MAUSAM, **77**, 3 (July 2026),1101-1110

MAUSAM

Homepage: https://mausamjournal.imd.gov.in/index.php/MAUSAM

L E T T E R S

UDC No.:551.576.4:656.71(540.45)
DOI :https://doi.org/10.54302/mausam.v77i3.6525

A STUDY ON THE CHARACTERISTICS OF FOG OVER AGARTALA AIRPORT

1. Fog is considered as an important weather phenomenon during the later part of the post-monsoon season and the winter season (November to February). In India, the Indo-Gangetic plains, northeastern states and some parts of east-coast observes major fog during this period. The main concern about fog is due to its effect on the transportation industry, mainly in the aviation sector. Fog seriously degrades the visibility, sometimes to such an extent that transportation through roadways, railways and airways is badly hampered. Many times, it causes delays in flight operations and ultimately leads to economic loss. Even low-intensity fog can cause difficulty in aircraft operations in some airports, because, structures and runways must be clearly visible to the pilot when looking down from directly above the airfield. Sometimes, the pilot may very quickly lose all visual cues while attempting to land and find themselves in very serious difficulty.

The atmospheric conditions favourable for the formation of fog are the presence of high relative humidity near the earth's surface, cloud-free or very less cloudy condition which permits radiative cooling of the atmosphere, light surface wind for gentle mixing of cooled air and a layer of the atmosphere near the surface where temperature increases with height (inversion layer) that confines the vertical mixing of particles in a relatively shallow layer Suresh, *et al*. (2007). These conditions are often satisfied during late night and morning hours in November to February, when there is no weather system approaching.

Several studies have been performed in the past to find out the characteristics of fog at different regions of the country. Jenamani (2012) has deduced vulnerable period and intensity of fog hazardous for aviation by analysing microclimatological features of occurrence of fog of different intensities at Indira Gandhi International airport based on data from 1981 – 2005. Sawaisarje *et al. (*2014) have presented climatology of fog events over Indian sub-continent using data of general visibility observed at synoptic observatories for the period 1971 – 2010. Their study revealed that Indo-Gangetic plains are susceptible for 7-10 fog days during December and January. Singh and Kant (2006) for north India, Suresh, *et al*. (2007) for Chennai, Ram and Mohapatra (2008) for Guwahati, Mishra and Mohapatra (2004) for Bhubaneshwar, Laskar *et al*. (2013) for Patna, Mohapatra and Das (1998) for Bangalore, have studied for their respective regions. In the present study, an attempt has been made to find out the characteristics of fog at Maharaja Bir Bikram Airport (MBB), Agartala. Agartala, the capital of Tripura, is an important city in northeast India. It also has a domestic CAT I airport, which is very important for the Tripura and adjoining states as well as for Bangladesh. The visibility minima required for the Tripura airport to land/take-off is 800 metres so even shallow fog can cause delay in landing and take-off operations in the airport. In winter season, on some occasions, the flight operations are hampered especially due to fog causing major operational challenges to manage the air traffic flow along with safety and security of the passengers. It can be seen from the satellite imageries that in many times the extensive fog layer covering a vast area across Indo-Gangetic plains travels towards Tripura, through Bangladesh and covers almost the whole state (Fig. 1). The climatological characteristics of fog for the airport is very important, as it will be helpful for the meteorologists to issue proper forecasts, warnings for aviation services and in turn will help aviators to plan and manage their operations efficiently.

2. ***Data and methodology*** - Fog is the cloud at surface level or suspension of very small water droplets in the air reducing the horizontal visibility to less than 1000 metres with relative humidity 75% or more. The present study has been performed for analysis of fog at Agartala Airport (23°53´N, 91°15´E) in November, December, January and February months during the period 2011-2020. The data on various parameters related to fog have been obtained from the current weather observations at Agartala Airport. The study has been performed for each month individually. The intensity of fog can be classified into four categories based on the associated visibility, (i) shallow fog, when visibility is <1000 metres and ≥500 metres, (ii) moderate fog, when visibility is between <500 metres and ≥200 metres, (iii) dense fog, when visibility is between <200 metres and ≥50 metres and very dense fog, when visibility is <50 metres (India Meteorological Department, 2021).

3. ***Results and discussion*** - *Temporal variation of fog* - Tables 1(a-c) show the month wise mean, standard

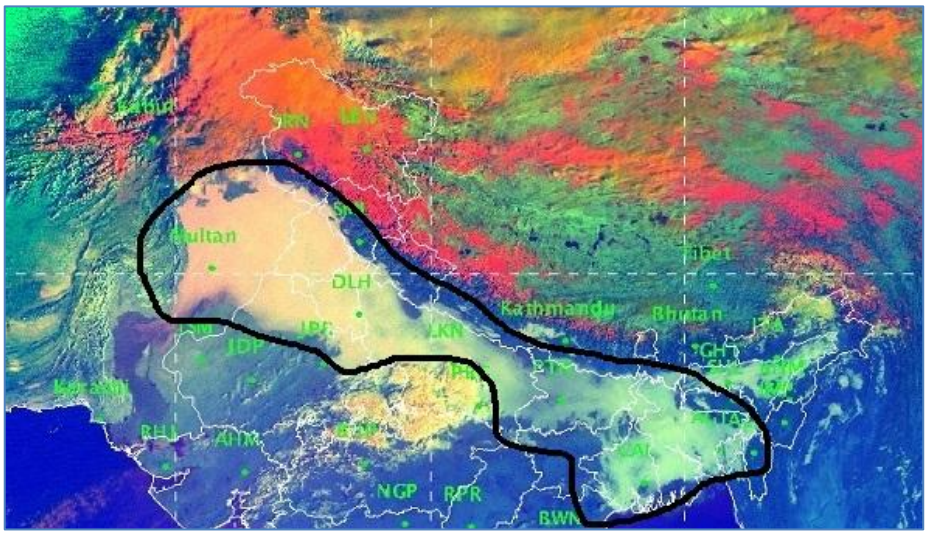


Fig. 1. Fog layer detected by INSAT 3D at 0830 Hours of IST of 24th December 2019
(Source: Satellite Met. Division, IMD, New Delhi)

