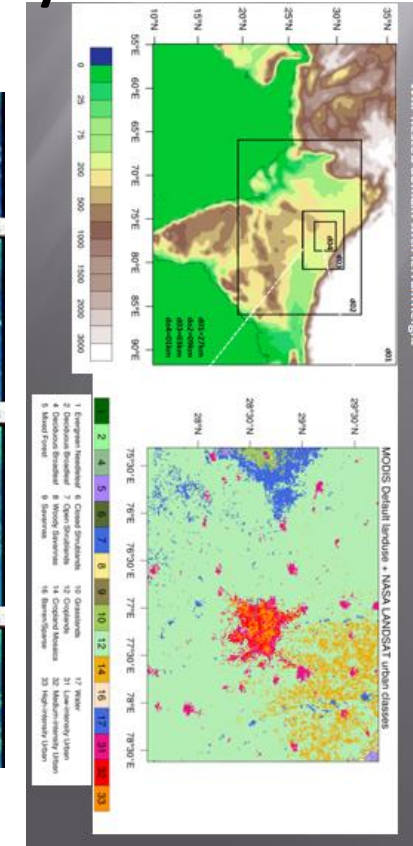
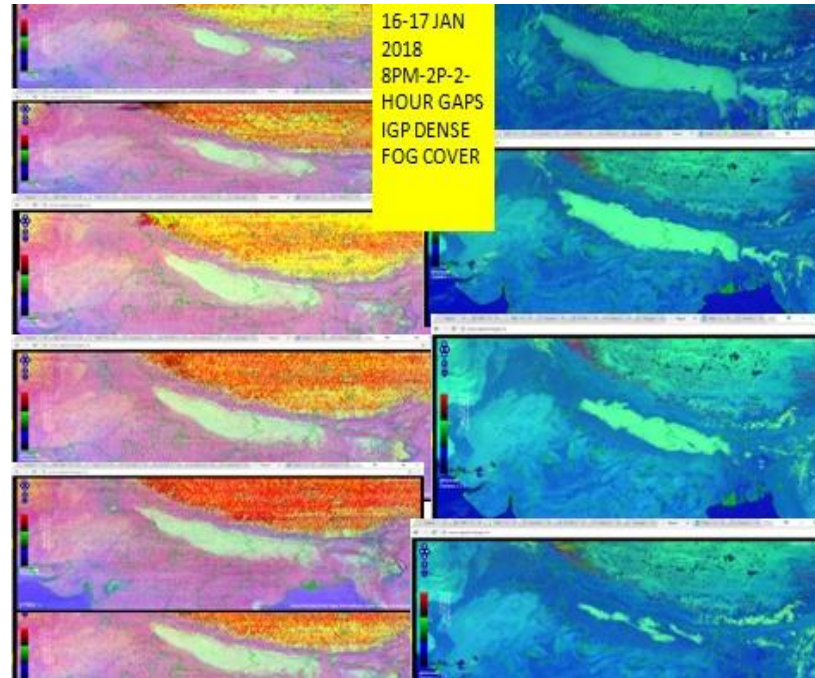


DEL (DELHI IGI AIRPORT): AvRDP Phase-I (PROGRESS ON MET-ATM INTIGRATION, ISSUES AND CHALLENGES) on Fog and TS/DS



Dr Rajendra Kumar Jenamani
Team from IMD Delhi and IITM Pune

[E-MAIL-rjenamani1@yahoo.co.in](mailto:rjenamani1@yahoo.co.in)/rjenamani@hotmail.com

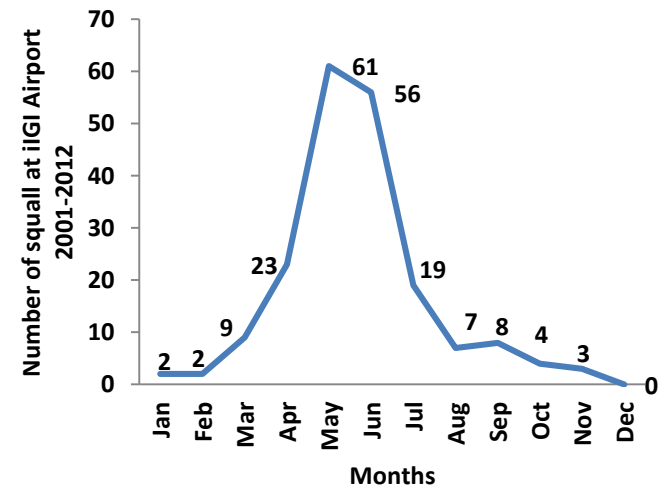
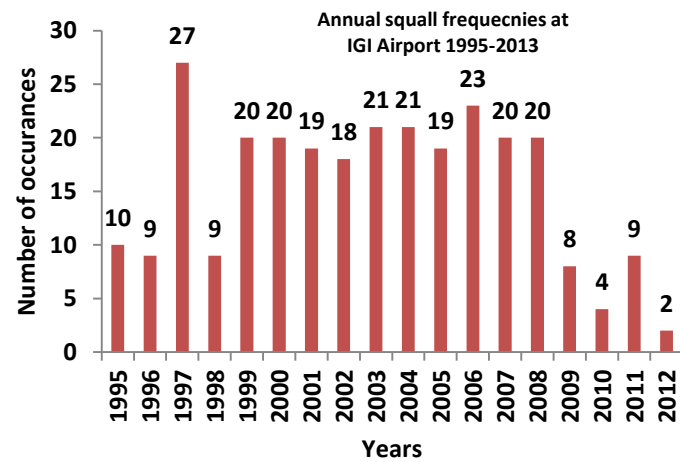
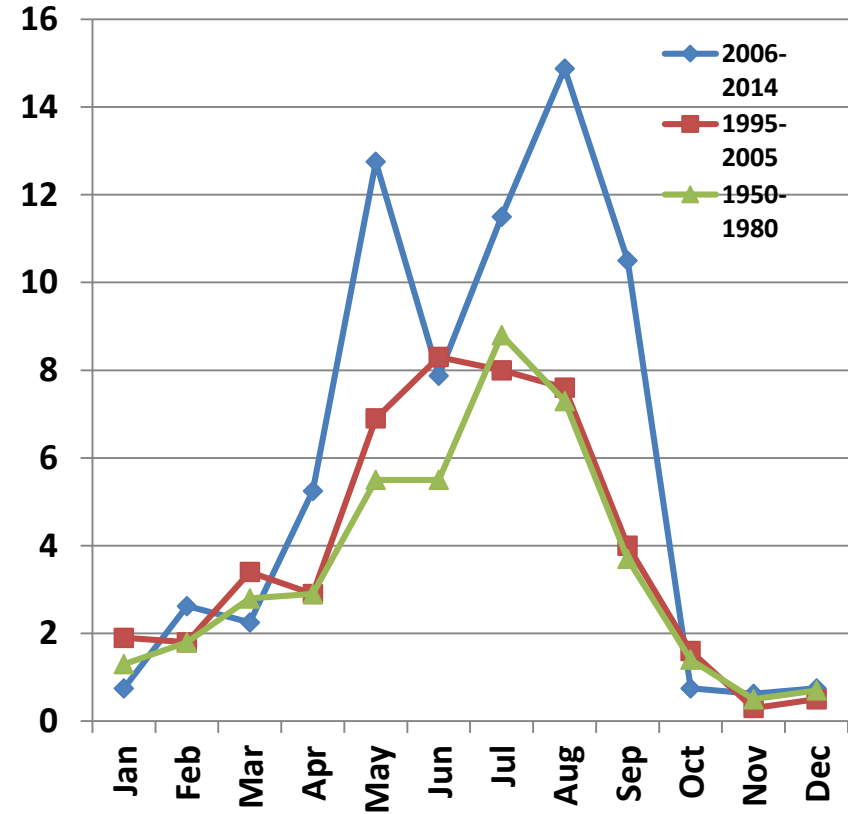
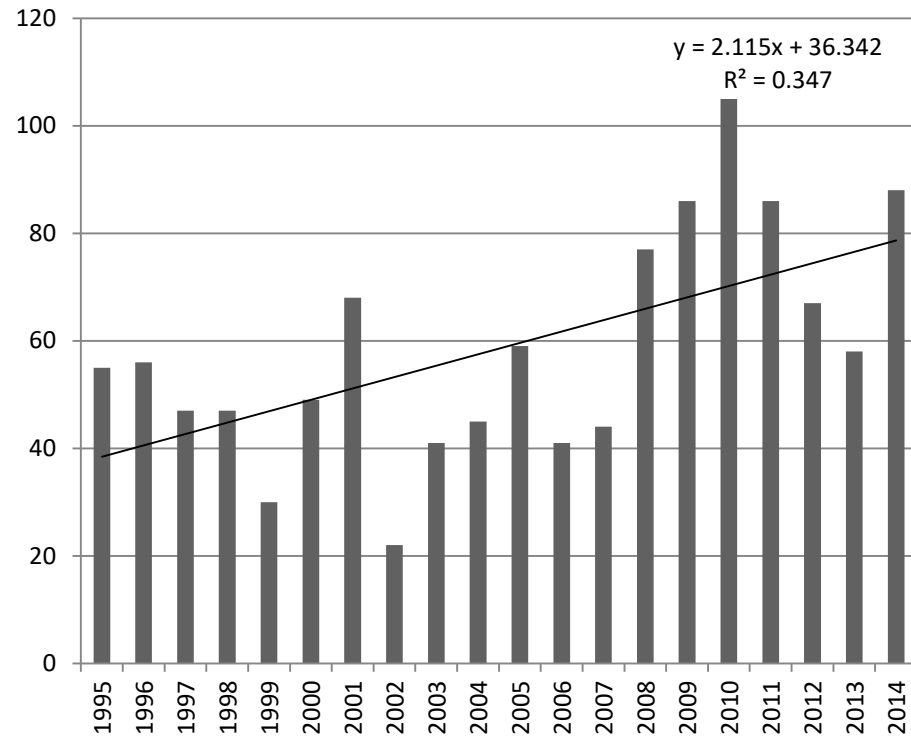
Met Watch Office, IGIA, IMD, NEW DELHI

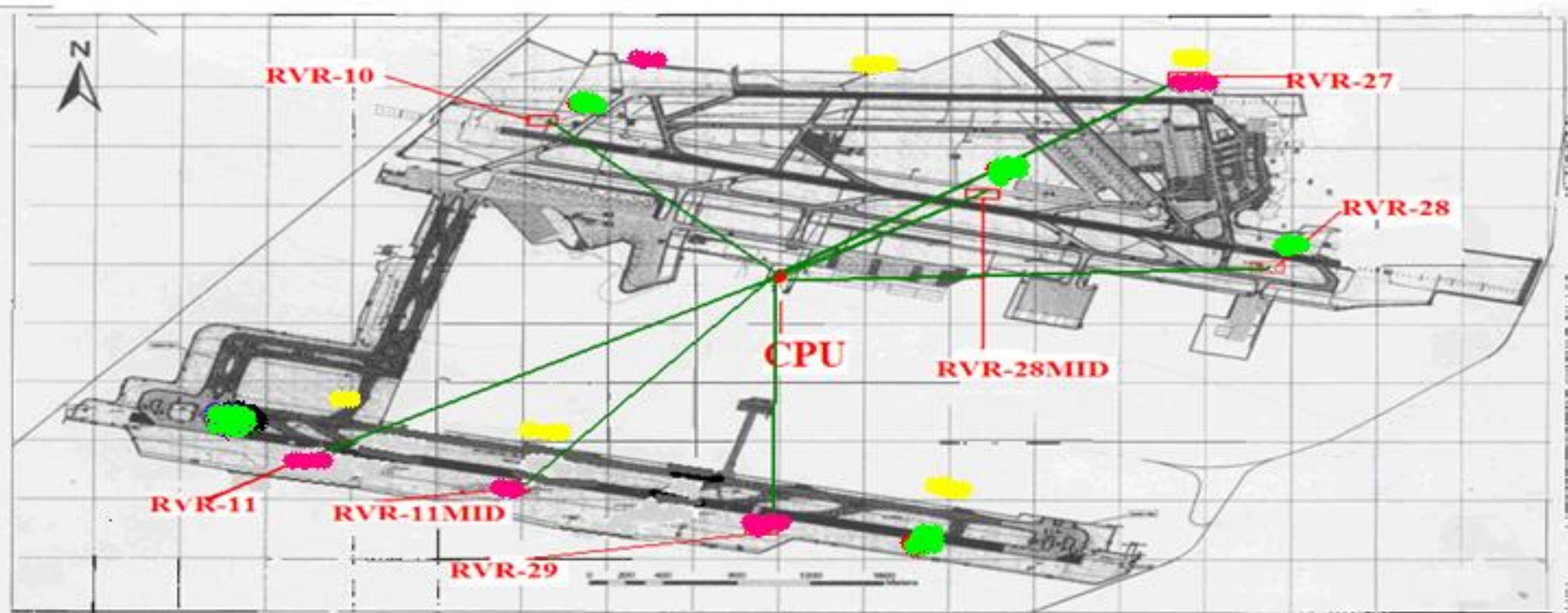
OBJECTIVE

- **About occurrences of fog,TS/DS**
- **Progress on Fog**
- **OnTS/DS**
- **Summery and Challenges on Phase-II part**

Climatology of Fog, Delhi (1981-2014)

Fog/Dense Fog at IGIA		Nov	Dec	Jan	Feb	Season
Fog	Days	10	24	25	15	74
	Hours	85	246	243	110	684
Dense Fog	Days	1	6	10	3	20
	Hours	2	34	52	11	99





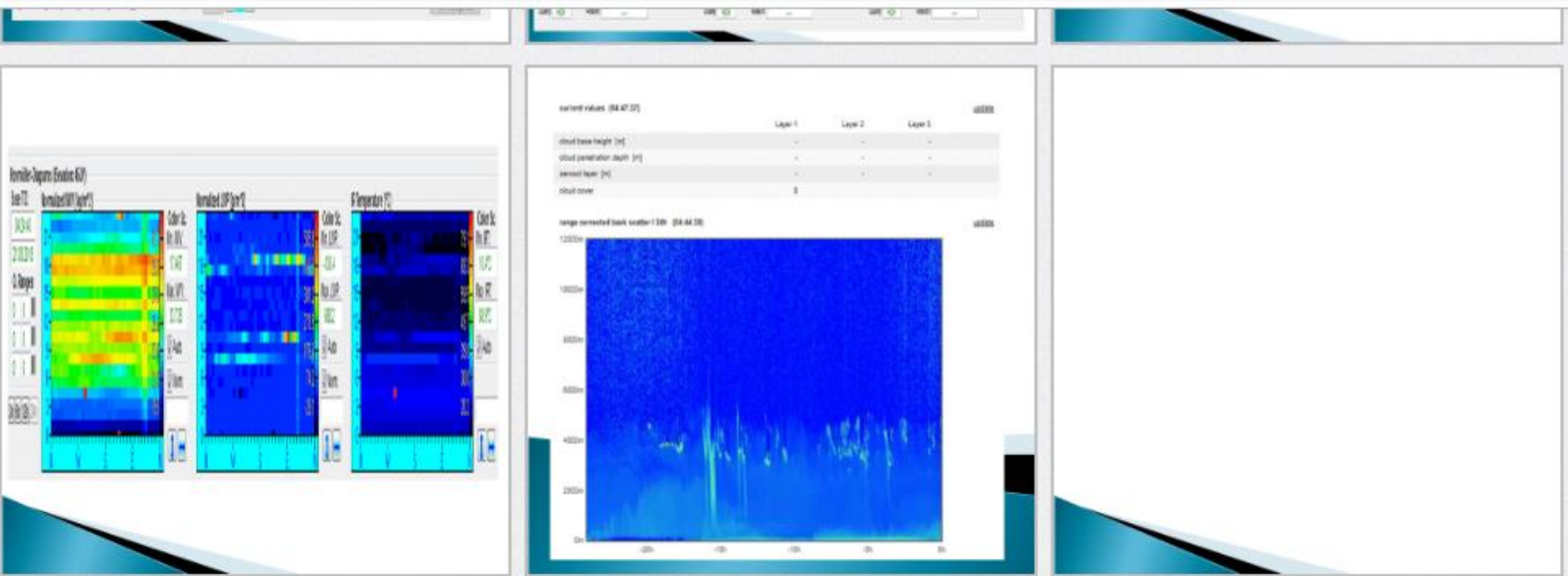
DEL (DELHI IGI airport): AvRDP on Fog

- **STAGE 1 (1ST AND 2ND IOP ON FOG AS PRE-AVRDP)-** A) WINTER FOG EXPERIMENT (WIFEX) HAS BEEN CONDUCTED AT IGI AIRPORT DELHI JOINTLY BY IMD-IITM CONSECUTIVELY FOR TWO WINTERS OF 2015-16 AND 2016-17. B) **DEVELOPING AND IMPLEMENTING NEW RGB SCHEME FROM 6 CHANNEL OF INSAT 3D RGB FOR DAY/NIGHT AND VALIDATION OF CLOUD AND FOG RADIANCE FOR 2015-17**
- THE MAIN OBJECTIVE OF WIFEX IS TO UNDERSTAND FOG MICRO-PHYSICS AND ROLE OF VARIOUS TYPE OF GASEOUS AND OTHER POLLUTANTS THOSE TRIGGER FOG FORMATION, INTENSIFICATION AND DISSIPATION. THE OTHER OBJECTIVE IS TO USE THOSE PRECIOUS DATA AT REAL TIME IN DEVELOPMENT AND VALIDATION OF AN EFFECTIVE FOG FORECAST MODEL THAT PROVIDE FOG EARLY WARNING 18-24 HOURS IN ADVANCE FOR ATM AND AIRLINES USE.
- **IOP1- 16 DEC 2015 - 15 FEB 2016 (PILOT MODE ONLY NEW DATA OF FOG COLLECTED)**
- **IOP2-25 NOV 2016 - 13 FEB 2017 (THE NEW WRF/NCUM/EMPERICAL BASED FOG MODE DEVELOPED AND EXPERIMENTAL FORECAST STARTED)**
- IN ALL TOW PHASES OF WIFEX 2015-2017, AT IGI AIRPORT, AROUND TOTAL OF 30-NUMBER OF DIFFERENT EQUIPMENTS HAVE BEEN INSTALLED AND MADE OPERATIONAL FOR MEASUREMENT OF VARIOUS FOG RELATED PARAMETERS AT SECOND TO HOURS TIME GAP. SOME OF THE MAJOR EQUIPMENTS INSTALLED AT IGI AIRPORT DURING THREE PHASES OF WIFEX ARE: EIGHTEEN NUMBER OF RVR AT THREE RWY, RADIOMETER, SODAR, A 20 METER FLUX TOWER WITH THREE LEVEL OBSERVATIONS OF FLUXES , AEROSOL, GASES AND FOG WATER ANALYZER, RADIATION AND **TETHERED BALLOONS DATA . THERE WERE TOTAL OF 18 NUMBER OF RVR SYSTEMS SPREAD AT DIFFERENT LOCATION AROUND AIRPORT FOR FOG RVR BASED REPORTING.**
- **GFS LWC BASED FOG FORECAST WAS IN TRIAL MODE IN 2016-17.**
- **INSAT 3D BASED RGB FOR DAY/NIGHT PICTURES** **INSAT-BASED NOWCAST TOOL**
- **STAGE 2 (3RD IOP OF IGIA+ PHASE I OF AVRDP):**

What Met Watch Office(IMD) IGIA did in Phase 1 of AvRDP: Country's 1st Winter Fog Experiment(WIFEX) conducted successfully at IGI Airport Delhi for last 3 Winters consecutively covering 2015-2018 with Model development and validation in the 3rd campaign 2017-18 using data of Fog micro-physics of 1 and 2nd campaign

