Atmospheric Heating over the Tibetan Plateau before the Asian Monsoon Onset

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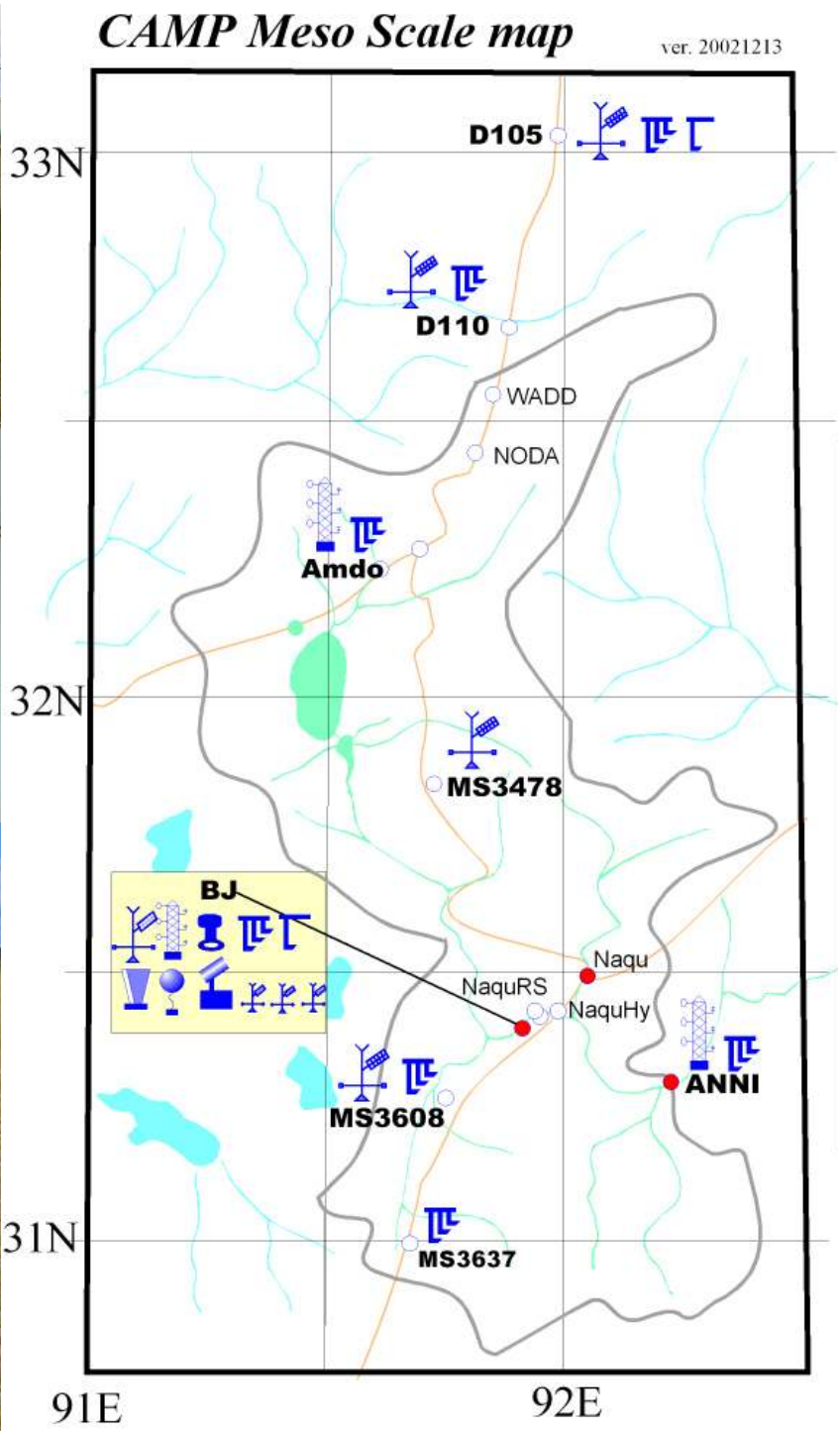
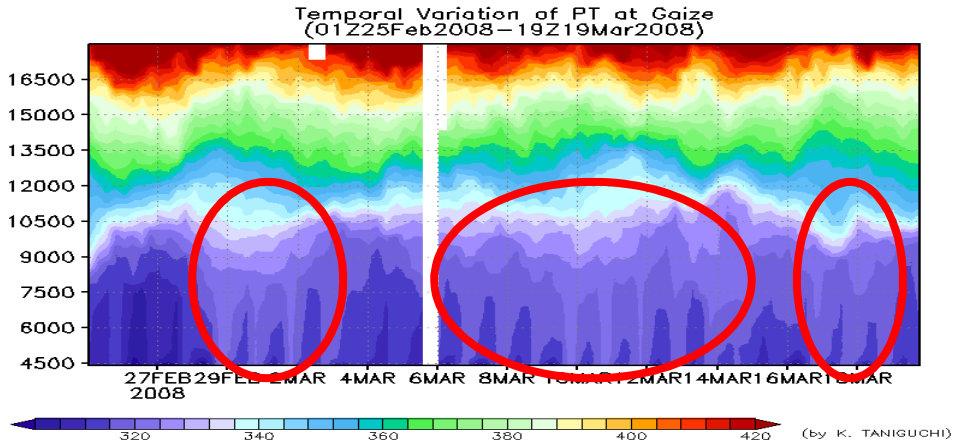
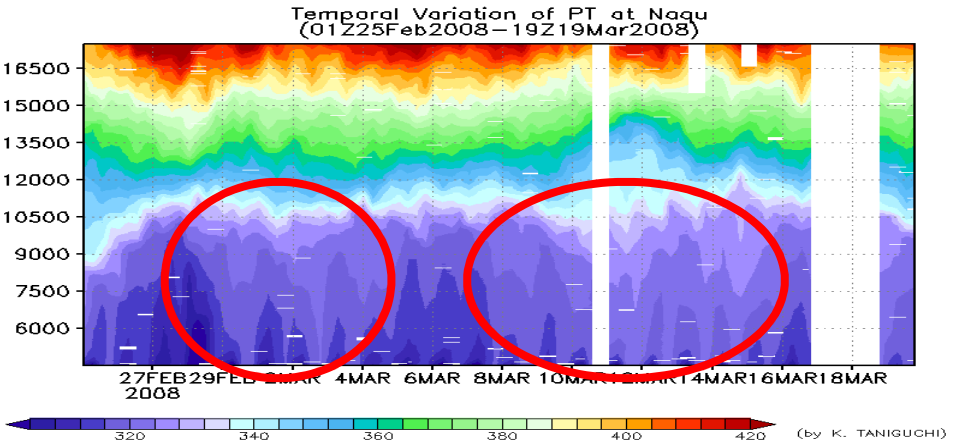
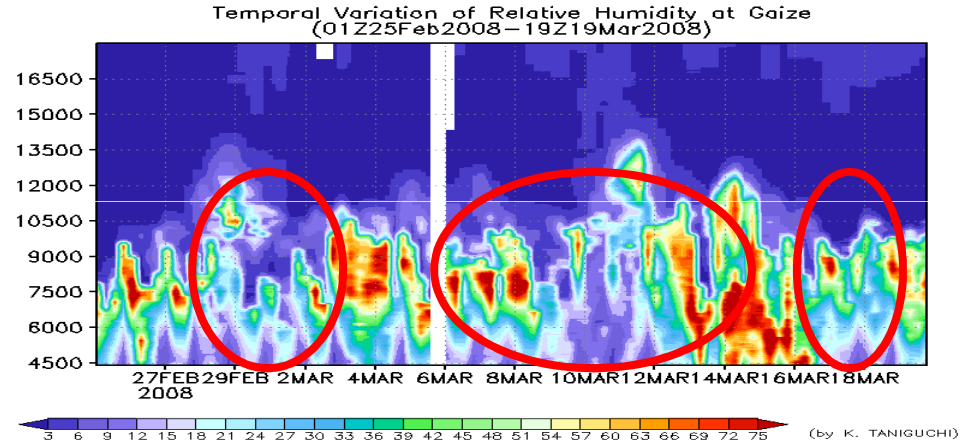
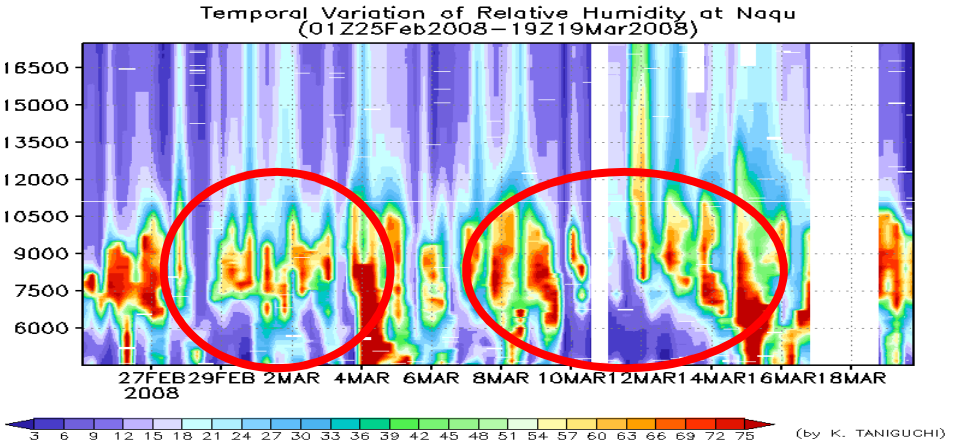
Kenji Taniguchi, Kanazawa University

