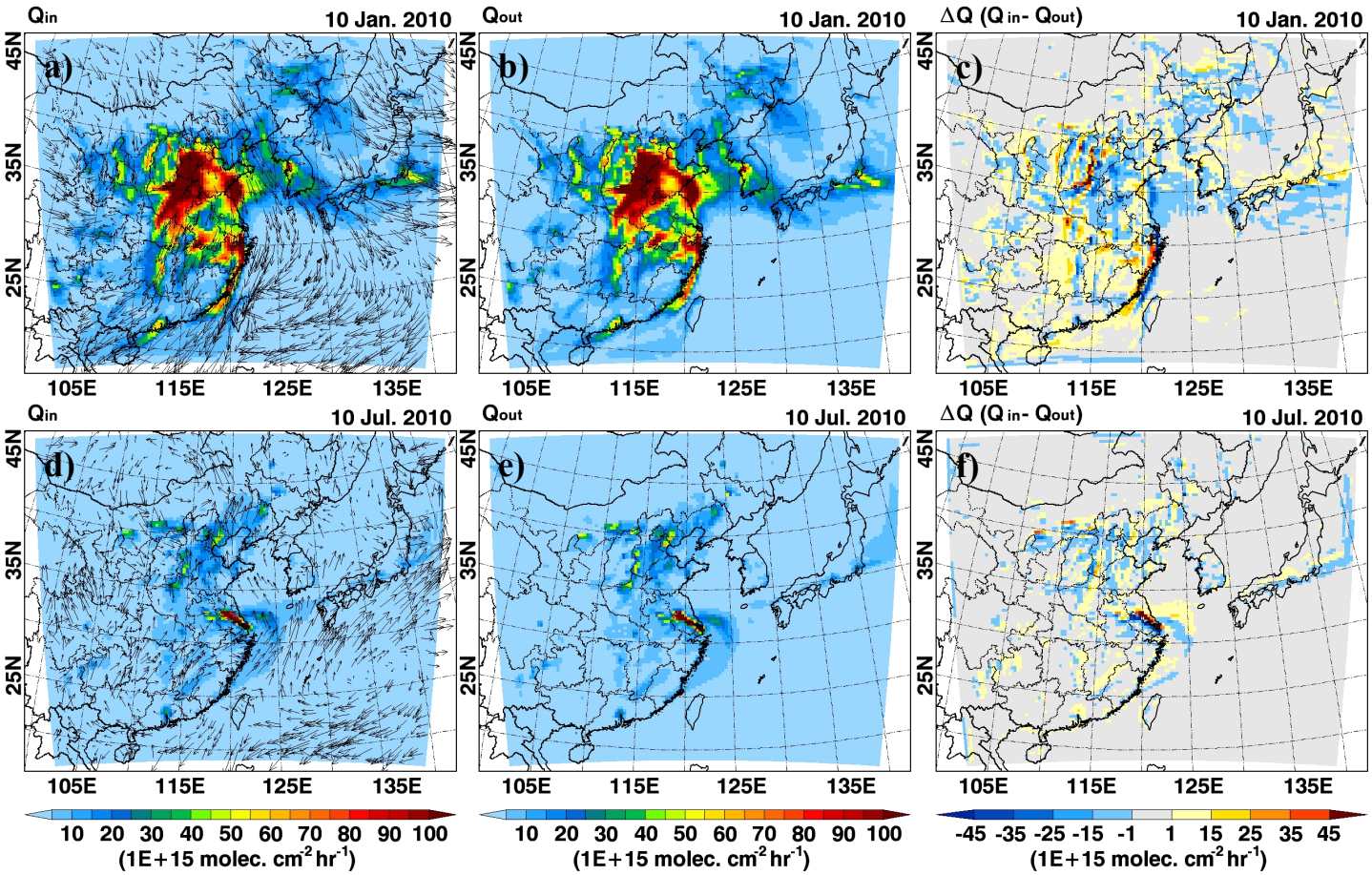
Qin
10 Jan. 2010
Qout
10 Jan. 2010
ΔQ (Q in- Qout)
10 Jan. 2010
a)
b)
c)
d)
e)
f)
45N
35N
25N
105E
115E
125E
135E
Qin
10 Jul. 2010
Qout
10 Jul. 2010
ΔQ (Q in- Qout)
10 Jul. 2010
10 20 30 40 50 60 70 80 90 100
(1E+15 molec. cm-2 hr-1)
10 20 30 40 50 60 70 80 90 100
(1E+15 molec. cm-2 hr-1)
-45 -35 -25 -15 -1 1 15 25 35 45
(1E+15 molec. cm-2 hr-1)

