Validation and inter comparisons of profiles from ATOVS and AIRS data over India and its surrounding regions.

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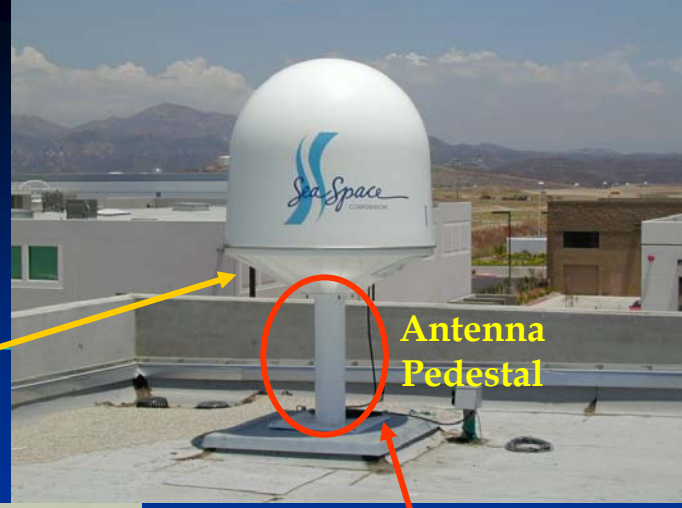
TeraScan HRPT Acquisition and Processing System



