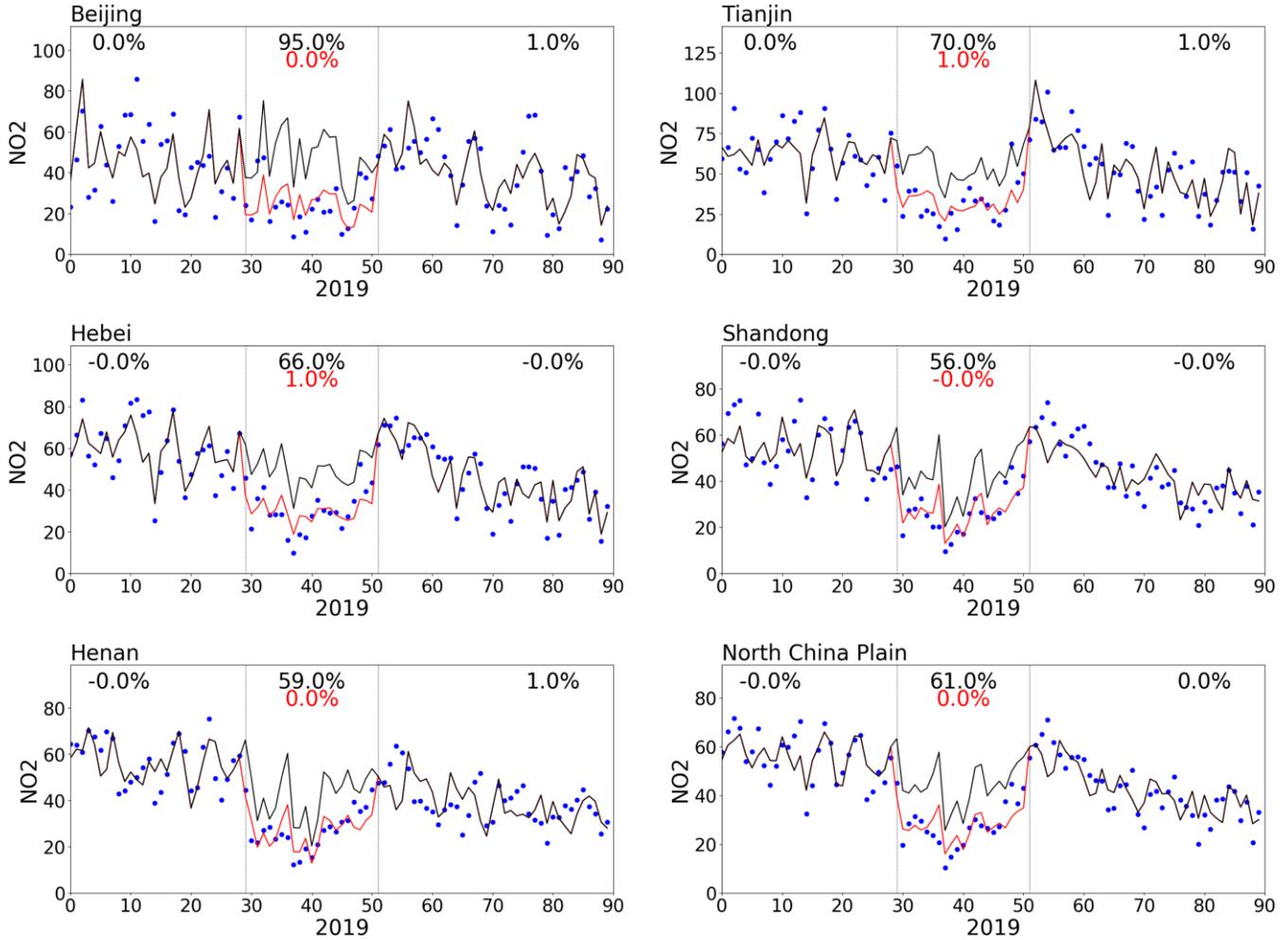


1 **Supplementary information for the manuscript *Quantifying the emission changes and associated***
2 ***air quality impacts during the COVID-19 pandemic in North China Plain: a response modeling study***

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6 **Figure S1** Comparison of the simulated average concentrations of NO₂ in NCP (the percentage numbers
7 indicate the normalized mean biases in hypothesis and actual simulations respectively for Period 2. Blue
8 dots: observations; Black line: simulations using adjusted emission with no consideration of shutdown
9 influences; Red line: simulations using adjusted emission with consideration of shutdown influences;
10 unit: $\mu\text{g m}^{-3}$)