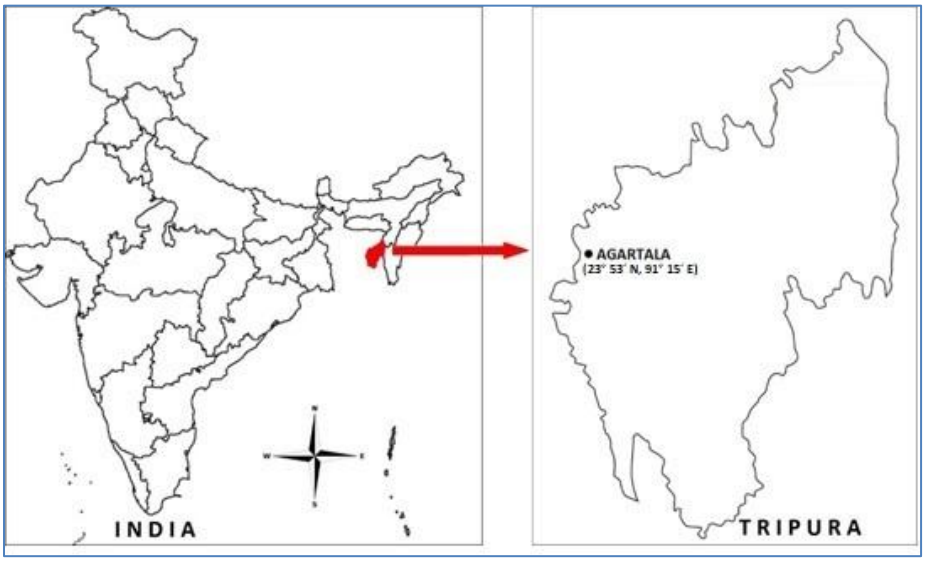


Fig. 2. Location of Agartala, with map of Tripura

deviation and coefficient of variation of fog (all categories), moderate fog and dense fog at Agartala Airport from November to February months during 2011-2020. It has been observed that the highest frequency of foggy days (19.7 every year) is in December, followed by January (18.2 per year), November (9.0 per year) and February (8.6 per year). The order is same for moderate fog also, however in February month, greater number of dense fog days observed than the November month. If the month wise frequency of days with moderate and dense fogs are compared, it was found that December, January and February months the frequency of dense fog is higher than that of moderate fog. It was also observed that, in the November month the frequency of moderate fog is higher than that of dense fog. The total number of foggy days during all four months in the period of study (55.5) is much higher than the climatological normal (31.2) prepared for the period of 1981-2010 (India Meteorological Department, 2015). The same results were also observed by Laskar *et al*. (2013) and in January & February at Guwahati by Ram and Mohapatra (2008).

The probability of occurrence of fog on a particular date has been calculated based on number of times fog has occurred on that date during the study period. The day wise probability of occurrence of fog thus obtained is shown in Fig. 3(a-c). It shows the intra-seasonal variation of occurrence of fog. It is seen that, the probability of

TABLE 1 (a)

Mean, standard deviation (SD) and coefficient of variation (CV) of month wise frequency of fog at Agartala Airport

Parameter	Month				Total (Nov-Feb)
	Nov	Dec	Jan	Feb	
Mean	9.0	19.7	18.2	8.6	55.5
SD	3.3	6.9	6.1	4.8	13.7
CV (%)	36	35	33	56	24

TABLE 1 (b)

Mean, standard deviation (SD) and coefficient of variation (CV) of month wise frequency of moderate fog at Agartala Airport

Parameter	Month				Total (Nov-Feb)
	Nov	Dec	Jan	Feb	
Mean	1.8	4.3	2.3	1.6	10.0
SD	1.2	2.5	1.4	1.3	3.5
CV (%)	69	58	61	81	34

TABLE 1 (c)

Mean, standard deviation (SD) and coefficient of variation (CV) of month wise frequency of dense to very dense fog at Agartala Airport

Parameter	Month				Total (Nov-Feb)
	Nov	Dec	Jan	Feb	
Mean	1.3	9.9	8.4	2.1	21.7
SD	1.0	5.3	4.5	1.4	7.5
CV (%)	77	53	53	69	34

occurrence of fog is less than 50% in most of the days in November (26 days). However, there is a drastic increase of probability in December and continues till mid of January. The probability is 90% on, as many as nine days during the second half of December and first half of January. It decreases after that and beyond the first couple of days of February the probability goes down below 50% and finally during last week of February, it reaches around 20%. The probabilities of moderate fog are 0-20% in most of the days (except five days). Probability of dense fog is comparatively lower in November and February, as already supported by Tables 1(a-c). However, almost half of the days during 10th December – 15th January has ≥ 30% probability of dense fog.