1.2m HRPT Tracking Antenna

Optional Items

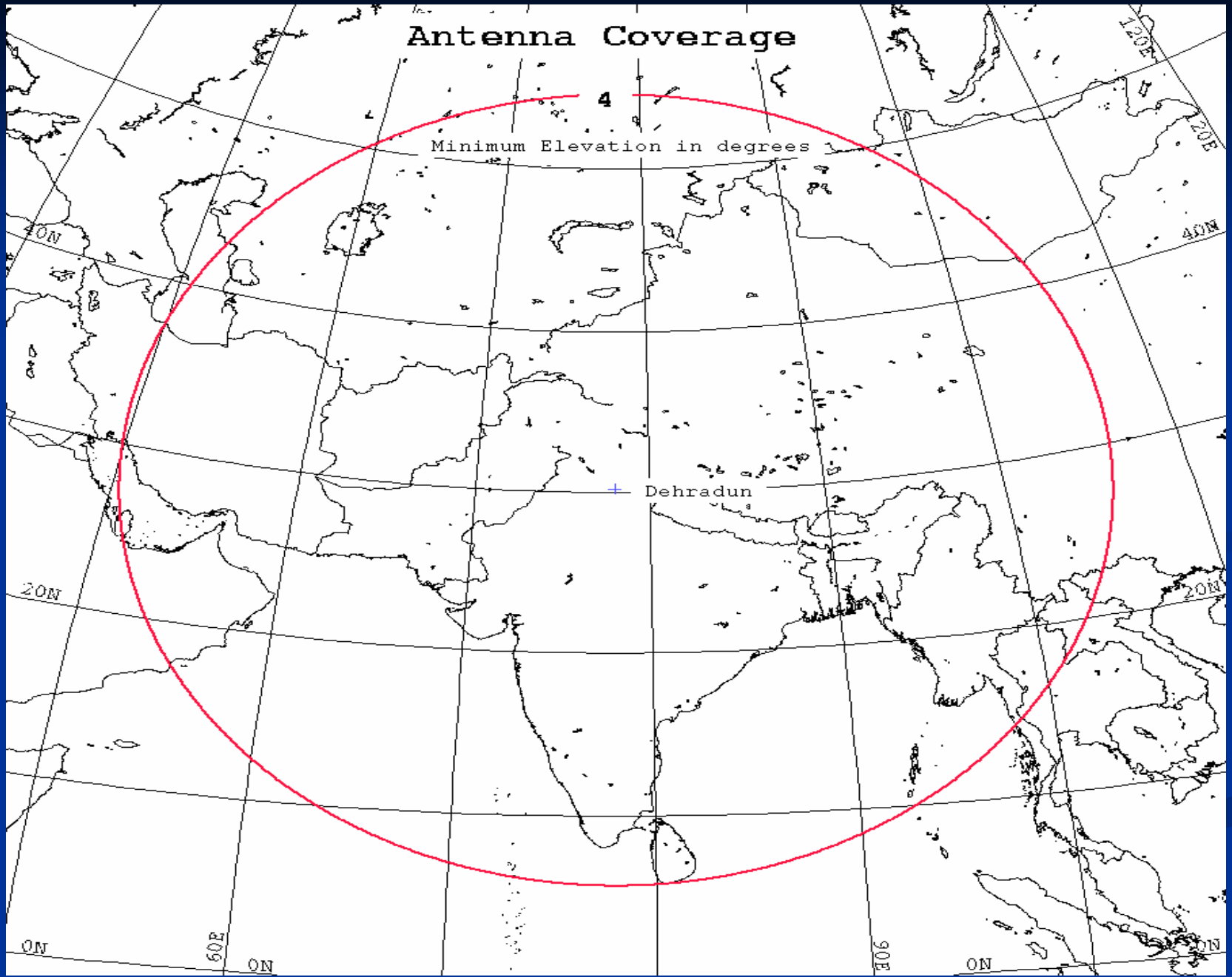
Sun Ultra-10 Acquisition and Processing

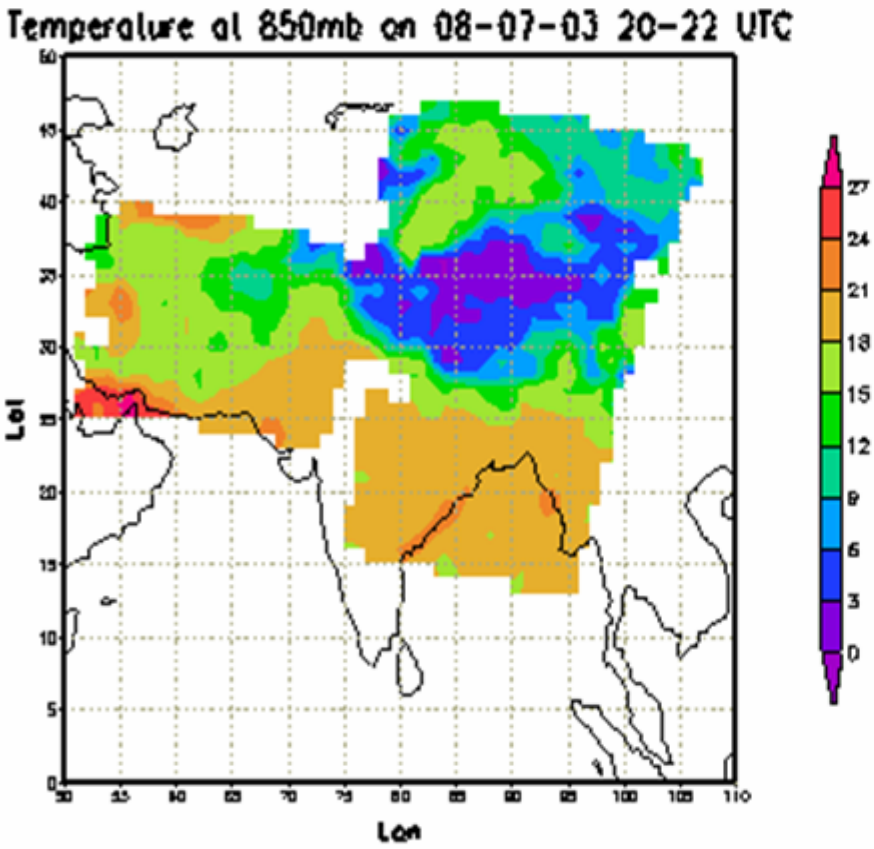
Color DeskJet Printer

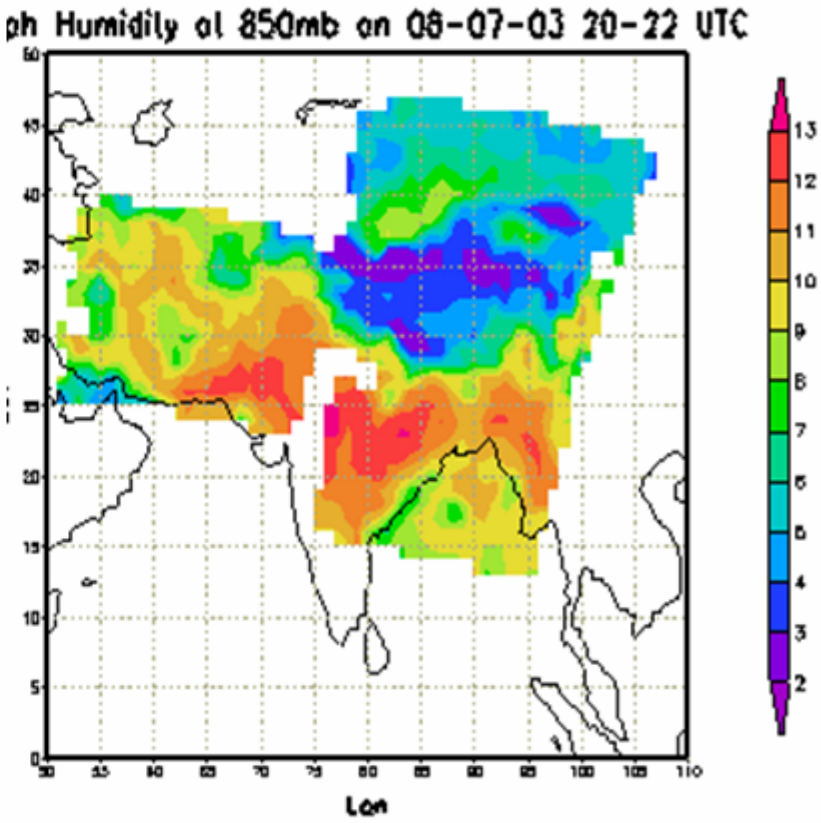
HRPT Receiver

UPS

DAT Drive

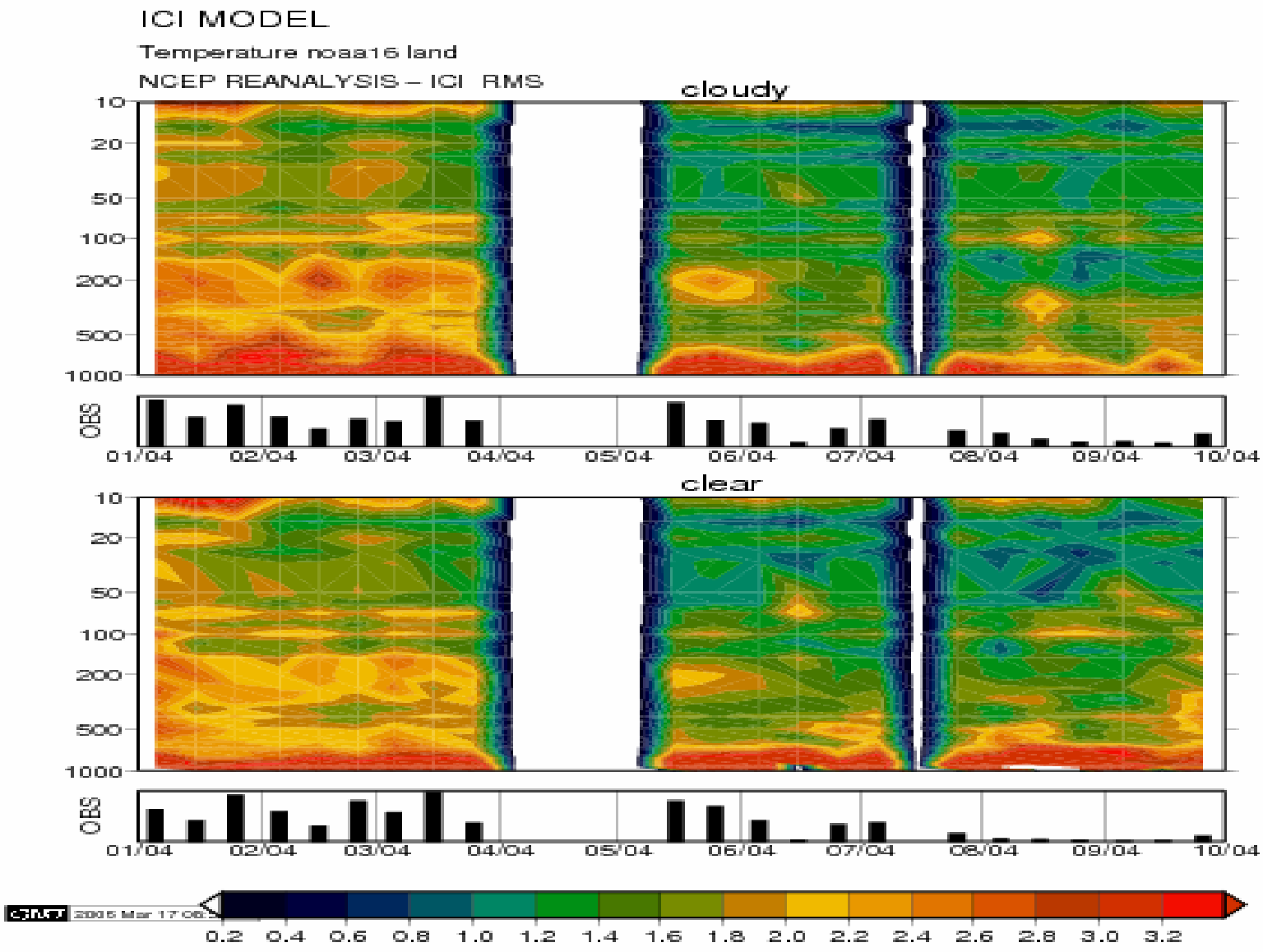

Antenna Coverage
4
Minimum Elevation in degrees
Dehradun
40N
20N
0N
60E
90E
120E

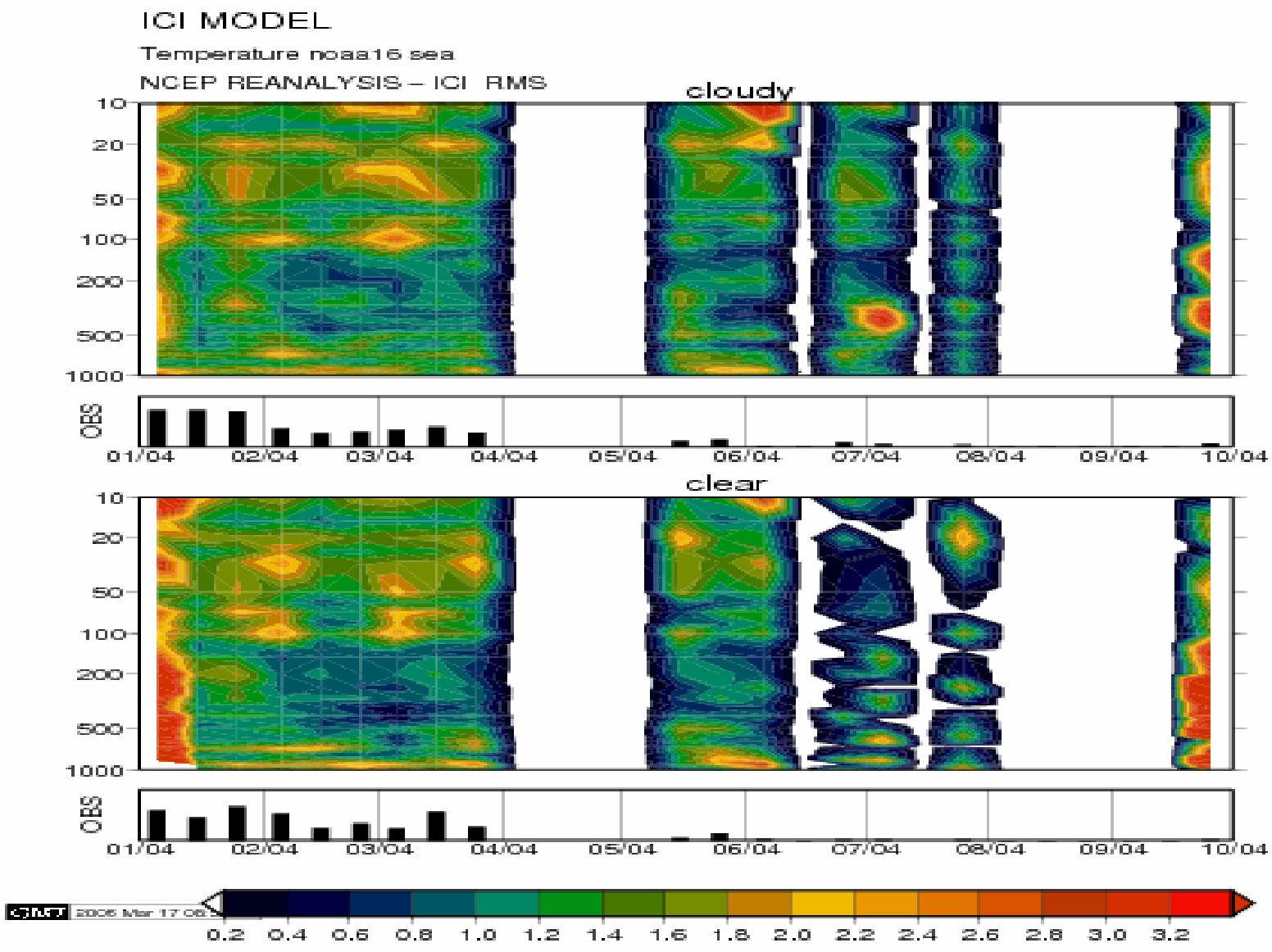

Temperature at 850mb on 08-07-03 20-22 UTC
Lat
Lon
27
24
21
18
15
12
9
6
3
0

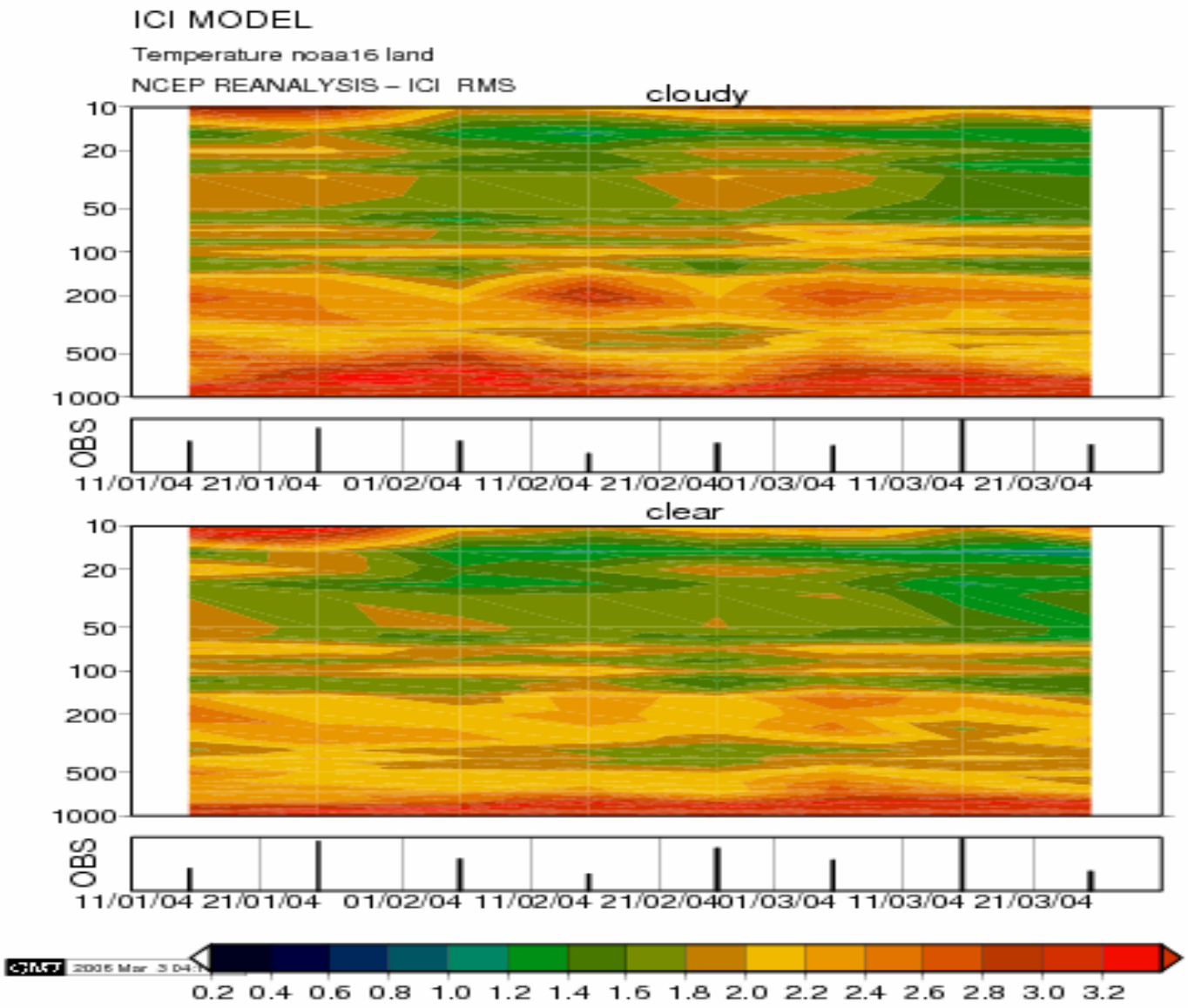

ph Humidity at 850mb on 08-07-03 20-22 UTC
Lon
13
12
11
10
9
8
7
6
5
4
3
2

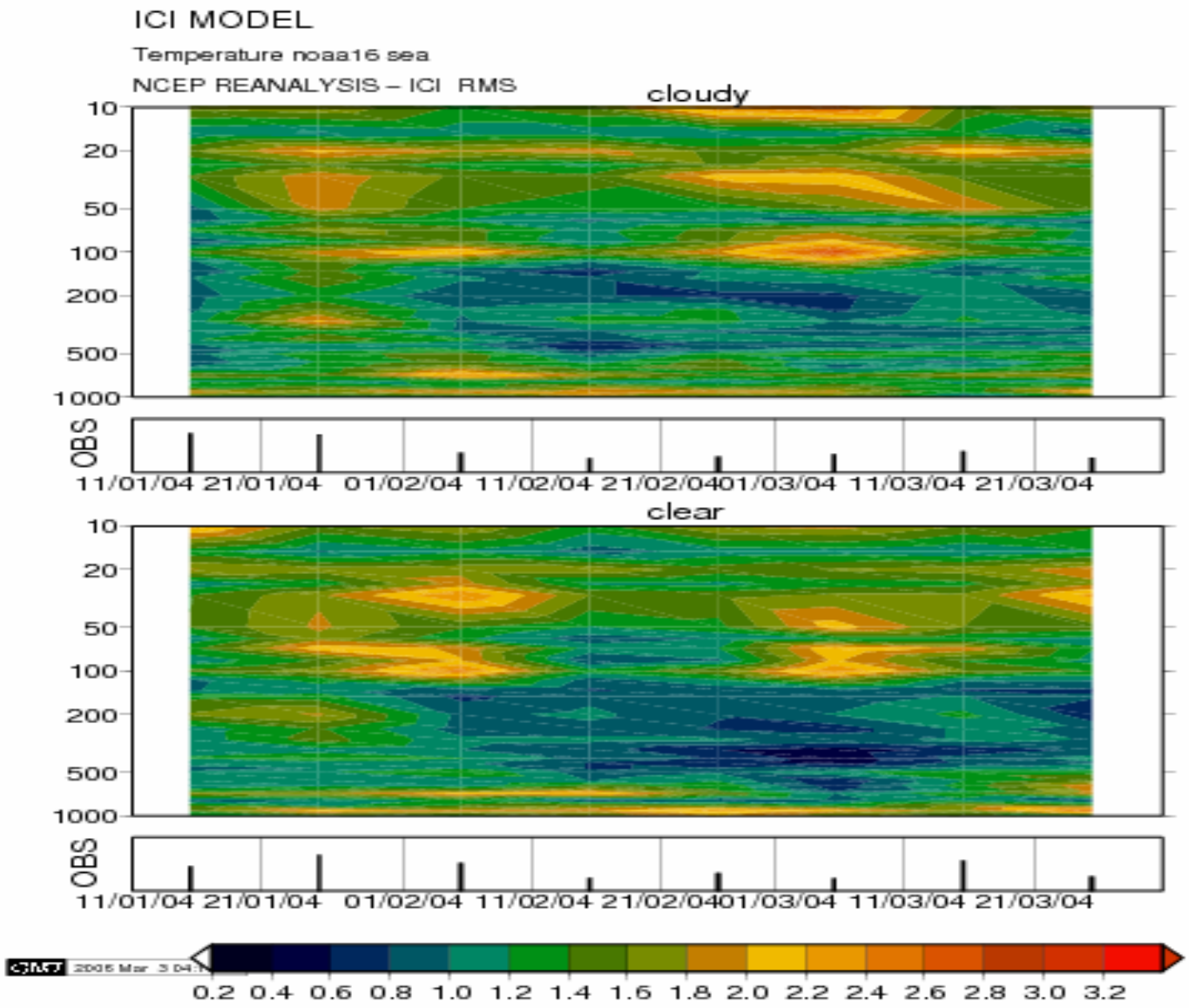
Retrievals of Temperature and Moisture Profiles for NOAA-16 using ICI Model

- The first guess was taken from LAM Model run operationally by IMD for the input to the AAPP and followed by ICI model.
- The NCEP reanalysis was used for the computation of RMSE and bias.
- This exercise was carried out from January 2004 to September 2004.


ICI MODEL
Temperature noaa16 land
NCEP REANALYSIS – ICI RMS
cloudy
clear
10
20
50
100
200
500
1000
OBS
01/04
02/04
03/04
04/04
05/04
06/04
07/04
08/04
09/04
10/04
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
2.2
2.4
2.6
2.8
3.0
3.2


ICI MODEL
Temperature noaa16 sea
NCEP REANALYSIS – ICI RMS
cloudy
10
20
50
100
200
500
1000
OBS
01/04
02/04
03/04
04/04
05/04
06/04
07/04
08/04
09/04
10/04
clear
10
20
50
100
200
500
1000
OBS
01/04
02/04
03/04
04/04
05/04
06/04
07/04
08/04
09/04
10/04
CNET 2006 Mar 17 08:
0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0 3.2