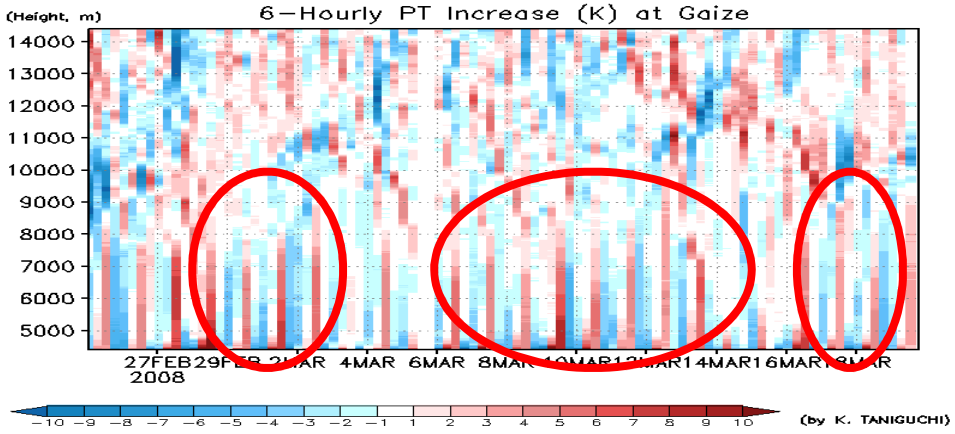

CAMP Meso Scale map
ver. 20021213
33N
32N
31N
91E
92E
D105
D110
WADD
NODA
Amdo
MS3478
BJ
Naqu
NaquRS
NaquHy
ANNI
MS3608
MS3637

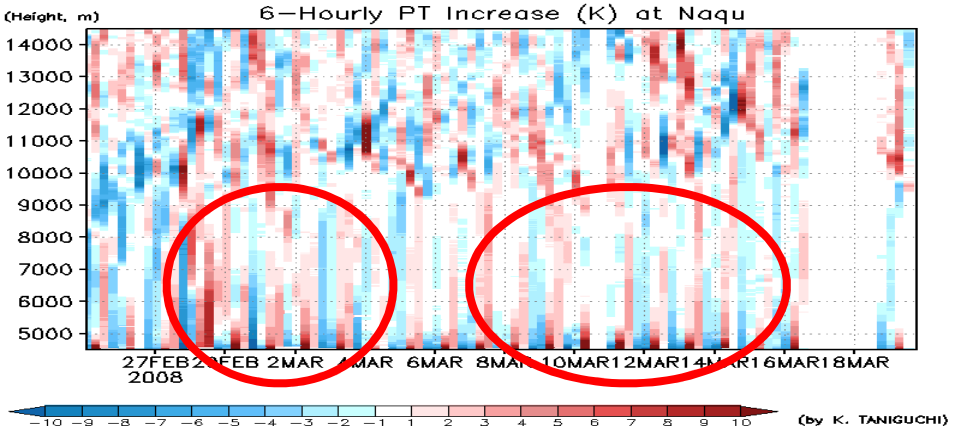

Temporal Variation of PT at Gaize
(01Z25Feb2008-19Z19Mar2008)
16500
15000
13500
12000
10500
9000
7500
6000
4500
27FEB29FEB 2MAR 4MAR 6MAR 8MAR 10MAR12MAR14MAR16MAR18MAR
2008
320 340 360 380 400 420
(by K. TANIGUCHI)