Fig. S1

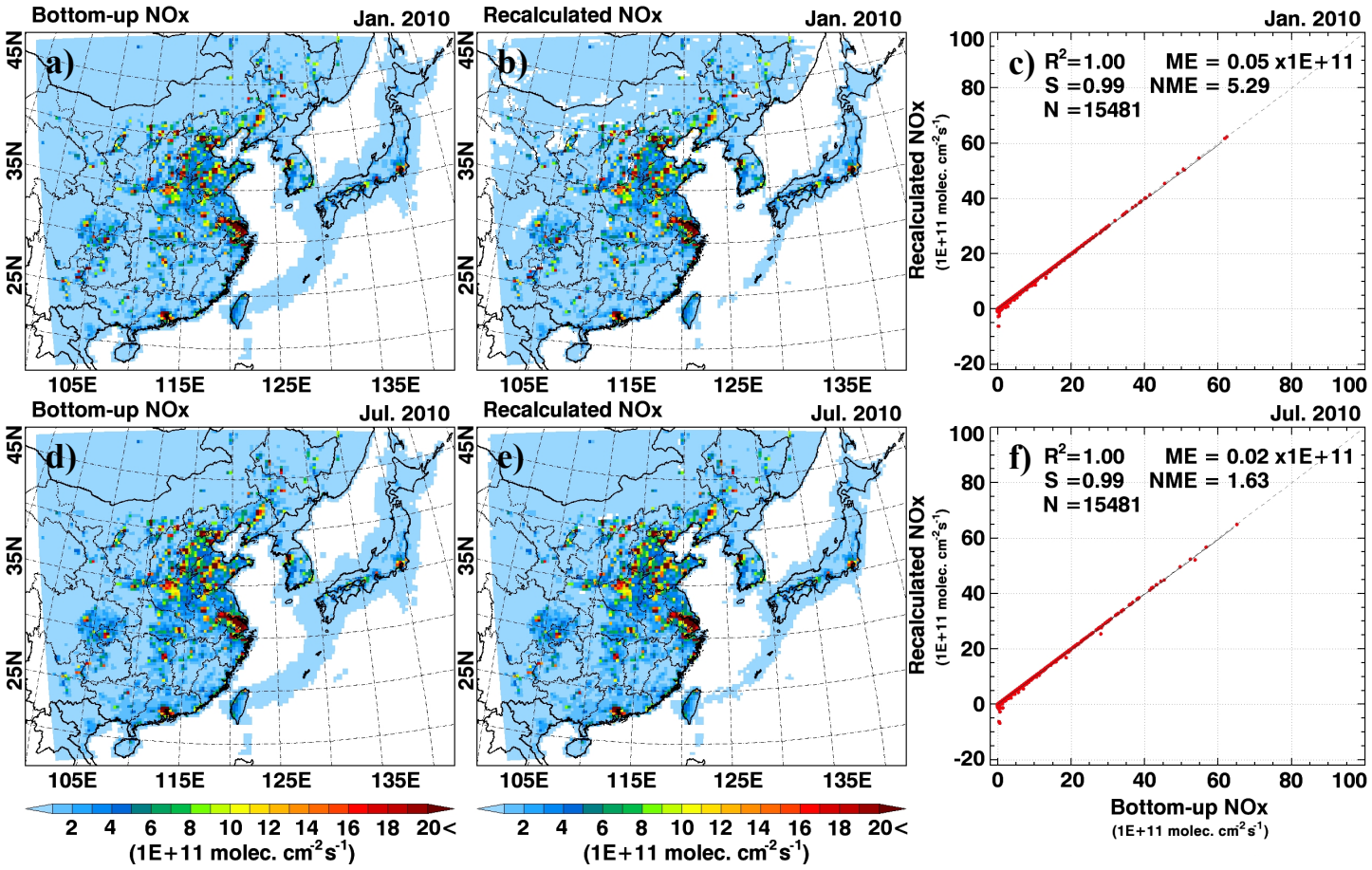
Bottom-up NOx
Jan. 2010
a)
Recalculated NOx
Jan. 2010
b)
Jan. 2010
c)
R²=1.00
ME = 0.05 x1E+11
S =0.99
NME = 5.29
N =15481
Recalculated NOx
(1E+11 molec. cm⁻²s⁻¹)
Bottom-up NOx
Jul. 2010
d)
Recalculated NOx
Jul. 2010
e)
Jul. 2010
f)
R²=1.00
ME = 0.02 x1E+11
S =0.99
NME = 1.63
N =15481
Bottom-up NOx
(1E+11 molec. cm⁻²s⁻¹)
45N
35N
25N
105E
115E
125E
135E
0
20
40
60
80
100
-20
2 4 6 8 10 12 14 16 18 20<
(1E+11 molec. cm⁻²s⁻¹)