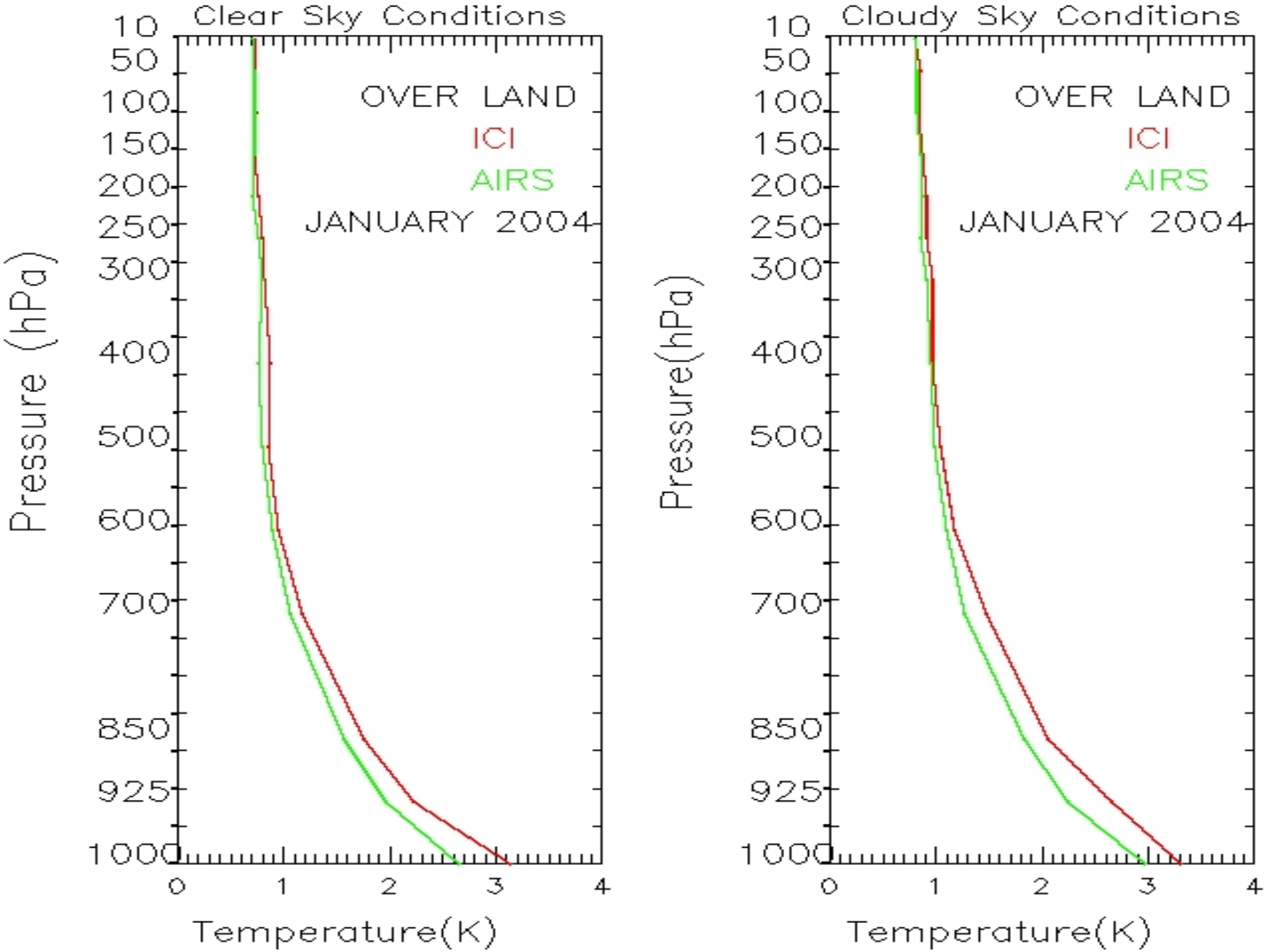

ICI MODEL
Temperature noaa16 land
NCEP REANALYSIS – ICI RMS
cloudy
10
20
50
100
200
500
1000
OBS
11/01/04 21/01/04 01/02/04 11/02/04 21/02/04 01/03/04 11/03/04 21/03/04
clear
10
20
50
100
200
500
1000
OBS
11/01/04 21/01/04 01/02/04 11/02/04 21/02/04 01/03/04 11/03/04 21/03/04
0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0 3.2

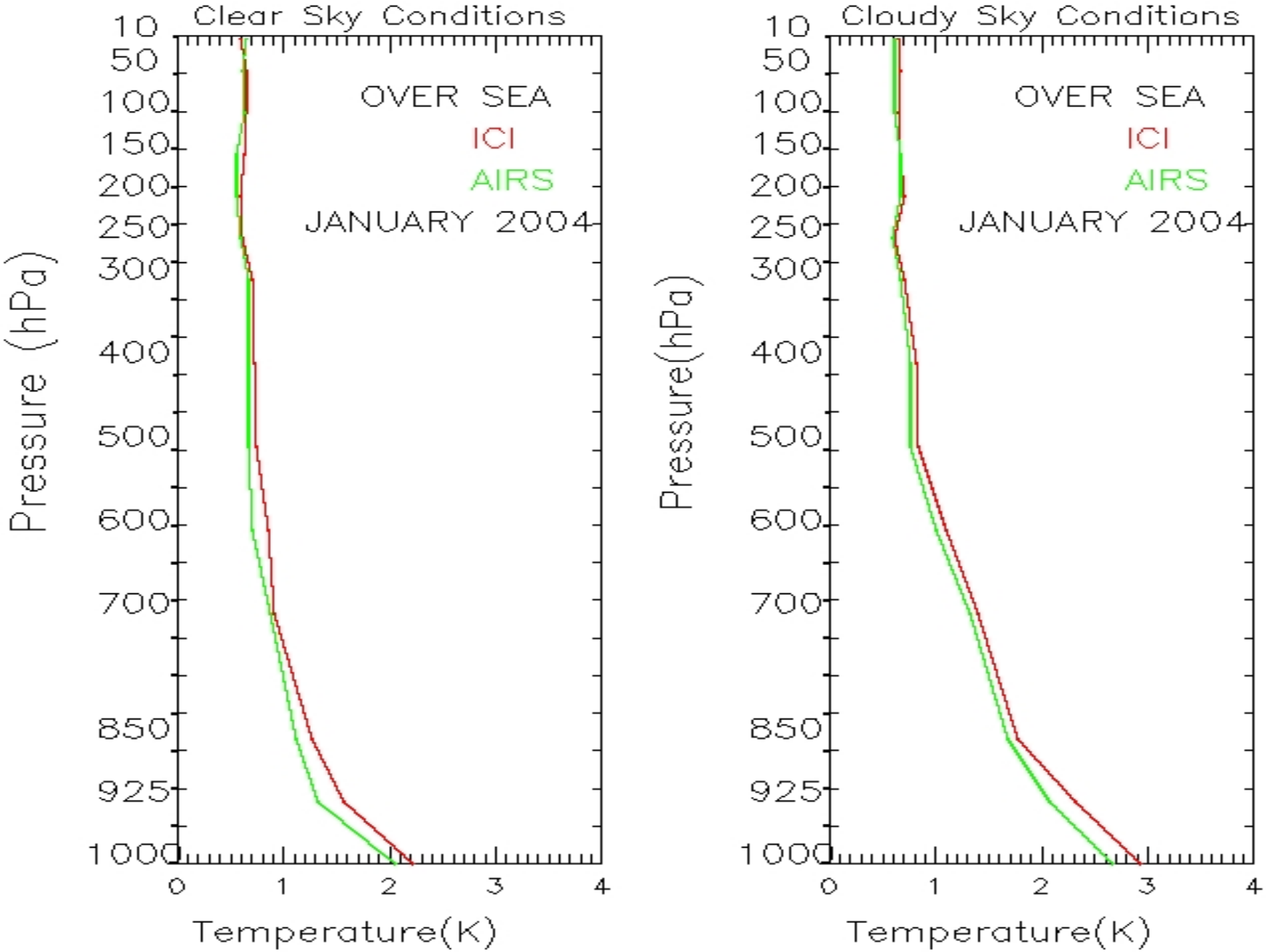

ICI MODEL
Temperature noaa16 sea
NCEP REANALYSIS – ICI RMS
cloudy
10
20
50
100
200
500
1000
OBS
11/01/04 21/01/04 01/02/04 11/02/04 21/02/0401/03/04 11/03/04 21/03/04
clear
10
20
50
100
200
500
1000
OBS
11/01/04 21/01/04 01/02/04 11/02/04 21/02/0401/03/04 11/03/04 21/03/04
0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0 3.2

Intercomparisions of Temperature Profiles for NOAA-16 using ICI Model with AIRS

- The NCEP reanalysis was used for the computation of RMSE and bias For both ICI retrievals and AIRS profiles.

- This exercise was carried out for January 2004.

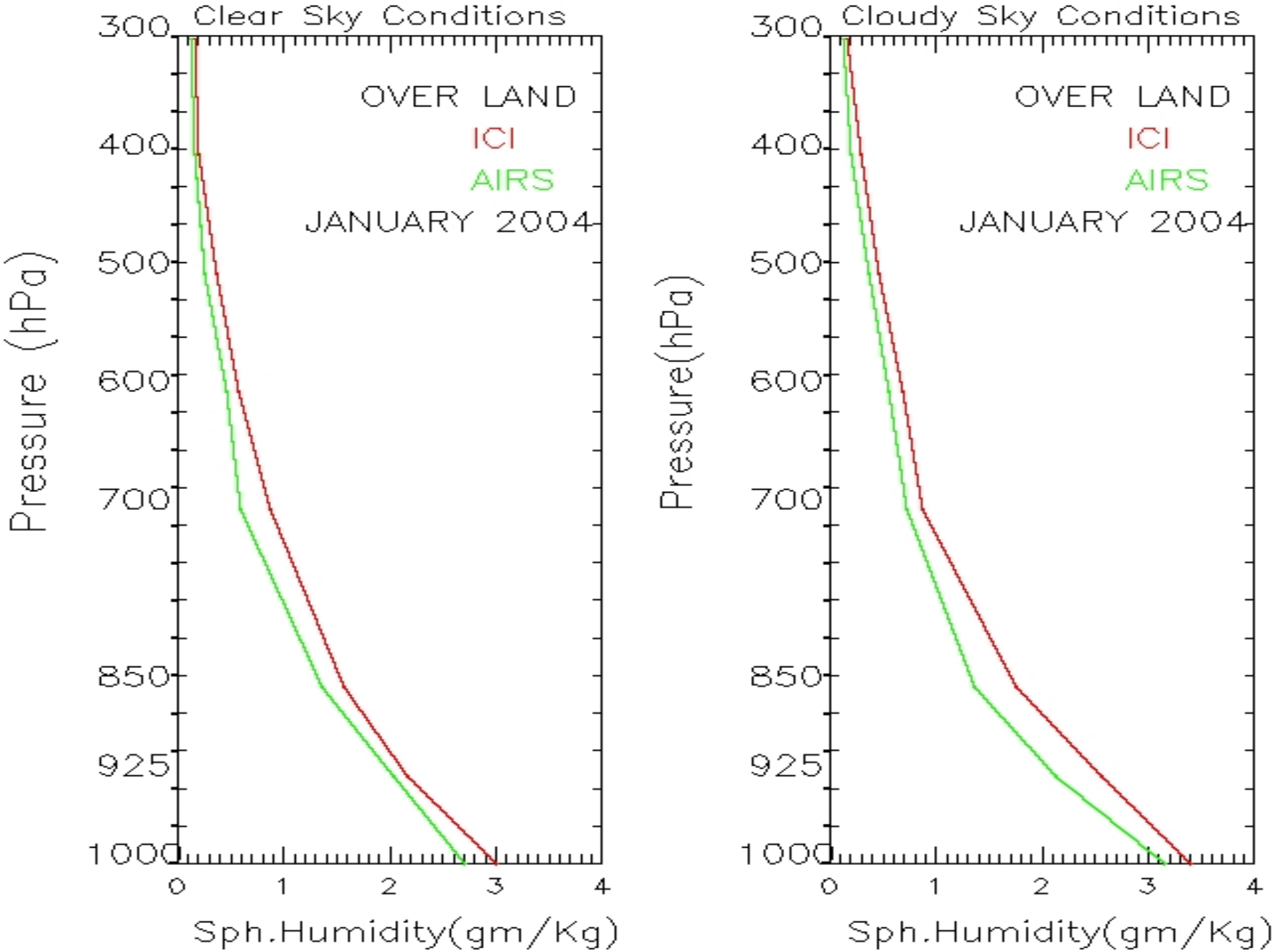

Clear Sky Conditions
OVER LAND
ICI
AIRS
JANUARY 2004
Pressure (hPa)
10
50
100
150
200
250
300
400
500
600
700
850
925
1000
0
1
2
3
4
Temperature(K)
Cloudy Sky Conditions
OVER LAND
ICI
AIRS
JANUARY 2004
Pressure(hPa)
Temperature(K)