Temporal Variation of PT at Naqu
(01Z25Feb2008-19Z19Mar2008)
16500
15000
13500
12000
10500
9000
7500
6000
27FEB29FEB 2MAR 4MAR 6MAR 8MAR 10MAR14MAR16MAR18MAR
2008
320 340 360 380 400 420
(by K. TANIGUCHI)


Temporal Variation of Relative Humidity at Gaize
(01Z25Feb2008-19Z19Mar2008)
16500
15000
13500
12000
10500
9000
7500
6000
4500
27FEB29FEB 2MAR 4MAR 6MAR 8MAR 10MAR12MAR14MAR16MAR18MAR
2008
3 6 9 12 15 18 21 24 27 30 33 36 39 42 45 48 51 54 57 60 63 66 69 72 75
(by K. TANIGUCHI)

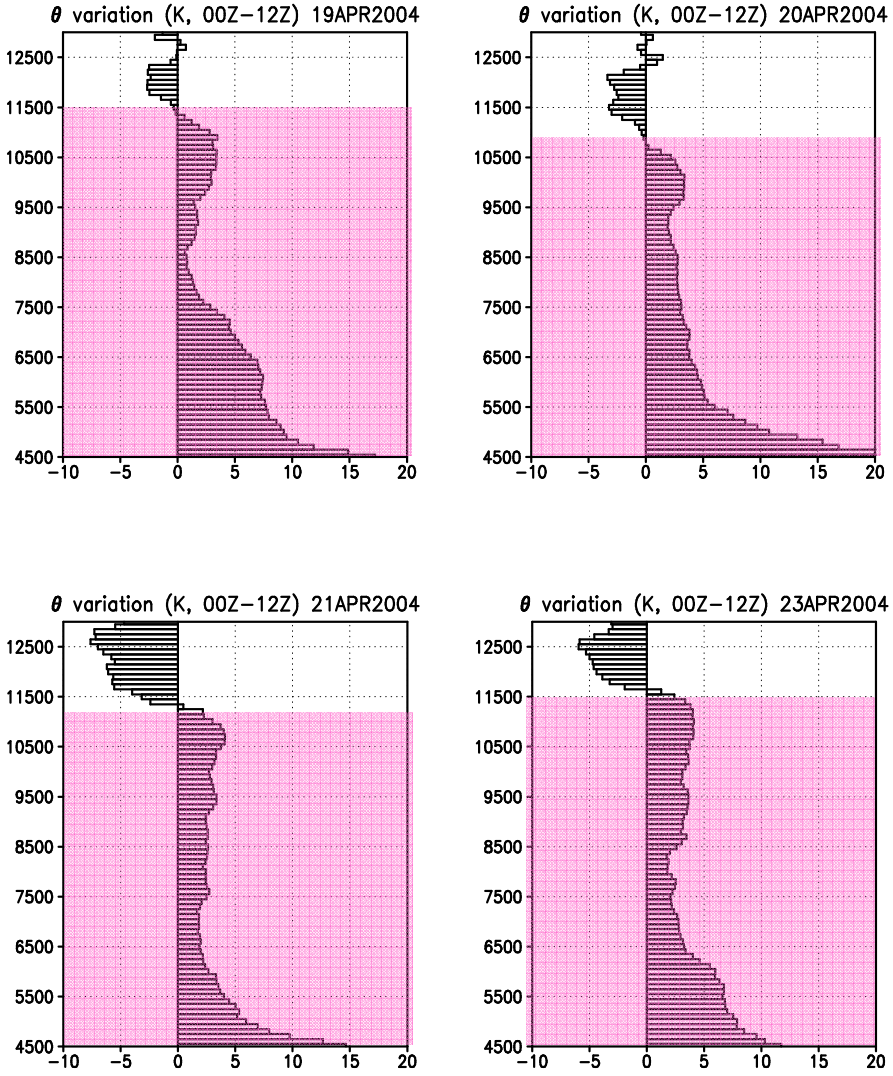

Temporal Variation of Relative Humidity at Naqu
(01Z25Feb2008-19Z19Mar2008)
16500
15000
13500
12000
10500
9000
7500
6000
27FEB29FEB 2MAR 4MAR 6MAR 8MAR 10MAR12MAR14MAR16MAR18MAR
2008
3 6 9 12 15 18 21 24 27 30 33 36 39 42 45 48 51 54 57 60 63 66 69 72 75
(by K. TANIGUCHI)


(Height, m)
6-Hourly PT Increase (K) at Gaize
14000
13000
12000
11000
10000
9000
8000
7000
6000
5000
27FEB29FEB 2MAR 4MAR 6MAR 8MAR 10MAR12MAR14MAR16MAR18MAR
2008
-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 1 2 3 4 5 6 7 8 9 10
(by K. TANIGUCHI)