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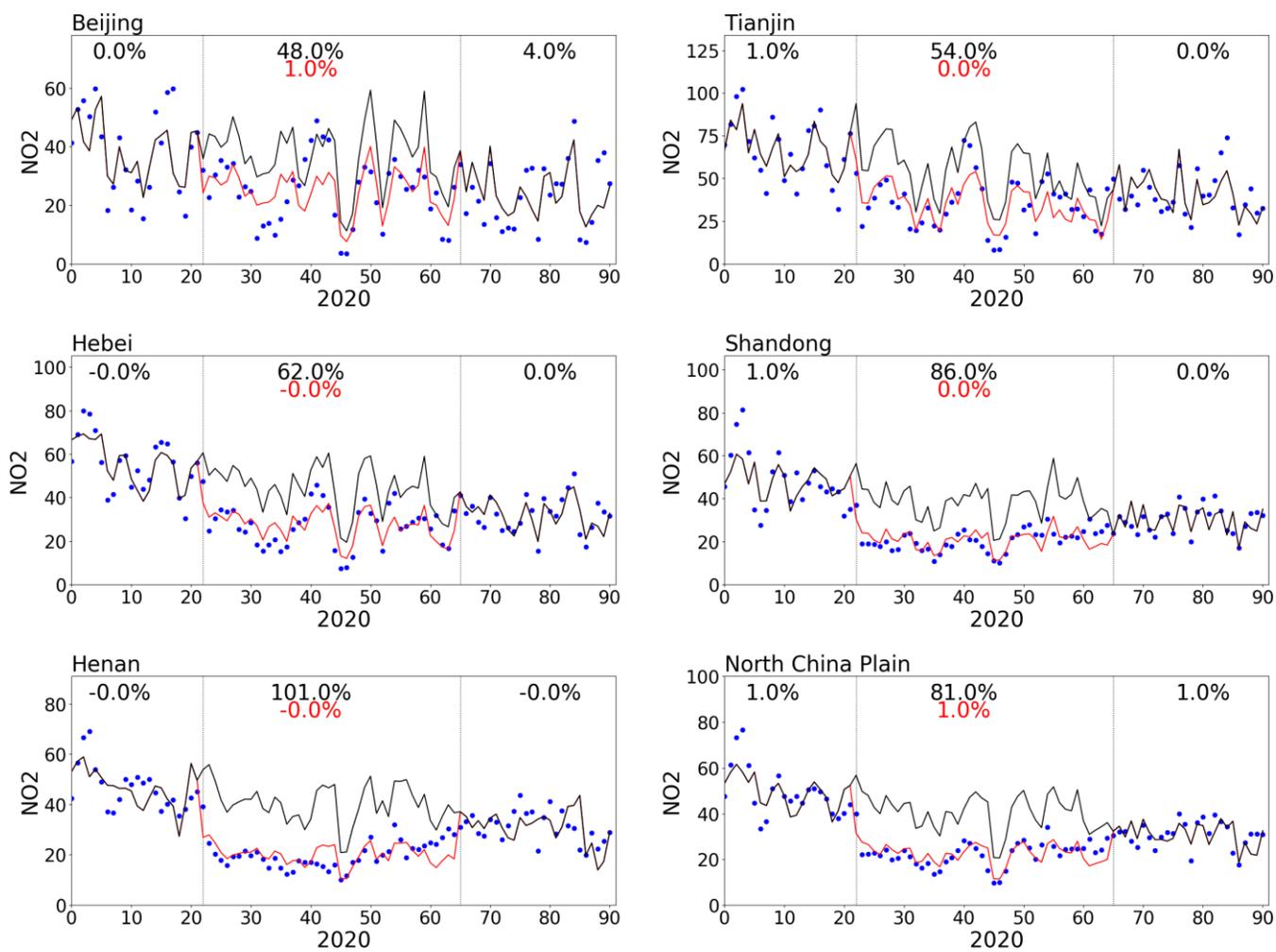
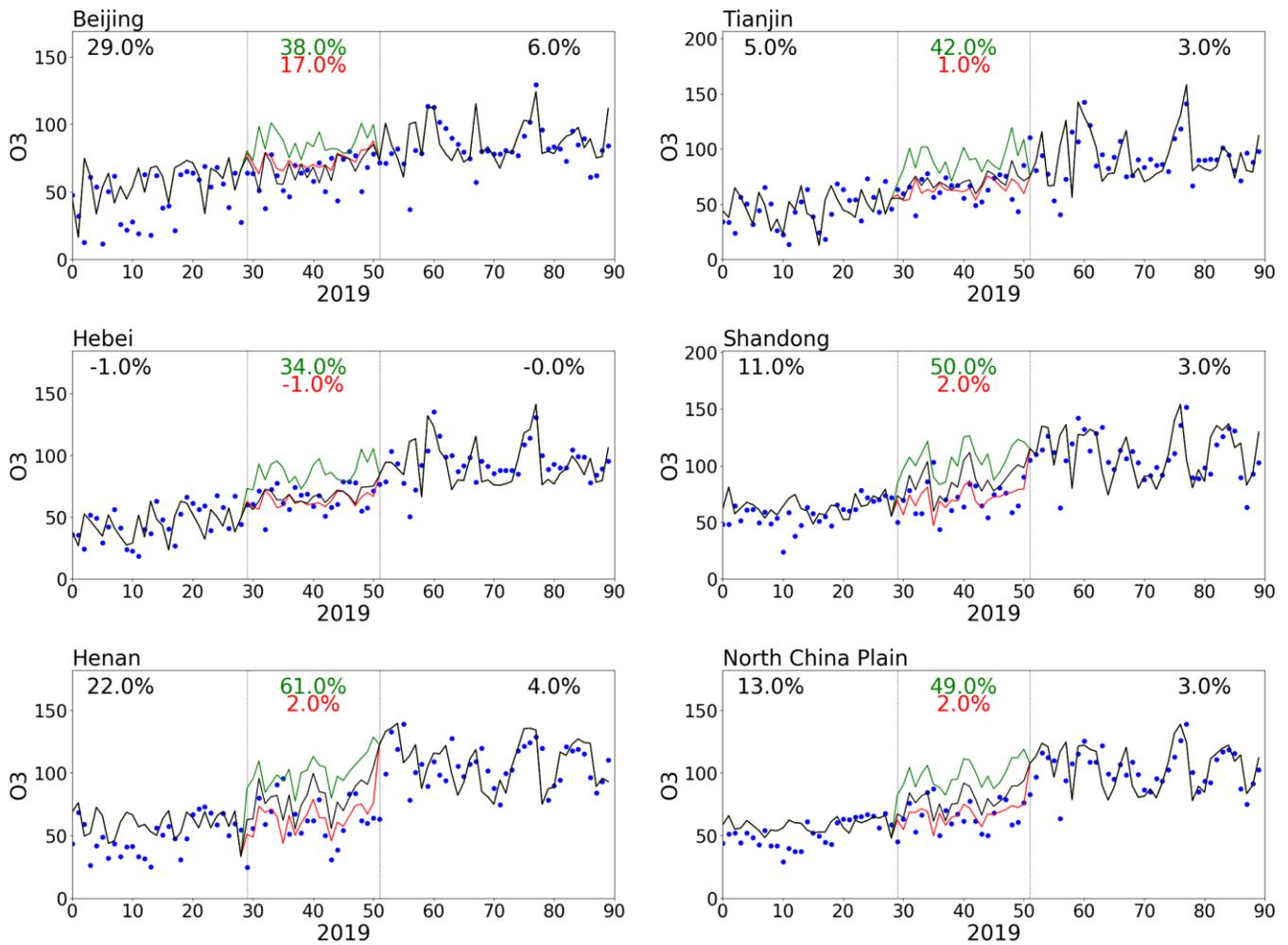