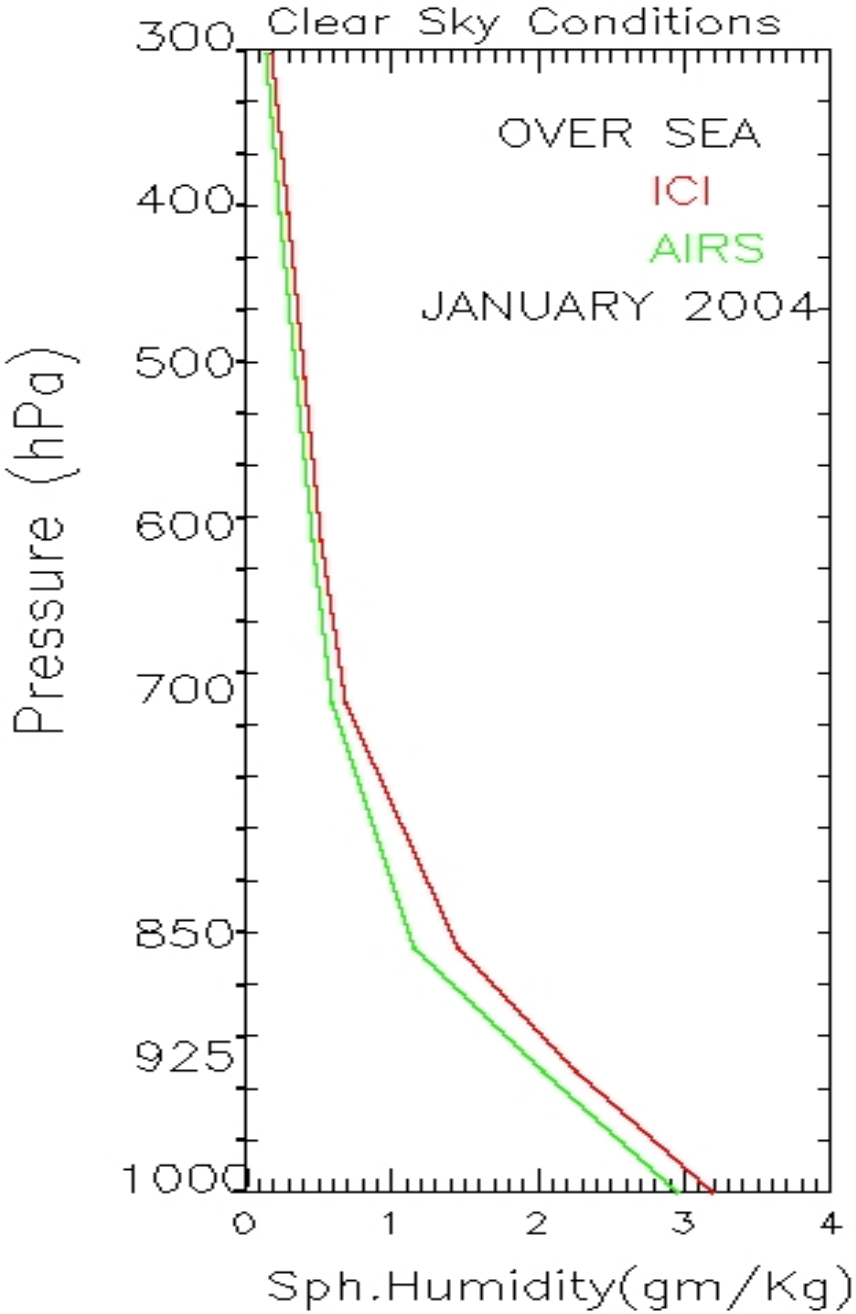

Clear Sky Conditions
OVER SEA
ICI
AIRS
JANUARY 2004
Pressure (hPa)
10
50
100
150
200
250
300
400
500
600
700
850
925
1000
0
1
2
3
4
Temperature(K)
Cloudy Sky Conditions
OVER SEA
ICI
AIRS
JANUARY 2004
Pressure(hPa)
10
50
100
150
200
250
300
400
500
600
700
850
925
1000
0
1
2
3
4
Temperature(K)

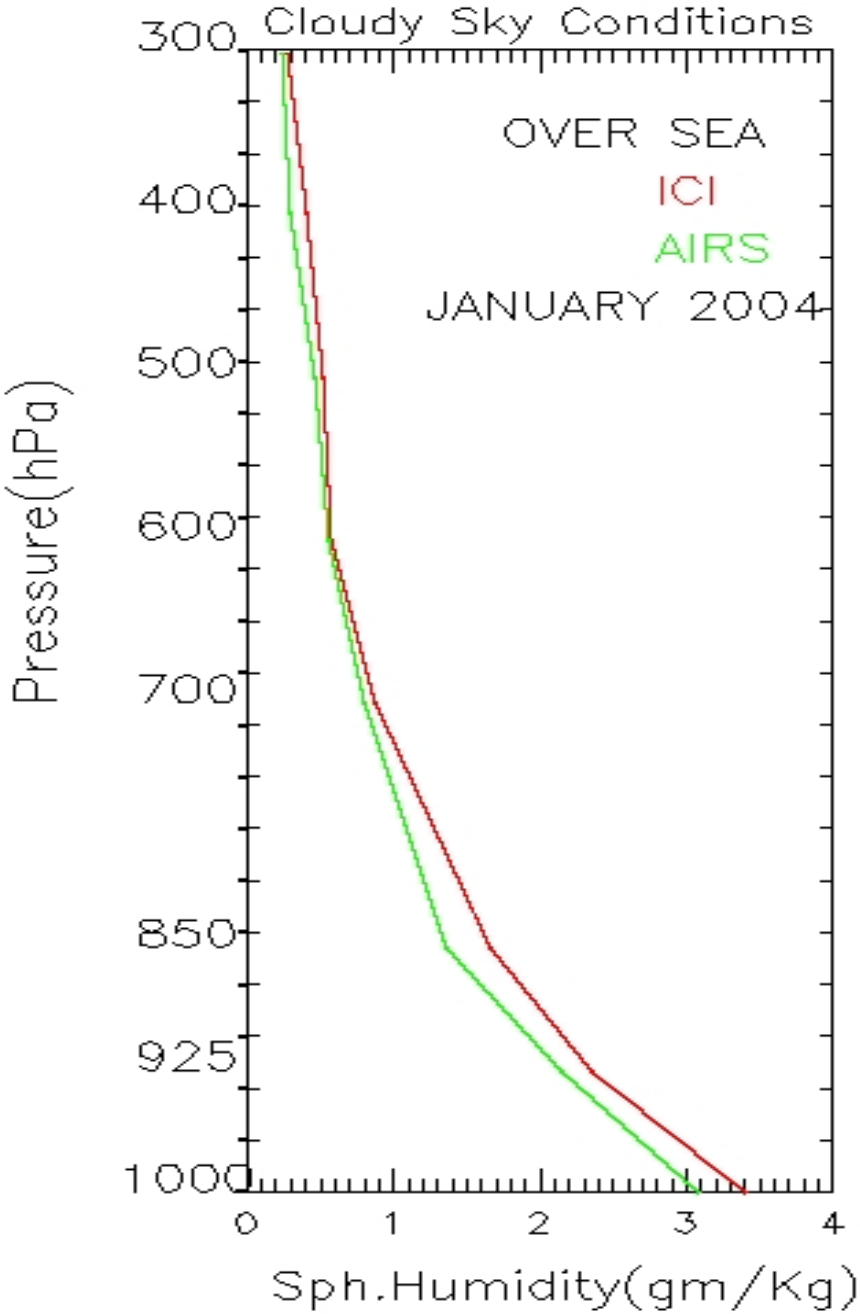
Intercomparisions of Moisture Profiles for NOAA-16 using ICI Model with AIRS

- The NCEP reanalysis was used for the computation of RMSE and bias For both ICI retrievals and AIRS profiles.

- This exercise was carried out for January 2004.