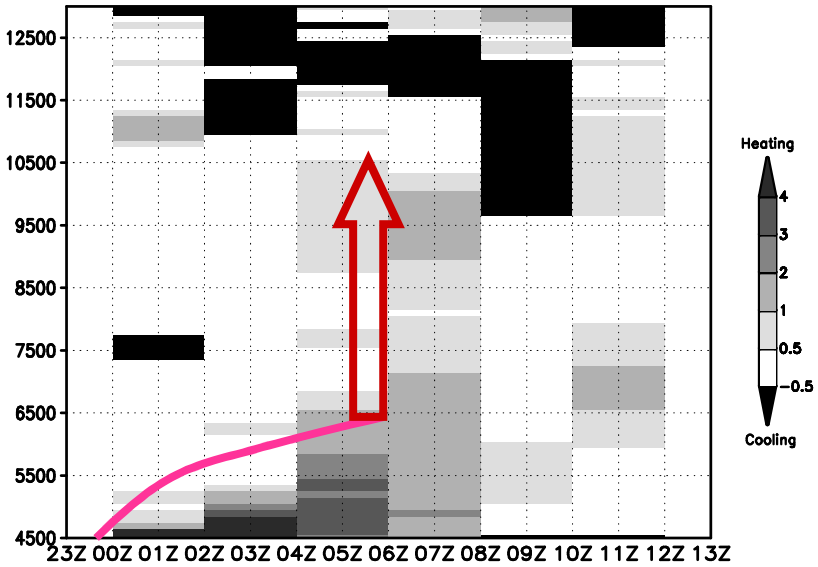

(Height, m)
6-Hourly PT Increase (K) at Naqu
14000
13000
12000
11000
10000
9000
8000
7000
6000
5000
27FEB29FEB 2MAR 4MAR 6MAR 8MAR 10MAR12MAR14MAR16MAR18MAR
2008
-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 1 2 3 4 5 6 7 8 9 10
(by K. TANIGUCHI)

Atmospheric Heating over the Tibetan Plateau

CEOP/CAMP-Tibet IOP in 2004

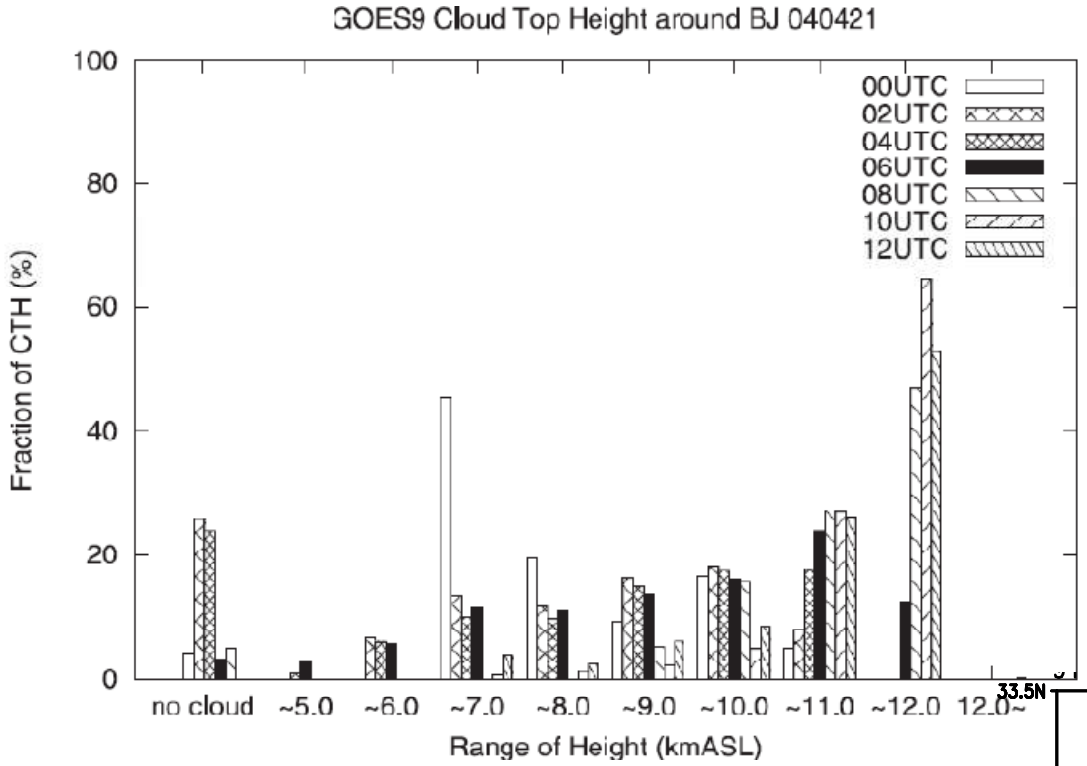


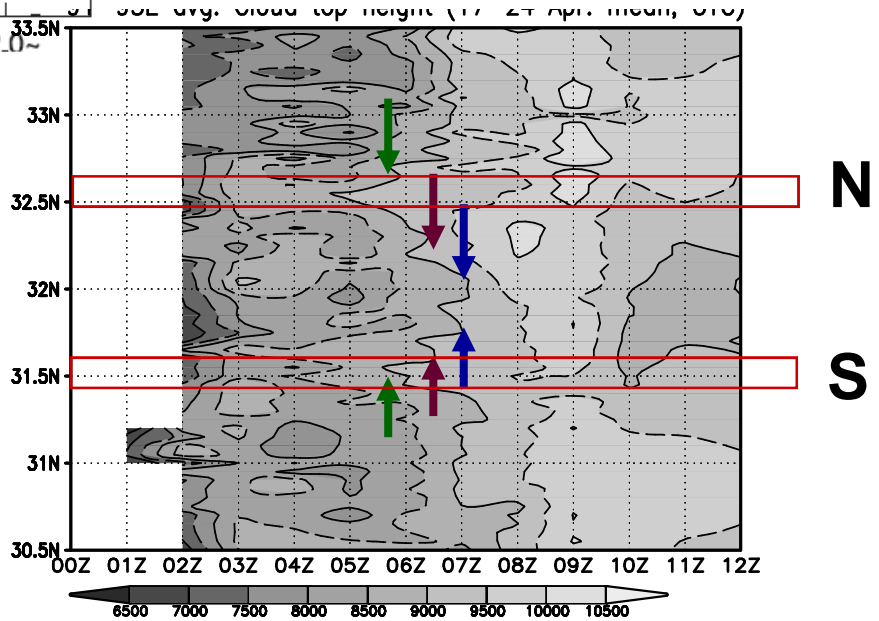
2 hourly Change of Atmospheric Temperature