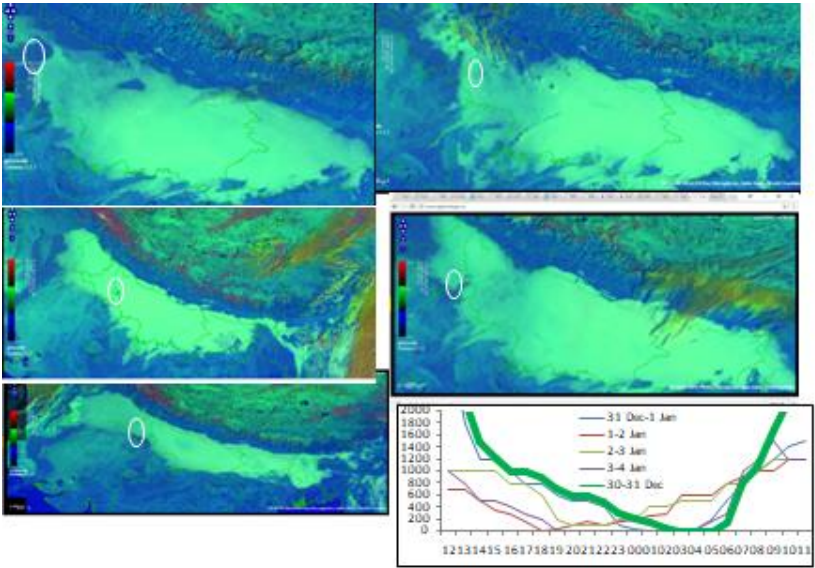
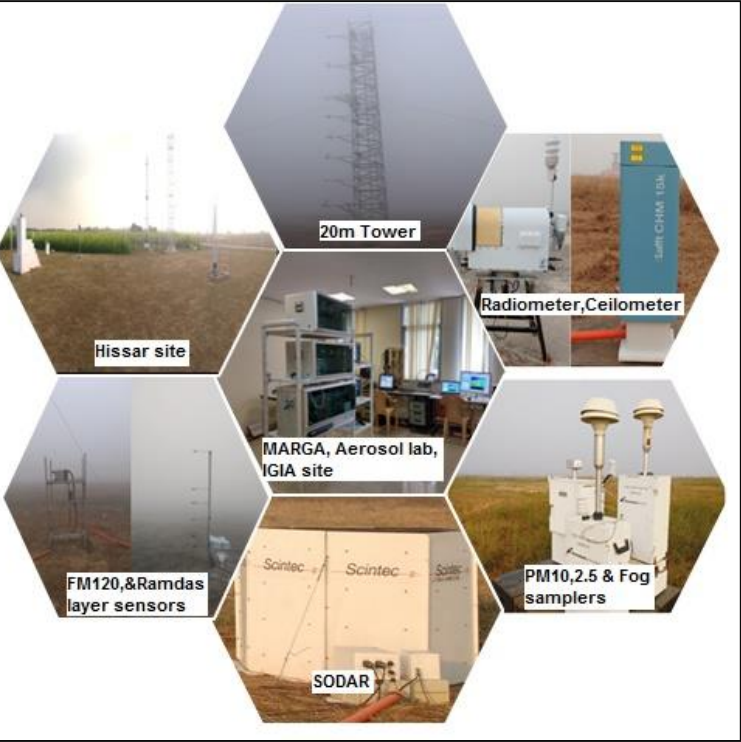
Data link for Av model produc
INSAT 3D fog JF

<https://drive.google.com/open?id=1s-qV4tRKZWkmtZwUaH6BICvzSblpDTPe>
https://drive.google.com/open?id=1JgW0u0k3EM4V6H89oeJ5oTqBC_lzeg-8

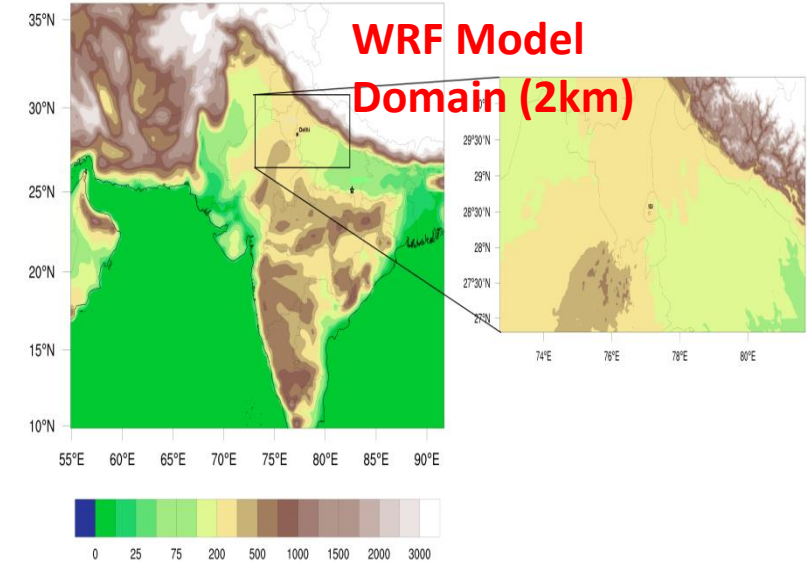


Team Members	Team Members from IMD	Advisory	Patron
Concerned scientists from WIFEX, CAIPEEX, HACPL and Thunderstorm-Dynamics	Dr. R Jenamnai Shree N. Nigam Team Members from NCMRWF Dr. V.S. Prasad	Dr. G.S. Bhat, Chairman Fog experiment Dr. Ravi Nanjundaya, Director IITM Dr. E.N. Rajagopalan, Director NCMRWF Dr. K. J. Ramesh, DG IMD	Dr. M. Rajeevan, Chairman ESSO and Secretary, MoES, Govt. of India

IGI AIRPORT WIFEX AND DEVELOPMENT OF NEW INSAT 3D BASED RGB FOG DETECTION SCHEME AND NEW FOG NOWCAST AND FORECAST MODELS AND THEIR VALIDATION COMPLETED IN PHASE 1 IN 2017-2018

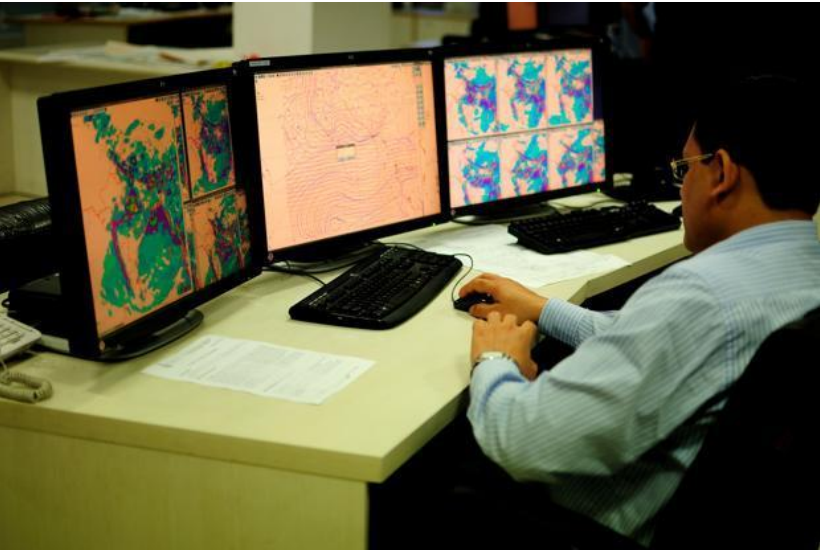


Fog coverage across IGP Region as captured in IMD Newly developed RGB algorithm in INSAT-3D RAPID . Delhi IGIA was Dense fog free on 30 Dec 2017 but on 31 Dec 2017 ,1, 3 and 4 Jan 2018, it had dense fog of Visibility<200m for 6-11 hours



Total fog events during WIFEX 2015-18 when all special observations were captured and Airport intensity/duration based fog nowcast/forecast

Year	Moderate (Vis <500 >200m)	Dense (Vis <200m)
2015-16	14	20
2016-17	23	28
2017-18	18	16
Total	55	64

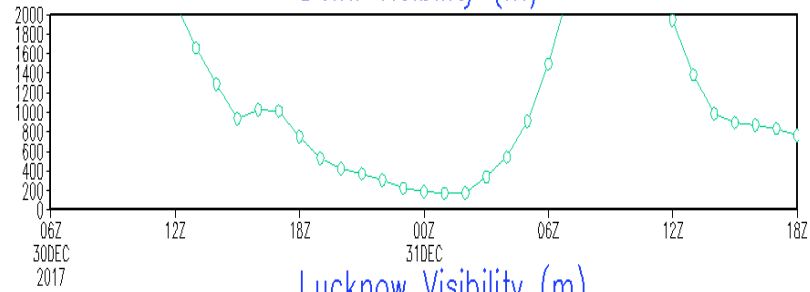


IMD Delhi Fog forecast/nowcast system 2016-2018

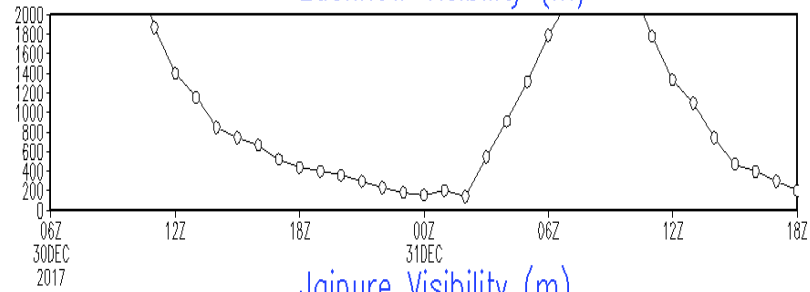
- **Local threshold tables using synoptic/UA data**
- **Synoptic system driven and wind flow pattern based fog Analogues from past cases with GFS wind Analysis and Forecast products and other GFS fog products**
- **INSAT 3D and DWR based nowcast**
- **All Objective based fog forecasts using fog Models and FDP-Winter products**

• Micro_Phy	: WSM6, WDM6, WSM3, Lin et al, Morrison
• Radiation	: CAM , RRTM, RRTMG
• PBL	: MYNN2.5, QNSE, ACM2, YSU
• Surface Layer	: MM5
• Land Surface	: Pleim-Xiu, NOAH, NOAH_MP
❖ Spin-up simulations	: 06, 12, 24, 48hr
❖ Domain	: single
❖ Resolution	: 2km , 4km
❖ IC/BC	: ECMWF, GFS, IITM_GFS, NCUM
❖ No of Grids	: 440*220 (2km), 220*110 (4km), 440*220 (4km)
❖ Vertical levels	: 60, 50

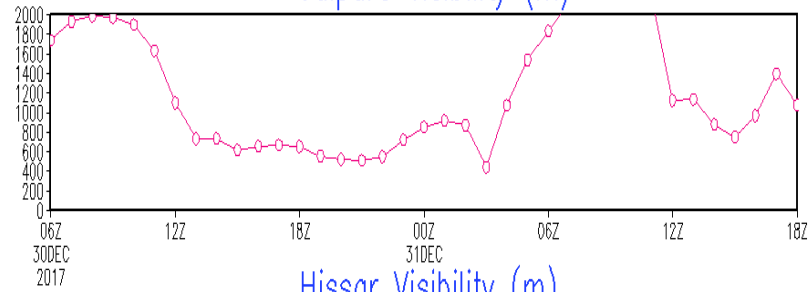
Delhi Visibility (m)



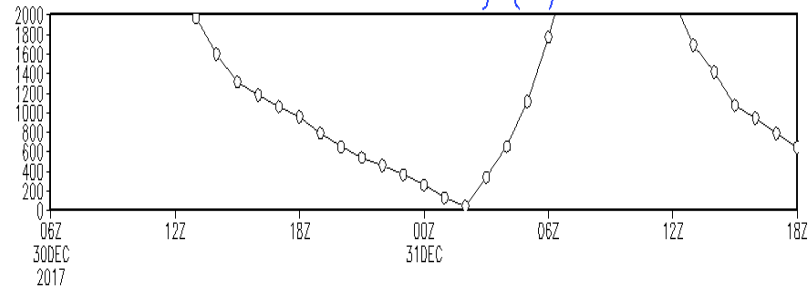
Lucknow Visibility (m)



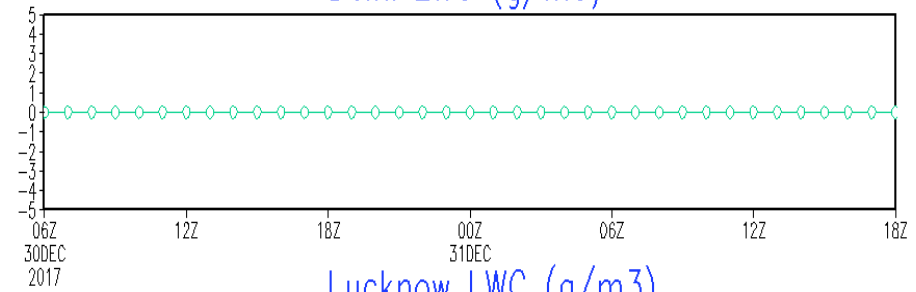
Jaipure Visibility (m)



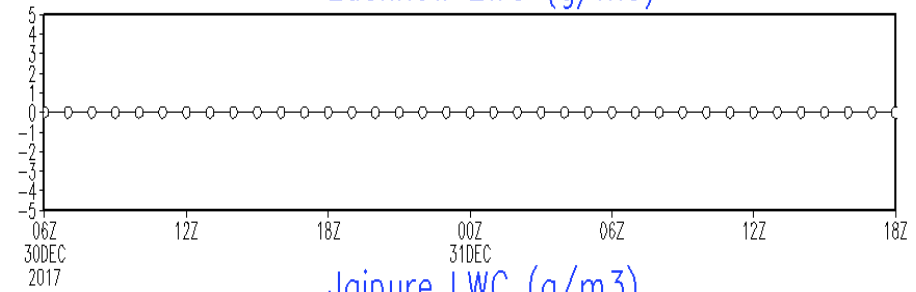
Hissar Visibility (m)



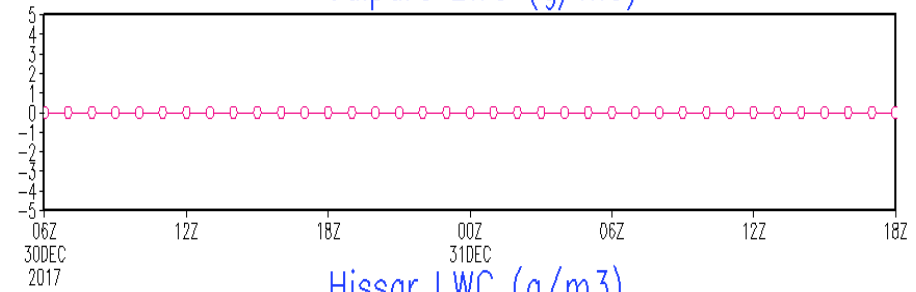
Delhi LWC (g/m3)



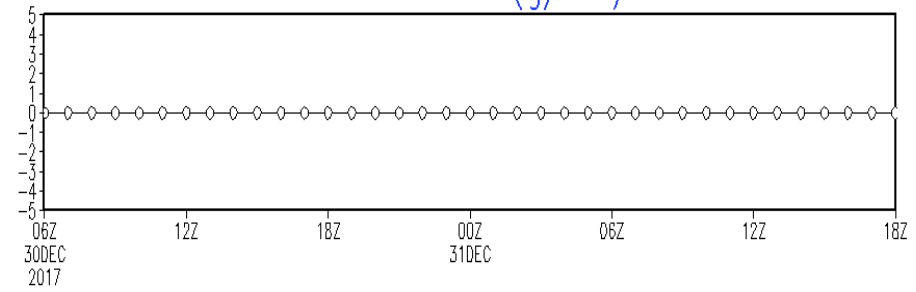
Lucknow LWC (g/m3)



Jaipure LWC (g/m3)



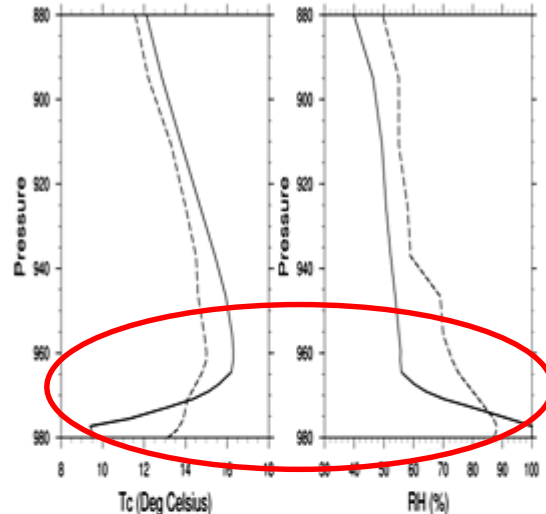
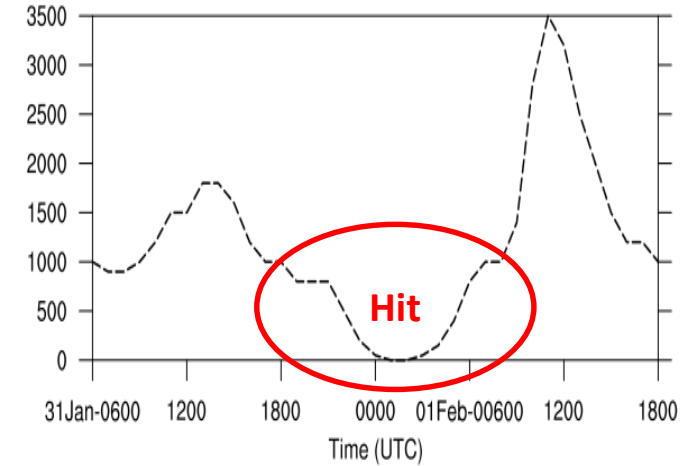
Hissar LWC (g/m3)



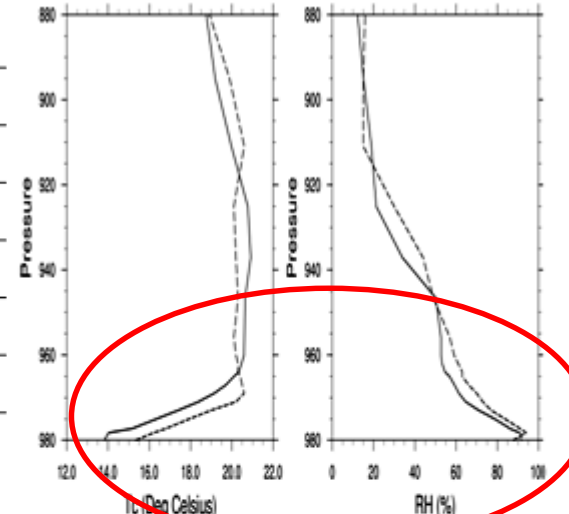
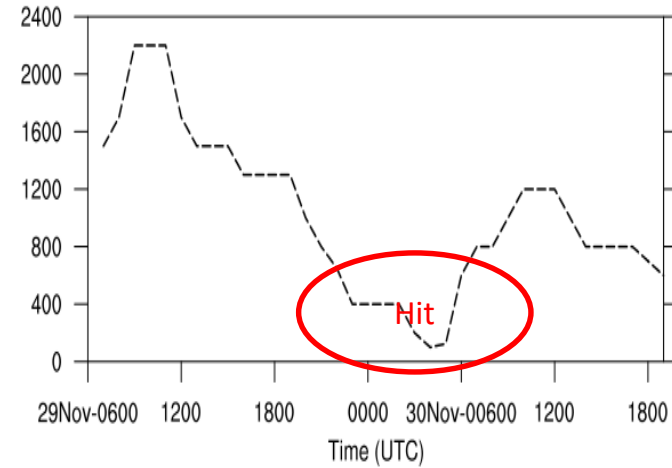
Predicted Fog events