Life cycle of fog - Table 2 and Fig 4 shows the frequency of time of onset of fog at one-hour interval during the months November to February at Agartala Airport. It has been observed that in most of the cases, the onset of fog takes place during 0001-0100 UTC. The second peak of time of onset is 2301-2400 UTC in November, whereas it is 2201-2300 UTC in December and January. In February, both 2201-2300 and 2301-2400 UTC have equal frequencies of onset. In fact, in November, about 29% of the onset of fog takes place between 2301-2400 UTC, whereas in other months no other time interval apart from 0001-0100 UTC has recorded more than 15% of the onset. It is also observed that in November, no onset of fog has taken place between 0301-1600 UTC. The same is also seen for February between 0401-1800 UTC. However, the time frame where no onset of fog has taken place in December and January is comparatively smaller, where cases of onset of fog has also been observed during the afternoon hours. According to the study, fog develops on about 70% occasion over North Eastern part of India during November to January when the area is not affected by the western disturbance. Following the passage of western disturbance, anticyclonic circulation sets in over north India and dry cold air associated with this anticyclonic circulation, sets in over the area and produces clear skies, although occasionally high clouds and scattered cumulus clouds in the afternoon are not unusual. After 1200 UTC, these clouds begin to dissipate and by early part of night, the sky clears and remains so until 0400 or 0500 UTC on the following morning. Such a clearing together with light surface wind inevitably produces favourable conditions for fog formation in the early morning hours. On the other days of the winter months (November to January), when light northerly/northwesterly winds at lower levels with clear skies prevail over the region during the night hours, advection of moisture from major rivers (i.e., Jamuna and Padma rivers) allows the surface layers of air to form aerial lakes which under the influence of radiative cooling produces favourable conditions necessary for fog formation.

Table 3 and Fig. 5 shows the month wise frequency of complete dispersal of fog during various times of the day at one-hour interval. It can be inferred that during November maximum number of dispersals of fog has been found between 0201-0300 UTC, during December between 0401-0500 UTC and during January & February between 0301-0400 UTC. The percentage of dispersal of fog by 0300, 0400, 0500, 0600 and 0700 UTC in different months have been shown in Table 4. The dispersal generally takes places early in November. However, the late dispersal of fog during January can also be seen from this table, followed by December. Less than 20% of the

TABLE 2

Frequency of time of onset of fog at Agartala Airport during November to February

Time of onset (UTC)	Frequency of days				
	Nov	Dec	Jan	Feb	Total
0001 - 0100	2.9	5.4	6.7	3.6	18.6
0101 - 0200	0.3	1.7	0.8	1.2	4.0
0201 - 0300	0.1	0.2	0.3	0.3	1.0
0301 - 0400	0.0	0.0	0.0	0.1	0.1
0401 - 0500	0.0	0.0	0.0	0.0	0.0
0501 - 0600	0.0	0.0	0.0	0.0	0.0
0601 - 0700	0.0	0.0	0.0	0.0	0.0
0701 - 0800	0.0	0.0	0.0	0.0	0.0
0801 - 0900	0.0	0.2	0.0	0.0	0.2
0901 - 1000	0.0	0.0	0.1	0.0	0.1
1001 - 1100	0.0	0.1	0.0	0.0	0.1
1101 - 1200	0.0	0.0	0.3	0.0	0.3
1201 - 1300	0.0	0.2	0.2	0.0	0.4
1301 - 1400	0.0	0.6	0.3	0.0	0.9
1401 - 1500	0.0	0.3	0.3	0.0	0.7
1501 - 1600	0.0	0.6	0.8	0.0	1.3
1601 - 1700	0.2	1.2	0.6	0.0	2.0
1701 - 1800	0.1	1.0	1.0	0.0	2.1
1801 - 1900	0.0	0.6	0.3	0.2	1.1
1901 - 2000	0.1	0.6	0.3	0.2	1.2
2001 - 2100	0.1	0.9	0.6	0.2	1.8
2101 - 2200	0.5	1.9	1.2	0.2	3.8
2201 - 2300	1.2	2.6	1.9	0.9	6.5
2301 - 2400	2.6	1.8	1.7	0.9	6.9

TABLE 3

Frequency of time of dispersal of fog at Agartala Airport during November to February

Time of dispersal (UTC)	Frequency of days				
	Nov	Dec	Jan	Feb	Total
0001 - 0100	0.1	0.2	0.2	0.0	0.5
0101 - 0200	0.7	0.3	0.0	0.1	1.1
0201 - 0300	3.4	2.2	0.7	1.3	7.6
0301 - 0400	2.4	4.9	5.3	2.9	15.5
0401 - 0500	1.0	5.6	4.6	1.9	13.0
0501 - 0600	0.1	2.9	2.3	1.3	6.7
0601 - 0700	0.1	2.0	2.4	0.2	4.8
0701 - 0800	0.0	0.8	1.1	0.0	1.9
0801 - 0900	0.0	0.1	0.3	0.0	0.4
0901 - 1000	0.0	0.0	0.0	0.0	0.0
1001 - 1100	0.0	0.0	0.0	0.0	0.0
1101 - 1200	0.0	0.1	0.0	0.0	0.1
1201 - 1300	0.0	0.0	0.1	0.0	0.1
1301 - 1400	0.0	0.1	0.0	0.0	0.1
1401 - 1500	0.0	0.0	0.0	0.0	0.0
1501 - 1600	0.0	0.0	0.0	0.0	0.0
1601 - 1700	0.0	0.0	0.0	0.0	0.0
1701 - 1800	0.0	0.0	0.0	0.0	0.0
1801 - 1900	0.0	0.2	0.0	0.0	0.2
1901 - 2000	0.0	0.0	0.0	0.0	0.0
2001 - 2100	0.1	0.1	0.1	0.0	0.3
2101 - 2200	0.0	0.0	0.1	0.0	0.1
2201 - 2300	0.1	0.2	0.0	0.0	0.3
2301 - 2400	0.0	0.0	0.1	0.1	0.2