Fig. S2

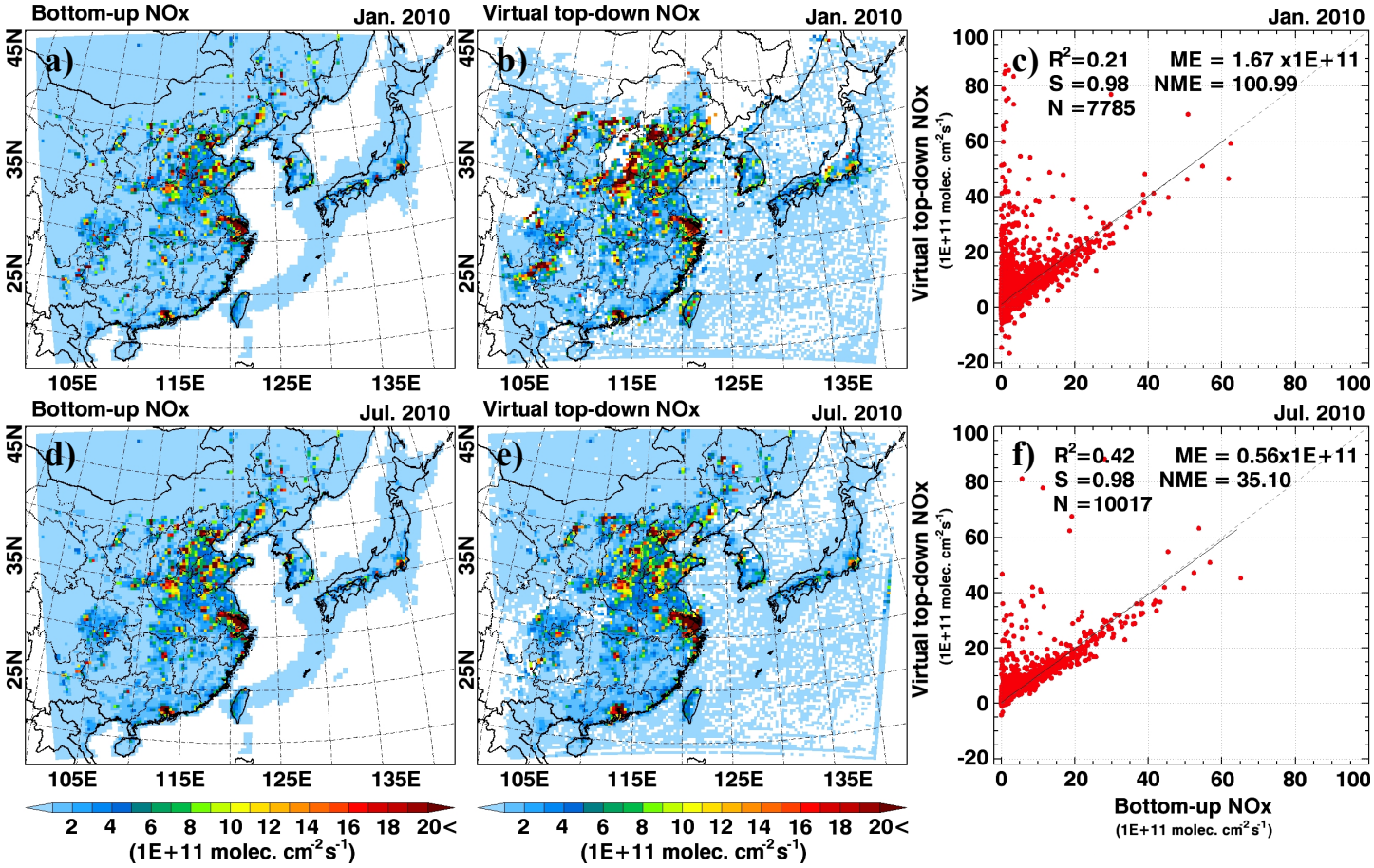
Bottom-up NOx
Jan. 2010
a)
Virtual top-down NOx
Jan. 2010
b)
Jan. 2010
c)
R²=0.21
S =0.98
N =7785
ME = 1.67 x1E+11
NME = 100.99
Virtual top-down NOx
(1E+11 molec. cm⁻²s⁻¹)
Bottom-up NOx
Jul. 2010
d)
Virtual top-down NOx
Jul. 2010
e)
Jul. 2010
f)
R²=0.42
S =0.98
N =10017
ME = 0.56x1E+11
NME = 35.10
Bottom-up NOx
(1E+11 molec. cm⁻²s⁻¹)
45N
35N
25N
105E
115E
125E
135E
2 4 6 8 10 12 14 16 18 20<
(1E+11 molec. cm⁻²s⁻¹)