... Observation
--- WRF

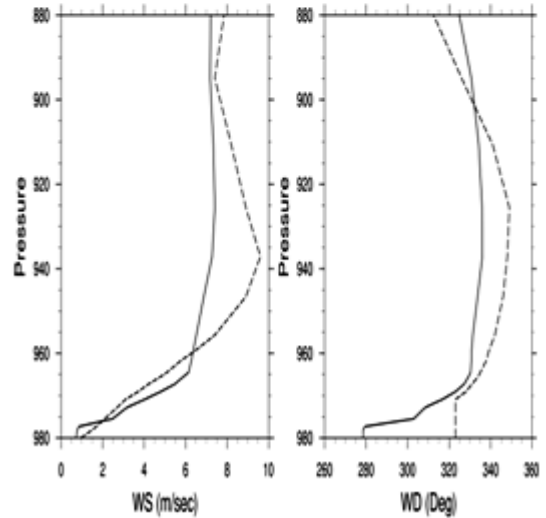
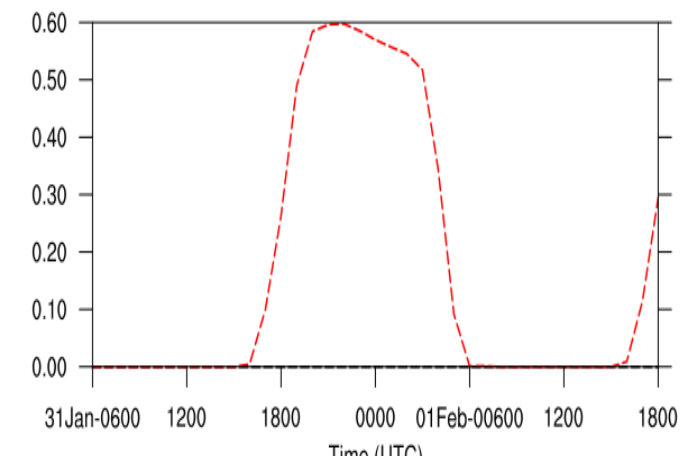
Visibility (m)



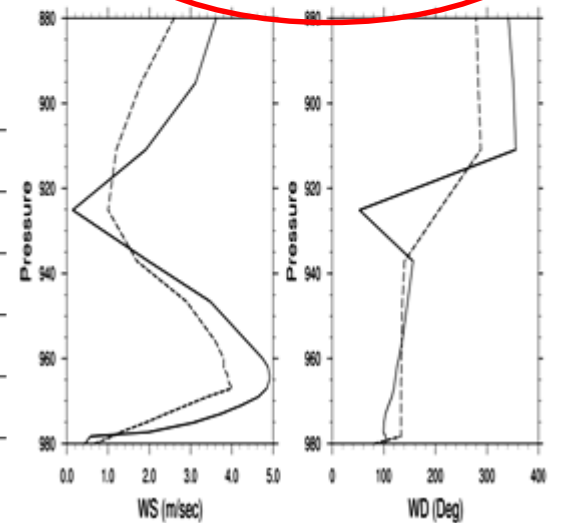
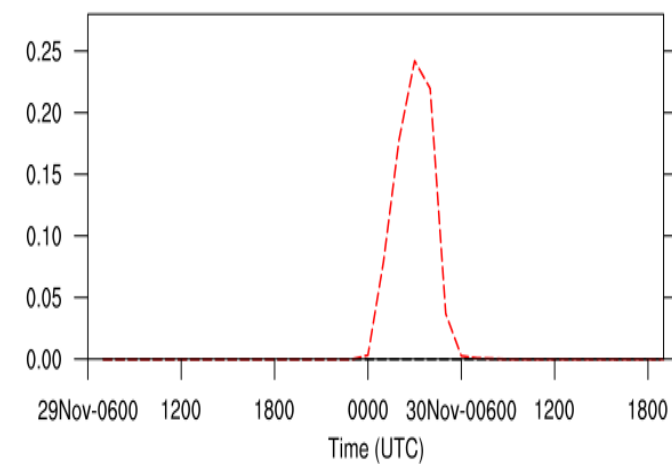
Visibility (m)



LWC (g/kg)

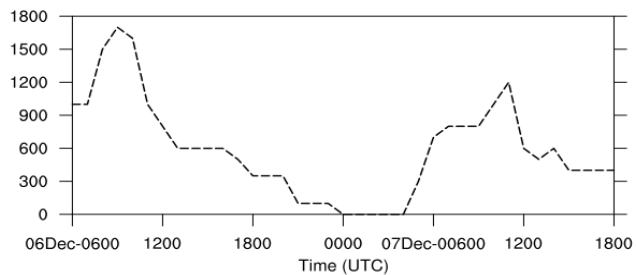


LWC (g/kg)

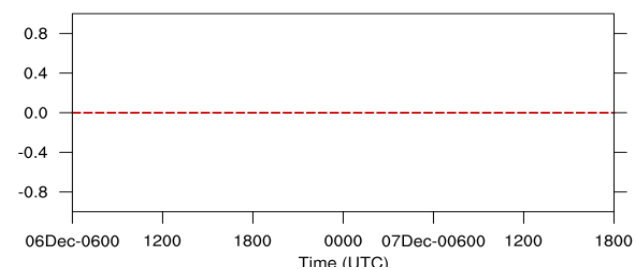


Failed Fog event

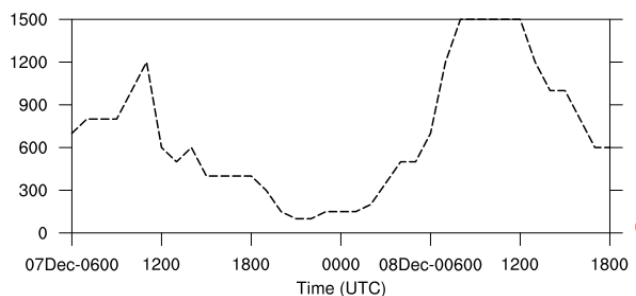
Visibility (m)



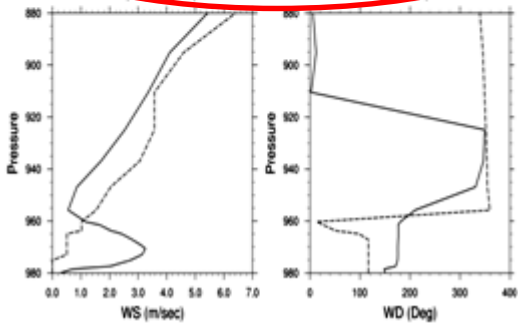
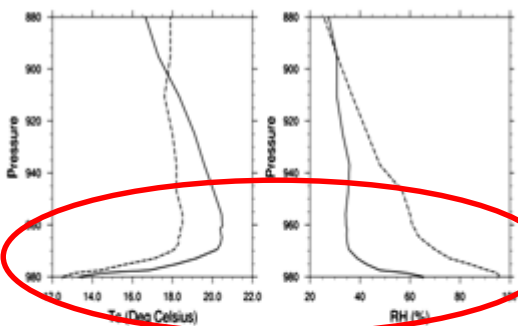
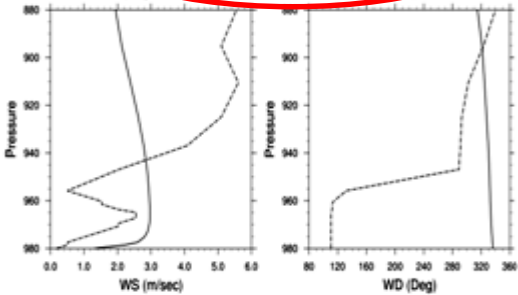
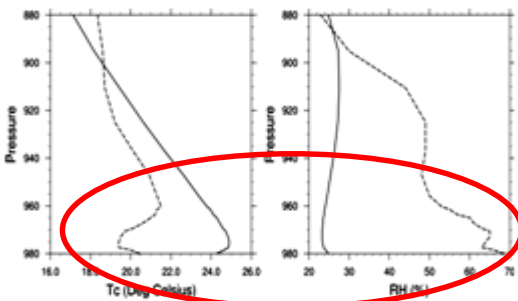
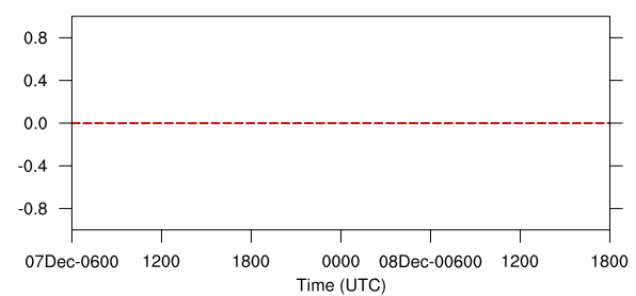
LWC (g/kg)



Visibility (m)



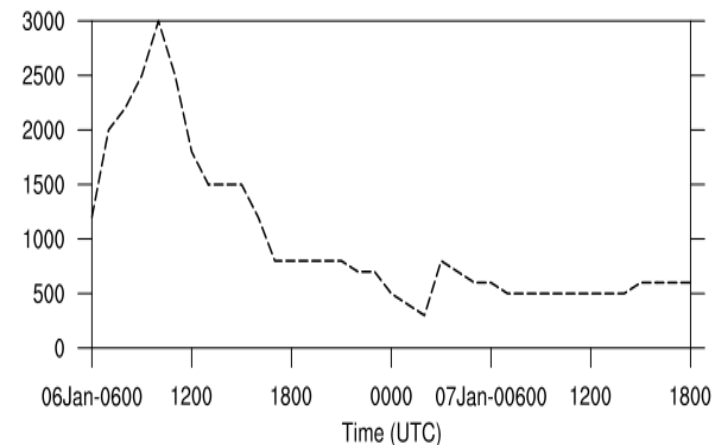
LWC (g/kg)



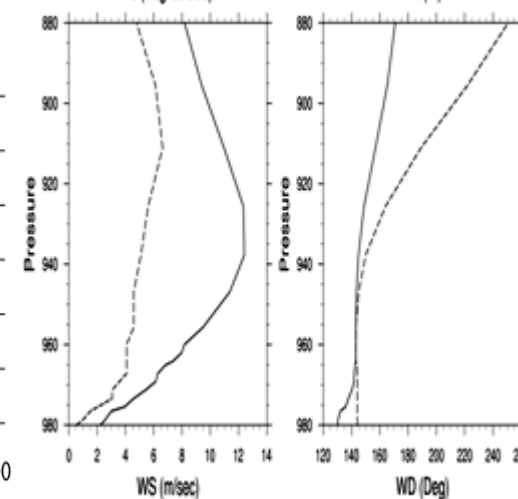
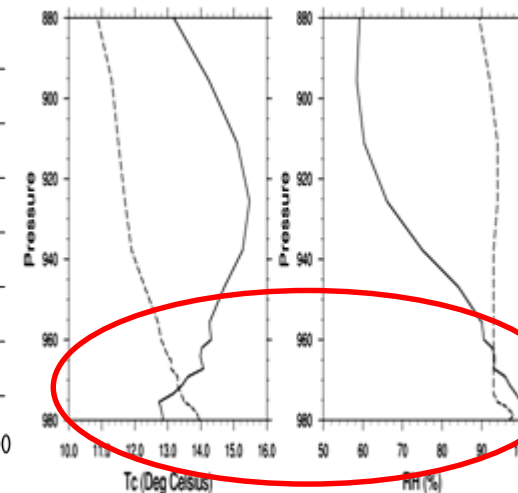
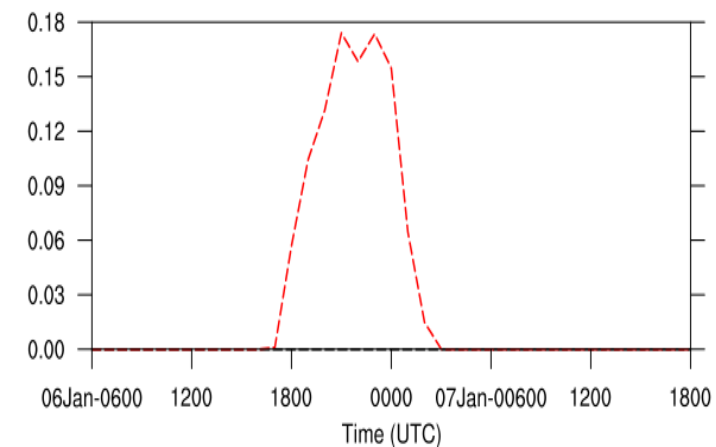
False_Alarm

... Observation
--- WRF

Visibility (m)



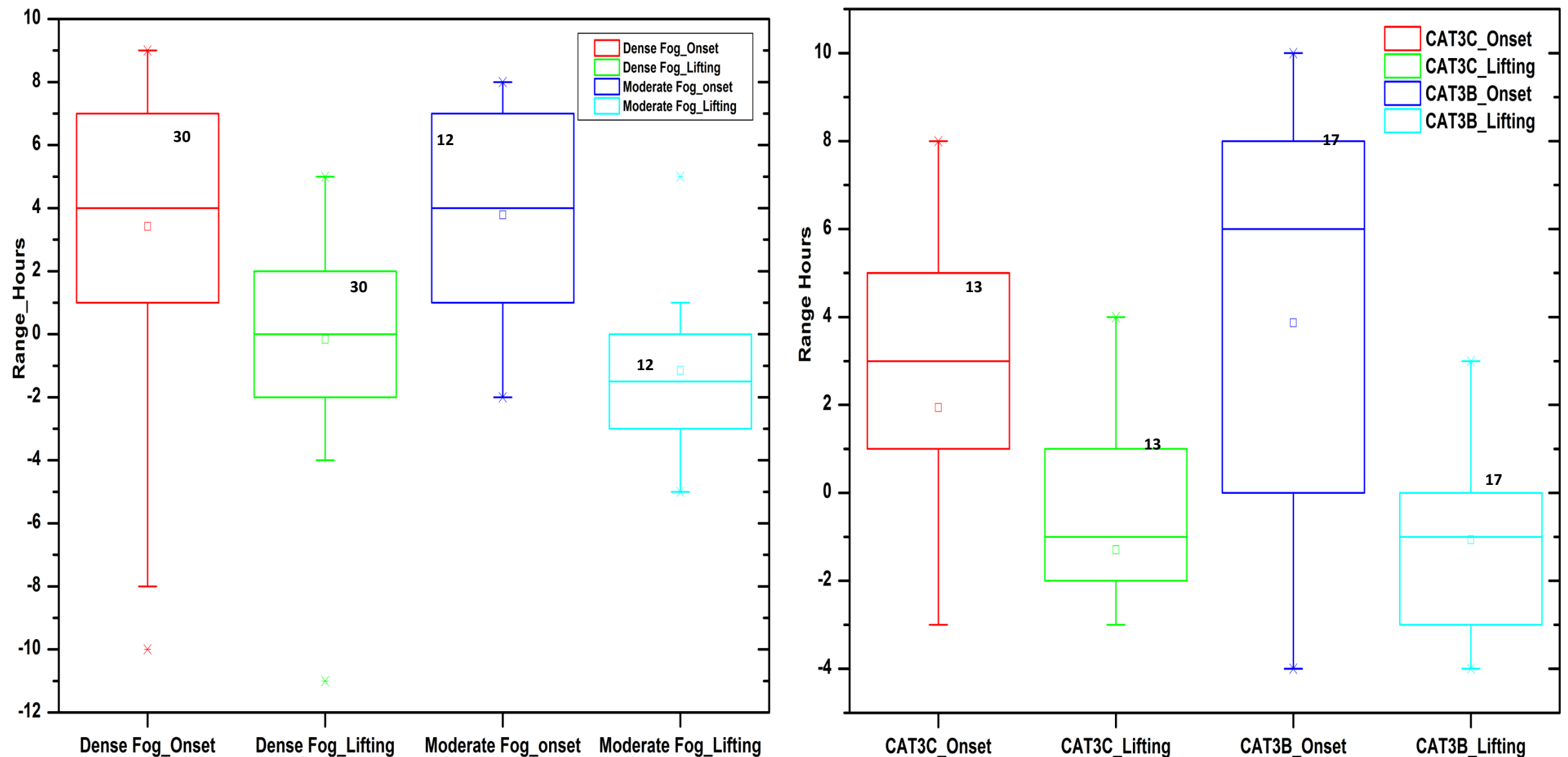
LWC (g/kg)