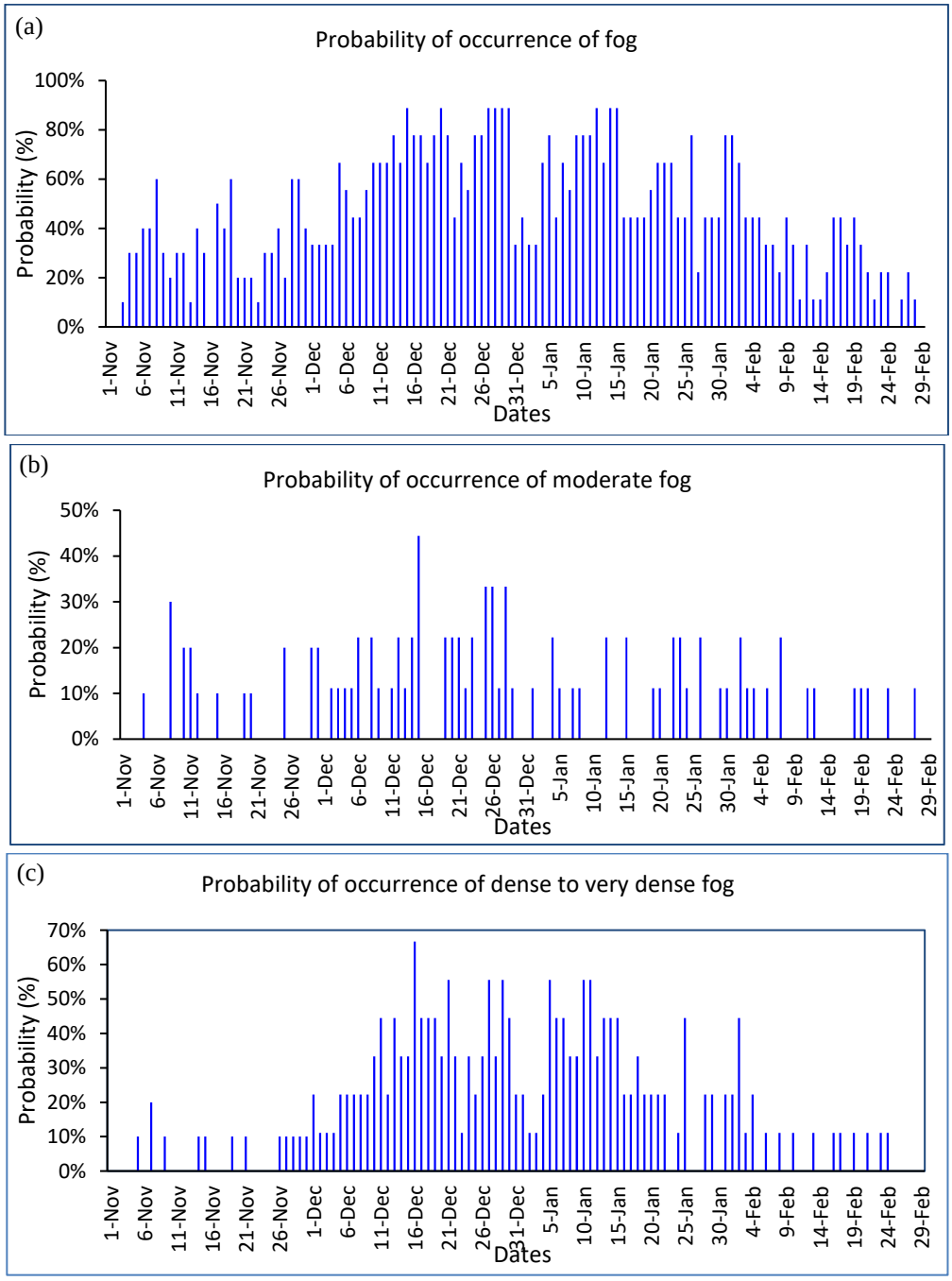
TABLE 4

Percentage of Total Fog Dispersed at Different Times (UTC) During November–February

Time of dispersal	Months				Total
	Nov	Dec	Jan	Feb	
By 0300 UTC	53%	14%	5%	18%	18%
By 0400 UTC	83%	39%	36%	55%	47%
By 0500 UTC	95%	67%	62%	79%	71%
By 0600 UTC	96%	81%	75%	96%	84%
By 0700 UTC	98%	92%	89%	99%	93%

fogs during December, January and February gets dispersed by 0300 UTC. This usually hampers the flight operation at Agartala Airport during the morning. hours. In November, 83% of the total fogs get dispersed by 0400 UTC, however during December, January and February only 39%, 36% and 55% of the dispersal of total fogs take place by this time. In 19% and 25% of the cases, non-dispersal of fog has been observed till 0600 UTC during December and January. There are also cases of dispersal during afternoon/evening hours in December and January. According to Basu, 1957, when the area is affected by western disturbance, North East India experiences fog following the western disturbance.