Figure S2 Same as Figure S1 but in 2020

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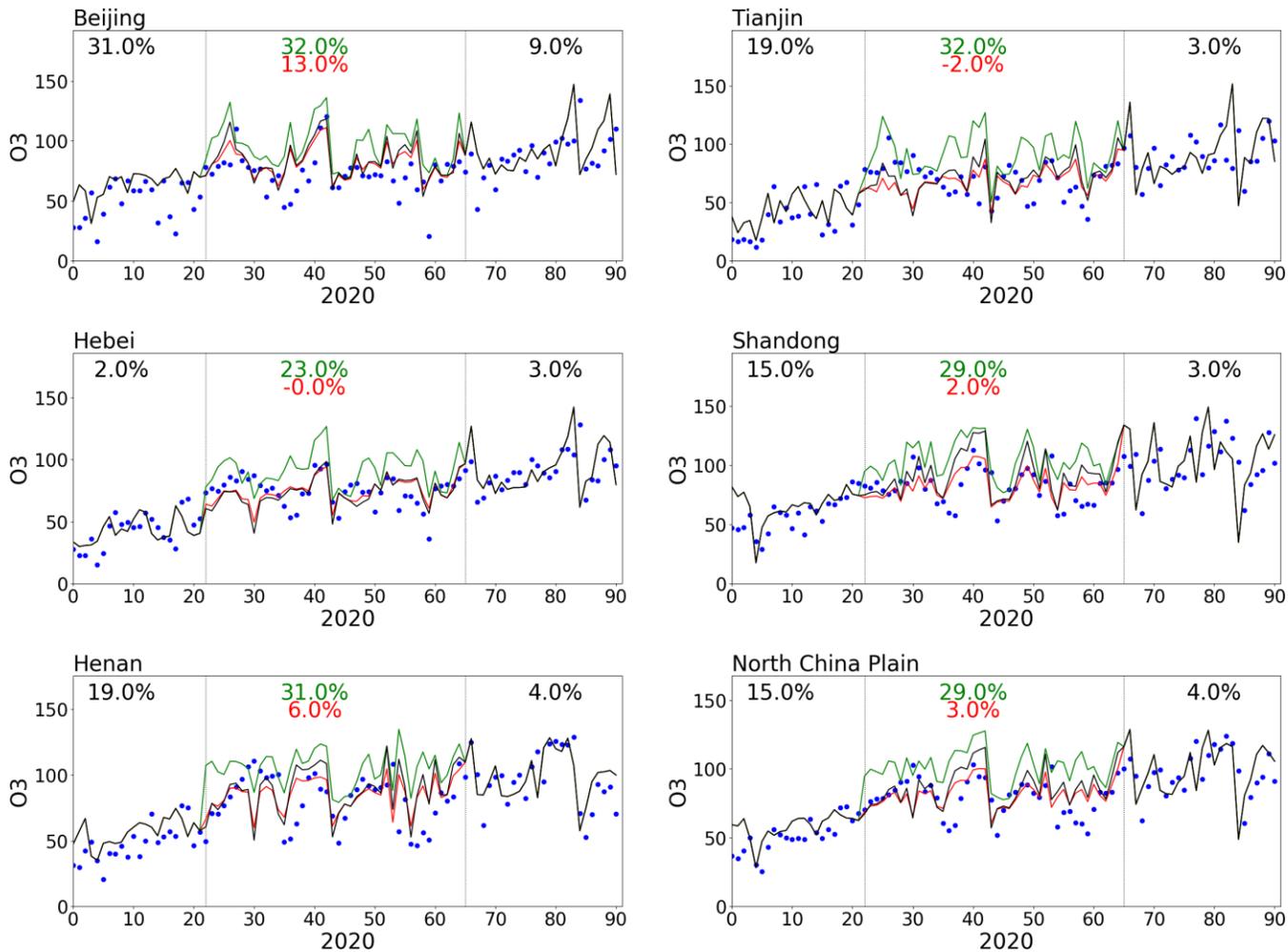
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16 **Figure S3** Comparison of the simulated average concentrations of O₃ in NCP (the percentage numbers
 17 indicate the normalized mean biases in hypothesis and actual simulations respectively for Period 2. Blue
 18 dots: observations; Black line: simulations using adjusted emission with no consideration of shutdown
 19 influences; Red line: simulations using adjusted emission with consideration of shutdown influences;
 20 Green line: simulations using adjusted emission with consideration of shut-down influences but without
 21 VOC; unit: $\mu\text{g m}^{-3}$)

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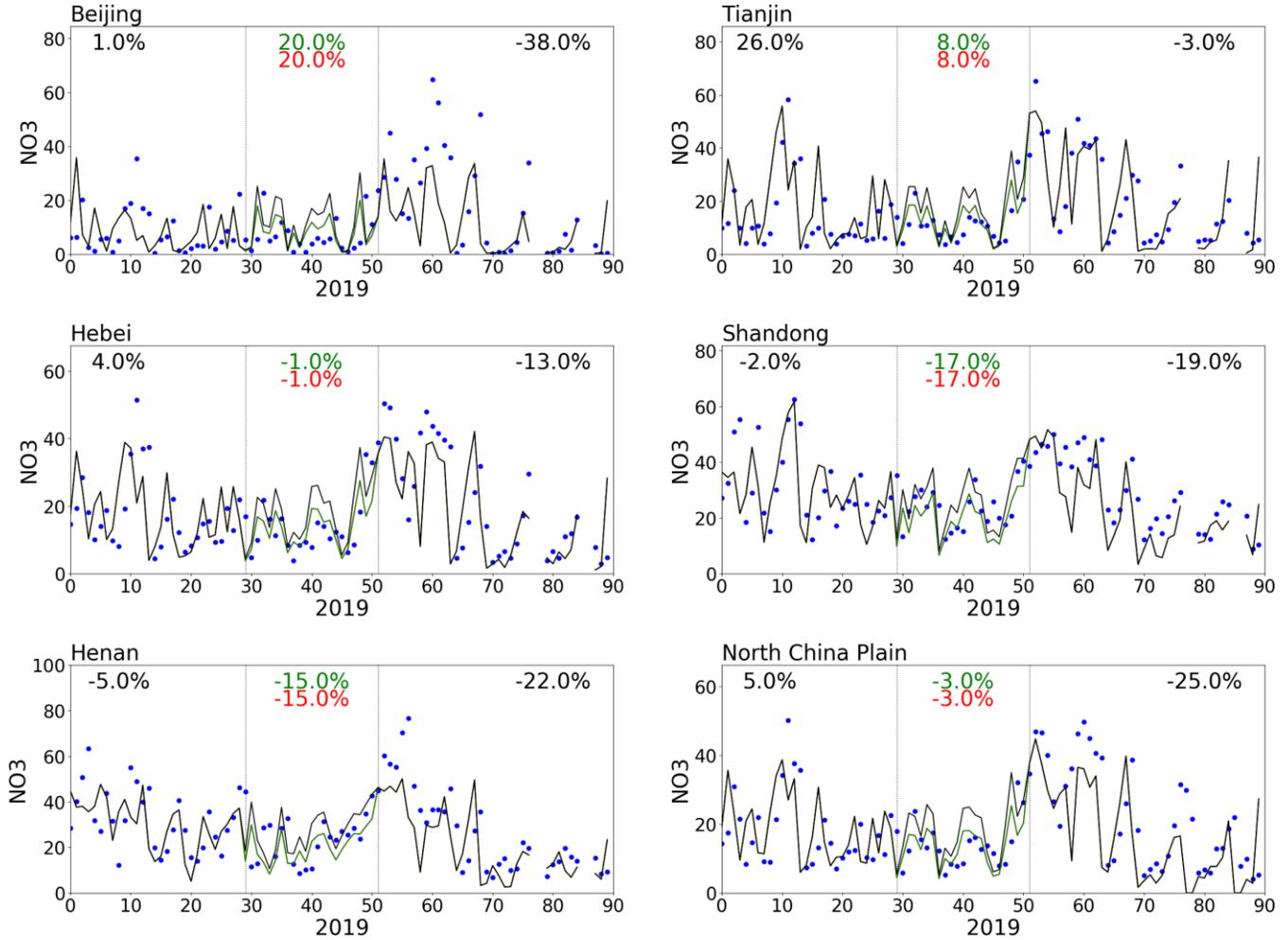