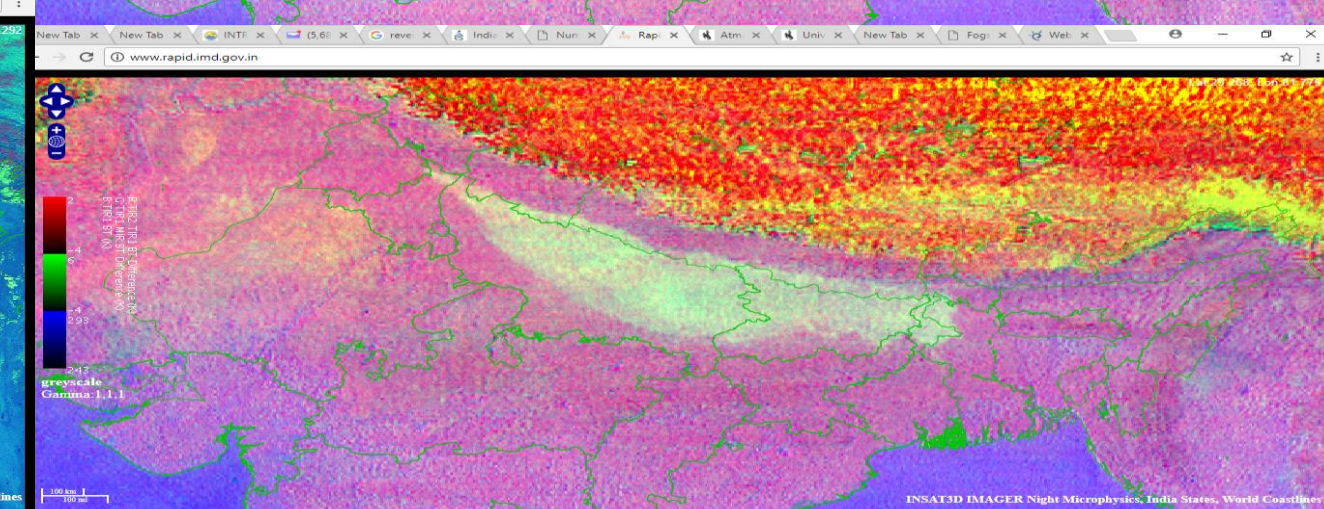
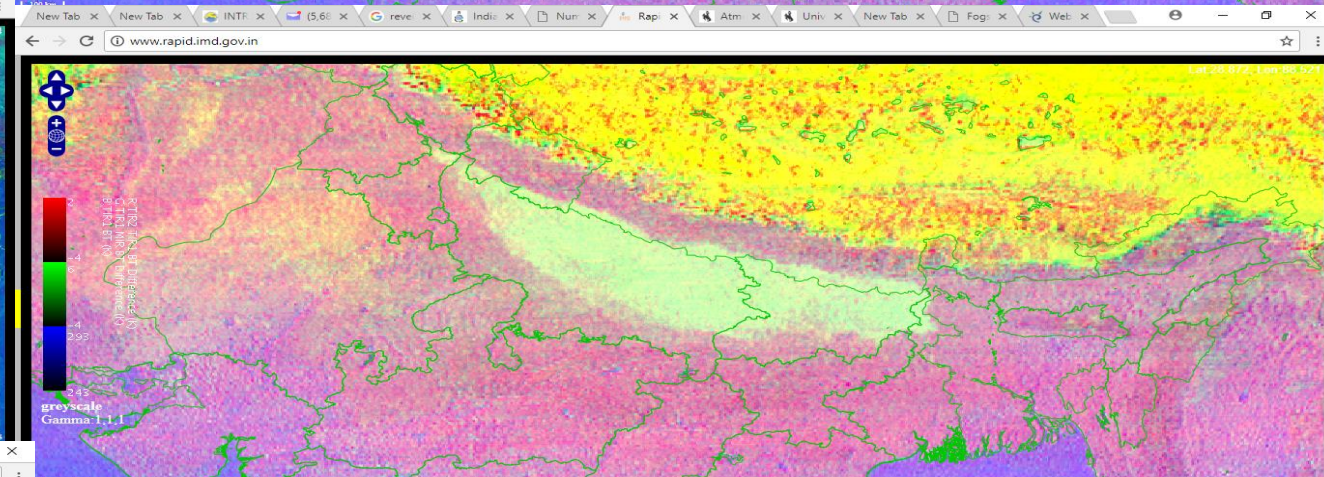
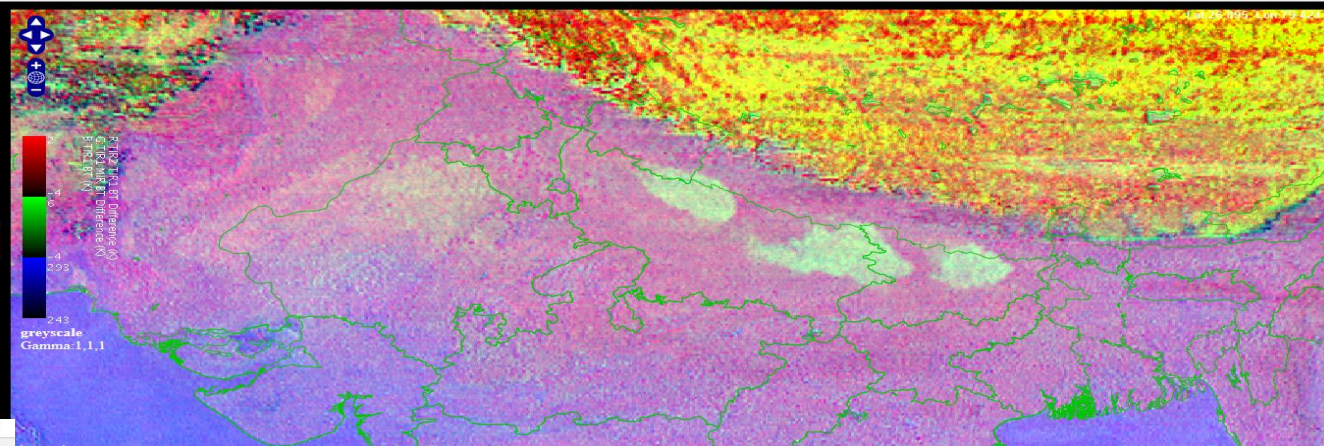
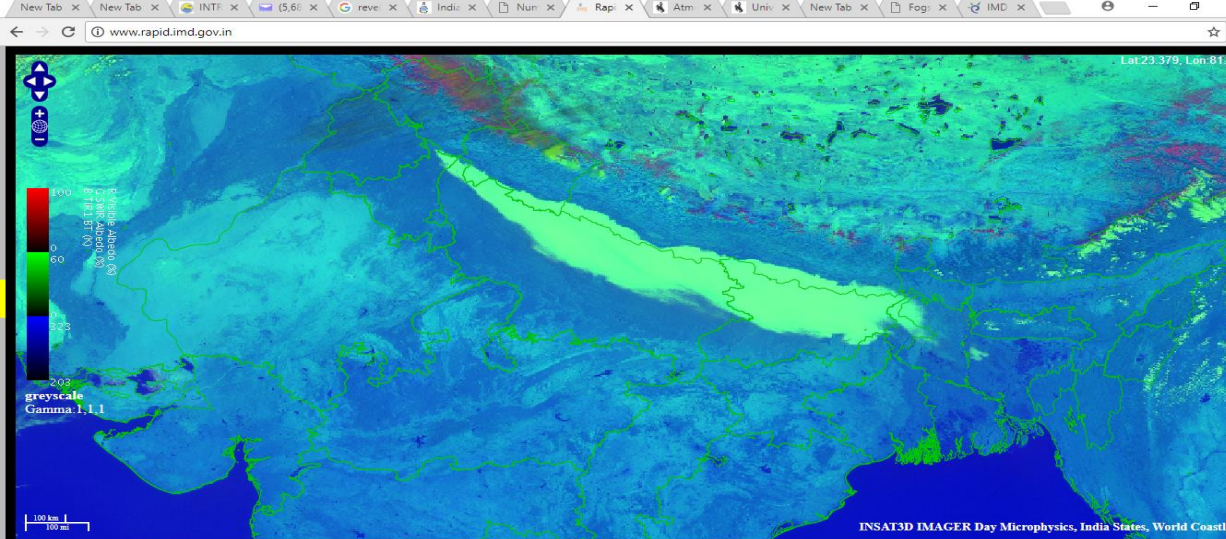
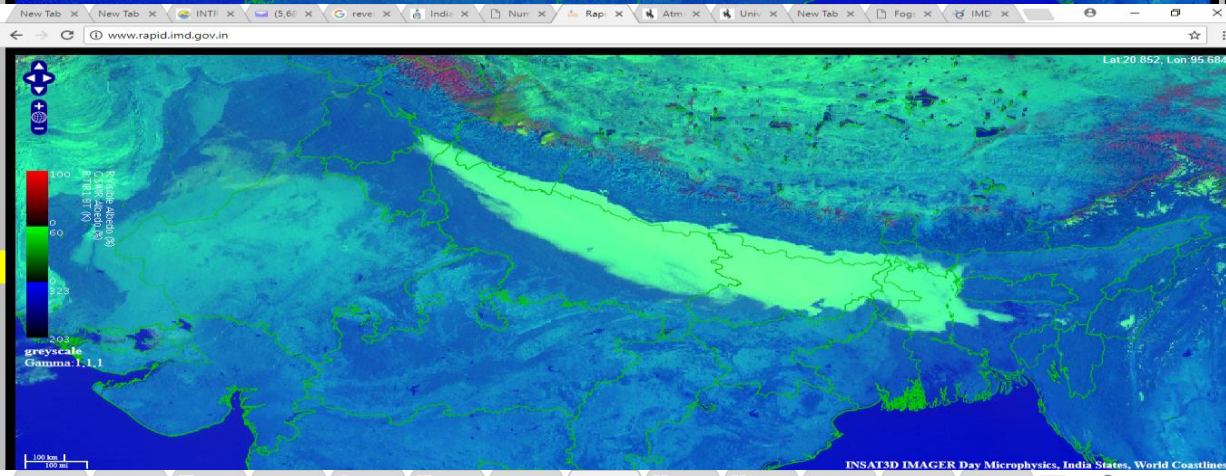
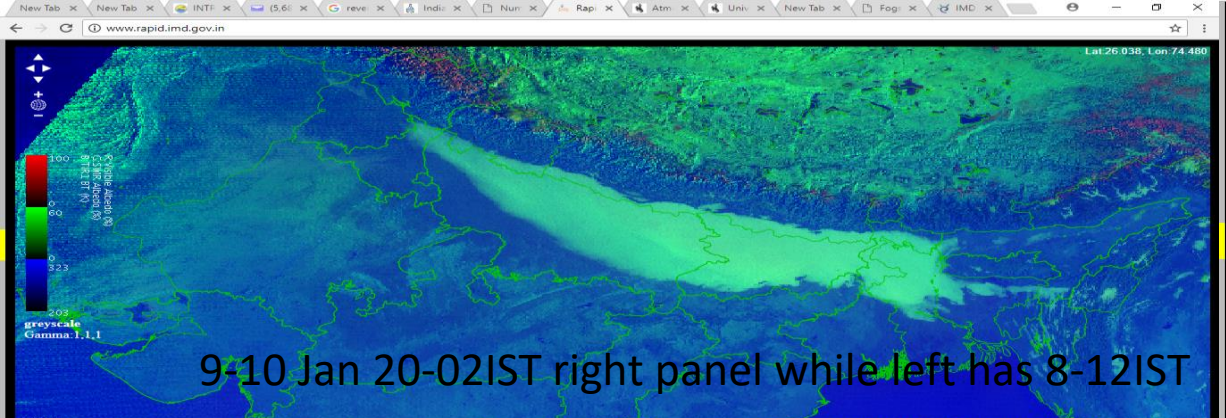


Month	Moderate (Vis < 500m)	Dense (Vis< 200m)	CAT-II/CATIII (Vis < 175m)	CAT-IIIB/C (Vis < 50m)
2016-17	07/23 (30%)	21/28 (75%)	12/15 (80%)	09/13 (69%)
2017 single				
2017 ensemble	09/17 (53%)	11/16 (69%)	05/07 (71%)	07/09 (78%)
False Alarms				
Month	Total model run days	Fog days	No Fog days	Model False alarm
16-17/ 17-18	71 63	51 33	15 20	05 06

Challenges of WRF model to fog simulations-
Onset timing and lifting timings

Onset and lifting range of different fog events during WIFEX 2016-18





Certain synoptic disturbances and
favoring Flow pattern favors advection
fog due to WD, Easterly
wave/disturbances, Cyclone over BOB



Sub: Fog outlook No-6 issued on 17 Jan valid till 26 Jan 2017: Light rains/cloudy with stronger easterly wind phase on 23 and 24 Jan at Delhi. Dense fog layer likely lifted during 22-24 Jan 2018

Fog outlook No-6 issued on 17 Jan valid during 17 Jan till 26 Jan 2017: Light rains/cloudy with stronger easterly wind phase on 23 and 24 Jan at Amritsar and Delhi due to very active WD and circulation affecting the plains of northwest India .

Dense Fog and Wind at airport status and outlook –

Dense fog Status-Fresh dense fog layer has been formed today across Patiala- Meerut, Bareilly Lucknow sector and the layer in satellite could be seen just 30-40km far east of IGIA Palam Delhi as given below. Even Safderjung airport had 200m for 00-0400UTC today. This formation is newly added to almost a semi-permanent dense fog layer that has been persisting across Luknow- Allahabad-Varanasi-Gaya-Agartala sector since 24 Dec and now have almost completed 20-24 days of long and extreme spell with its present at these airports almost most of dates in this period as dense fog layer category of CAT-IIIA/B type of 0-200m general visibility in most mid-night till mornings during 24 Dec-17 Jan.

Winds Status and forecast outlook-Though, easterly wind pattern has prevailed today across all these airports, but it is very short lived and we forecast likely westerly wind pattern by tomorrow on 18 Jan at most airports of northwest India. This will again be followed by another reversal of RWY-winds to easterly on 23 and 24 Jan followed with light wind/westerly on 25 and 26 Jan when it will be partly cloudy skies and no chance of rains across all airports of northwest India.

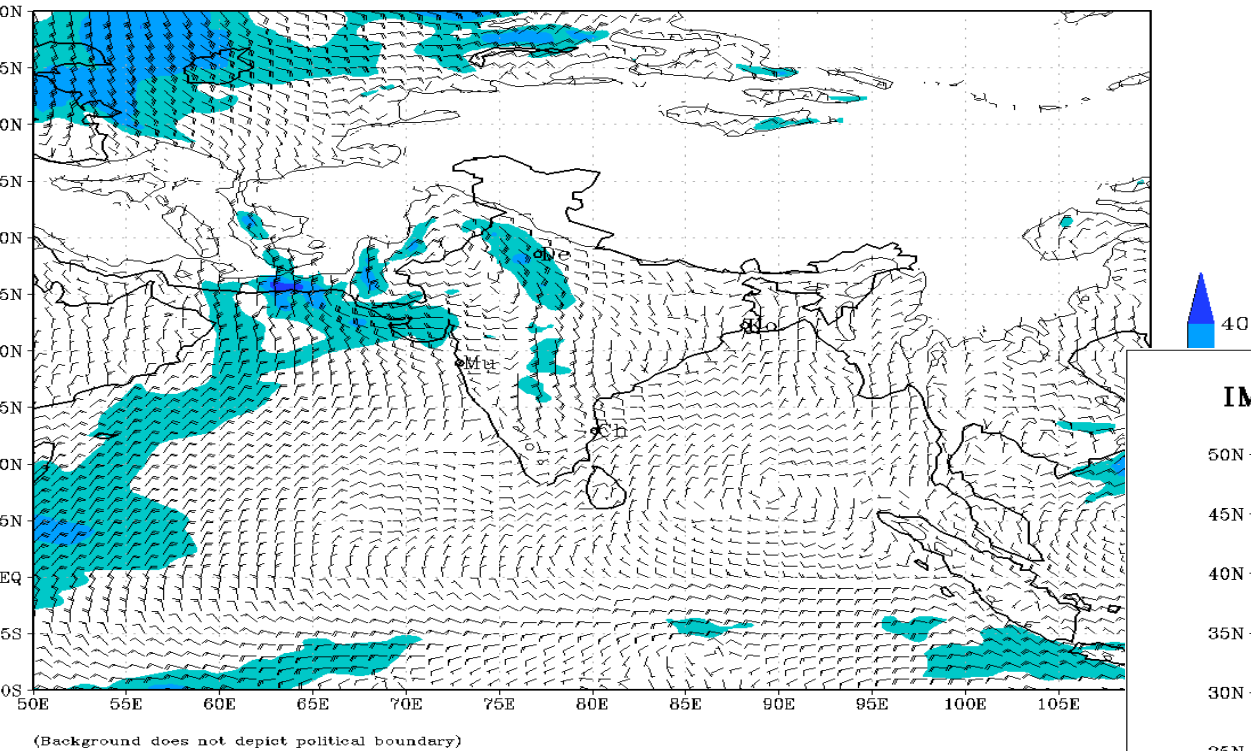
Dense fog forecast outlook-Under such drastic wind changes during 17-26 Jan, it is very challenging to provide any specified intensity and duration of fog forecast for Amritsar and Delhi airport till 21 and 22 Jan in longer period outlook and for this pls see 6-hourly fog forecast. However for Lucknow and Varansi, we forecast dense fog to stay on 17-18 Jan with high improvement of vis on 18-20 Jan and then further intensification of dense fog on 20-22.

Major outlook on fog- All these dense fog whole across this great Indo-Gangetic belt will be cleared from most airports including Berily-Lcuknow-Allhabd-Varansi-Gaya-Patna belt by 23 or 24 Jan

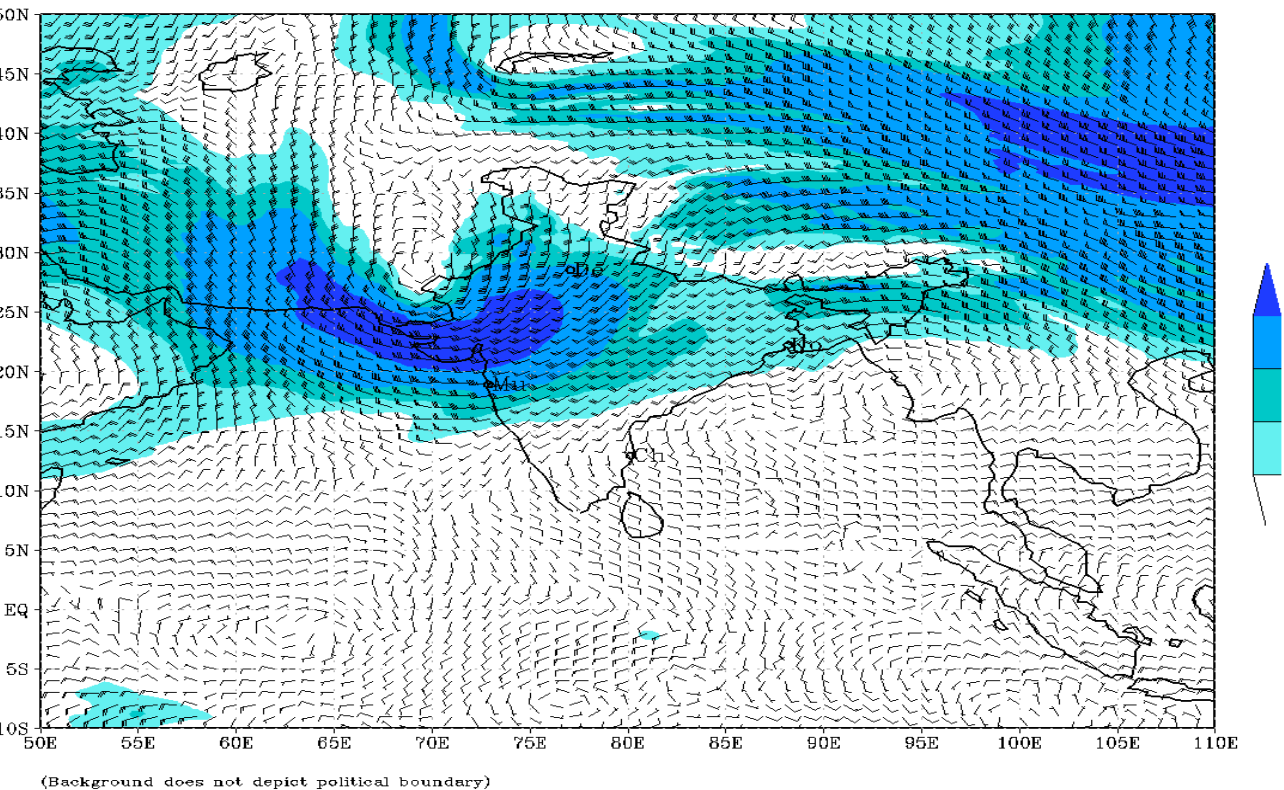
Wit regards

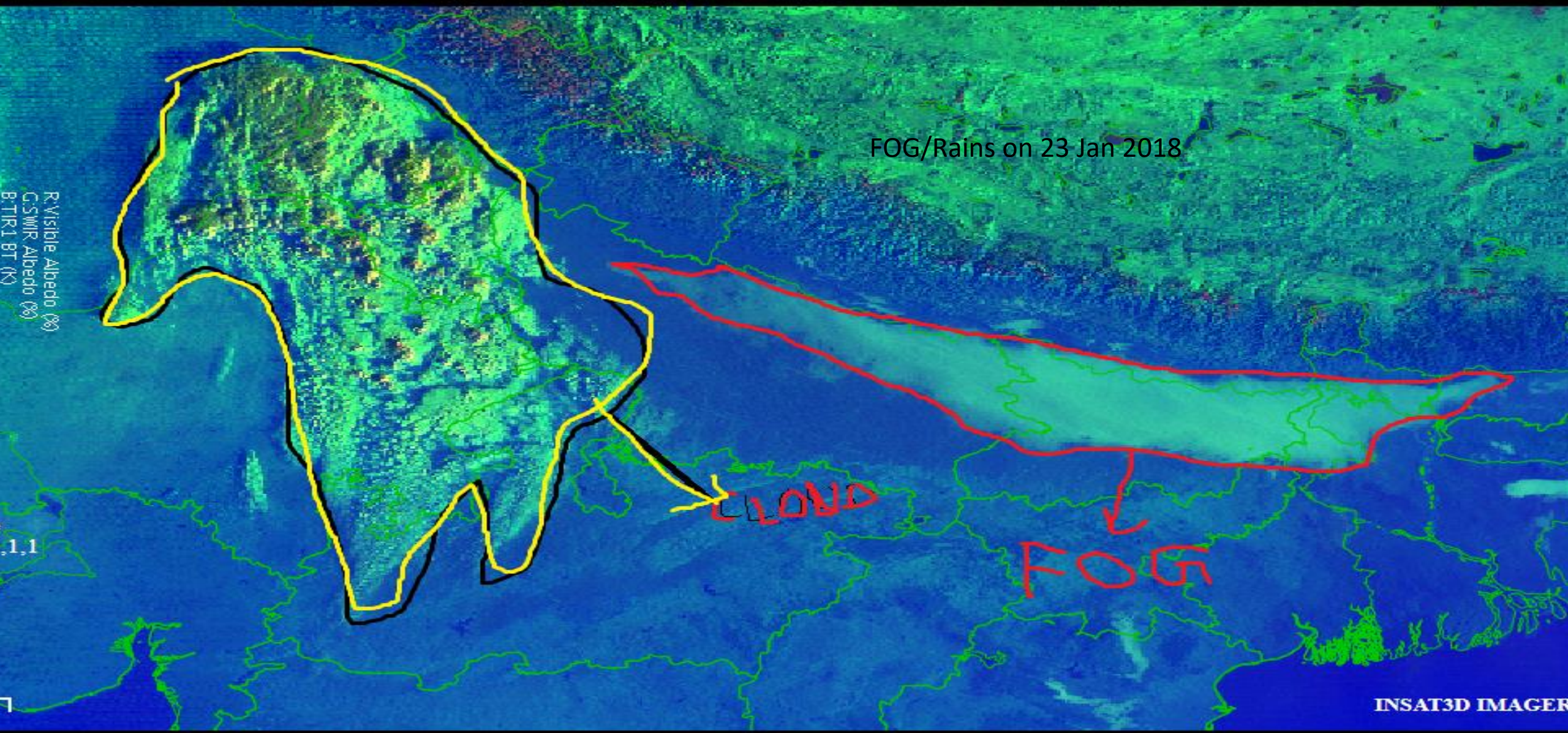
DR JENAMANI

IMD:GFS MODEL(12 Km) 925 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 17-01-2018 valid for 00 UTC of 23-01-2018



IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 17-01-2018 valid for 00 UTC of 23-01-2018



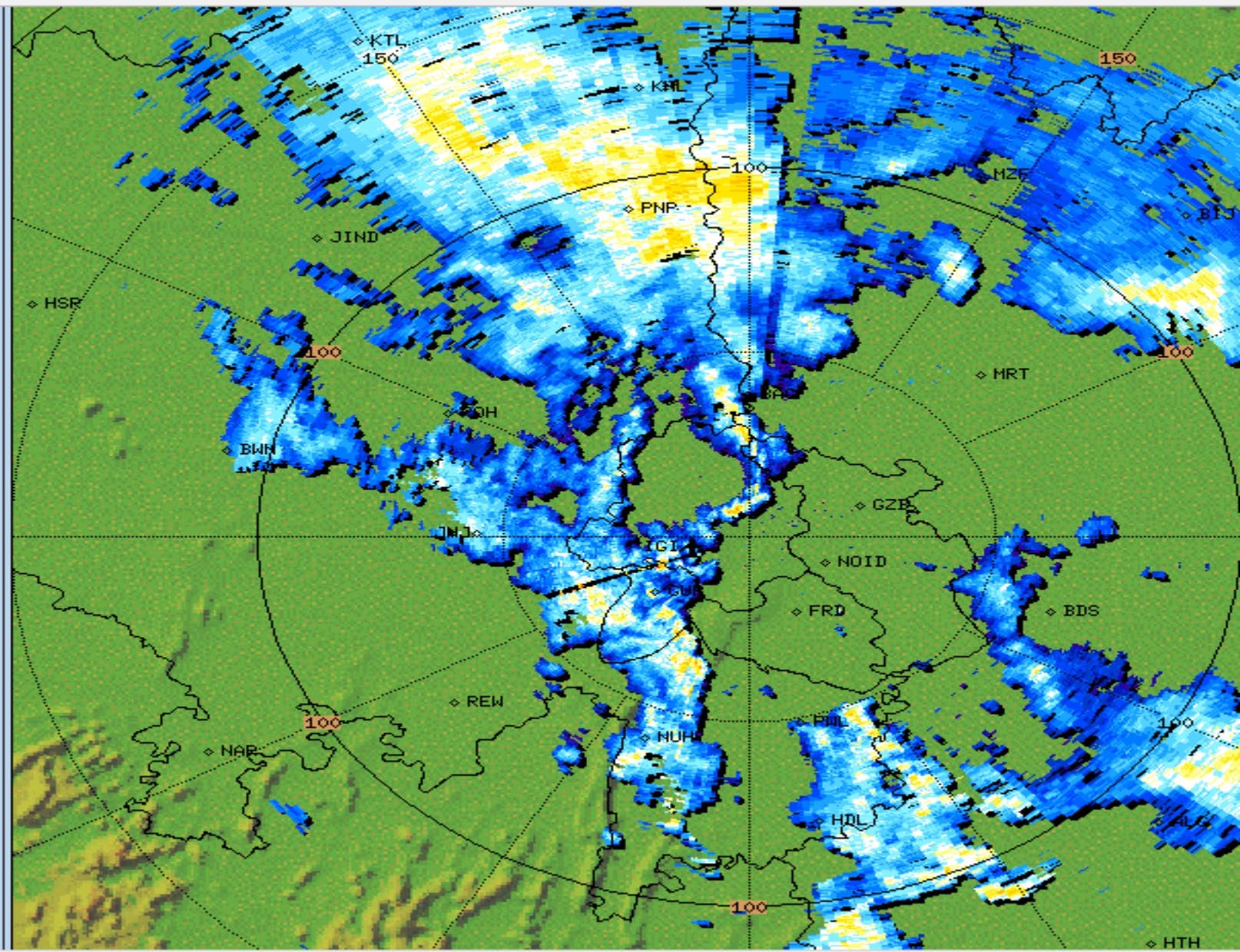




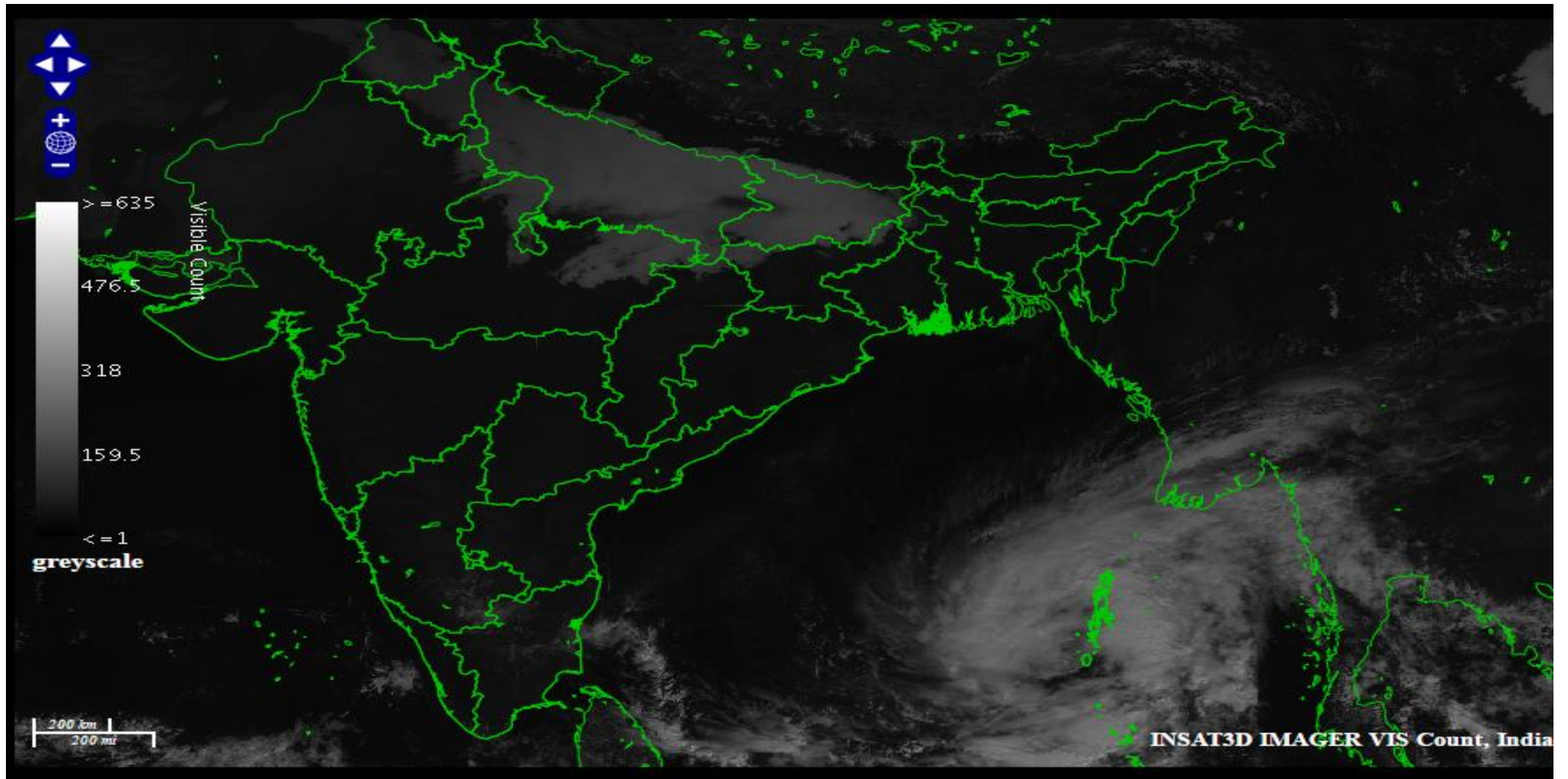
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 - ☐ Volume Velocity Processing(2)
 - ☐ Plan Position Indicator(V)
 - ☐ Surface Rainfall Intensity
 - ☐ Precipitation Accumulation (PAC) 24 hrs at 0300 UTC



1000IST of 7 TO 12 Dec 2016 –All 1000IST



of VIP-IIIpdf



ts (6).png

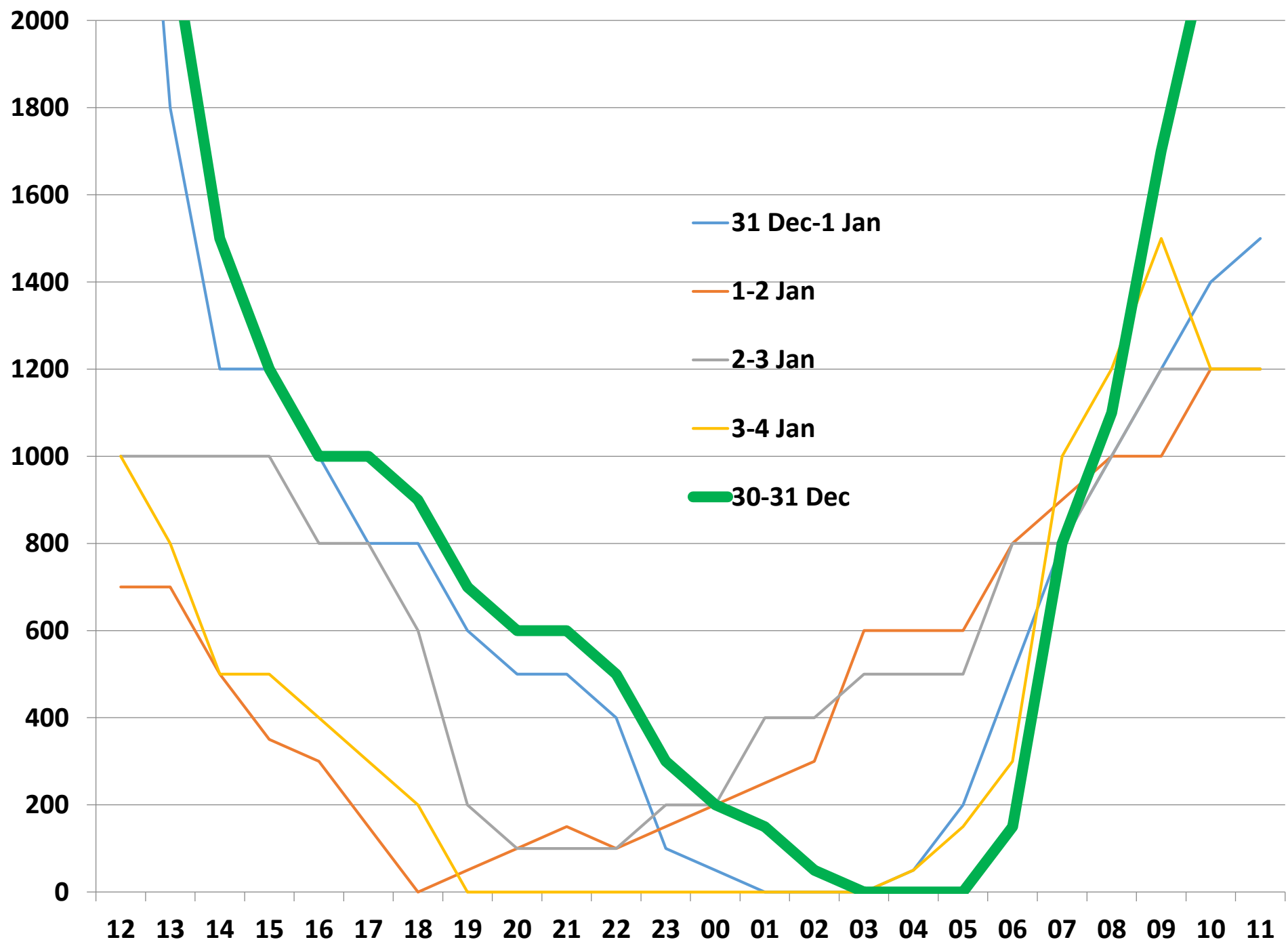


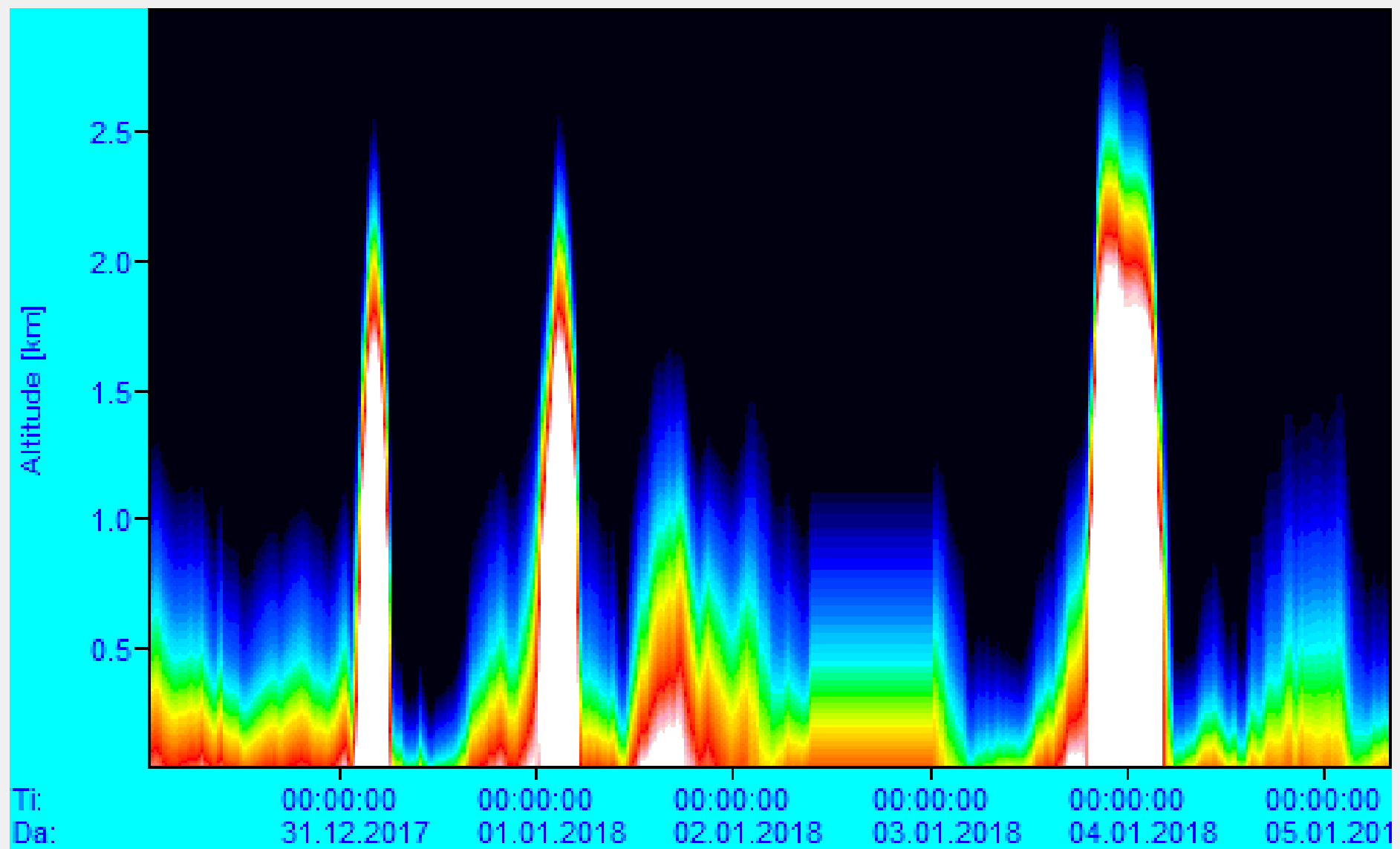
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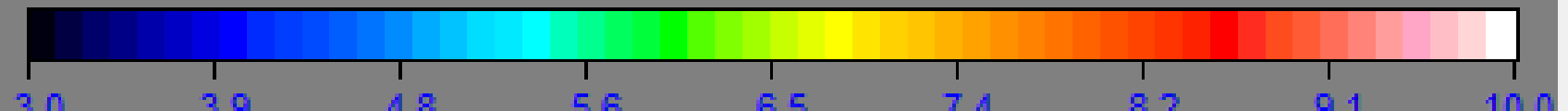




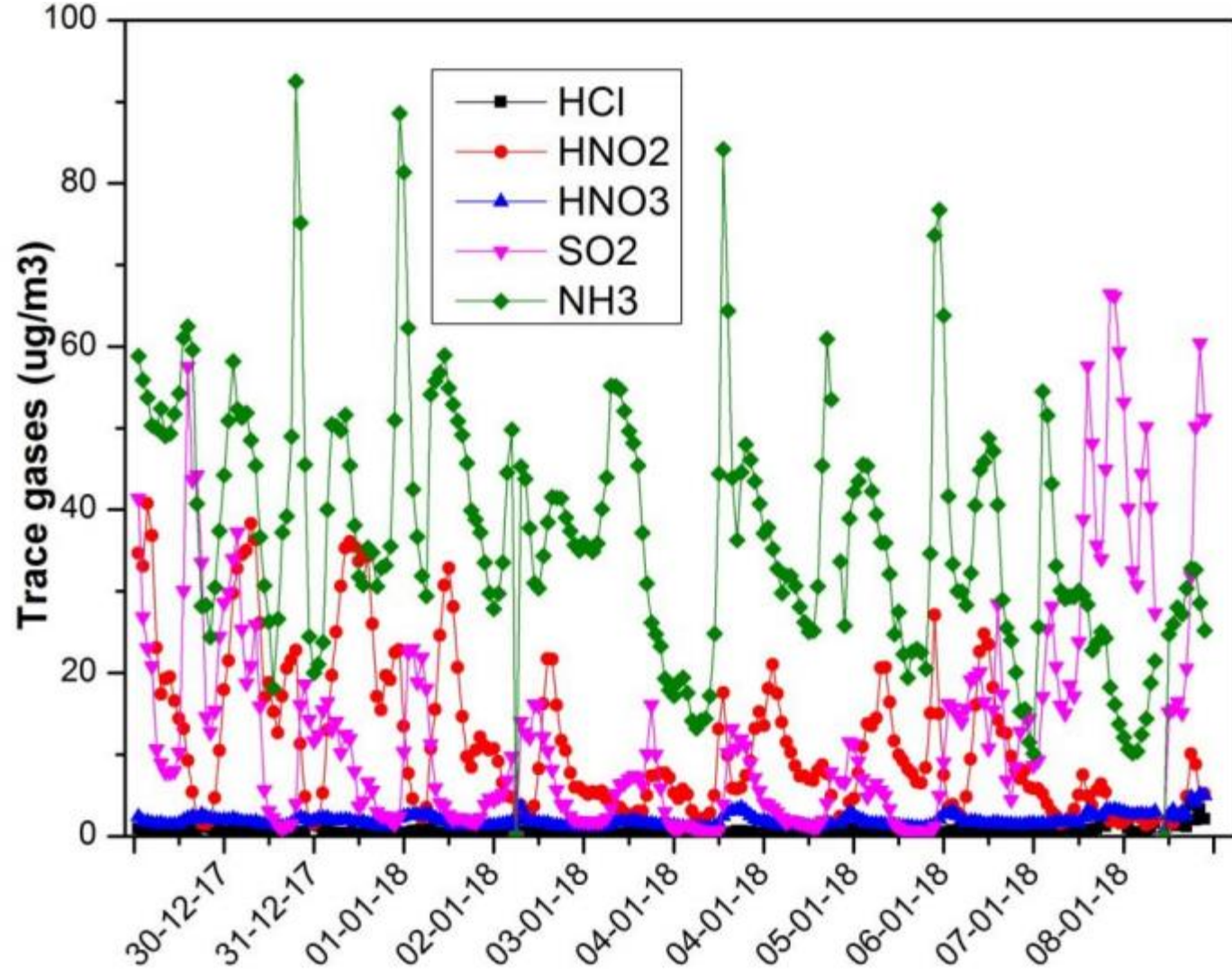


RF:

H[g/m³]



MARGA (Chemical analysis of PM1, PM2.5 and gases): Variation of the concentration of water soluble chemical constituents of PM2.5 and PM1 and trace gases during the periods " 30 Dec 17-8 Jan 18".