Table 5 shows the frequency of duration of fog at Agartala Airport and its graphical representation in Fig 6. It can be observed that most of the fogs during November and February lasts for less than one hour, whereas during December and January, the highest frequency of duration is found to be 1-2 hours. The duration of fog is comparatively more in December and January. In these two months, there are more than 20% of the cases with duration of fog $\geq$ 8 hours. There are also cases for more than 12 hours of fog, with 6% and 11% of the cases in December and January respectively. The longest duration



Figs. 3(a-c). Day wise probability of occurrence of (a) fog (b) moderate fog (c) dense to very dense fog ; at Agartala Airport

of fog is observed to be of 21 hours on 9th and 10th December 2012.

Frequency of different ranges of lowest visibility due to fog - The frequencies of different ranges of lowest visibility associated with the fog in the four months have been shown in Table 6 and Fig 7. The time of occurrence of the lowest visibility has also been shown in Table 7 and Fig 8. The lowest visibility associated with fog gives an idea of the intensity of the fog. It is seen that, in November and February the maximum frequency of fog has been observed with visibility in the range 751-800 metres, whereas in December and January, it is observed December (third peak in January) has been seen with with visibility 0-50 metres. The second peak in visibility 51-100 metres, which clearly indicates the high

TABLE 5

Frequency of duration of fog at Agartala Airport during November to February

Duration of fog (hours)	Frequency of days				
	Nov	Dec	Jan	Feb	Total
00-01	2.6	3.1	1.7	2.4	9.8
01-02	2.5	3.3	3.8	1.7	11.3
02-03	1.2	1.9	2.7	1.3	7.1
03-04	0.8	1.8	1.3	0.7	4.6
04-05	0.5	1.6	1.1	0.9	4.1
05-06	0.1	1.1	1.4	0.4	3.1
06-07	0.0	1.3	0.9	0.1	2.3
07-08	0.1	1.1	0.4	0.1	1.8
08-09	0.1	0.4	0.4	0.0	1.0
09-10	0.0	1.0	0.4	0.2	1.7
10-11	0.1	0.9	0.3	0.0	1.3
11-12	0.0	0.4	0.8	0.0	1.2
12-13	0.0	0.7	0.2	0.0	0.9
13-14	0.0	0.2	0.6	0.0	0.8
14-15	0.0	0.3	0.7	0.0	1.0
15-16	0.0	0.2	0.4	0.0	0.7
16-17	0.0	0.1	0.0	0.0	0.1
17-18	0.0	0.0	0.1	0.0	0.1
18-19	0.0	0.1	0.1	0.0	0.2
19-20	0.0	0.0	0.0	0.0	0.0
20-21	0.0	0.0	0.0	0.0	0.0
21-22	0.0	0.1	0.0	0.0	0.1
22-23	0.0	0.0	0.0	0.0	0.0
23-24	0.0	0.0	0.0	0.0	0.0

TABLE 6

Frequency of different ranges of lowest visibility due to fog at Agartala Airport during November to February

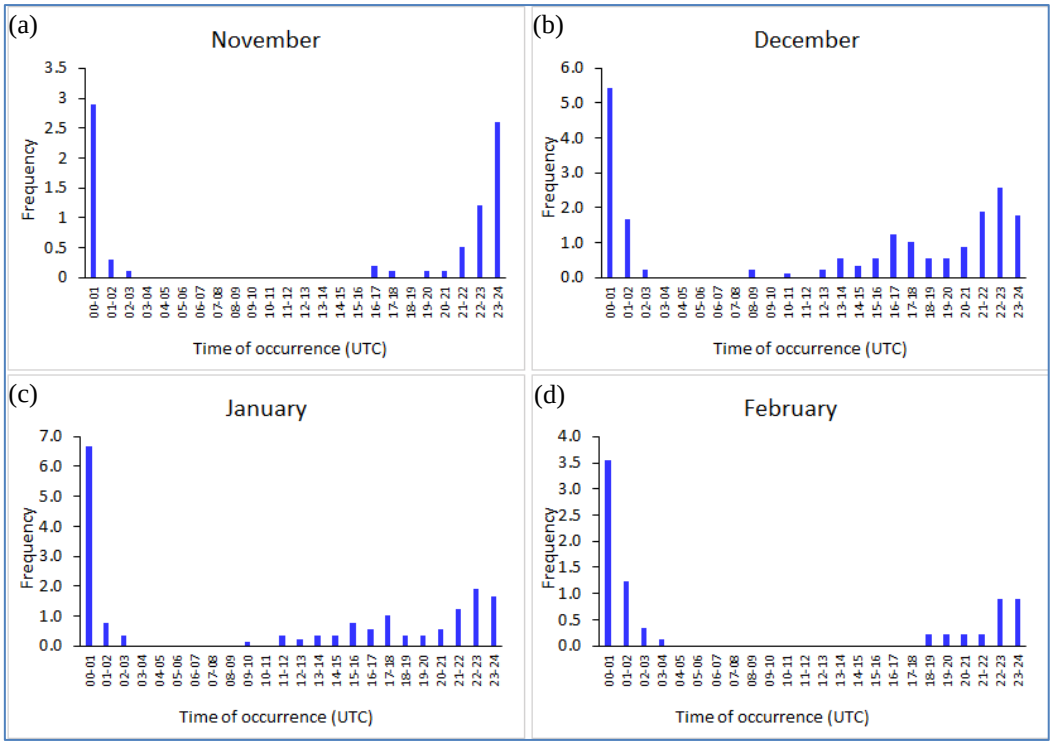
Visibility range (in metres)	Frequency of days				
	Nov	Dec	Jan	Feb	Total
0-50	0.2	5.3	5.6	0.9	12.0
51-100	0.8	3.3	2.2	0.8	7.1
101-150	0.3	1.2	0.6	0.4	2.5
151-200	1.0	1.1	1.2	0.4	3.8
201-250	0.0	0.0	0.0	0.0	0.0
251-300	0.3	1.4	0.6	0.4	2.7
301-350	0.4	0.8	0.2	0.1	1.5
351-400	0.1	0.9	0.4	0.4	1.9
401-450	0.0	0.0	0.0	0.1	0.1
451-500	0.8	0.7	0.9	0.4	2.8
501-550	0.0	0.0	0.0	0.0	0.0
551-600	1.3	1.1	2.7	1.2	6.3
601-650	0.0	0.1	0.0	0.0	0.1
651-700	0.1	0.2	1.3	0.1	1.8
701-750	0.0	0.0	0.0	0.0	0.0
751-800	3.6	2.9	2.2	2.6	11.3
801-850	0.0	0.0	0.0	0.0	0.0
851-900	0.1	0.6	0.2	0.6	1.4