Fig. S3

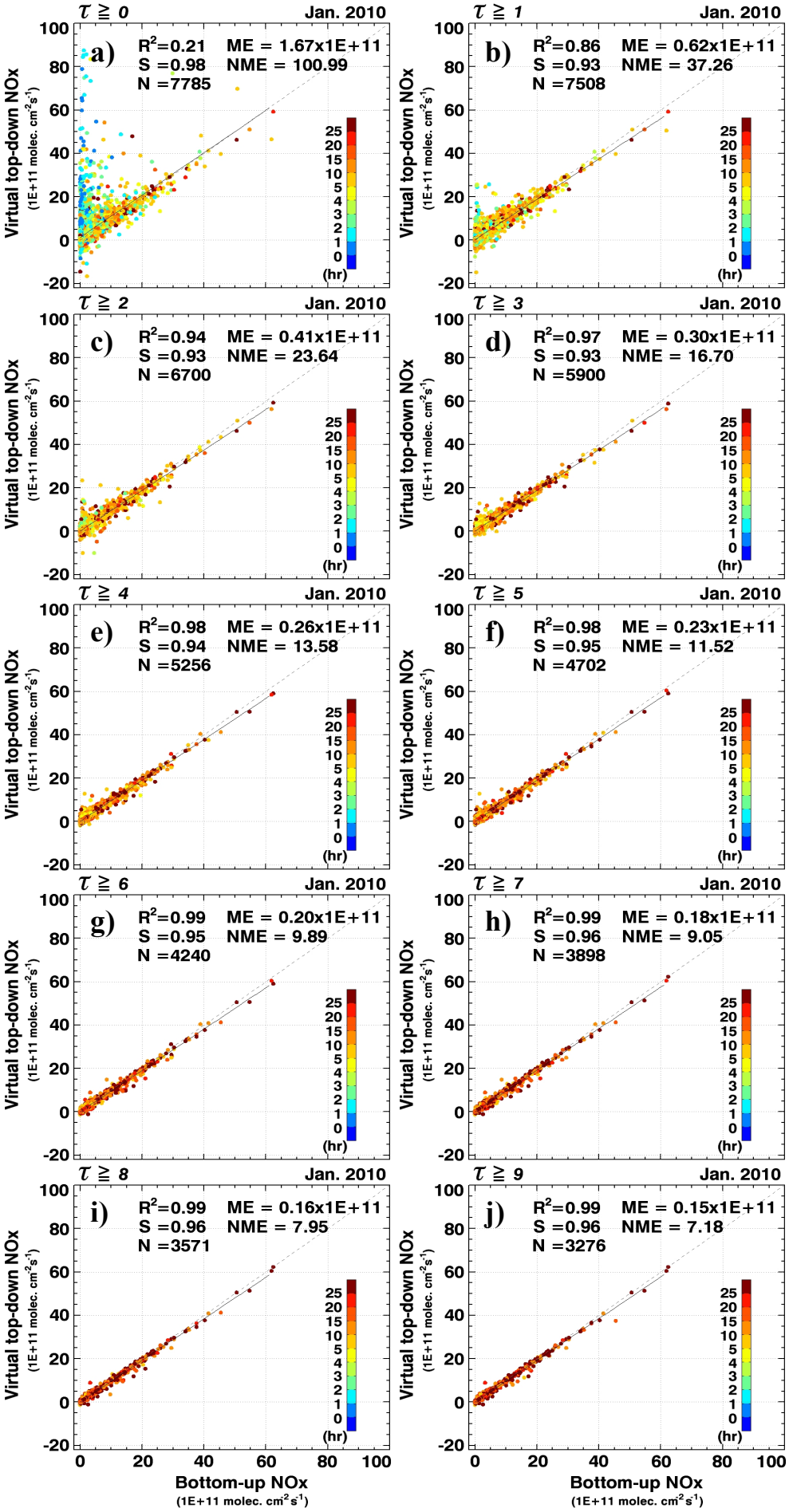
τ ≧ 0
Jan. 2010
a)
R²=0.21
ME = 1.67x1E+11
S =0.98
NME = 100.99
N =7785
τ ≧ 1
Jan. 2010
b)
R²=0.86
ME = 0.62x1E+11
S =0.93
NME = 37.26
N =7508
τ ≧ 2
Jan. 2010
c)
R²=0.94
ME = 0.41x1E+11
S =0.93
NME = 23.64
N =6700
τ ≧ 3
Jan. 2010
d)
R²=0.97
ME = 0.30x1E+11
S =0.93
NME = 16.70
N =5900
τ ≧ 4
Jan. 2010
e)
R²=0.98
ME = 0.26x1E+11
S =0.94
NME = 13.58
N =5256
τ ≧ 5
Jan. 2010
f)
R²=0.98
ME = 0.23x1E+11
S =0.95
NME = 11.52
N =4702
τ ≧ 6
Jan. 2010
g)
R²=0.99
ME = 0.20x1E+11
S =0.95
NME = 9.89
N =4240
τ ≧ 7
Jan. 2010
h)
R²=0.99
ME = 0.18x1E+11
S =0.96
NME = 9.05
N =3898
τ ≧ 8
Jan. 2010
i)
R²=0.99
ME = 0.16x1E+11
S =0.96
NME = 7.95
N =3571
τ ≧ 9
Jan. 2010
j)
R²=0.99
ME = 0.15x1E+11
S =0.96
NME = 7.18
N =3276
Virtual top-down NOx
(1E+11 molec. cm⁻²s⁻¹)
Bottom-up NOx
(1E+11 molec. cm⁻²s⁻¹)
(hr)