Real time in IGIA Delhi real time Fog forecast/nowcast system-

Two stages based fog forecast products which covers all characteristics of fog at IGIA

- Stage 1**- Yes/No Dense fog forecast-Categorical forecast i.e. chances of occurrences/non- occurrences of say dense during an evening to next day evening, dense fog likely or not, we do not look for timing at this stage 1)
- Stage 2**-Intensity and duration based fog forecast from Objective based fog forecast using fog Models for onset lifting timings and intensity at four visibility ranges as in Table

Fog Forecast Schedule

Time of Issue of Fog F/c (UTC)	Validity of Fog Forecast (UTC)	Validity of Outlook (UTC)	Time of Upload in OLBS (UTC)
0000	0030-0630	0630- 1830	Within 15 minute from the time of issue
0600	0630-1230	1230- 0030	Within 15 minute from the time of issue
1200	1230-1830	1830- 0630	Within 15 minute from the time of issue
1800	1830-0030	0030- 1230	Within 15 minute from the time of issue

Following is the sample of a real time fog forecast issued operationally by MWO Delhi for Delhi for season 2017-18.

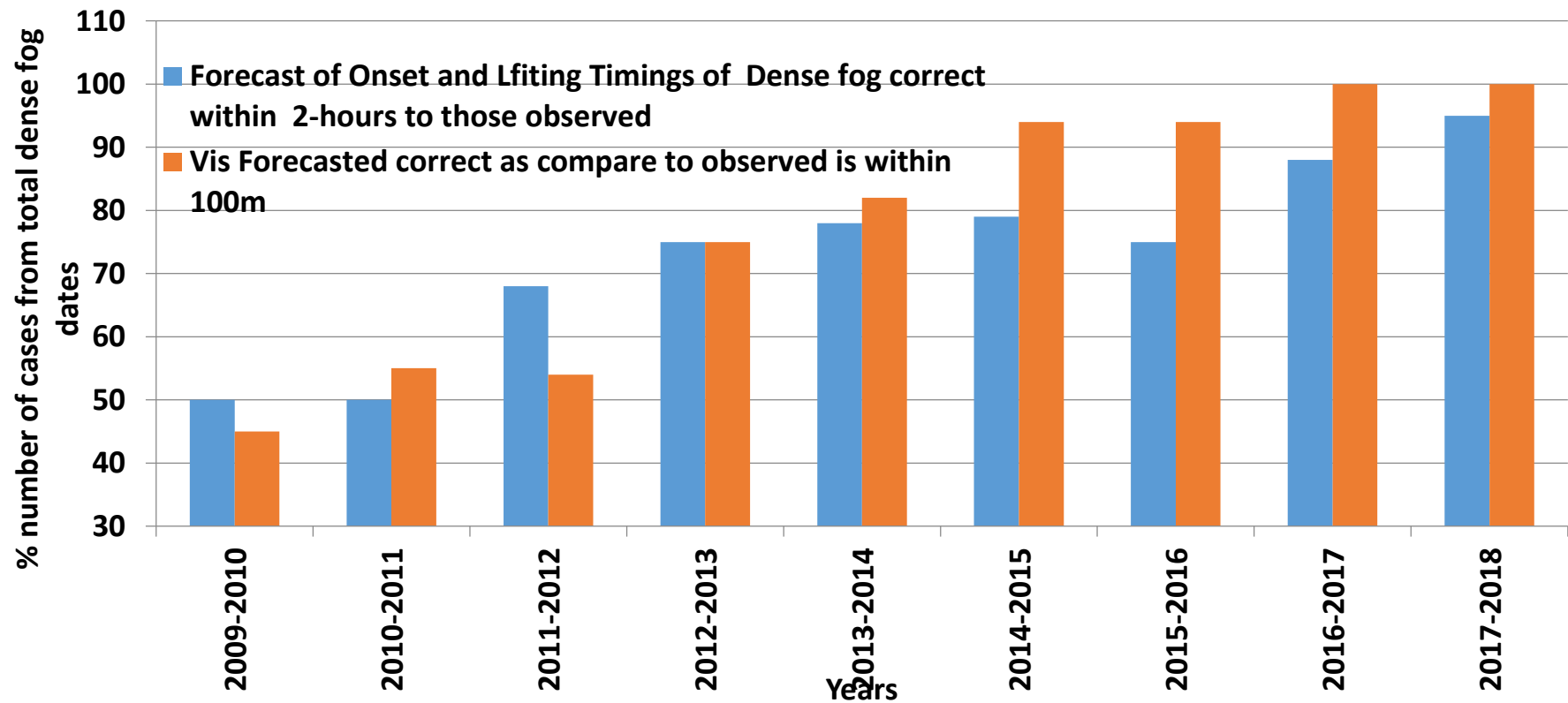
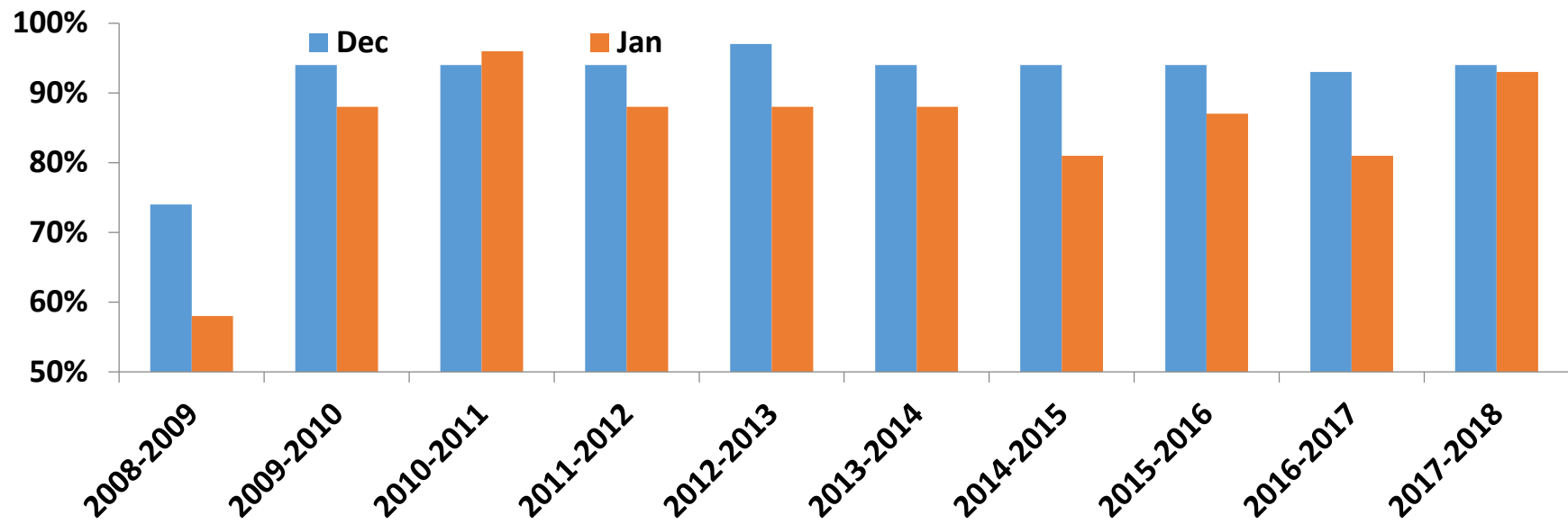
SAMAPLE OF FOG FORECAST FOR I G I AIRPORT

DATE 08/01/2018 TIME OF ISSUE 08/1200 UTC (08/1730 IST) VALID FROM 08/1230 UTC (08/1800 IST) TO 08/1830 UTC (08/2400 IST).

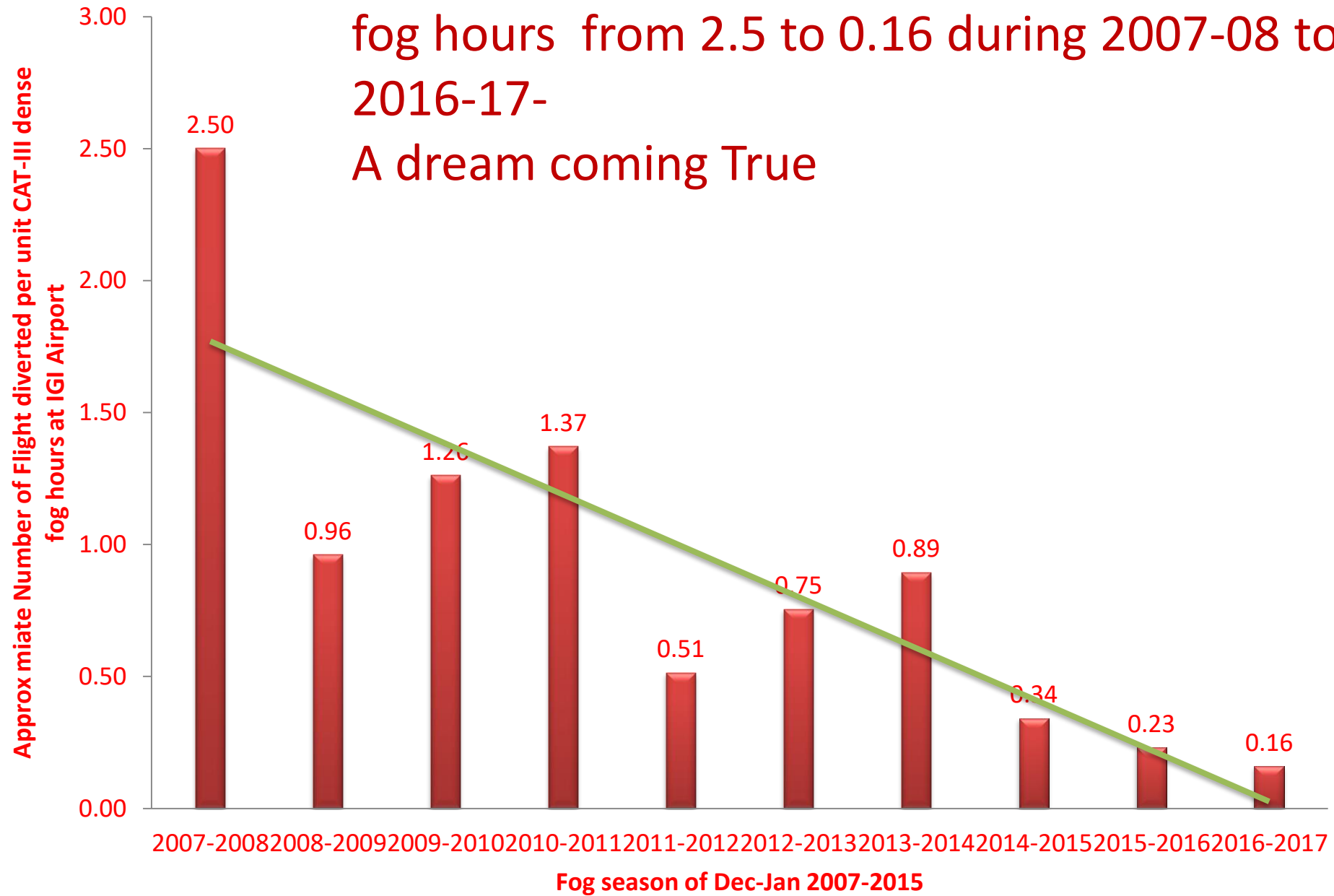
VISIBILITY LIKELY TO REDUCE 0400M IN FOG FROM 08/1400 UTC (08/1930 IST). IT MAY FURTHER REDUCE BELOW 0200M IN DENSE FOG (CAT-II/CAT-III DENSE FOG) FROM 08/1800 UTC (082330 IST).

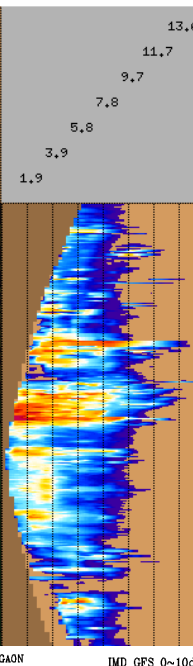
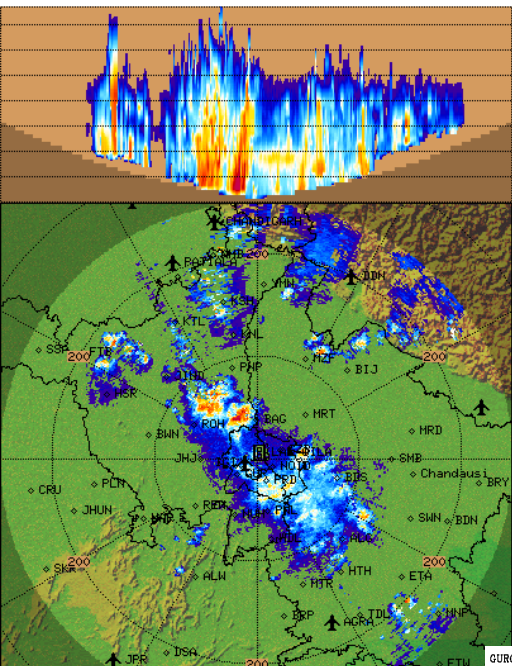
OUT LOOK FOR NEXT SUBSEQUENT 12 HOURS

FROM 08/1830 UTC (09/0000 IST) TO 09/0630 UTC (09/1200 IST) VISIBILITY MAY REDUCE BELOW 0050M IN VERY DENSE FOG (CAT-IIIB VERY DENSE FOG) FROM 08/2000 UTC (09/0130 IST). IT MAY IMPROVE UPTO 0200M IN DENSE FROM 09/0330 UTC (09/0900 IST) IT MAY FURTHER IMPROVE TO 0800M IN SHALLOW FOG FROM 09/0600 UTC (09/1130 IST)

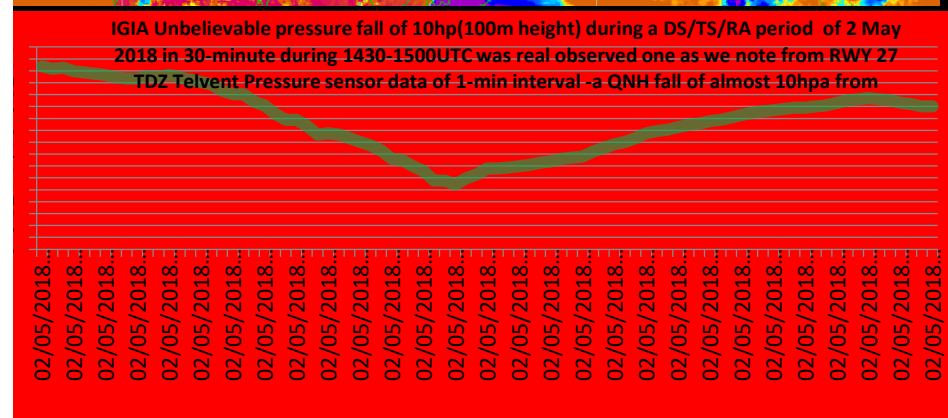
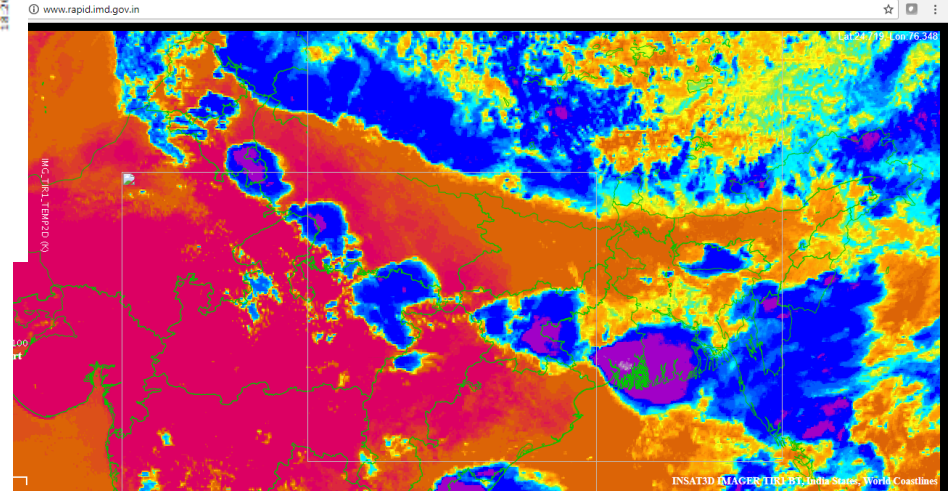
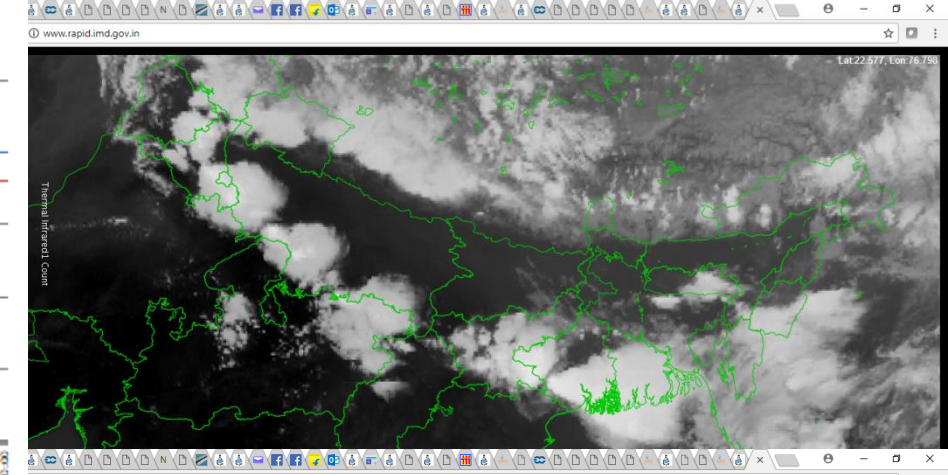
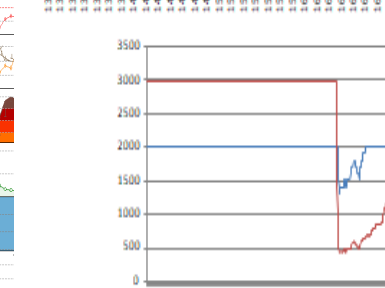
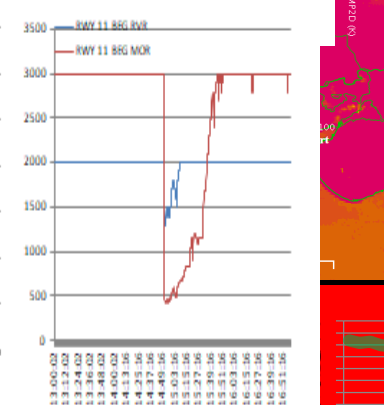
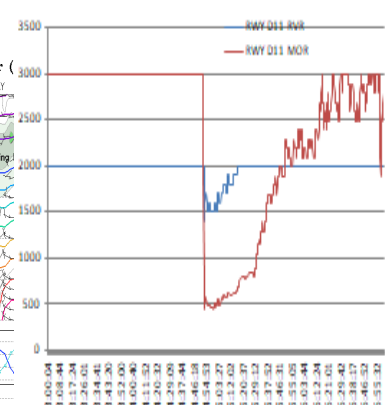
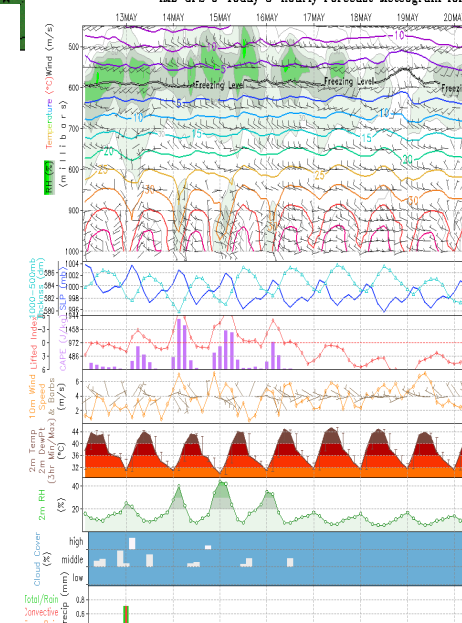
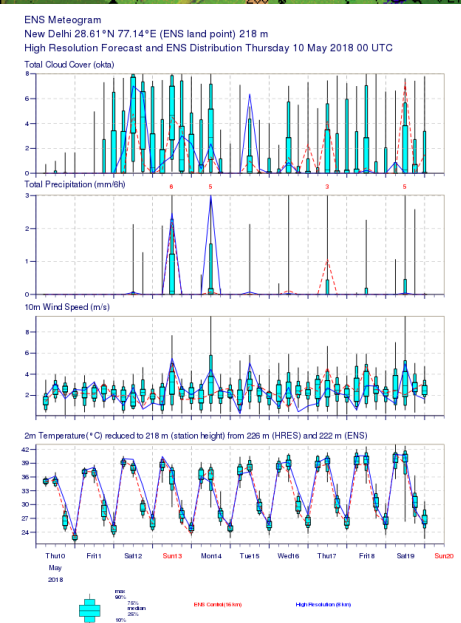
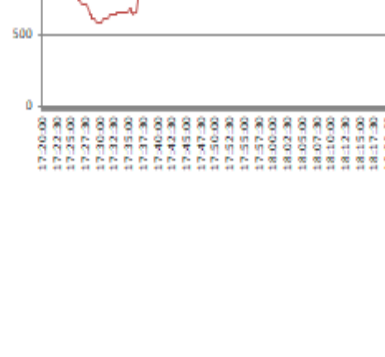
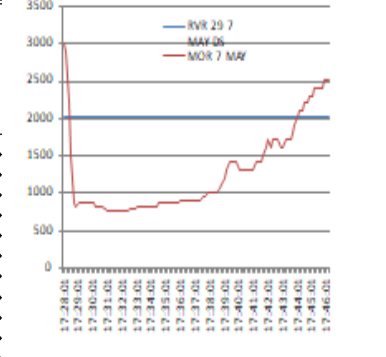
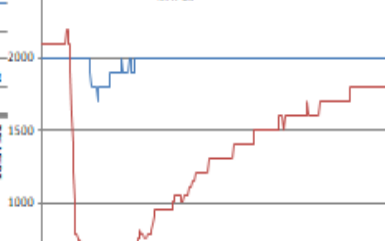
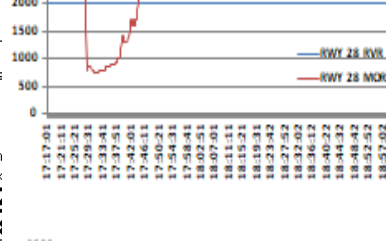