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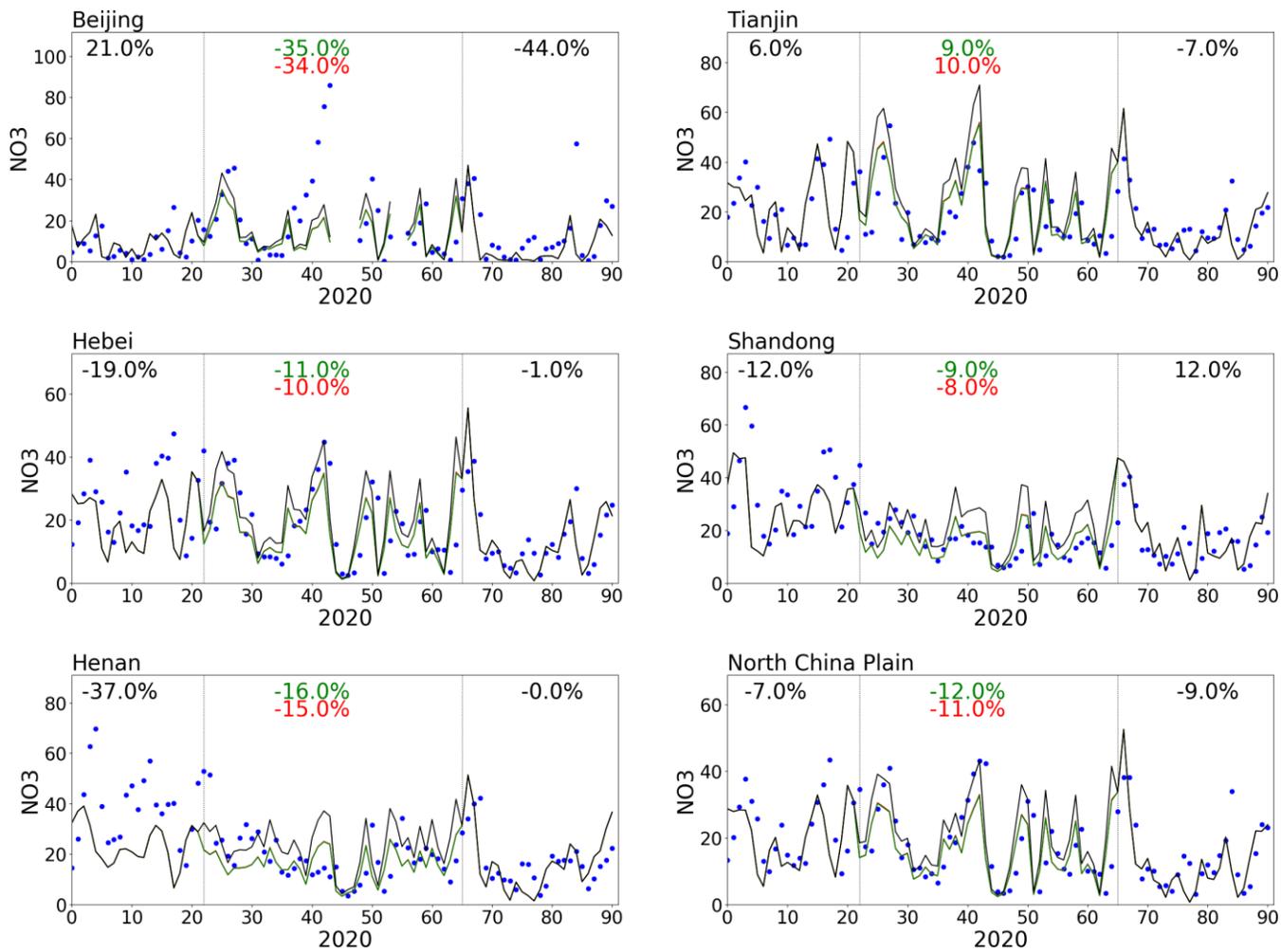
Figure S4 Same as Figure S3 but in 2020



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29 **Figure S5** Comparison of the simulated average concentrations of NO_3^- in NCP (the percentage numbers
 30 indicate the normalized mean biases in hypothesis and actual simulations respectively for Period 2. Blue
 31 dots: observations; Black line: simulations using adjusted emission with no consideration of shutdown
 32 influences; Red line: simulations using adjusted emission with consideration of shutdown influences;
 33 Green line: simulations using adjusted emission with consideration of shut-down influences but without
 34 NH_3 ; unit: $\mu\text{g m}^{-3}$)