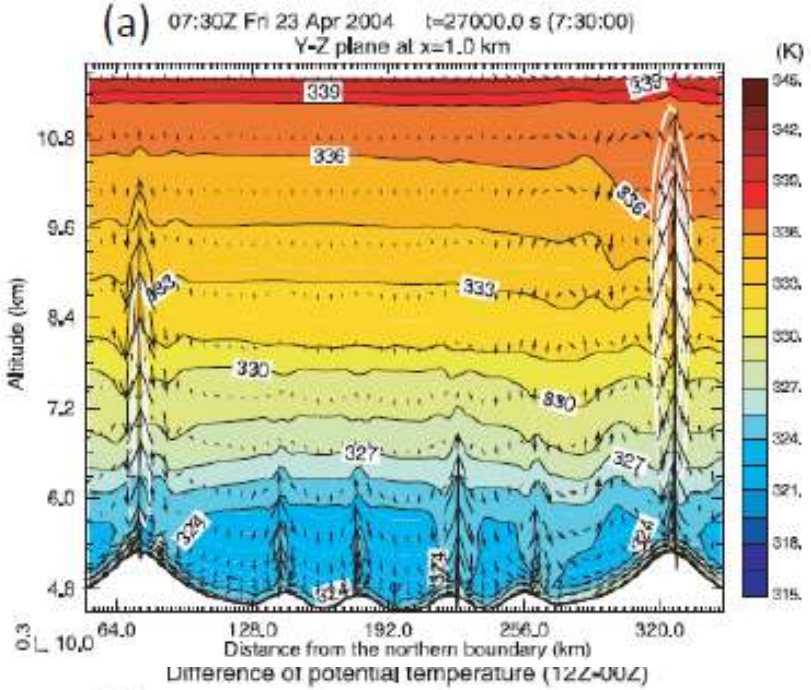
(Taniguchi & Koike, 2007)

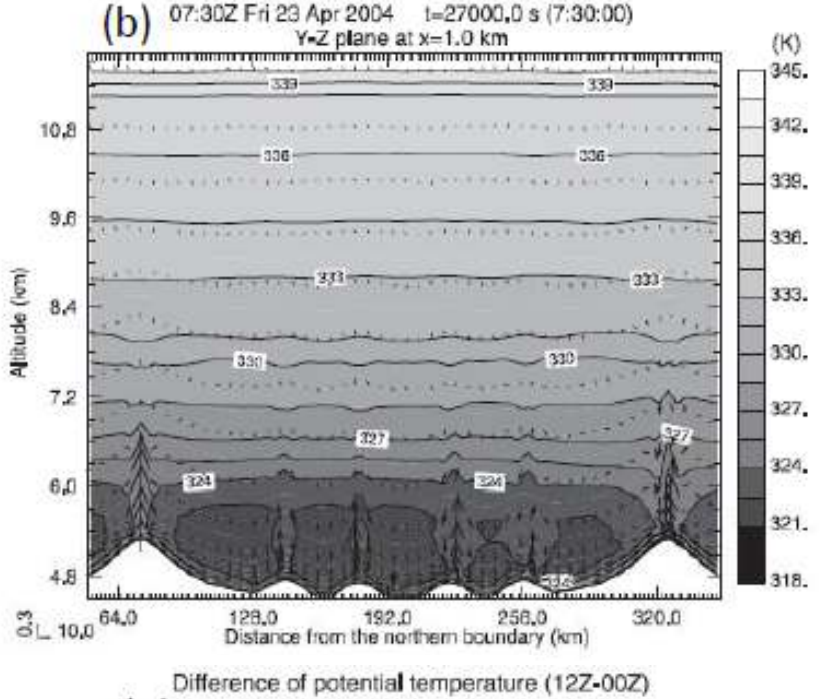
Atmospheric Heating over the Tibetan Plateau



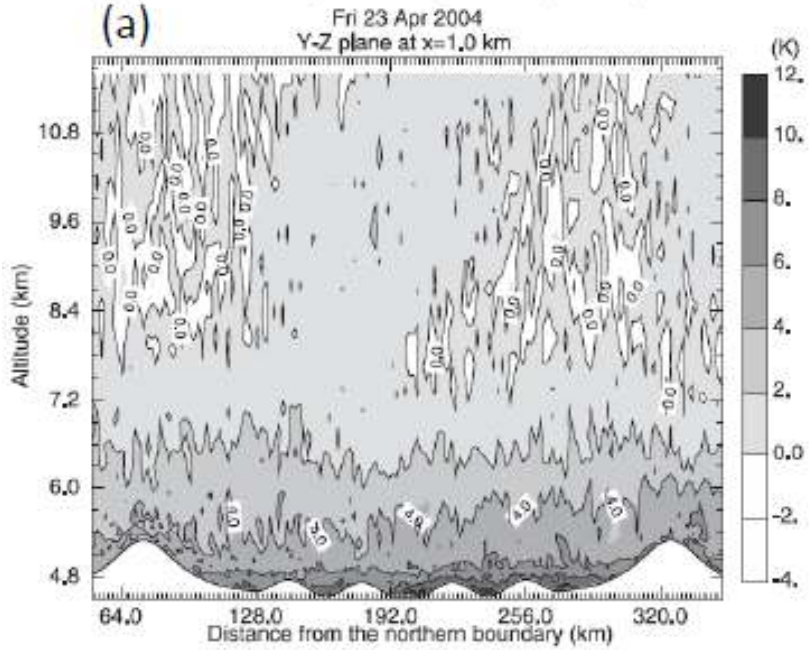


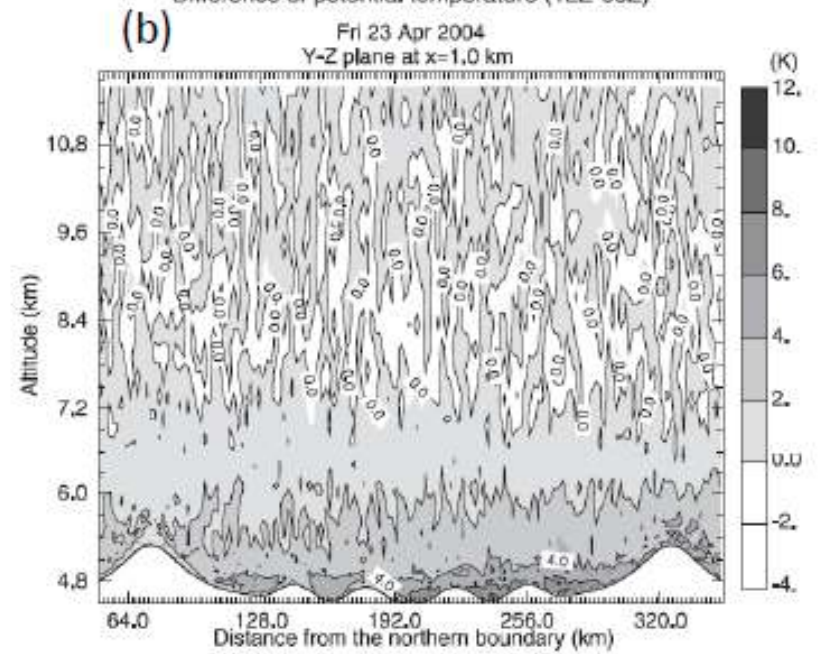
(Taniguchi & Koike, 2007)