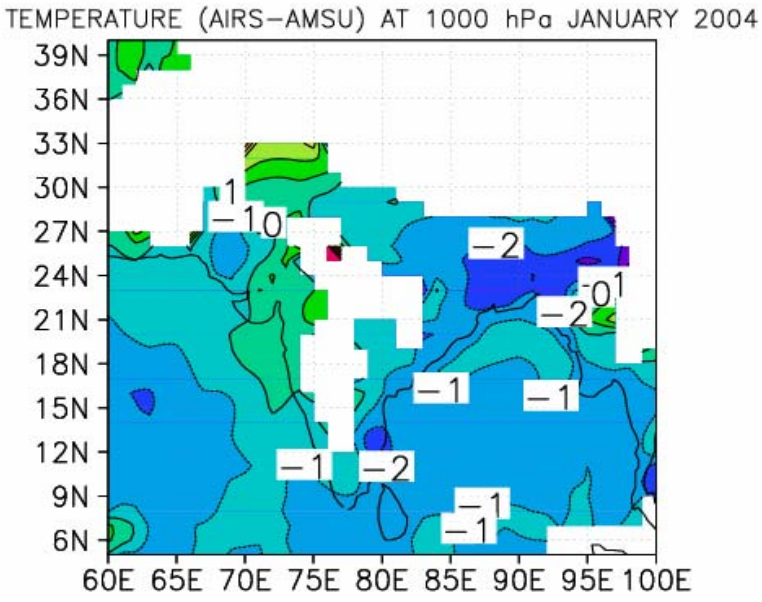

Clear Sky Conditions
OVER LAND
ICI
AIRS
JANUARY 2004
Pressure (hPa)
300
400
500
600
700
850
925
1000
0
1
2
3
4
Sph.Humidity(gm/Kg)
Cloudy Sky Conditions
OVER LAND
ICI
AIRS
JANUARY 2004
Pressure(hPa)
300
400
500
600
700
850
925
1000
0
1
2
3
4
Sph.Humidity(gm/Kg)

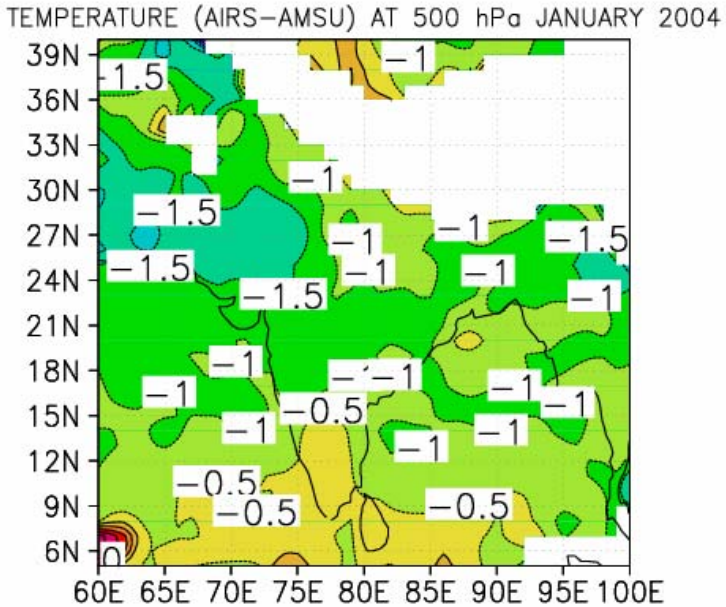

Clear Sky Conditions
OVER SEA
ICI
AIRS
JANUARY 2004
Pressure (hPa)
300
400
500
600
700
850
925
1000
0
1
2
3
4
Sph.Humidity(gm/Kg)

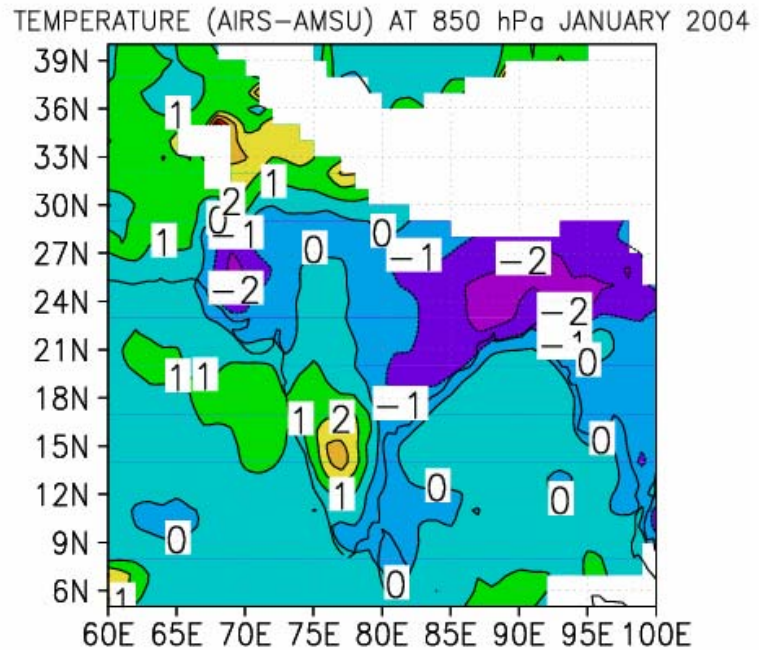

Cloudy Sky Conditions
OVER SEA
ICI
AIRS
JANUARY 2004
Pressure(hPa)
300
400
500
600
700
850
925
1000
0
1
2
3
4
Sph.Humidity(gm/Kg)

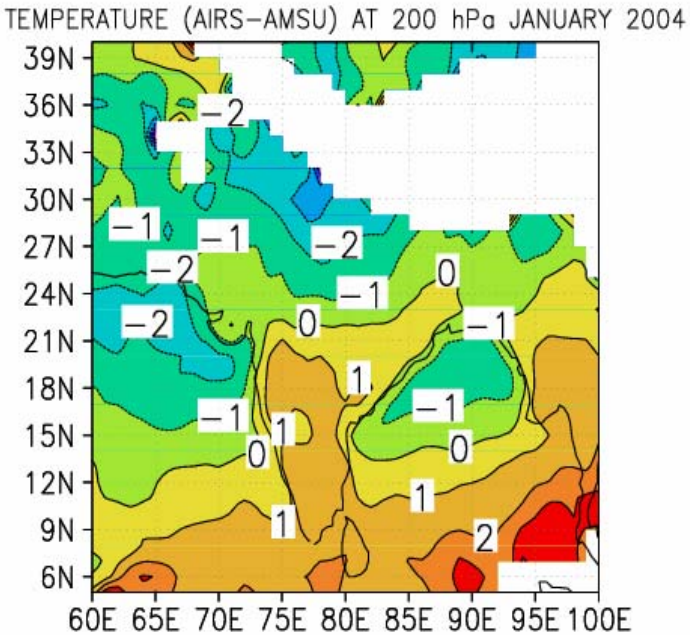
Intercomparisions of horizontal fields of Temperature Profiles for NOAA-16 using ICI Model with AIRS at different pressure levels

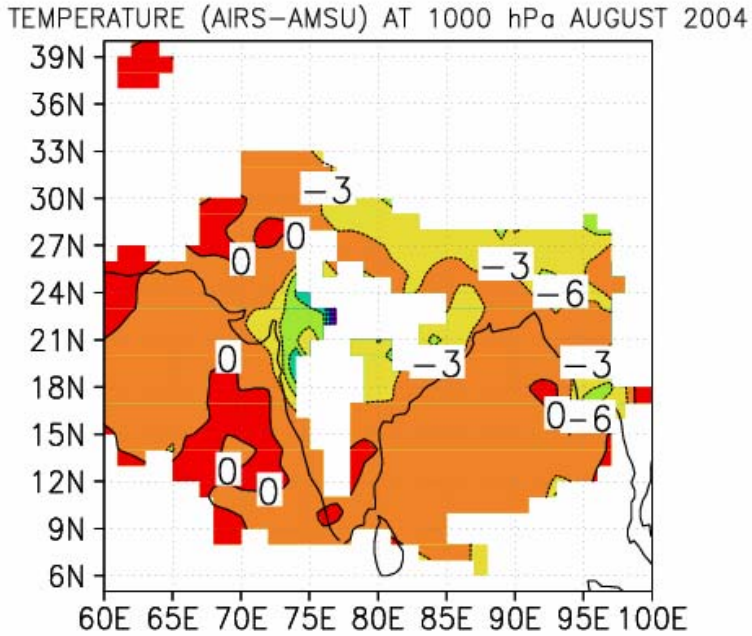
- This exercise was carried out for Temperature profiles for the period of January and August 2004.

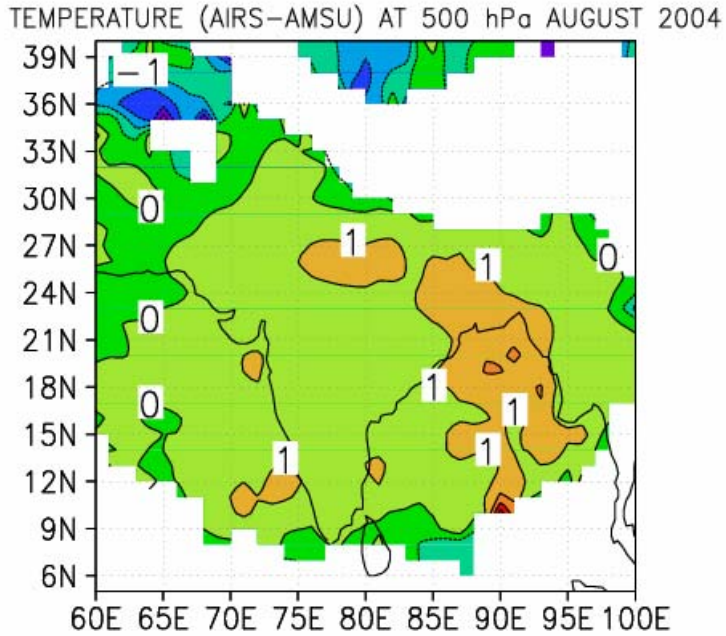

TEMPERATURE (AIRS–AMSU) AT 1000 hPa JANUARY 2004
39N
36N
33N
30N
27N
24N
21N
18N
15N
12N
9N
6N
60E 65E 70E 75E 80E 85E 90E 95E 100E

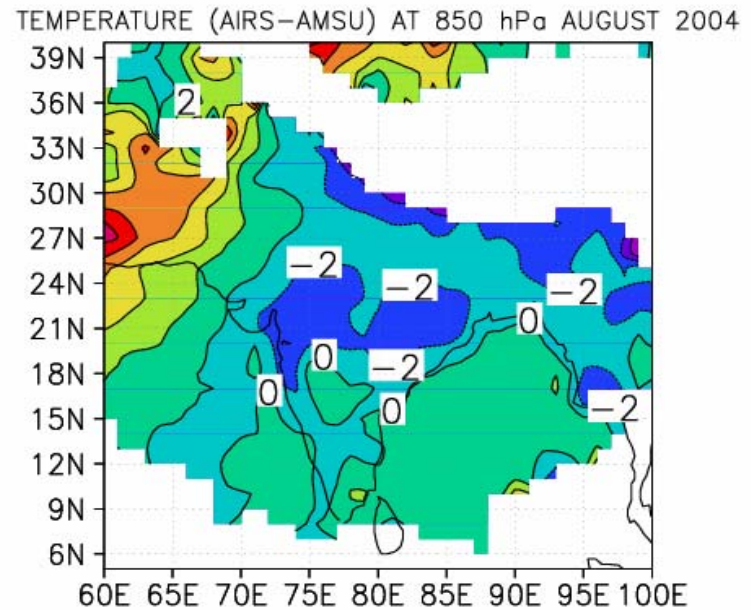

TEMPERATURE (AIRS–AMSU) AT 500 hPa JANUARY 2004
39N
36N
33N
30N
27N
24N
21N
18N
15N
12N
9N
6N
60E 65E 70E 75E 80E 85E 90E 95E 100E