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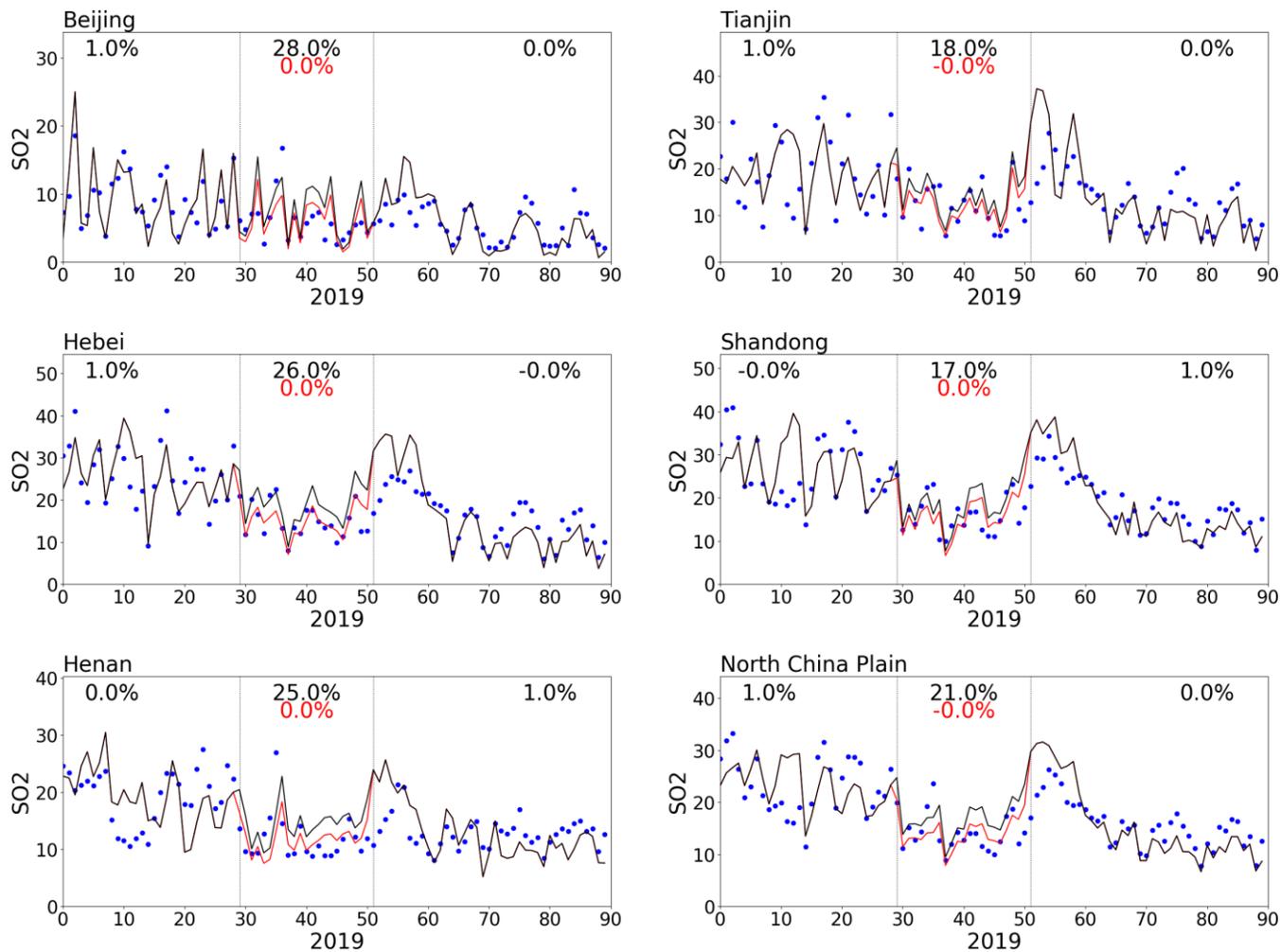
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Figure S6 Same as Figure S5 but in 2020



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42 **Figure S7** Comparison of the simulated average concentrations of SO₂ in NCP (the percentage numbers
 43 indicate the normalized mean biases in hypothesis and actual simulations respectively for Period 2. Blue
 44 dots: observations; Black line: simulations using adjusted emission with no consideration of shutdown
 45 influences; Red line: simulations using adjusted emission with consideration of shutdown influences;
 46 unit: $\mu\text{g m}^{-3}$)