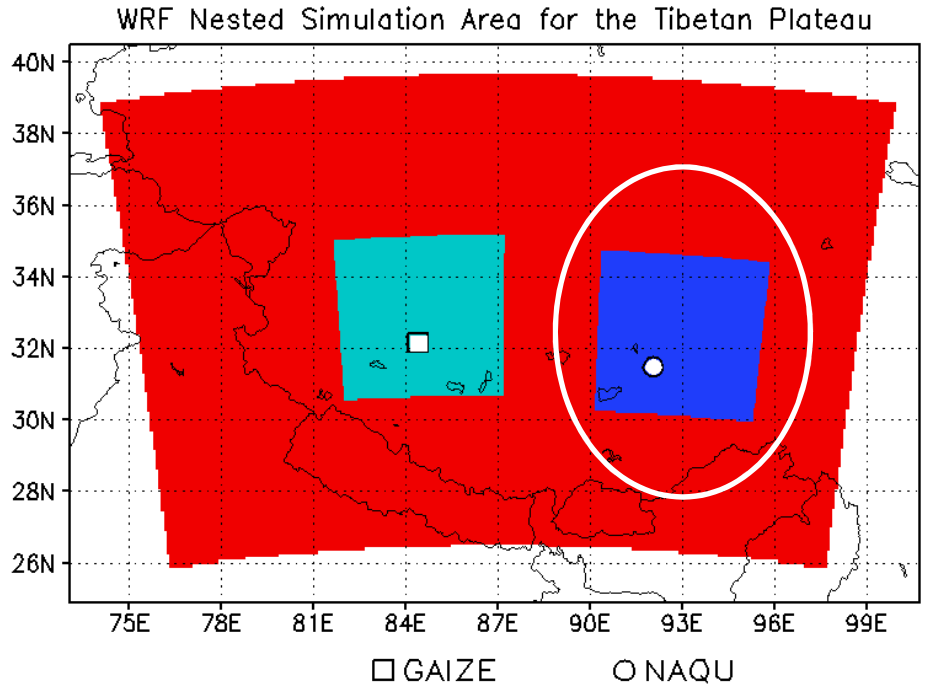
Difference of potential temperature (12Z-00Z)