TABLE 7

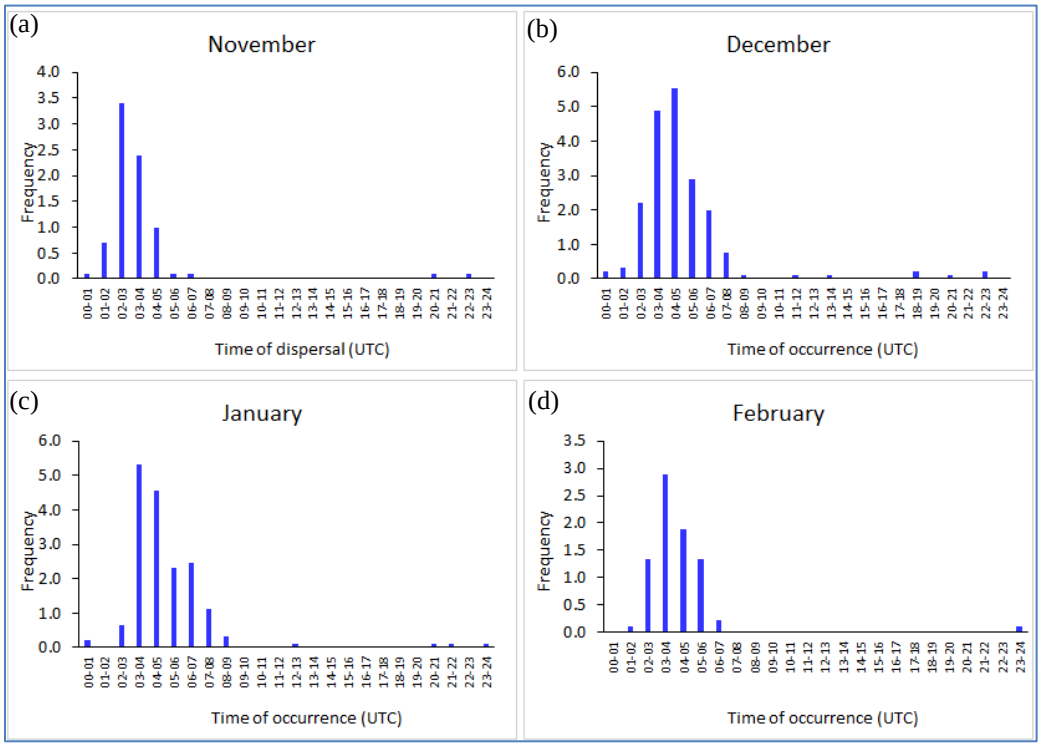
Frequency of time of occurrence of lowest visibility during foggy days at Agartala Airport during November to February

Time of occurrence of lowest visibility (UTC)	Frequency of days				
	Nov	Dec	Jan	Feb	Total
0001 - 0100	4.4	8.1	7.9	3.8	24.2
0101 - 0200	0.2	3.2	3.4	2.1	9.0
0201 - 0300	0.2	0.4	0.2	0.6	1.4
0301 - 0400	0.0	0.1	0.1	0.1	0.3
0401 - 0500	0.0	0.0	0.0	0.0	0.0
0501 - 0600	0.0	0.0	0.0	0.0	0.0
0601 - 0700	0.0	0.0	0.0	0.0	0.0
0701 - 0800	0.0	0.0	0.0	0.0	0.0
0801 - 0900	0.0	0.1	0.0	0.0	0.1
0901 - 1000	0.0	0.0	0.0	0.0	0.0
1001 - 1100	0.0	0.0	0.0	0.0	0.0
1101 - 1200	0.0	0.0	0.0	0.0	0.0
1201 - 1300	0.0	0.0	0.0	0.0	0.0
1301 - 1400	0.0	0.0	0.0	0.0	0.0
1401 - 1500	0.0	0.0	0.0	0.0	0.0
1501 - 1600	0.0	0.0	0.0	0.0	0.0
1601 - 1700	0.1	0.1	0.0	0.0	0.2
1701 - 1800	0.0	0.4	0.1	0.0	0.6
1801 - 1900	0.0	0.0	0.0	0.0	0.0
1901 - 2000	0.1	0.1	0.1	0.0	0.3
2001 - 2100	0.1	0.1	0.2	0.1	0.5
2101 - 2200	0.0	0.3	0.1	0.0	0.4
2201 - 2300	1.3	1.7	2.4	1.1	6.5
2301 - 2400	2.6	4.9	3.4	0.8	11.7