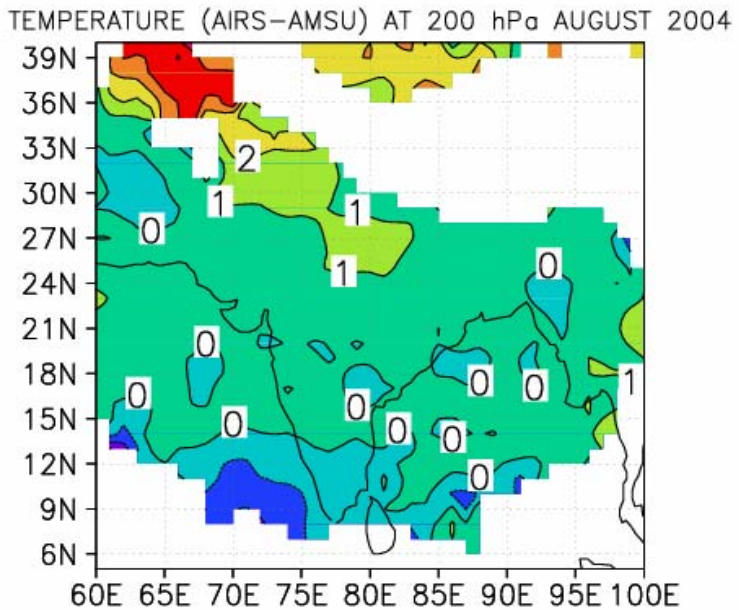

TEMPERATURE (AIRS–AMSU) AT 850 hPa JANUARY 2004
39N
36N
33N
30N
27N
24N
21N
18N
15N
12N
9N
6N
60E 65E 70E 75E 80E 85E 90E 95E 100E


TEMPERATURE (AIRS–AMSU) AT 200 hPa JANUARY 2004
39N
36N
33N
30N
27N
24N
21N
18N
15N
12N
9N
6N
60E 65E 70E 75E 80E 85E 90E 95E 100E


TEMPERATURE (AIRS−AMSU) AT 1000 hPa AUGUST 2004
39N
36N
33N
30N
27N
24N
21N
18N
15N
12N
9N
6N
60E 65E 70E 75E 80E 85E 90E 95E 100E
−3
0
0
−3
−6
0
−3
−3
0−6
0
0

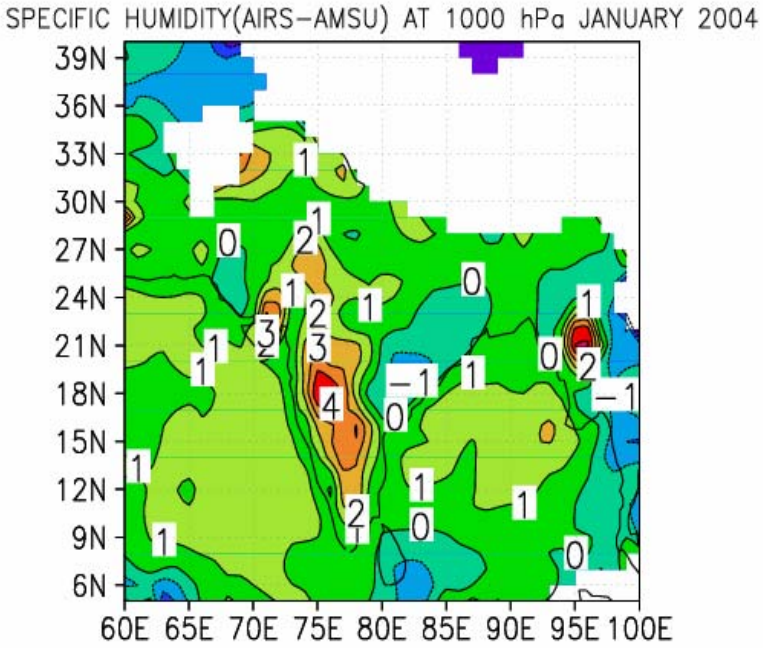

TEMPERATURE (AIRS−AMSU) AT 500 hPa AUGUST 2004
39N
36N
33N
30N
27N
24N
21N
18N
15N
12N
9N
6N
60E 65E 70E 75E 80E 85E 90E 95E 100E
−1
0
1
1
0
0
1
0
1
1
1

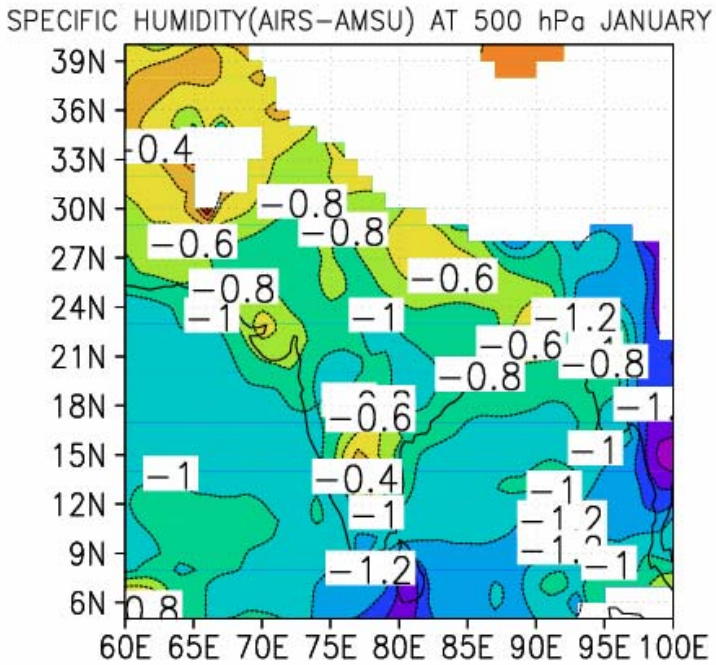

TEMPERATURE (AIRS−AMSU) AT 850 hPa AUGUST 2004
39N
36N
33N
30N
27N
24N
21N
18N
15N
12N
9N
6N
60E 65E 70E 75E 80E 85E 90E 95E 100E
2
−2
−2
−2
0
0
−2
0
0
−2

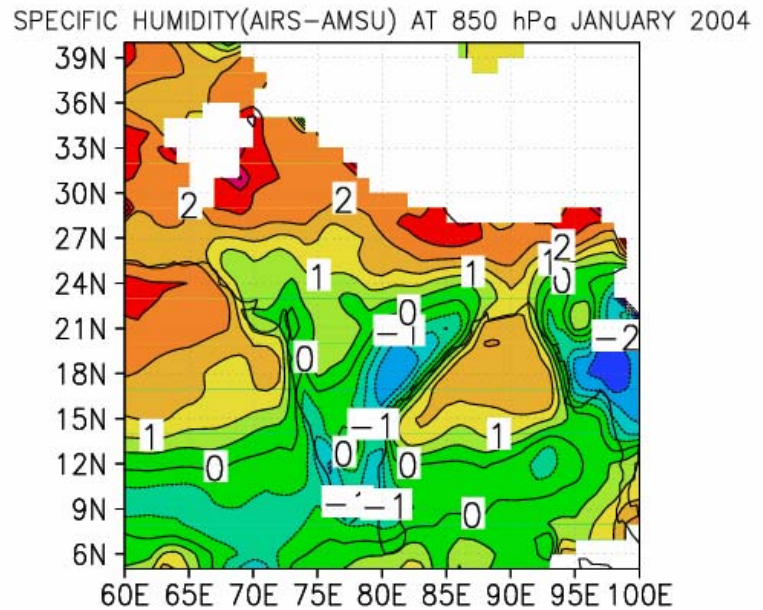

TEMPERATURE (AIRS−AMSU) AT 200 hPa AUGUST 2004
39N
36N
33N
30N
27N
24N
21N
18N
15N
12N
9N
6N
60E 65E 70E 75E 80E 85E 90E 95E 100E
2
1
1
0
1
0
0
0
0
0
0
0
0
1
0

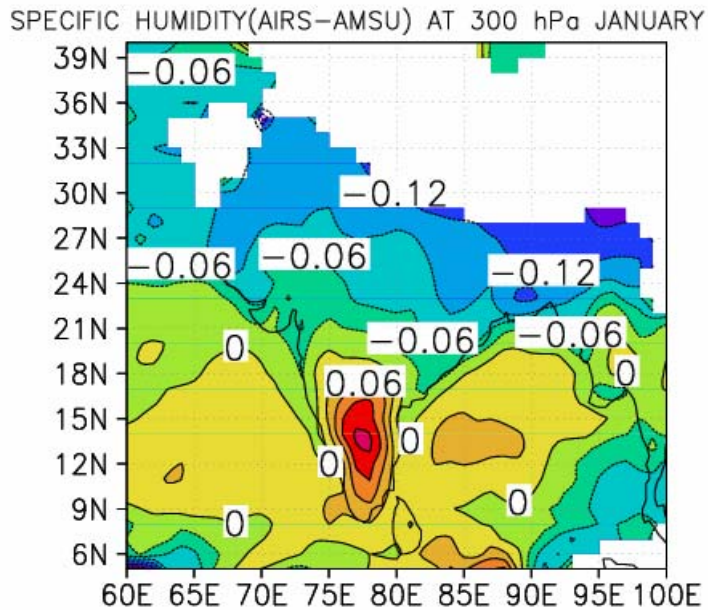
Intercomparisions of horizontal fields of Moisture Profiles for NOAA-16 using ICI Model with AIRS at different pressure levels