Fig. S4

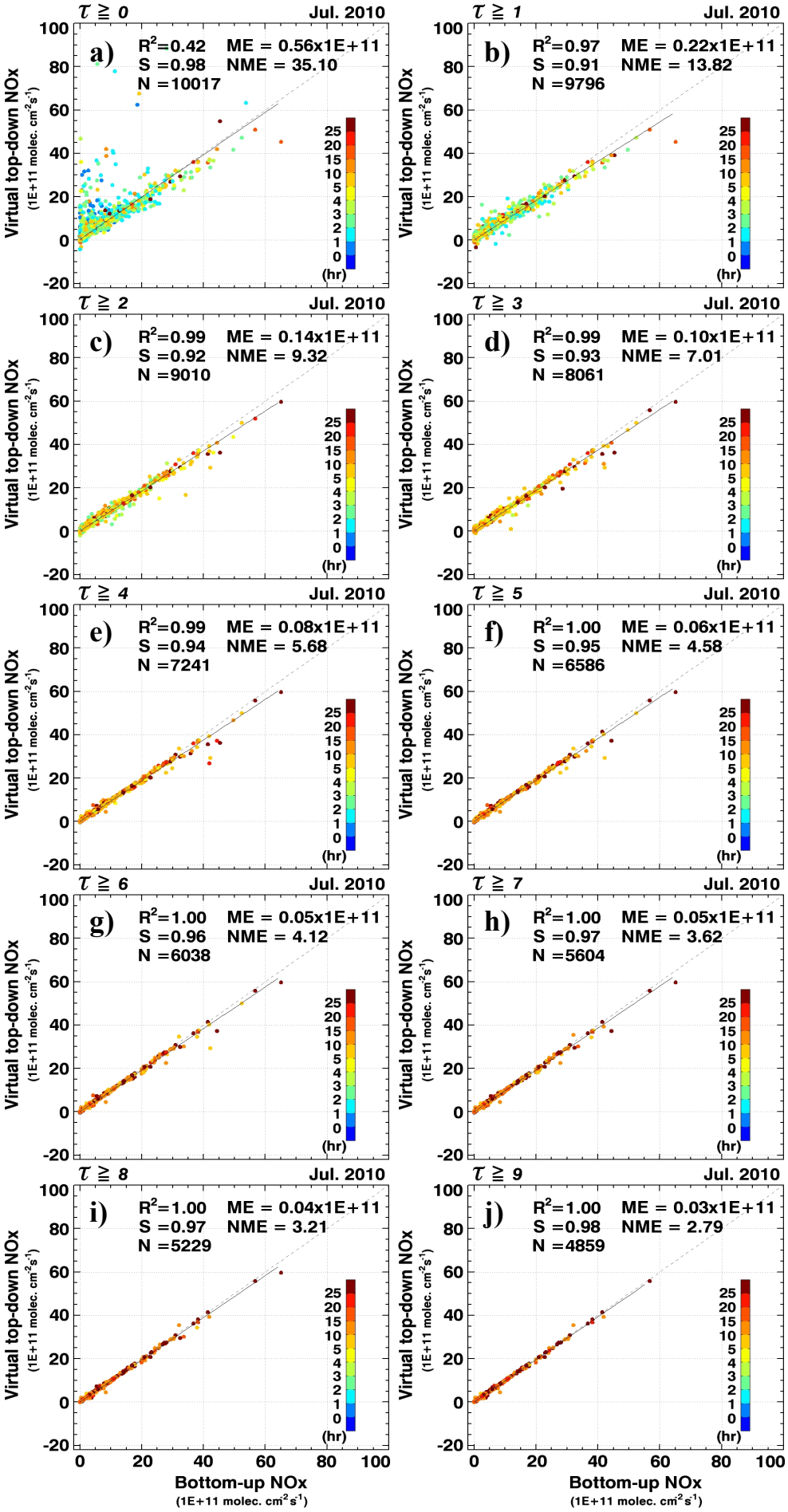
τ ≧ 0 Jul. 2010
a) R²=0.42 ME = 0.56x1E+11
S =0.98 NME = 35.10
N =10017
τ ≧ 1 Jul. 2010
b) R²=0.97 ME = 0.22x1E+11
S =0.91 NME = 13.82
N =9796
τ ≧ 2 Jul. 2010
c) R²=0.99 ME = 0.14x1E+11
S =0.92 NME = 9.32
N =9010
τ ≧ 3 Jul. 2010
d) R²=0.99 ME = 0.10x1E+11
S =0.93 NME = 7.01
N =8061
τ ≧ 4 Jul. 2010
e) R²=0.99 ME = 0.08x1E+11
S =0.94 NME = 5.68
N =7241
τ ≧ 5 Jul. 2010
f) R²=1.00 ME = 0.06x1E+11
S =0.95 NME = 4.58
N =6586
τ ≧ 6 Jul. 2010
g) R²=1.00 ME = 0.05x1E+11
S =0.96 NME = 4.12
N =6038
τ ≧ 7 Jul. 2010
h) R²=1.00 ME = 0.05x1E+11
S =0.97 NME = 3.62
N =5604
τ ≧ 8 Jul. 2010
i) R²=1.00 ME = 0.04x1E+11
S =0.97 NME = 3.21
N =5229
τ ≧ 9 Jul. 2010
j) R²=1.00 ME = 0.03x1E+11
S =0.98 NME = 2.79
N =4859
Virtual top-down NOx
(1E+11 molec. cm⁻²s⁻¹)
Bottom-up NOx
(1E+11 molec. cm⁻²s⁻¹)
(hr)