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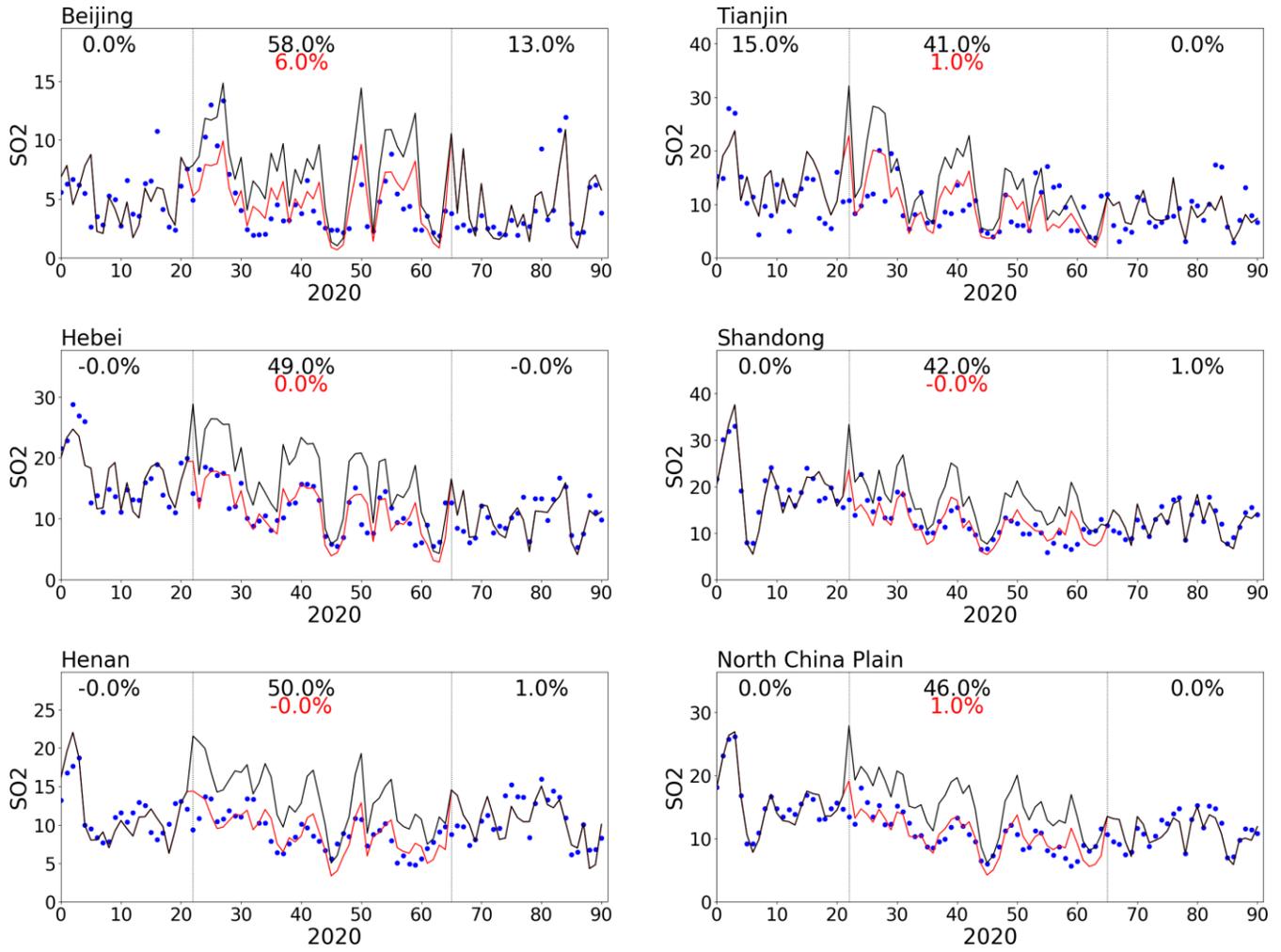
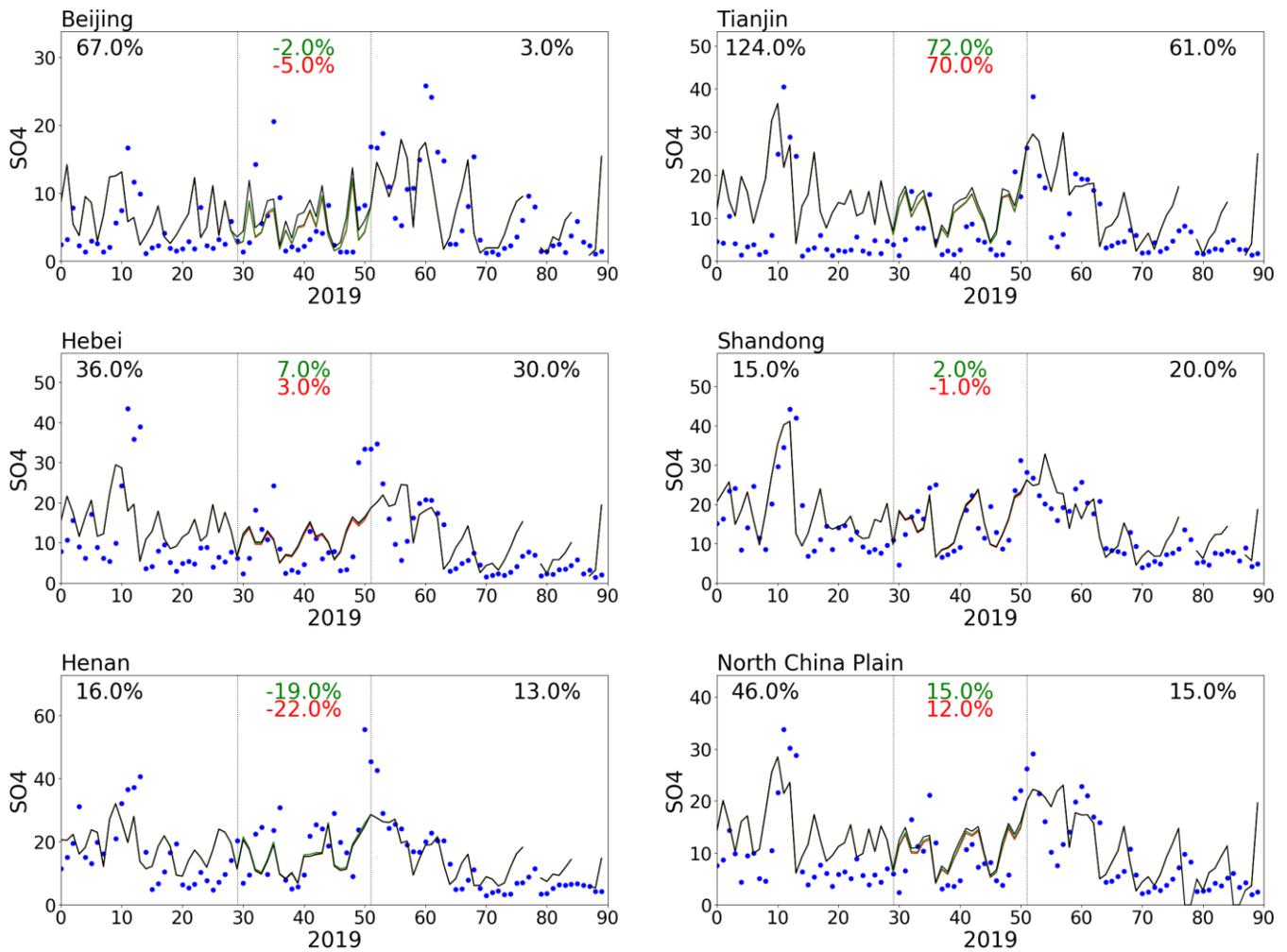