Reduction of flight diversion Rate per dense fog hours from 2.5 to 0.16 during 2007-08 to 2016-17-
A dream coming True





DELHI
Max with panels
MAX_Z
Task: IMD-B
Min Hgt:0.0 km
Max Hgt:15.0 km
Max Range:250 km
12:22:2
13 MAY 201

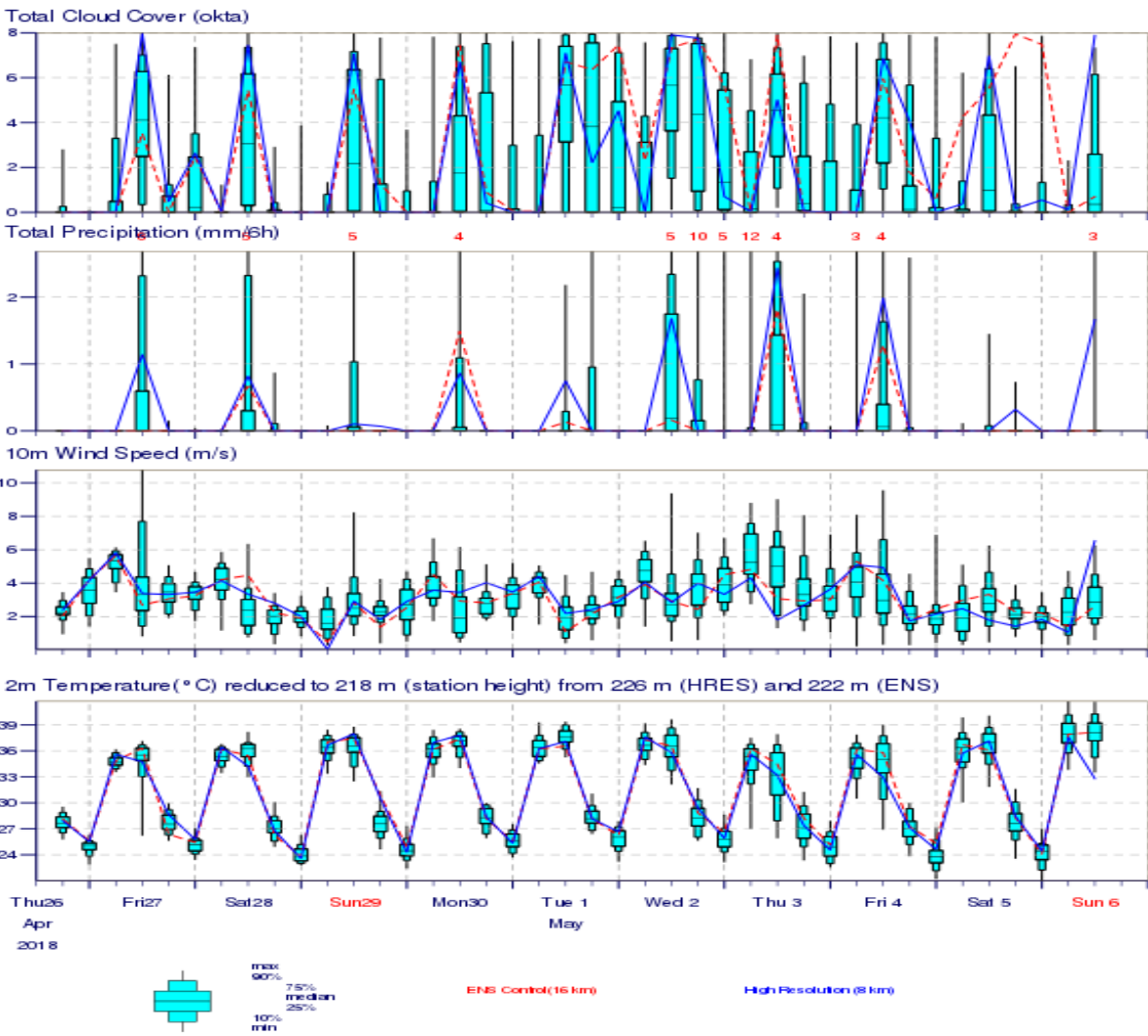


April--May --June 2018-All timings of TS/DS/RA/Squall and service performances for each events									
Date	TIME IN UTC	Lowest Vis in M	Wind max	WX	Times Dir has changed or cross winds	Issued in TAF 12-30hours lead time	TRENDS/AD Warnings	Rain at 0300 UTC following day	Flight diversion
6 April	1140-1400	800	48kt	DS/TSRA	3 Times	Yes from 0500 UTC same date	>2h	5.4mm	30
9 April	0030-0330	-	46kt	TSRA(2 times	Yes from 1100UTC	1.5h	0.4mm	4
11 April	0025-0330 & 2100-2300	-	25-35kts	TSRA(Agra damage)	1-times	Yes from 1100UTC	1.5-2h	6.2.mm	0
2May	1115-1400 1400-1630 1730-2230	450m	35-40kt	DS/BLDU TS/RA TS	5-TIMES AS NIGHT LESS DIV	YES from 0500UTC	2-h	3.4	21
3 May	2250-2400	-	21KT	TS RA	-	YES from 0500UTC	1.5-h	0.3MM	0
7 May	1730-2130	800m	45KT	DS/BLDU	1 TIMES but cross	YES from 0500UTC	1-h	-	6
8 May	1530-1630	-	45kt	TS	-	YES from 0500UTC	1.5-h	-	0
9 May	1030-1200	-	30KT	TSRA		YES from 0500UTC	1.5-h	3.2	0
12 May	1100-1200	-	-	CB NOT THUNDER/-RA	-	-	-	3.7mm	0
13 May	1100-1300	1500-3500	52kt	TS/RA	5-6 TIMES FOLLWED WITH CROSS FOR 2-HOURS AND PEAK TIMES	YES FROM 1100UTC of 12 May. But 0800UTC/13 has missed it.	2-h	1.2mm	78
13 MAY	1300-1500	4000	25-35KT	TS/RA					
15 May	2155-2220	-	50-58kts	TS/RA	2-TIMES	Yes at 1700	NO ADW	Trace	1
16 MAY	1800-1830	-	04KT	TS	-	-	-	-	-
17 May	1245-1430	1500	20-30kt	DU/TS/-RA	1	YES from 0500UTC	2-h		1
1 June	1400-1530	500	45-50kt	DS/TS	2	YES from 0500UTC	2-H	TRACE	8
9 June	1030-1500UTC	300	50-56KT	DS/TS/RA	2 TIMES	YES from 1100UTC of 08 June	2-h	23mm	30
27-Jun	0100-0200	1200	30	TS/RA	1	YES from 1100UTC of 08 June	1	3.4	6

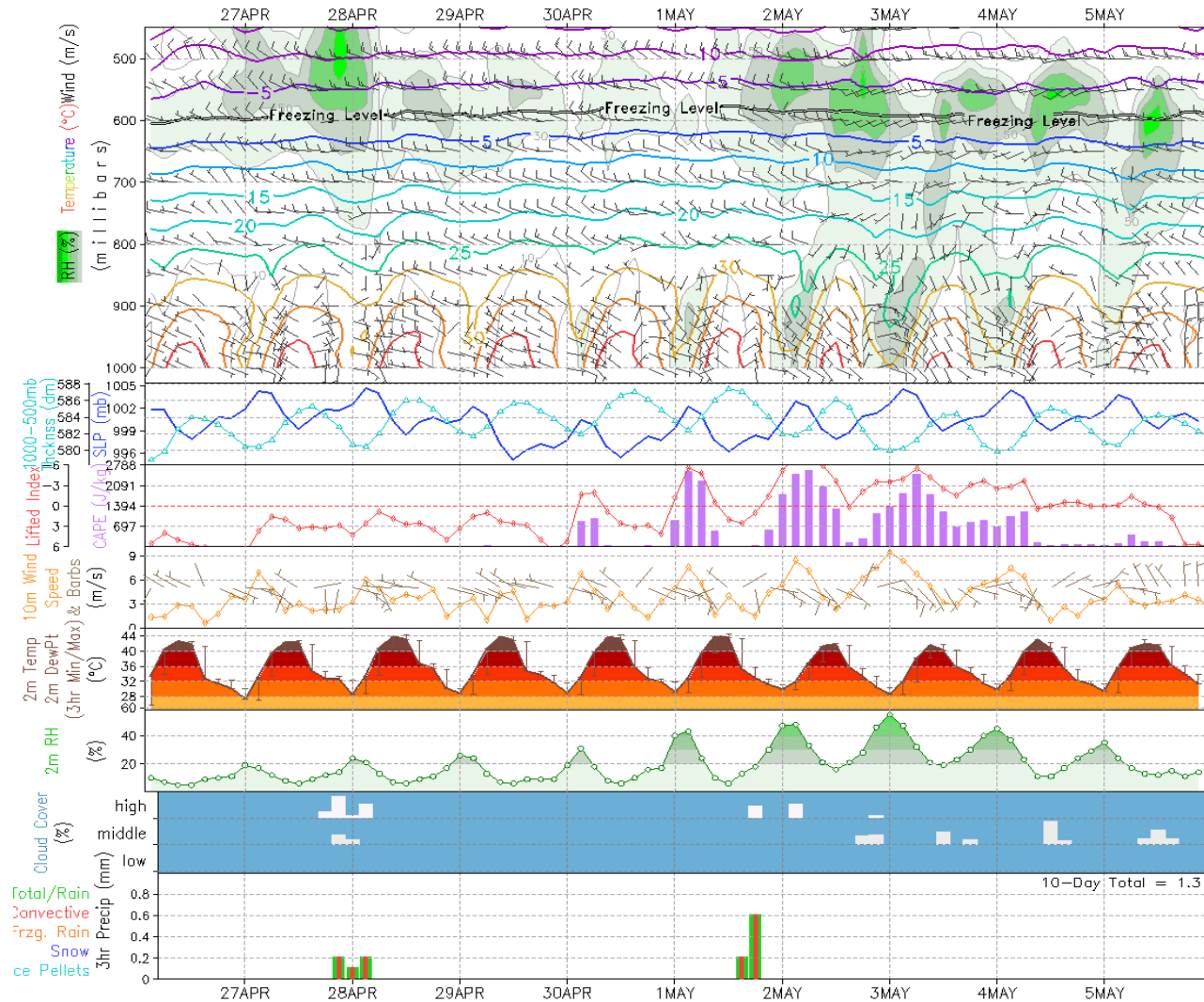
STORM OF IGIA 2 MAY 2018-A TS/DS

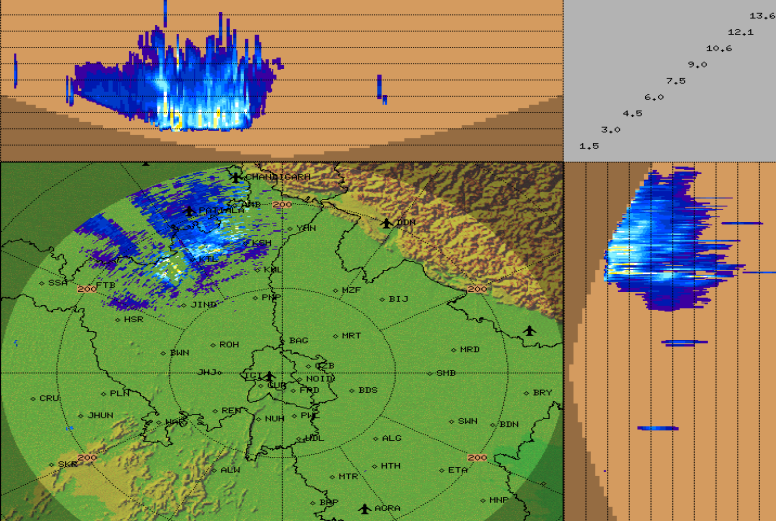
Date	TIME IN UTC	Lowest Vis in M	Wind max	WX	Times Dir has changed on cross winds	Issued in TAF 12- 30hours lead time	TRENDS/AD Warning issued at 1.5 to 2 hours in lead time	Rain at 0300 UTC following day	Flight diversion
2May	1115-1400 1400-1630 1730-2230	450m	35-40kt	DS/BLDU TS/RA TS	5-TIMES AS NIGHT LESS DIV	YES from 0500UTC	2-h	3.4	13

ENS Meteogram
New Delhi 28.61°N 77.14°E (ENS land point) 218 m
High Resolution Forecast and ENS Distribution Thursday 26 April 2018 12 UTC

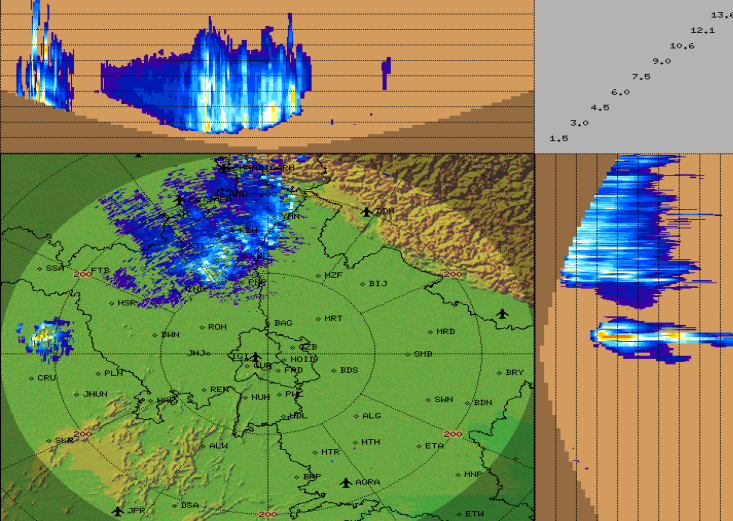
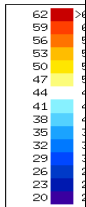


DELHI/SAFDARJUNG IMD GFS 0~10day 3-hourly Forecast Meteogram for (77.25E, 28.5N)

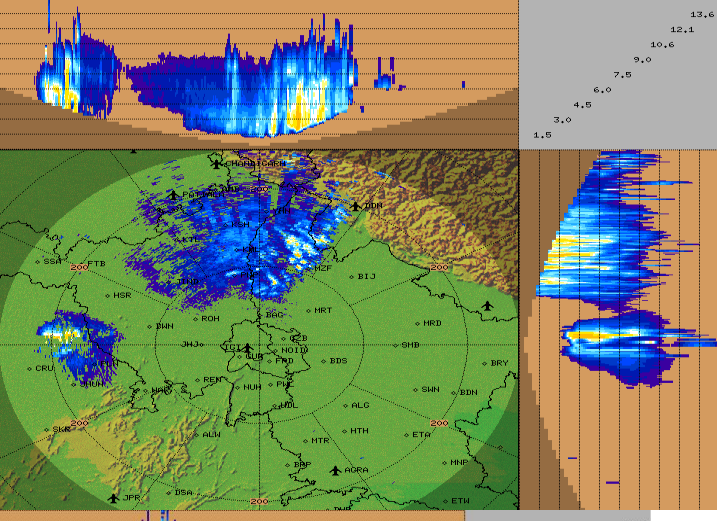
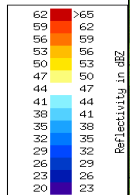




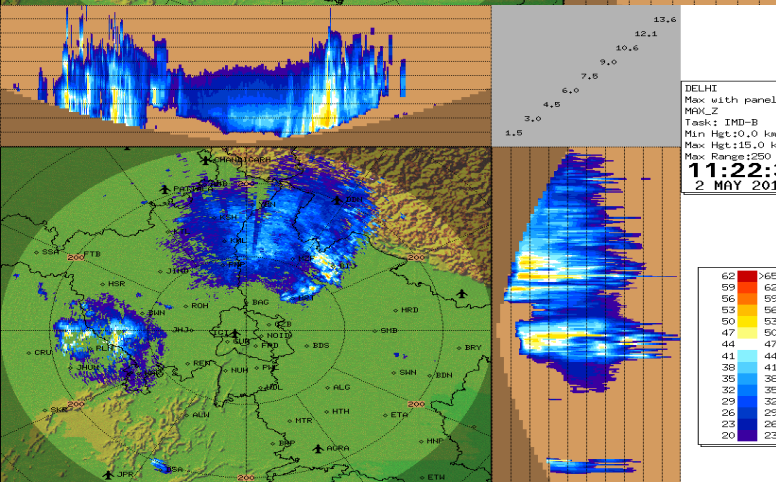
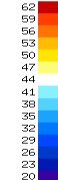
DELHI
Max with panels
MAX_Z
Task: IMD-B
Min Hgt:0.0 km
Max Hgt:15.0 km
Max Range:250 km
09:22:30Z
2 MAY 2018 UTC