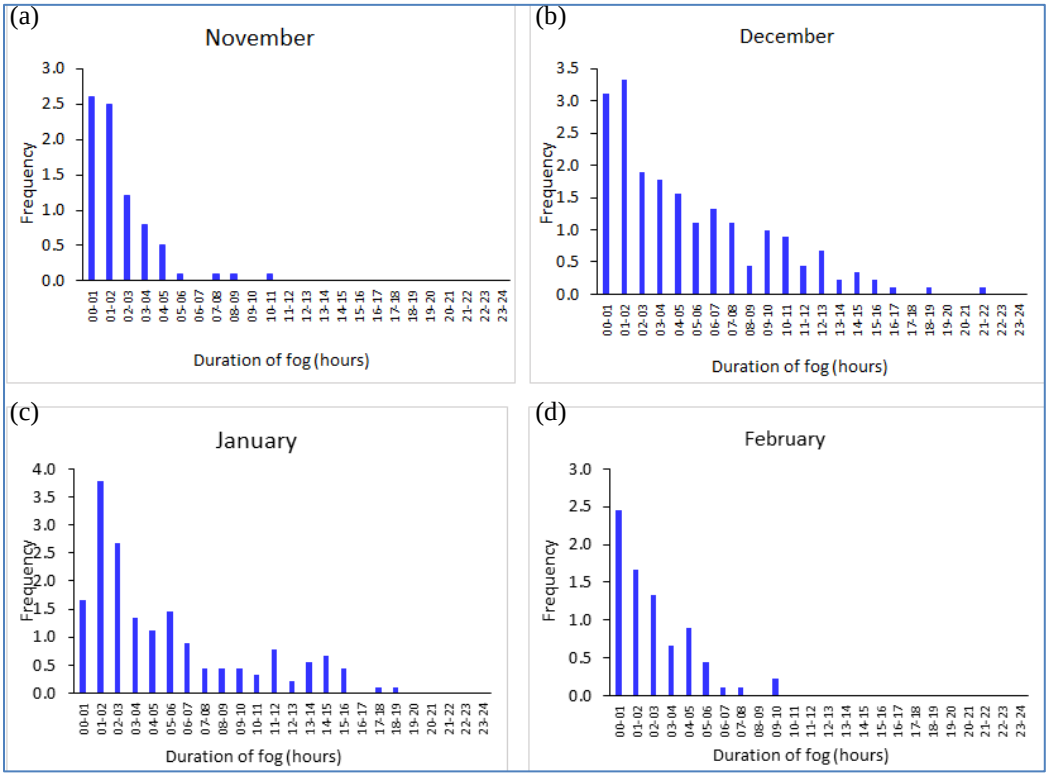
frequency of dense to very dense fog during these two months. The lowest visibility associated with the fog occurs during 0001-0100 UTC followed by 2301-2400 UTC. During November, in more than 75% of the cases, the highestintensity of fog occurs between 2301 – 0100 UTC, indicating early start of the dispersal process during this month. Whereas, the frequencies of reaching the lowest visibility (highest intensity of fog) is more than 2 days between 0101 – 0200 UTC in the other three months. However, in more than 75% of the cases the lowest visibility reaches between 2301 – 0200 UTC.



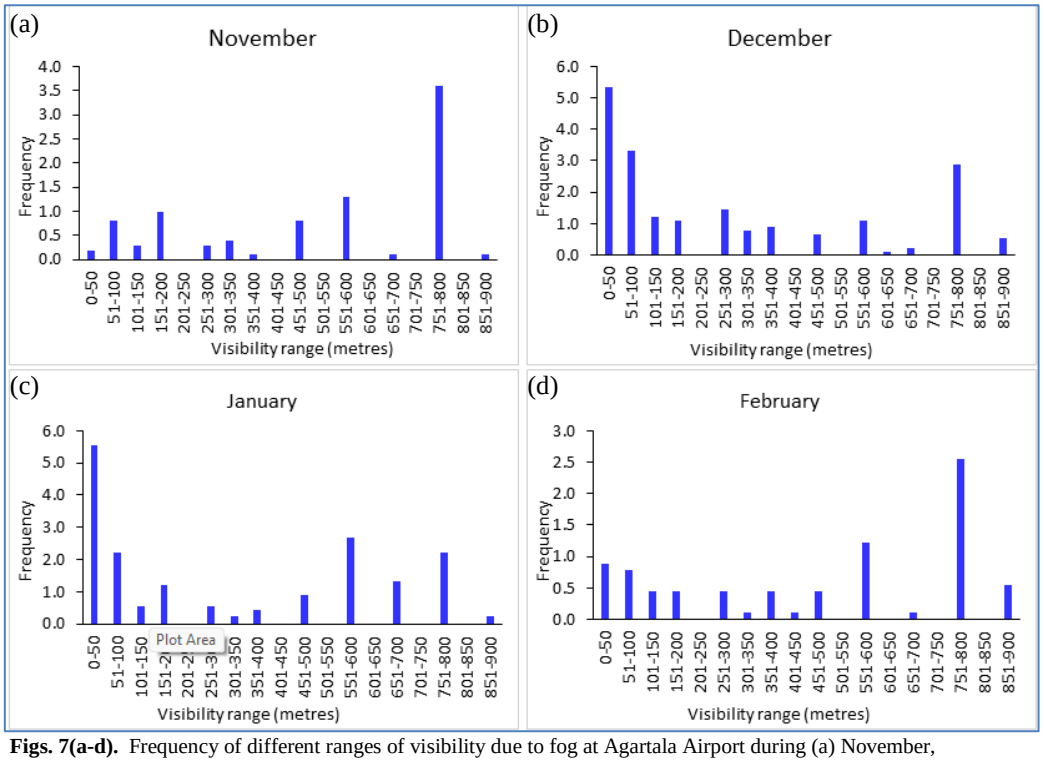
Figs. 4(a-d). Frequency of time of onset of fog at Agartala Airport during (a) November, (b) December, (c) January and (d) February