Figure S8 Same as Figure S7 but in 2020



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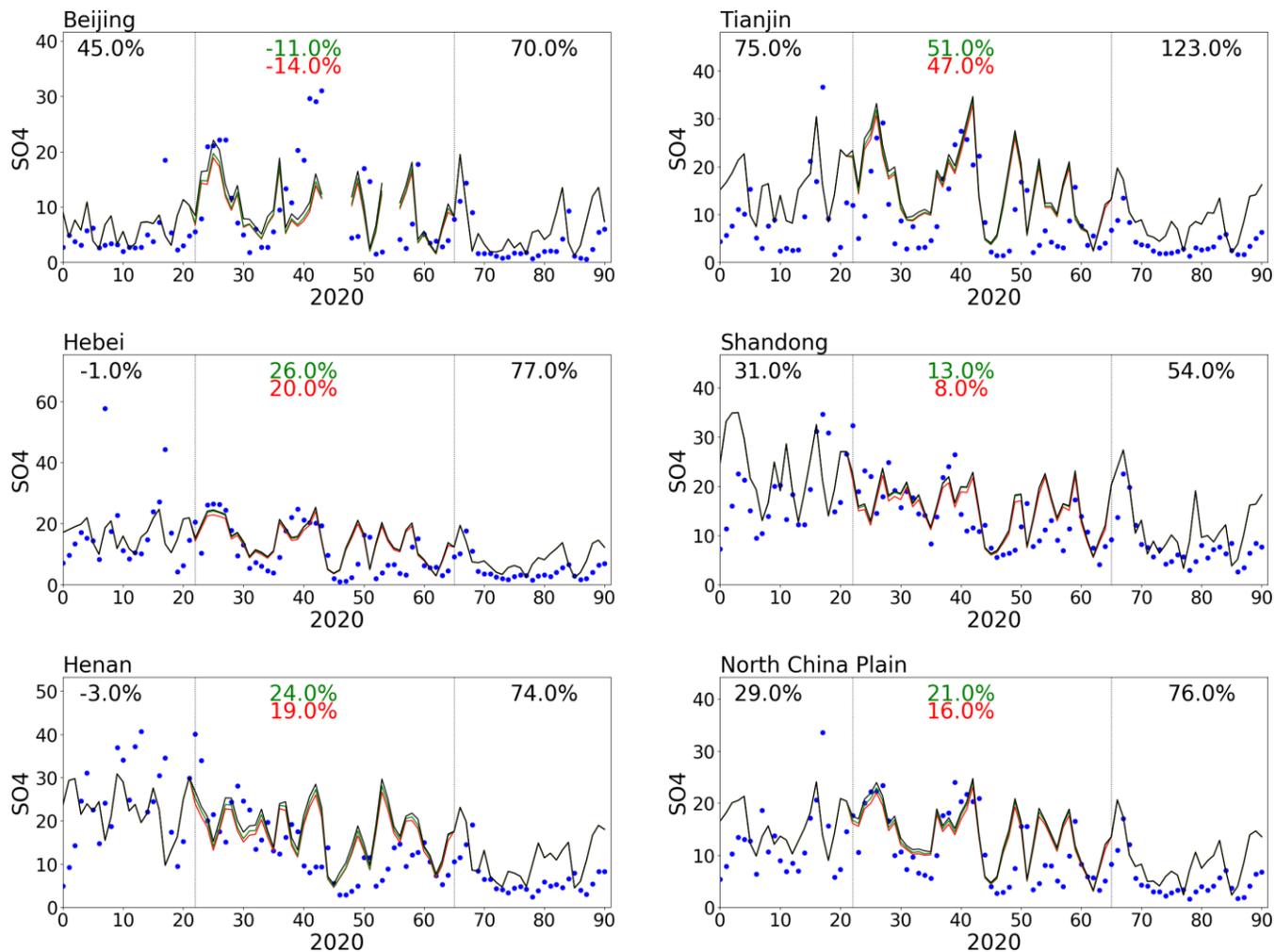
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Figure S9 Comparison of the simulated average concentrations of SO_4^{2-} in NCP (the percentage numbers indicate the normalized mean biases in hypothesis and actual simulations respectively for Period 2. Blue dots: observations; Black line: simulations using adjusted emission with no consideration of shutdown influences; Red line: simulations using adjusted emission with consideration of shutdown influences; Green line: simulations using adjusted emission with consideration of shut-down influences but without SO_2 ; unit: $\mu\text{g m}^{-3}$)

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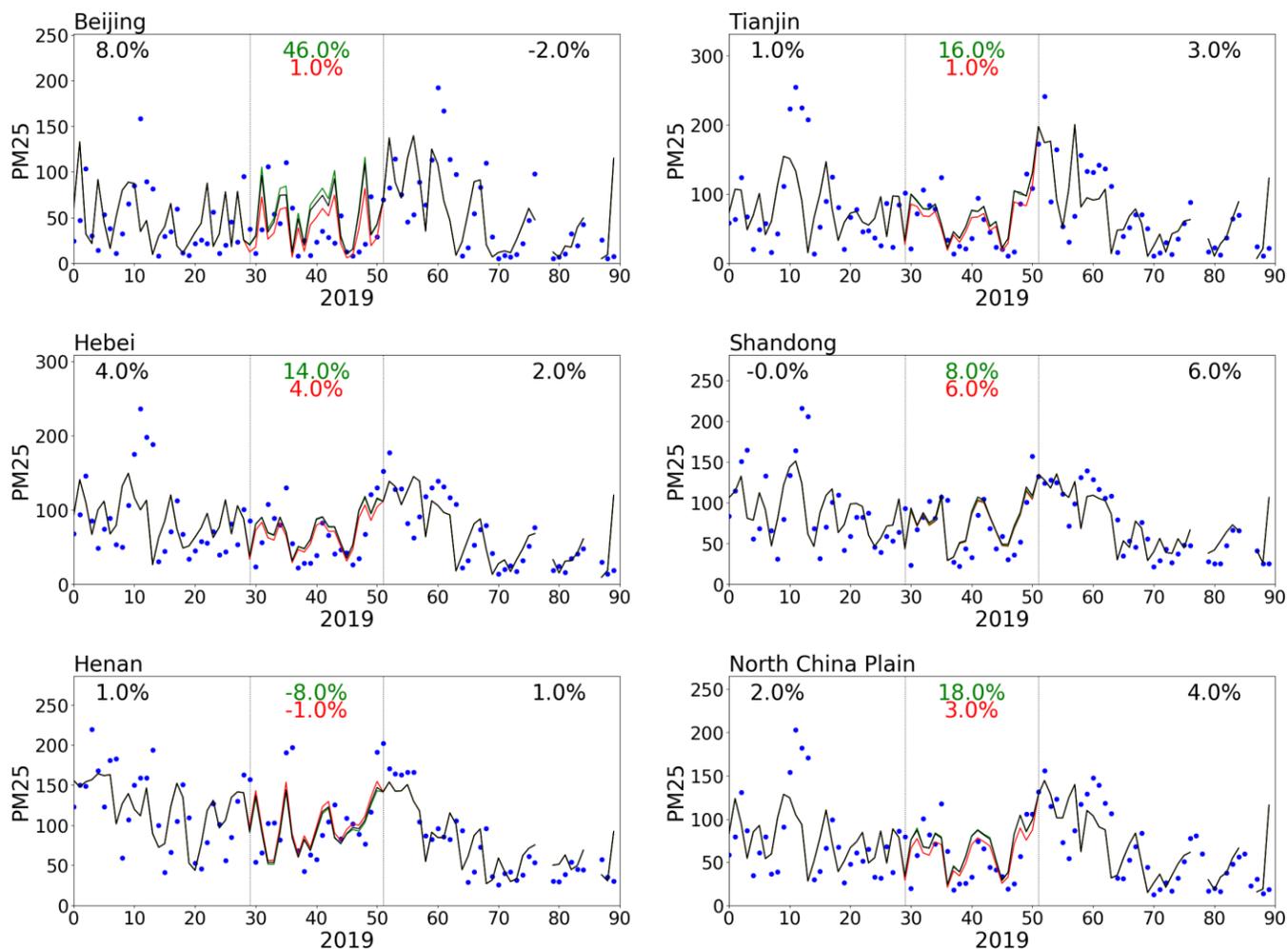