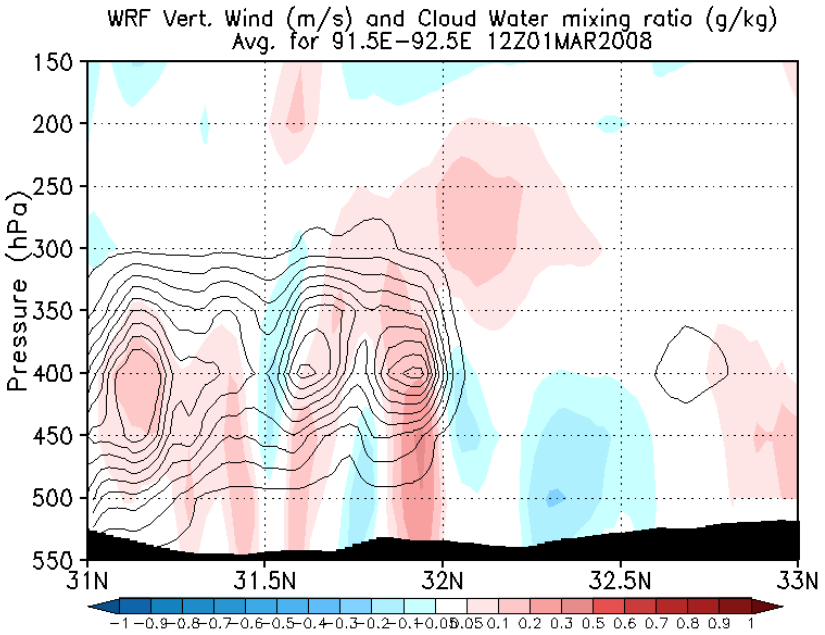


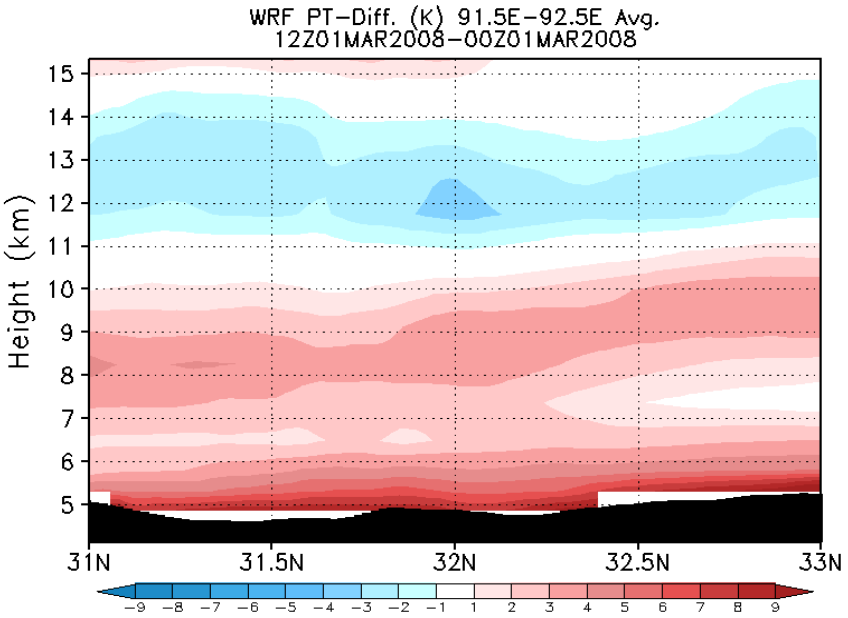


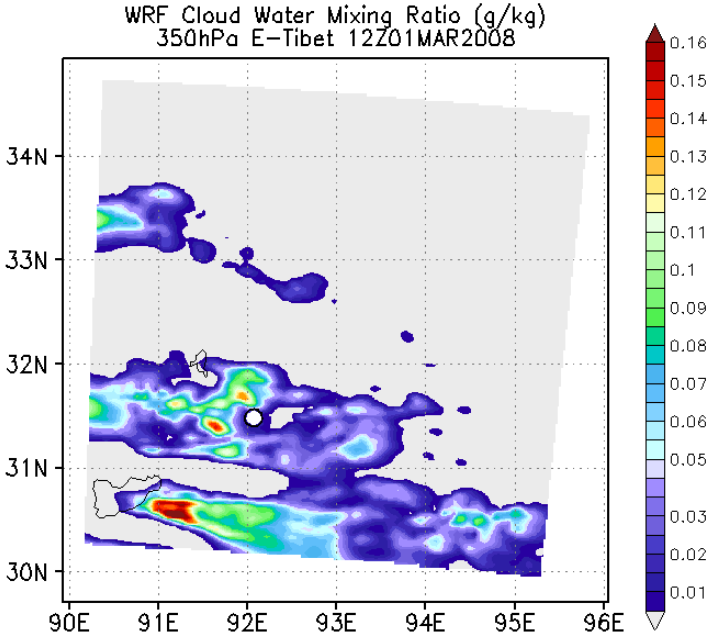
Numerical Experiment by WRF V3

- March 1-3, 2008
- Initial Condition : NCEP FNL
- Area : Two-way Nesting
- Spatial Resolution : Plateau Scale:20km, Mesoscale:5km



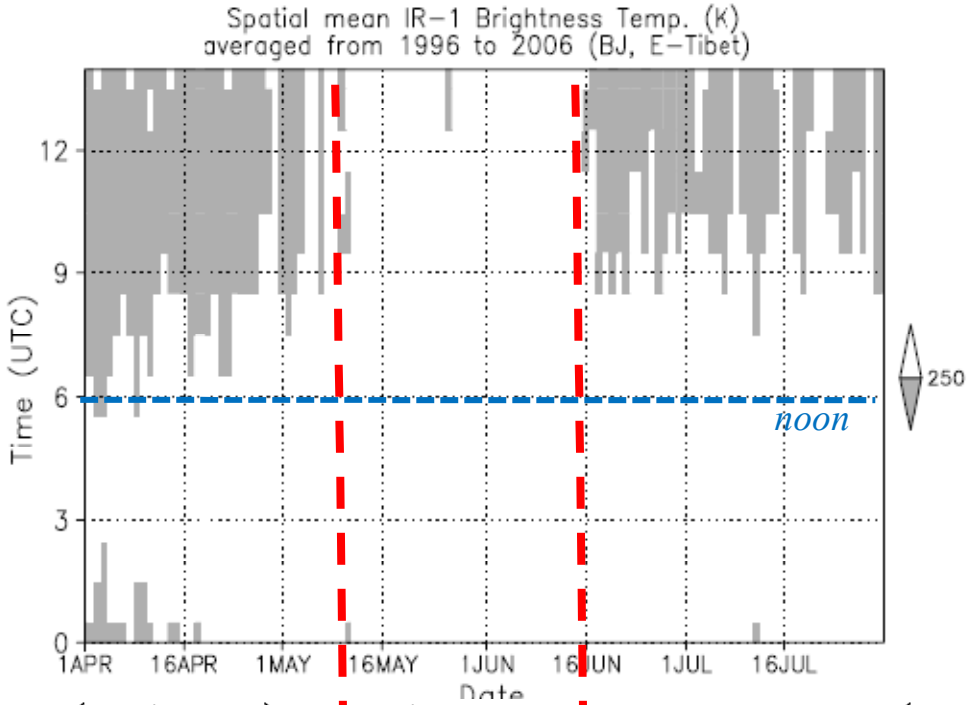

WRF Vert. Wind (m/s) and Cloud Water mixing ratio (g/kg)
Avg. for 91.5E-92.5E 12Z01MAR2008
Pressure (hPa)
150
200
250
300
350
400
450
500
550
31N
31.5N
32N
32.5N
33N
-1 -0.9 -0.8 -0.7 -0.6 -0.5 -0.4 -0.3 -0.2 -0.1 -0.05 0.05 0.1 0.2 0.3 0.5 0.6 0.7 0.8 0.9 1


WRF PT-Diff. (K) 91.5E-92.5E Avg.
12Z01MAR2008-00Z01MAR2008
Height (km)
15
14
13
12
11
10
9
8
7
6
5
31N
31.5N
32N
32.5N
33N
-9 -8 -7 -6 -5 -4 -3 -2 -1 1 2 3 4 5 6 7 8 9