Fig. S5

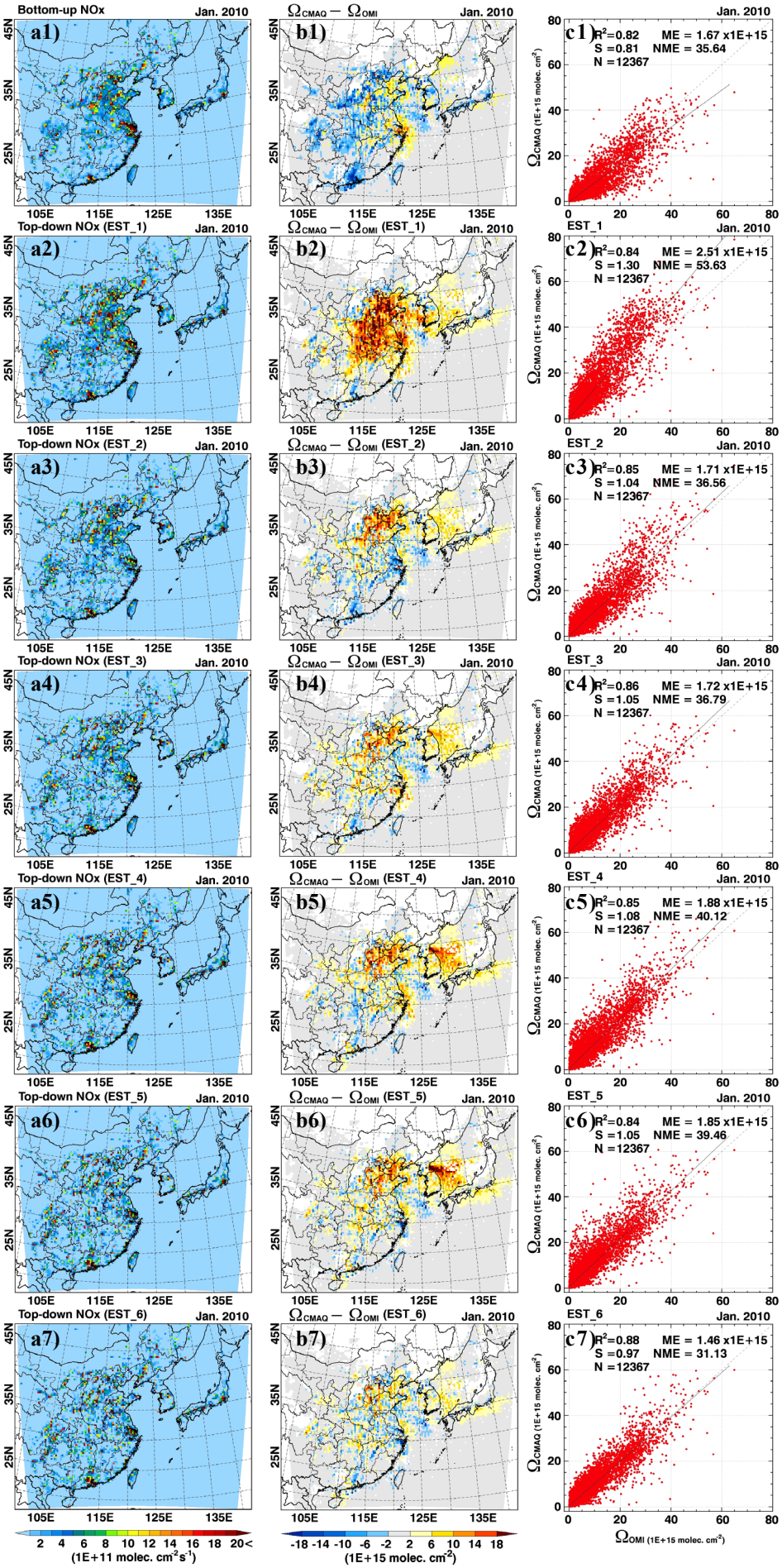
Bottom-up NOx
Jan. 2010
a1)
b1)
c1)
R²=0.82 ME = 1.67 x1E+15
S =0.81 NME = 35.64
N =12367
Top-down NOx (EST_1)
EST_1
a2)
b2)
c2)
R²=0.84 ME = 2.51 x1E+15
S =1.30 NME = 53.63
N =12367
Top-down NOx (EST_2)
EST_2
a3)
b3)
c3)
R²=0.85 ME = 1.71 x1E+15
S =1.04 NME = 36.56
N =12367
Top-down NOx (EST_3)
EST_3
a4)
b4)
c4)
R²=0.86 ME = 1.72 x1E+15
S =1.05 NME = 36.79
N =12367
Top-down NOx (EST_4)
EST_4
a5)
b5)
c5)
R²=0.85 ME = 1.88 x1E+15
S =1.08 NME = 40.12
N =12367
Top-down NOx (EST_5)
EST_5
a6)
b6)
c6)
R²=0.84 ME = 1.85 x1E+15
S =1.05 NME = 39.46
N =12367
Top-down NOx (EST_6)
EST_6
a7)
b7)
c7)
R²=0.88 ME = 1.46 x1E+15
S =0.97 NME = 31.13
N =12367
105E 115E 125E 135E
45N 35N 25N
0 20 40 60 80
2 4 6 8 10 12 14 16 18 20<
(1E+11 molec. cm-2 s-1)
-18 -14 -10 -6 -2 2 6 10 14 18
(1E+15 molec. cm-2)
ΩOMI (1E+15 molec. cm-2)