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Figure S10 Same as Figure S9 but in 2020



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66 **Figure S11** Comparison of the simulated average concentrations of PM_{2.5} in NCP (the percentage
 67 numbers indicate the normalized mean biases in hypothesis and actual simulations respectively for
 68 Period 2. Blue dots: observations; Black line: simulations using adjusted emission with no consideration
 69 of shutdown influences; Red line: simulations using adjusted emission with consideration of shutdown
 70 influences; Green line: simulations using adjusted emission with consideration of shut-down
 71 influences but without primary PM_{2.5}; unit: µg m⁻³)

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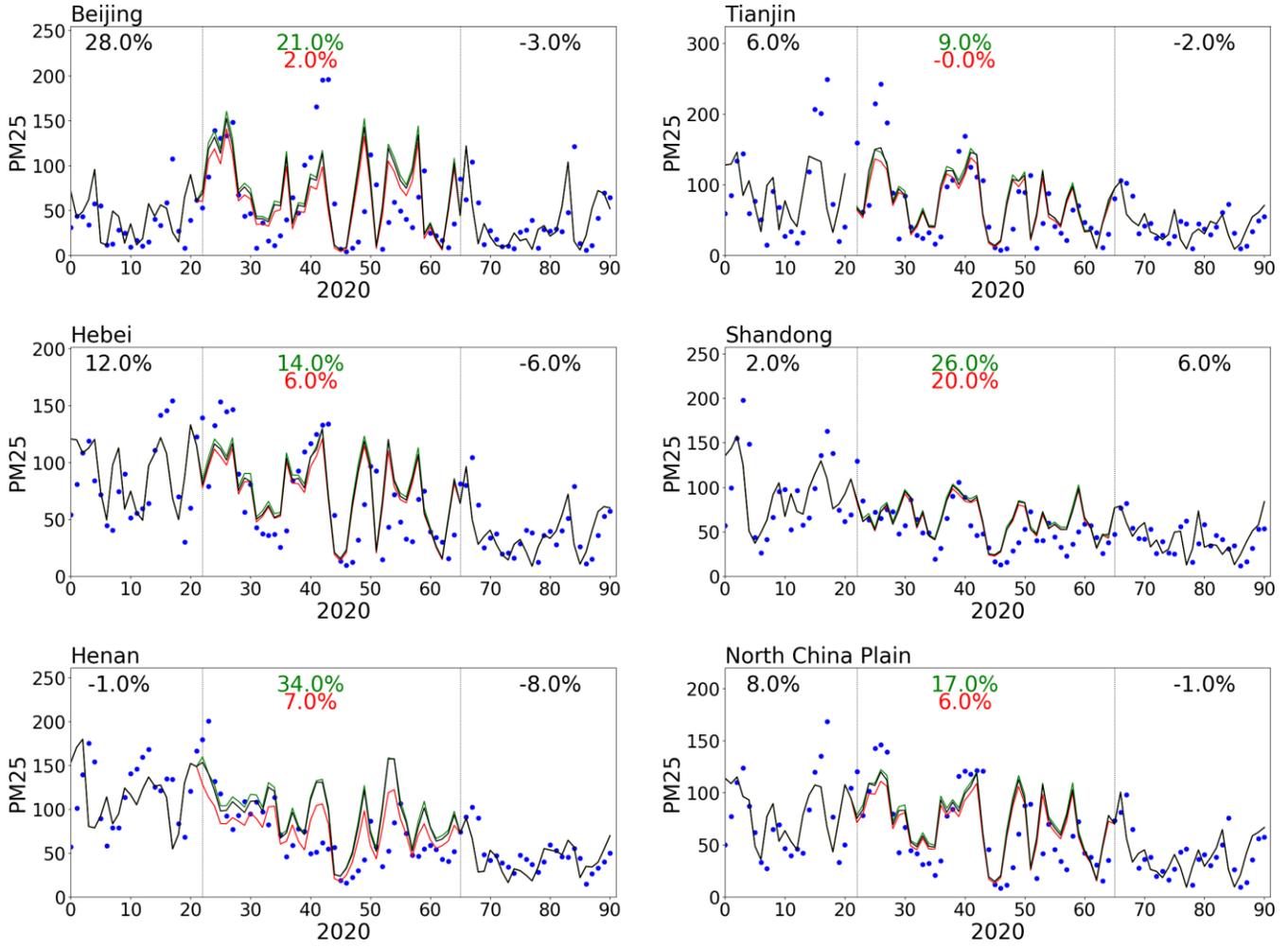


Figure S12 Same as Figure S11 but in 2020