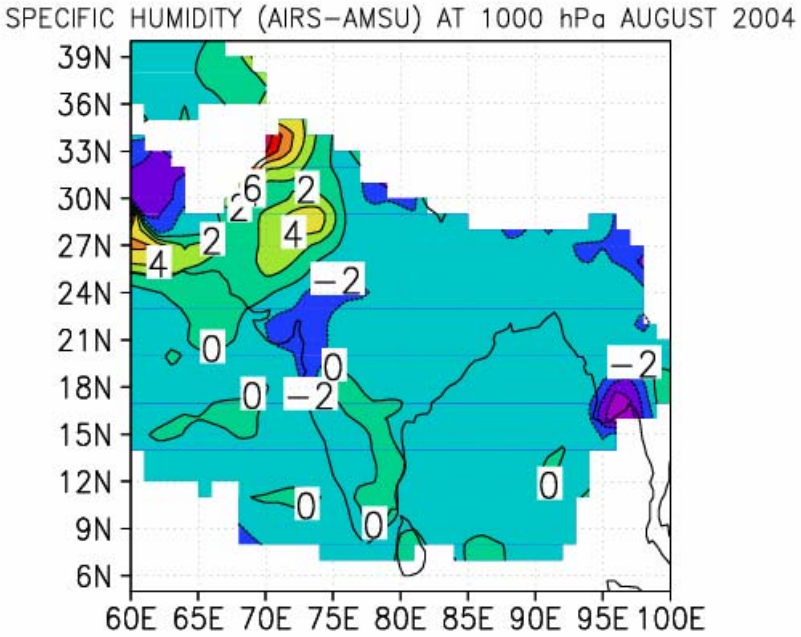
- This exercise was carried out for Moisture profiles for the period of January and August 2004.

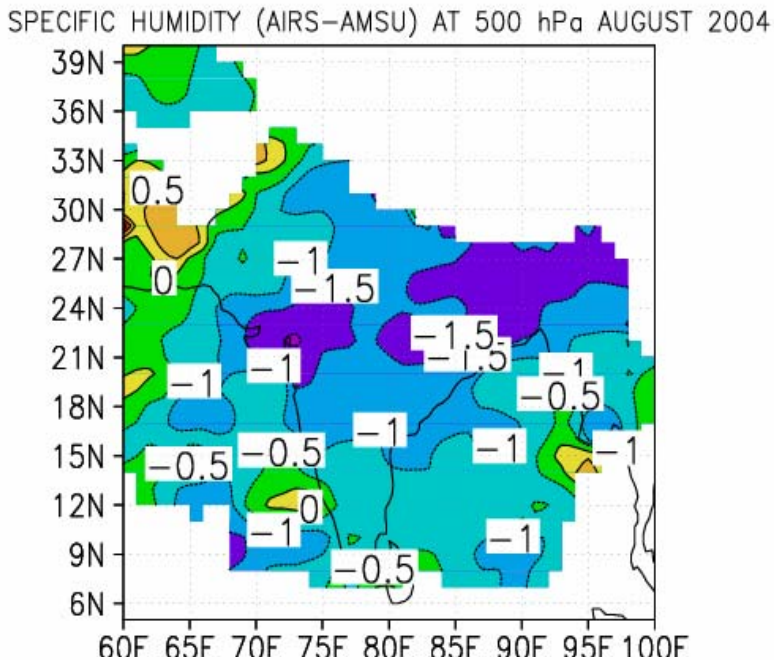

SPECIFIC HUMIDITY(AIRS−AMSU) AT 1000 hPa JANUARY 2004
39N
36N
33N
30N
27N
24N
21N
18N
15N
12N
9N
6N
60E 65E 70E 75E 80E 85E 90E 95E 100E

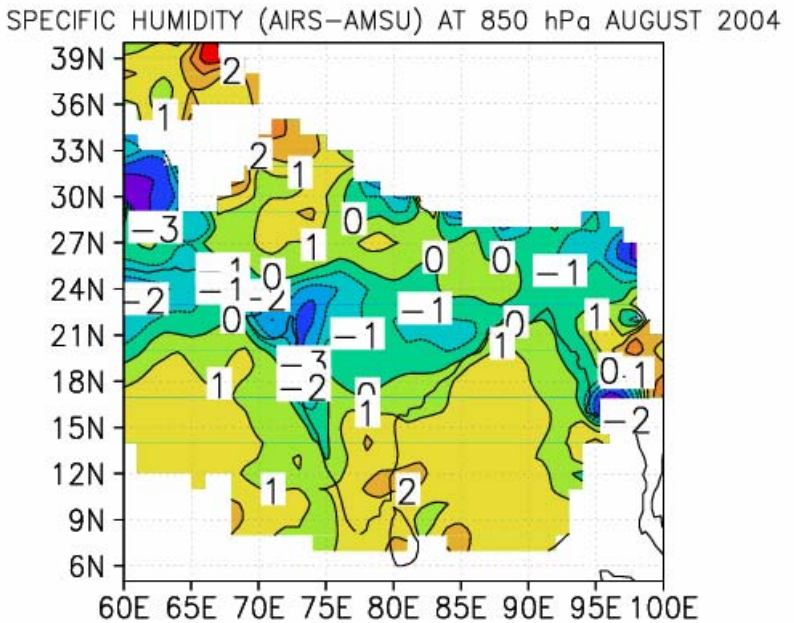

SPECIFIC HUMIDITY(AIRS−AMSU) AT 500 hPa JANUARY 2004
39N
36N
33N
30N
27N
24N
21N
18N
15N
12N
9N
6N
60E 65E 70E 75E 80E 85E 90E 95E 100E

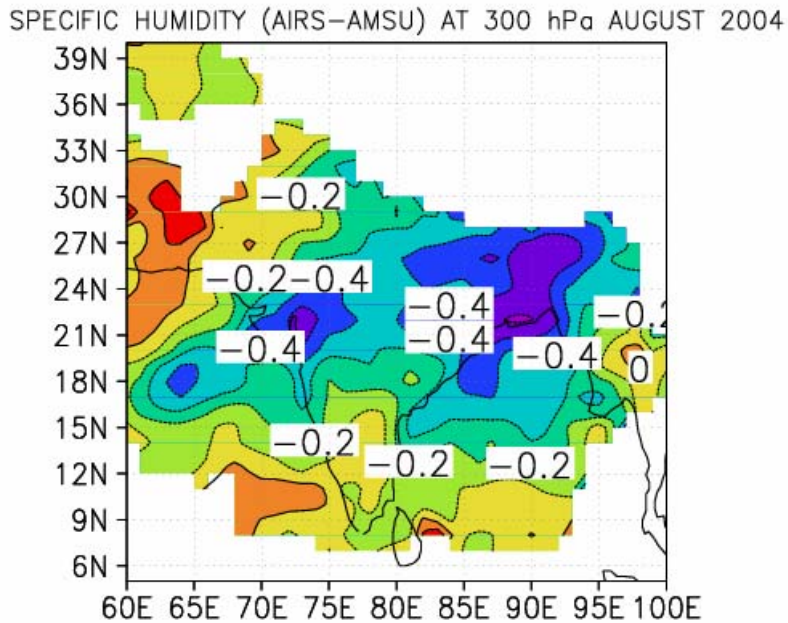

SPECIFIC HUMIDITY(AIRS−AMSU) AT 850 hPa JANUARY 2004
39N
36N
33N
30N
27N
24N
21N
18N
15N
12N
9N
6N
60E 65E 70E 75E 80E 85E 90E 95E 100E


SPECIFIC HUMIDITY(AIRS−AMSU) AT 300 hPa JANUARY 2004
39N
36N
33N
30N
27N
24N
21N
18N
15N
12N
9N
6N
60E 65E 70E 75E 80E 85E 90E 95E 100E


SPECIFIC HUMIDITY (AIRS−AMSU) AT 1000 hPa AUGUST 2004
39N
36N
33N
30N
27N
24N
21N
18N
15N
12N
9N
6N
60E 65E 70E 75E 80E 85E 90E 95E 100E


SPECIFIC HUMIDITY (AIRS−AMSU) AT 500 hPa AUGUST 2004
39N
36N
33N
30N
27N
24N
21N
18N
15N
12N
9N
6N
60E 65E 70E 75E 80E 85E 90E 95E 100E


SPECIFIC HUMIDITY (AIRS−AMSU) AT 850 hPa AUGUST 2004
39N
36N
33N
30N
27N
24N
21N
18N
15N
12N
9N
6N
60E 65E 70E 75E 80E 85E 90E 95E 100E


SPECIFIC HUMIDITY (AIRS−AMSU) AT 300 hPa AUGUST 2004
39N
36N
33N
30N
27N
24N
21N
18N
15N
12N
9N
6N
60E 65E 70E 75E 80E 85E 90E 95E 100E

Summary

The ICI model retrieved profiles are validated using NCEP reanalysis yields rms error about 3.2 K over land and 2k over Sea. Further the intercomparisions of ATOVS and AIRS profiles show the larger differences over land areas at few locations compared to oceanic areas. The order of the differences in temperature and moisture over land areas at surface and 850 hPa are about 3K and 3gm/kg respectively. However, these differences are very small in middle atmosphere.

Thanks

International TOVS Study Conference, 15th, ITSC-15, Maratea,Italy, 4-10 October 2006
Madison, WI, University of Wisconsin-Madison, Space Science and Engineering Center, Cooperative Institute for Meteorological Satellite Studies, 2006.