Fig. S6

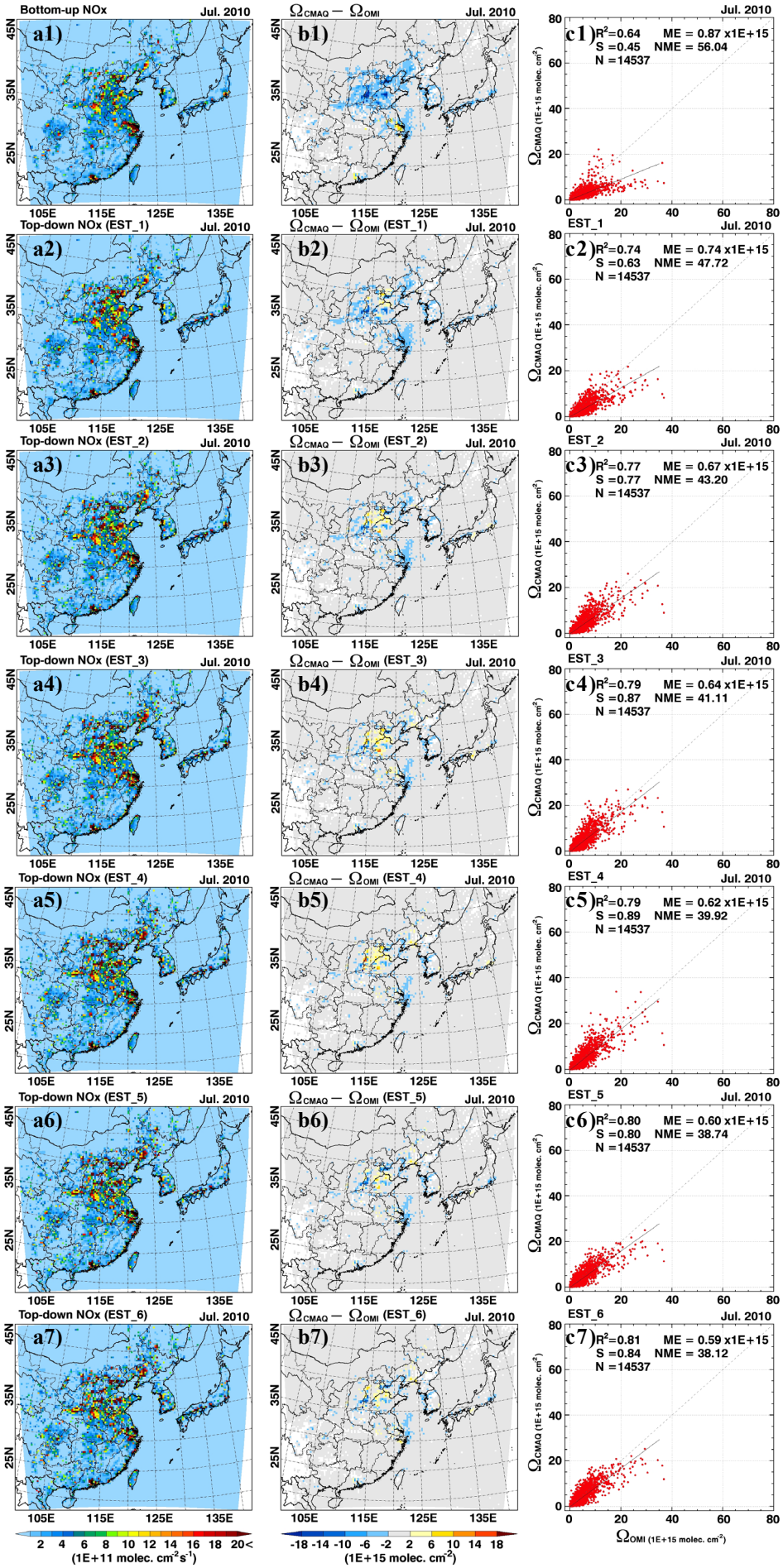
Bottom-up NOx
Jul. 2010
a1)
b1)
c1)
R²=0.64 ME = 0.87 x1E+15
S =0.45 NME = 56.04
N =14537
Top-down NOx (EST_1)
EST_1
a2)
b2)
c2)
R²=0.74 ME = 0.74 x1E+15
S =0.63 NME = 47.72
N =14537
Top-down NOx (EST_2)
EST_2
a3)
b3)
c3)
R²=0.77 ME = 0.67 x1E+15
S =0.77 NME = 43.20
N =14537
Top-down NOx (EST_3)
EST_3
a4)
b4)
c4)
R²=0.79 ME = 0.64 x1E+15
S =0.87 NME = 41.11
N =14537
Top-down NOx (EST_4)
EST_4
a5)
b5)
c5)
R²=0.79 ME = 0.62 x1E+15
S =0.89 NME = 39.92
N =14537
Top-down NOx (EST_5)
EST_5
a6)
b6)
c6)
R²=0.80 ME = 0.60 x1E+15
S =0.80 NME = 38.74
N =14537
Top-down NOx (EST_6)
EST_6
a7)
b7)
c7)
R²=0.81 ME = 0.59 x1E+15
S =0.84 NME = 38.12
N =14537
105E 115E 125E 135E
45N 35N 25N
0 20 40 60 80
2 4 6 8 10 12 14 16 18 20<
(1E+11 molec. cm-2 s-1)
-18 -14 -10 -6 -2 2 6 10 14 18
(1E+15 molec. cm-2)
(1E+15 molec. cm-2)