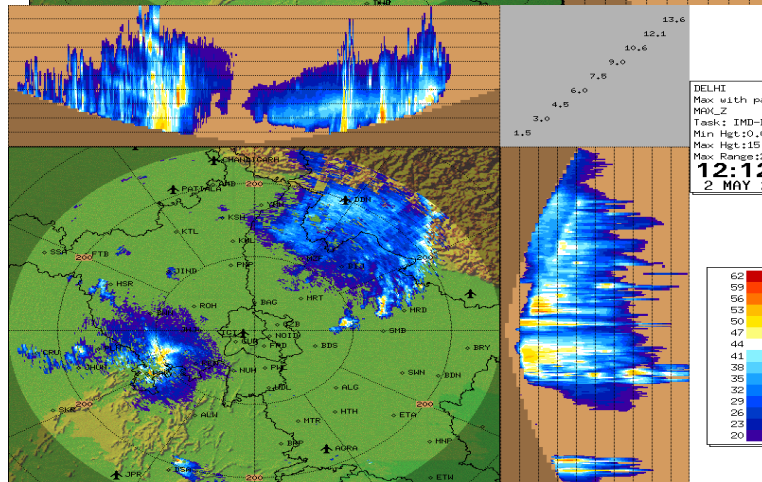
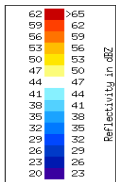
DELHI
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MAX_Z
Task: IMD-B
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Max Hgt:15.0 km
Max Range:250 km
10:02:30Z
2 MAY 2018 UTC



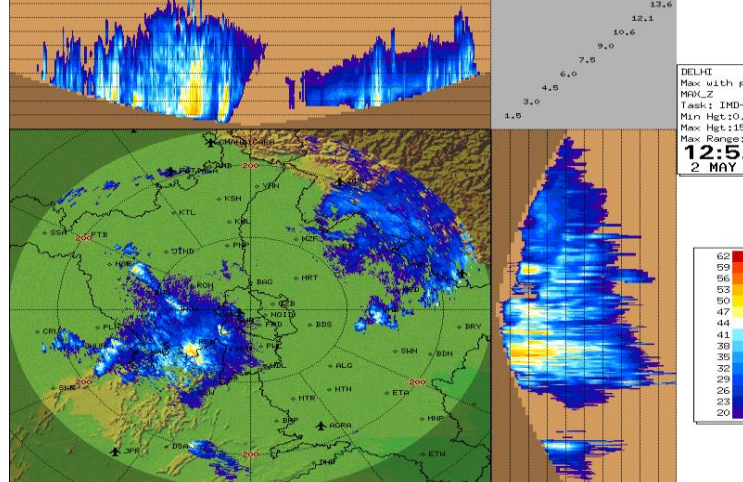
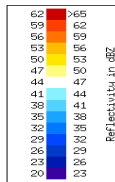
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Max with panels
MAX_Z
Task: IMD-B
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Max Hgt:15.0 km
Max Range:250 km
10:42:30Z
2 MAY 2018 UTC



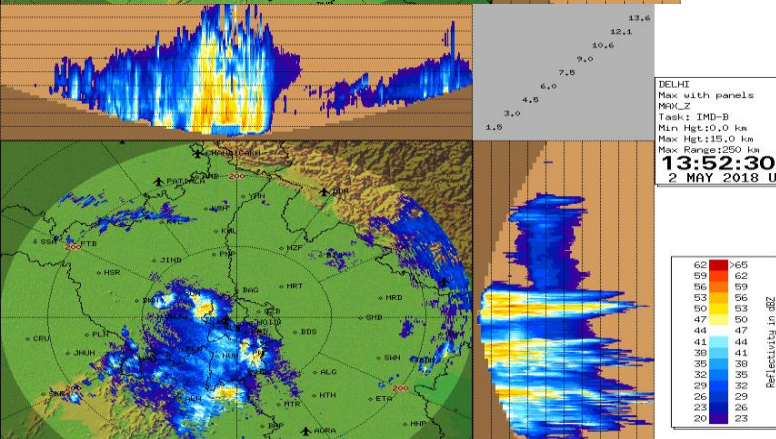
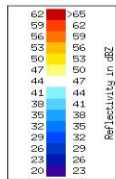
DELHI
Max with panels
MAX_Z
Task: IMD-B
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Max Hgt:15.0 km
Max Range:250 km
11:22:30Z
2 MAY 2018 UTC



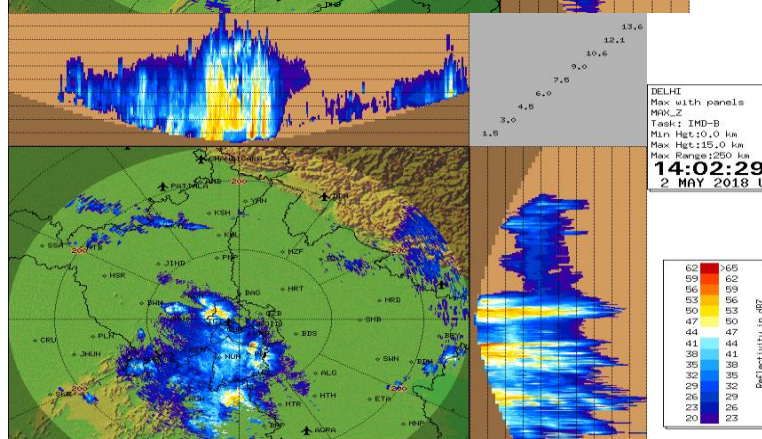
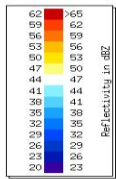
DELHI
Max with panels
MAX_Z
Task: IMD-B
Min Hgt:0.0 km
Max Hgt:15.0 km
Max Range:250 km
12:12:28Z
2 MAY 2018 UTC



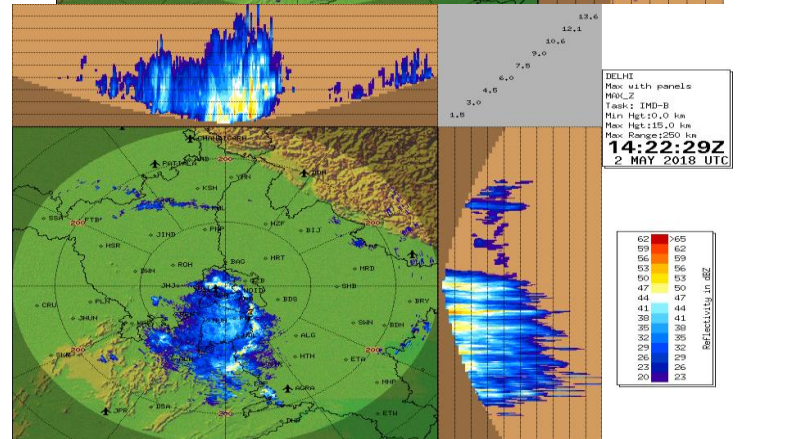
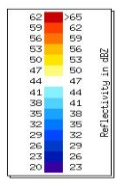
DELHI
Max with panels
MAX_Z
Task: IMD-B
Min Hgt:0.0 km
Max Hgt:15.0 km
Max Range:250 km
12:52:29Z
2 MAY 2018 UTC



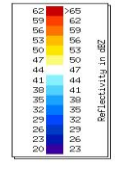
DELHI
Max with panels
MAX_Z
Task: IMD-B
Min Hgt:0.0 km
Max Hgt:15.0 km
Max Range:250 km
13:52:30Z
2 MAY 2018 UTC

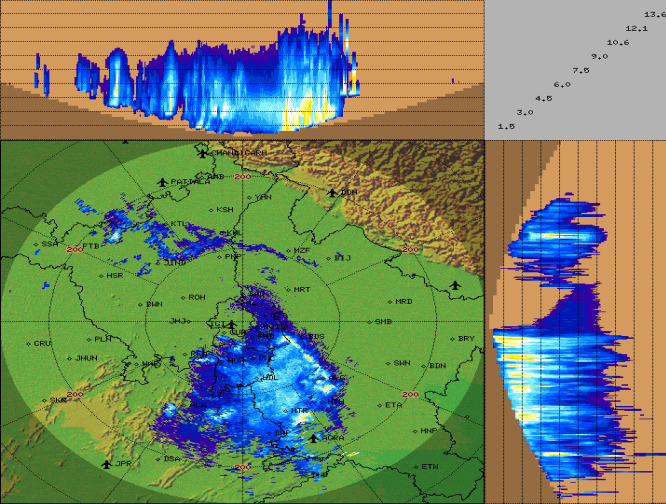


DELHI
Max with panels
MAX_Z
Task: IMD-B
Min Hgt:0.0 km
Max Hgt:15.0 km
Max Range:250 km
14:02:29Z
2 MAY 2018 UTC

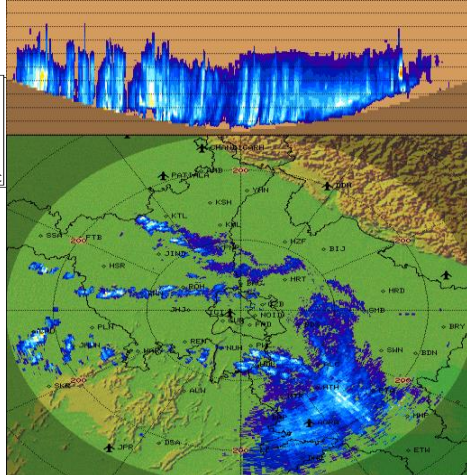
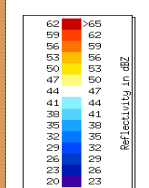


DELHI
Max with panels
MAX_Z
Task: IMD-B
Min Hgt:0.0 km
Max Hgt:15.0 km
Max Range:250 km
14:22:29Z
2 MAY 2018 UTC

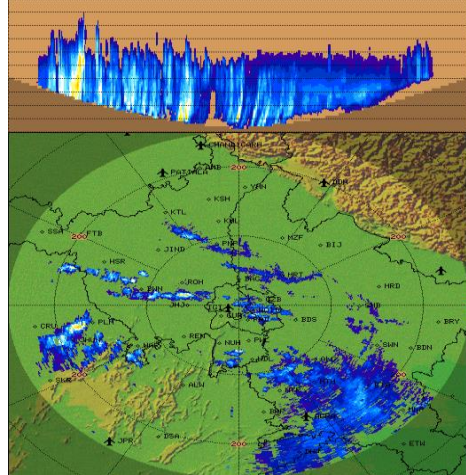
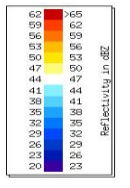




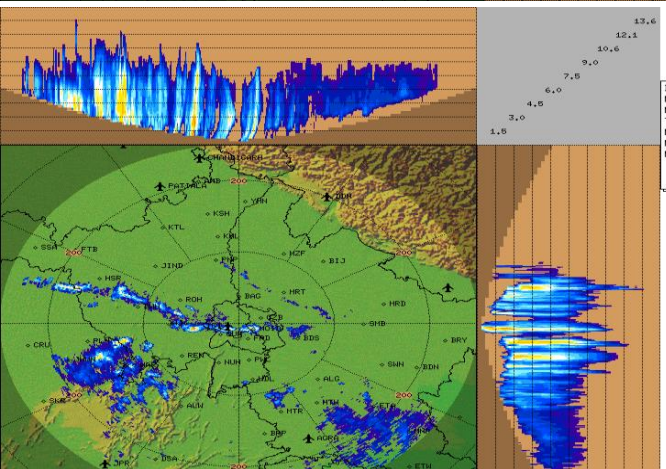
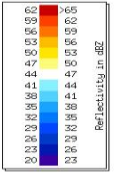
DELHI
Max with panels
MAX_Z
Task: IMD-B
Min Hgt:10.0 km
Max Hgt:15.0 km
Max Range:250 km
15:12:28Z
2 MAY 2018 UTC



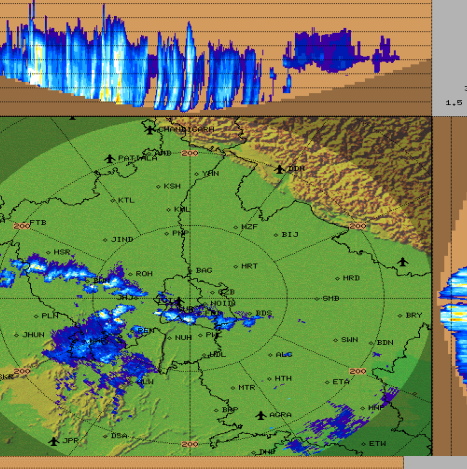
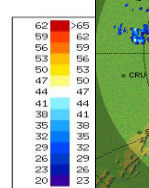
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MAX_Z
Task: IMD-B
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Max Hgt:15.0 km
Max Range:250 km
16:32:30Z
2 MAY 2018 UTC



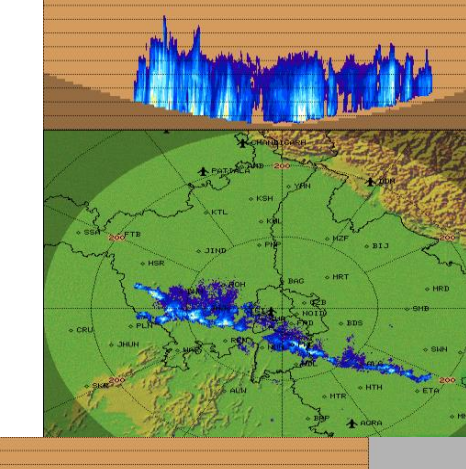
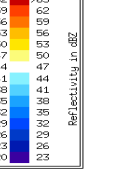
DELHI
Max with panels
MAX_Z
Task: IMD-B
Min Hgt:10.0 km
Max Hgt:15.0 km
Max Range:250 km
17:02:29Z
2 MAY 2018 UTC



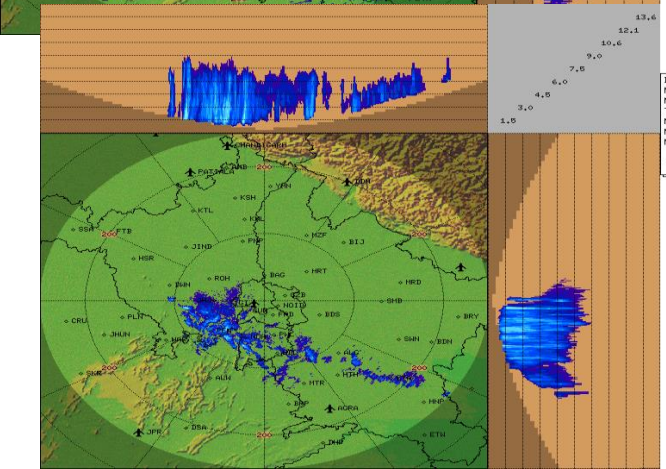
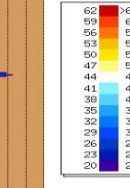
DELHI
Max with panels
MAX_Z
Task: IMD-B
Min Hgt:10.0 km
Max Hgt:15.0 km
Max Range:250 km
17:42:29Z
2 MAY 2018 UTC



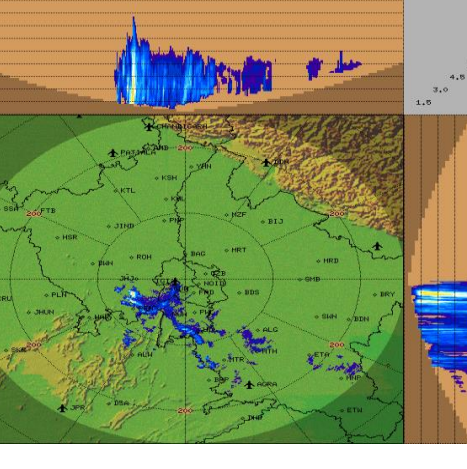
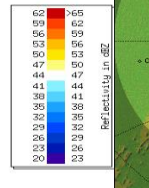
DELHI
Max with panels
MAX_Z
Task: IMD-B
Min Hgt:10.0 km
Max Hgt:15.0 km
Max Range:250 km
18:22:29Z
2 MAY 2018 UTC



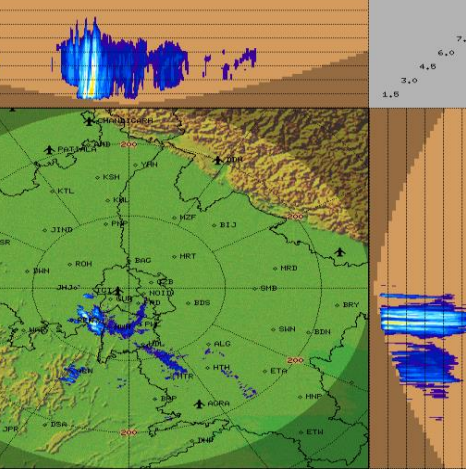
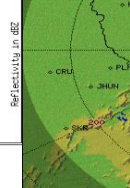
DELHI
Max with panels
MAX_Z
Task: IMD-B
Min Hgt:10.0 km
Max Hgt:15.0 km
Max Range:250 km
19:42:28Z
2 MAY 2018 UTC



DELHI
Max with panels
MAX_Z
Task: IMD-B
Min Hgt:10.0 km
Max Hgt:15.0 km
Max Range:250 km
20:32:30Z
2 MAY 2018 UTC



DELHI
Max with panels
MAX_Z
Task: IMD-B
Min Hgt:10.0 km
Max Hgt:15.0 km
Max Range:250 km
21:02:30Z
2 MAY 2018 UTC



DELHI
Max with panels
MAX_Z
Task: IMD-B
Min Hgt:10.0 km
Max Hgt:15.0 km
Max Range:250 km
21:32:29Z
2 MAY 2018 UTC



Summery and Challenges for Phase-II

➤ Fog AvRDP Nov-Feb 2018-19 Phase-II

- MET Capability is to forecast Gen Vis<200m or <50m for dense and very dense fog respectively for CAT-II/CAT-IIIA and CAT-IIIA/B/C with 80-90% Skill
- WHERE SKILL OF TIMINGS OF OBSEVED TO FORECAST WITHIN 0-3 HOURS ACCURATE IS 80%,
- LOWEST VIS FORECAST <50 OR <200M OR <500M UPTO 90% .
- Limitation-Can not confirm RWY 28 TDZ HAS CAT-IIIA/CAT-IIIB OR MAY HAVE CAT-II DENSE FOG.
- So best operate all CAT-IIIB Compliance during 1700-0430UTC for 1 Dec to 10 Feb
- In case not possible like some airlines-Then follow different scheduled from 15 Dec to 5 Feb 2018-19 for 2000-0400UTC and be in touch with MET for early information to have last minute solution before to fly to Delhi during this period or delay in case MET provides likely DENSE FOG.
- For non-CAT -III Airlines, % OF SAVING FLIGHT FROM DIVERSION IS 70% AND THE FLIGHT MAY BE RE-SCHEDULED FROM STARTING AIRPORT IN CASE IMD HAS CAT-III DENSE FOG WARNING, WHEN CHANCES OF ACTUALLY IT WILL NOT BE OBSERVED AT RWY 28 TDZ IS 30%(FA)

➤ **Thunderstorm/Dust Storm April-June 2019 AvRDP Phase-II**

- **For providing more TS/DS related micro-parameters, we need meso-scale model runs at airport RWY scale like RUC model**
- **Until unless we deliver a Ad warning of more precise information of minute to minute likely wind gusts/squalls and directions of winds in case it frequent changes from any approaching gust fronts from TS/DS in warnings specially for aviation use at RWY operation, then MET-ATM integration for any advance action type steps like airport capability declaration/closure of airport from approaching severe weather is challenging.**
- **We are working with Airport users-ATC-DIAL-AIRLINES on How to do MET-ATM integration, as such nowcast of meso-parameters from any severe TS/DS likely.**

THANK YOU