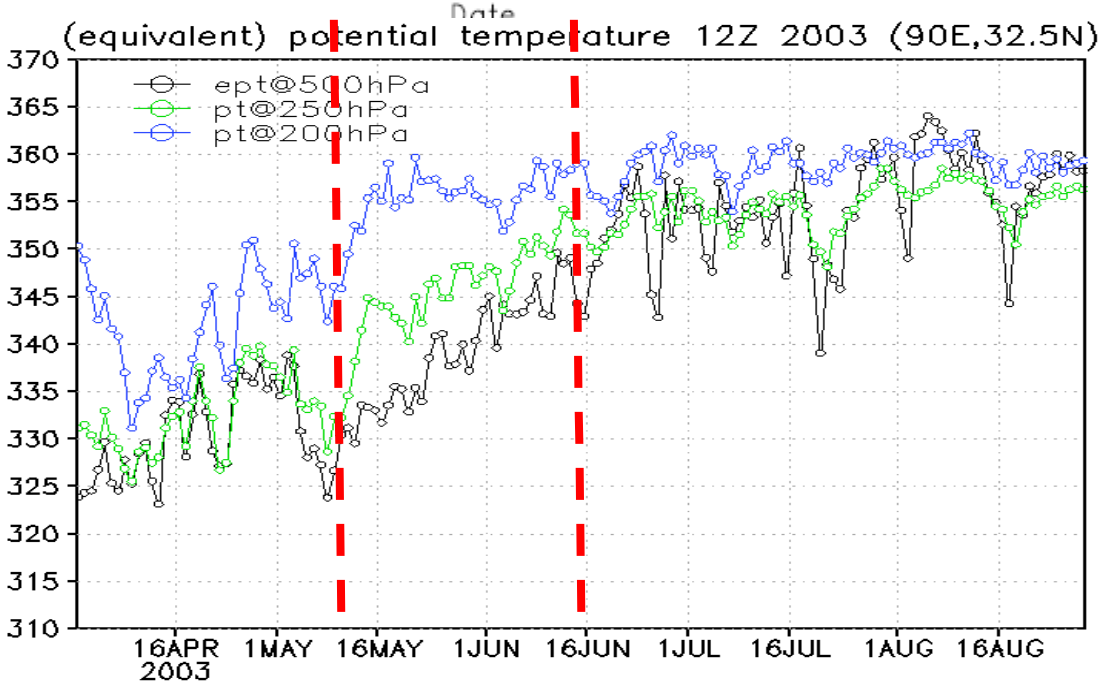

WRF Cloud Water Mixing Ratio (g/kg)
350hPa E-Tibet 12Z01MAR2008
34N
33N
32N
31N
30N
90E
91E
92E
93E
94E
95E
96E
0.16
0.15
0.14
0.13
0.12
0.11
0.1
0.09
0.08
0.07
0.06
0.05
0.03
0.02
0.01

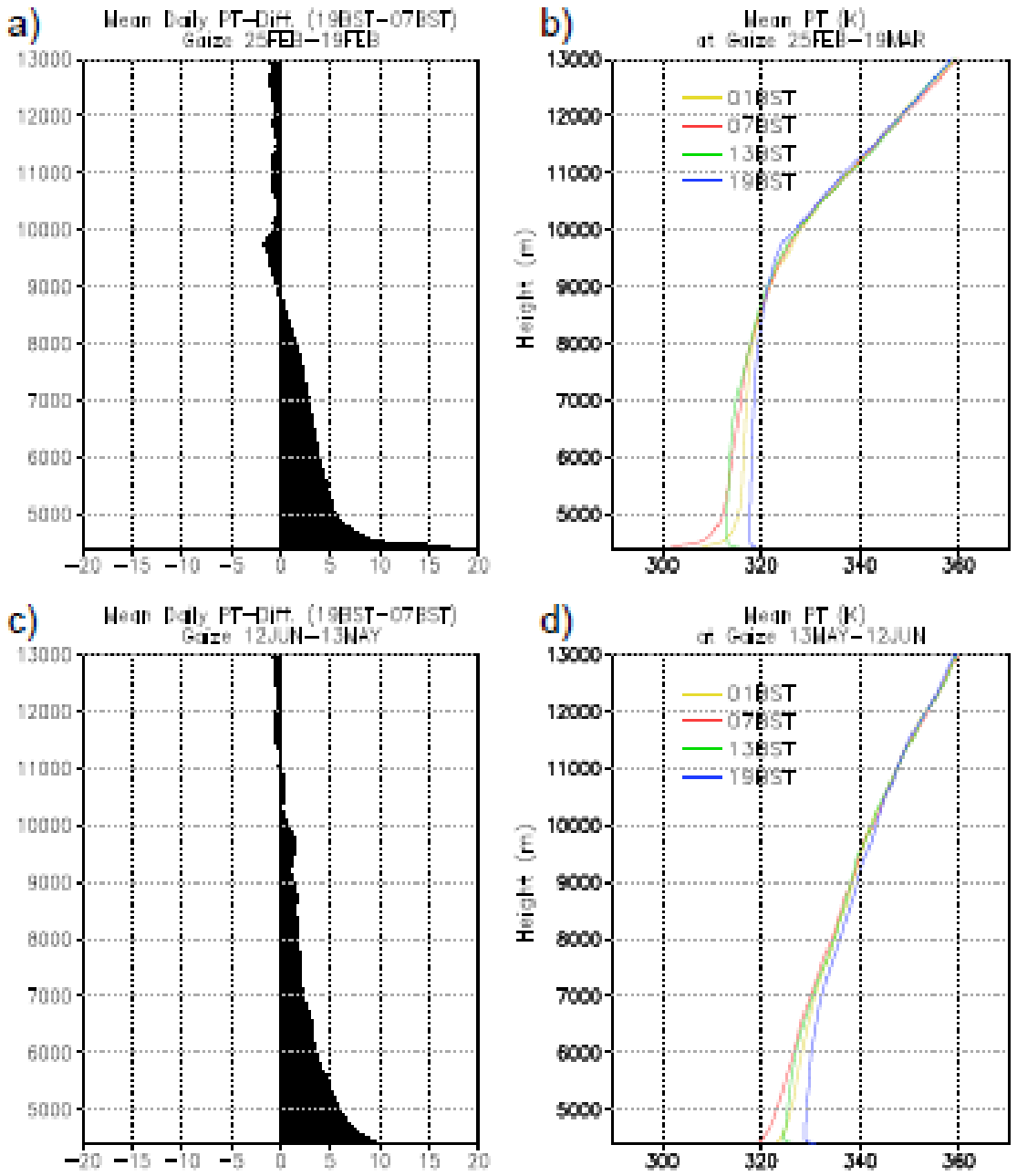
Convective Cloud Activity

(Taniguchi & Koike, 2007)



Atmospheric Heating




a)
Mean Daily PT-Diff. (19BST-07BST)
Gaize 25FEB-19FEB
b)
Mean PT (K)
at Gaize 25FEB-19MAR
01BST
07BST
13BST
19BST
Height (m)
c)
Mean Daily PT-Diff. (19BST-07BST)
Gaize 12JUN-13MAY
d)
Mean PT (K)
at Gaize 13MAY-12JUN
01BST
07BST
13BST
19BST
Height (m)