Fig. S7

Table S1. Bottom-up and top-down NO_x emission fluxes and their relative/absolute differences over regions in China.

Month	Regions [1)]	Bottom-up NO_x (E_b; Gg N month^{-1})	Top-down NO_x (E_t; Gg N month^{-1})	Relative difference [3)] (%)	Absolute difference [4)] (Gg N month^{-1})
Jan.	Beijing	9.78	12.09	23.57	2.31
	Tianjin	9.75	4.30	-55.86	-5.44
	Hebei	48.11	40.96	-14.85	-7.14
	Shandong	65.21	73.06	12.05	7.86
	Shanxi	32.66	62.00	89.83	29.34
	Henan	45.57	26.05	-42.84	-19.52
	Jiangsu	46.13	36.50	-20.88	-9.63
	Anhui	28.87	26.90	-6.80	-1.96
	Shanghai	15.90	6.88	-56.72	-9.02
	Zhejiang	31.32	21.72	-30.64	-9.59
	Fujian	13.89	16.14	16.23	2.25
	Guangdong	32.76	79.02	141.20	46.26
	Guangxi	16.57	27.33	64.94	10.76
	Guizhou	16.39	22.57	37.74	6.19
	Hunan	22.57	39.88	76.71	17.31
	Jiangxi	13.22	18.96	43.42	5.74
	Hubei	27.24	31.51	15.66	4.27
	Chongqing	13.27	17.19	29.53	3.92
	Shaanxi	19.03	30.33	59.41	11.30
	Gansu	10.96	14.71	34.27	3.76
	Ningxia	6.15	5.91	-3.97	-0.24
	Inner Mongolia	40.13	53.99	34.56	13.87
	Heilongjiang [2)]	23.71	23.71	0	0
	Jilin [2)]	17.69	17.65	-0.22	-0.04
	Liaoning	31.65	38.64	22.05	6.98
	Qinghai	2.31	7.46	223.24	5.15
	Sichuan	27.50	45.50	65.49	18.01
	Yunnan	16.53	19.29	16.70	2.76
	Hainan	1.99	2.98	49.74	0.99
Jul.	Beijing	8.20	10.10	23.27	1.91
	Tianjin	9.77	19.98	104.47	10.21
	Hebei	59.24	82.02	38.45	22.78
	Shandong	77.00	98.77	28.28	21.77
	Shanxi	34.21	46.73	36.61	12.52
	Henan	56.90	63.60	11.78	6.70
	Jiangsu	55.89	51.04	-8.69	-4.86
	Anhui	35.80	42.97	20.05	7.18
	Shanghai	16.64	11.58	-30.45	-5.07
	Zhejiang	33.94	35.40	4.29	1.46
	Fujian	17.09	19.78	15.70	2.68
	Guangdong	40.99	44.59	8.79	3.60
	Guangxi	19.04	23.42	23.00	4.38
	Guizhou	14.53	16.62	14.38	2.09
	Hunan	28.15	29.86	6.08	1.71
	Jiangxi	17.77	19.51	9.78	1.74
	Hubei	32.76	33.90	3.50	1.15
	Chongqing	14.05	17.23	22.63	3.18
	Shaanxi	21.60	29.65	37.27	8.05
	Gansu	10.90	12.99	19.14	2.09
	Ningxia	6.51	7.49	15.11	0.98
	Inner Mongolia	45.86	56.71	23.66	10.85
	Heilongjiang	22.71	24.78	9.11	2.07
	Jilin	18.71	25.27	35.10	6.57
	Liaoning	34.52	47.93	38.85	13.41
	Qinghai	2.50	4.95	97.94	2.45
	Sichuan	28.66	33.40	16.55	4.74
	Yunnan	14.13	15.28	8.14	1.15
	Hainan	2.63	2.76	4.82	0.13

[1)] The regions were presented in Fig. 1.

[2)] Satellite observations were very rarely conducted over the regions. Therefore, the top-down NO_x emission fluxes over the most pixels were replaced with the bottom-up NO_x emission fluxes (see the Sect. 3.6).

[3)] Relative difference $= \frac{E_t - E_b}{E_b} \times 100$ (unit: %)

[4)] Absolute difference $= E_t - E_b$ (unit: Gg N month^{-1})