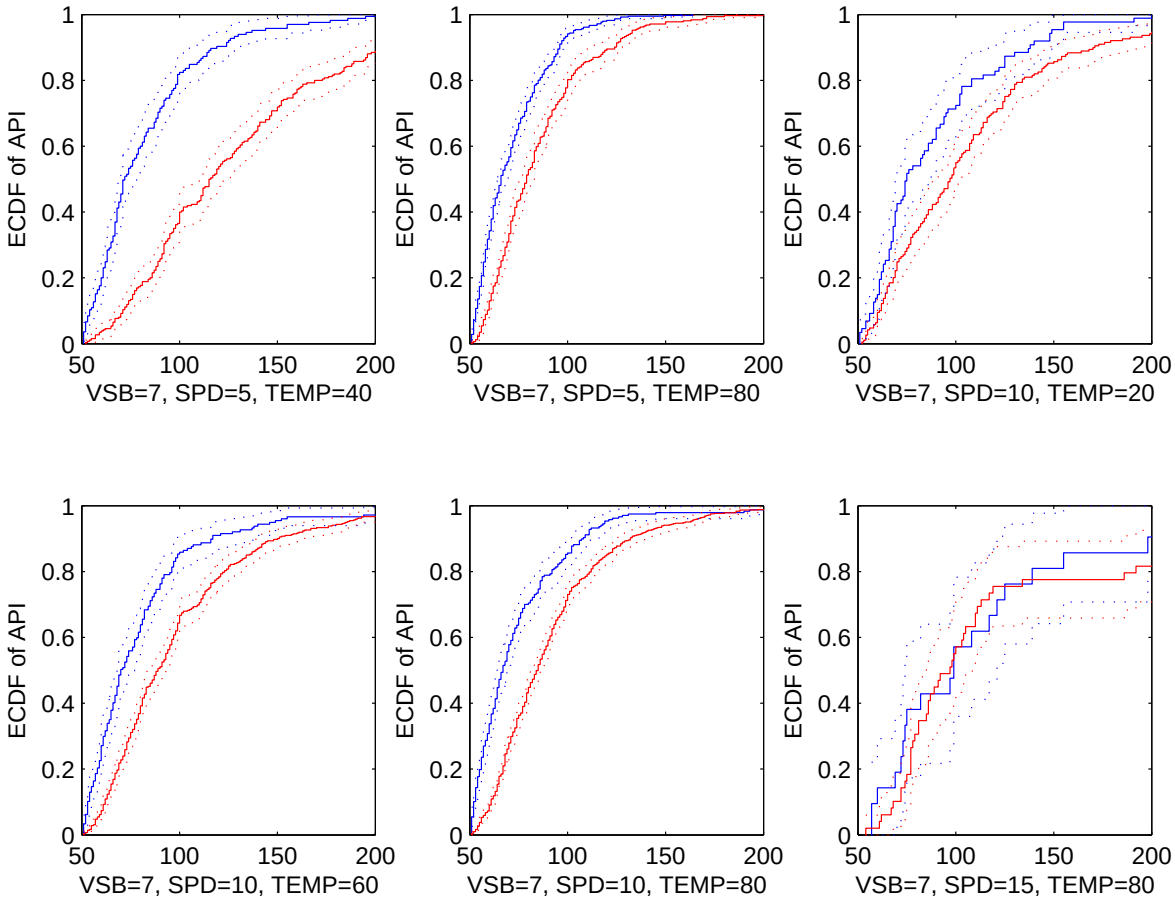


Figure SA.12: **Panel Matching Approach: Huhehaote-Baotou.** The red lines represent Huhehaote, the blue Baotou. The solid lines are the empirical cdfs of API conditional on the weather variables specified in the plot, the dotted lines give 95% point-wise confidence intervals for the empirical cdf. VSB denotes visibility, WSP wind speed, and TEMP temperature. The values for the weather variables are the discretized versions of the actual data for details on the discretization see Appendix C.

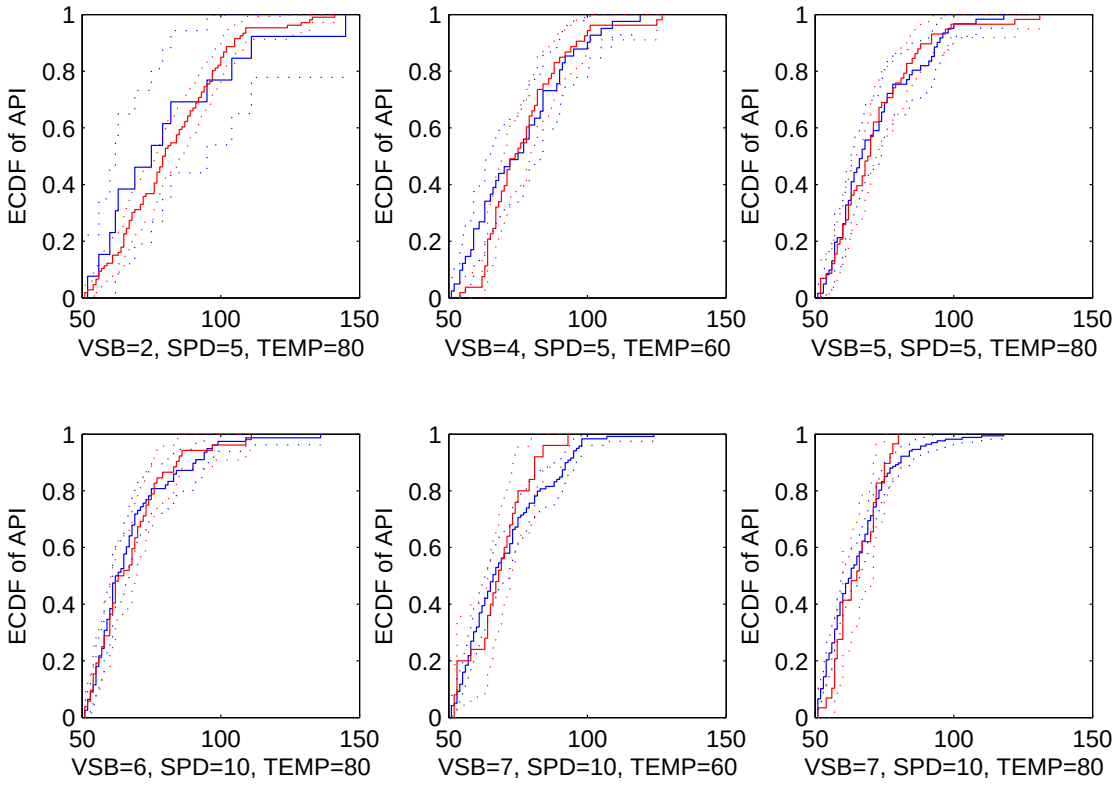


Figure SA.13: **Panel Matching Approach: Wuhu-Maanshan.** The red lines represent Wuhu, the blue Maanshan. The solid lines are the empirical cdfs of API conditional on the weather variables specified in the plot, the dotted lines give 95% point-wise confidence intervals for the empirical cdf. VSB denotes visibility, WSP wind speed, and TEMP temperature. The values for the weather variables are the discretized versions of the actual data for details on the discretization see Appendix C.