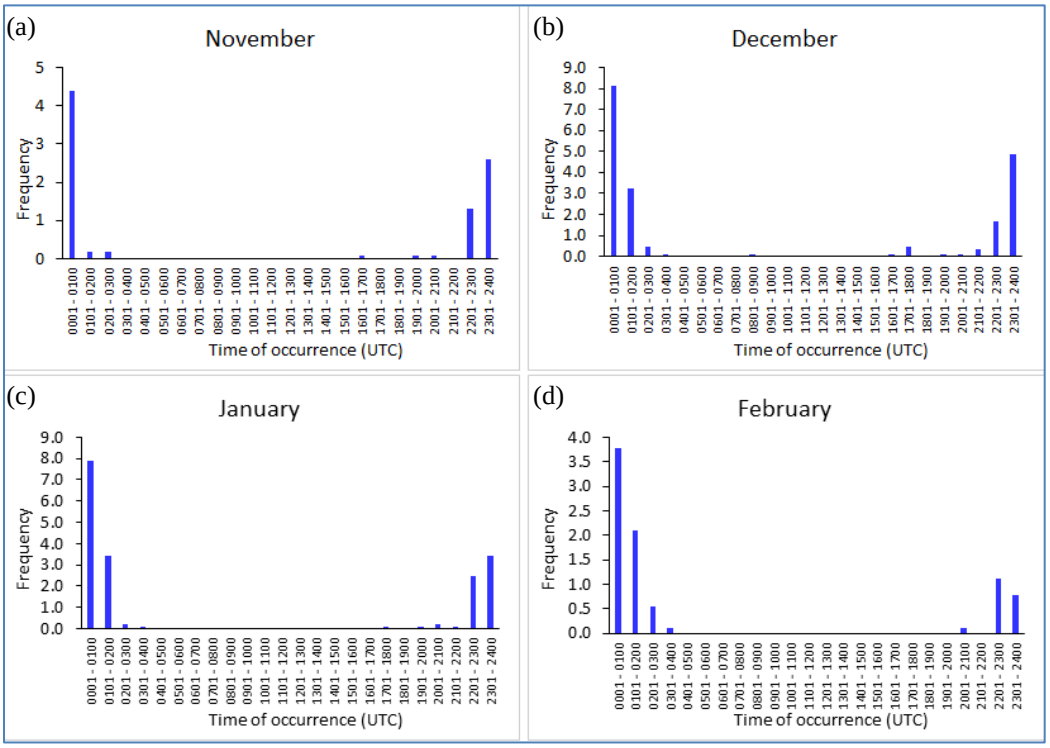
Figs. 5(a-d). Frequency of time of dispersal of fog at Agartala Airport during (a) November, (b) December, (c) January and (d) February



Figs. 6(a-d). Frequency of duration of fog at Agartala Airport during (a) November, (b) December, (c) January and (d) February



Figs. 7(a-d). Frequency of different ranges of visibility due to fog at Agartala Airport during (a) November, (b) December, (c) January and (d) February



Figs. 8(a-d). Frequency of time of occurrence of lowest visibility during foggy days at Agartala Airport during November to February

4. ***Conclusions*** - The characteristics of fog at Agartala airport during November to February has been studied in this paper. The following conclusions can be drawn from this study.

The frequency of fog is highest in December (19.7 days), followed by January (18.2 days), November (9.0 days) and February (8.6 days). The frequency of dense fog is also highest in December (9.9 days), followed by January (8.4 days), February (2.1 days) and November (1.3 days). It is noticed that the day wise probability of occurrence increases drastically in December continues till mid-January. The probability of dense fog also increases in December and January, with almost half of the days during 10th December – 15th January has ≥ 30% probability of dense fog. The onset of fog mostly takes place during 0001-0100 UTC. In more than 50% of the cases, onset takes place between 2201 UTC and 0200 UTC. There are cases of onset of fog has also been observed during the afternoon hours in December and January.

It is observed that the dispersal of fog takes place early in November, as compared to the other months. The late dispersal of fog during January has also been observed, followed by December. In 19% and 25% of the cases, non-dispersal of fog has been observed till 0600UTC during December and January. There are also cases of dispersal during afternoon/evening hours in these two months.

Also most of the fogs during November and February last for less than one hour, whereas during December and January, the highest frequency of duration is found to be 1-2 hours. There are 6% and 11% of cases of more than 12 hours of fog in December and January respectively. In November and February, the maximum frequency of fog has been observed with lowest visibility in the range 751-800 metres, whereas in December and January, it is observed in the range 0-50 metres. The lowest visibility occurs during 0001-0100 UTC on most occasions followed by 2301-2400 UTC.

Acknowledgements

The authors are thankful to the Director General of Meteorology, India Meteorological Department; Head, Regional Meteorological Centre, Guwahati and to the Head, Climate Research & Services, Pune for their constant motivation and guidance to the carry out t he work. The authors are also thankful to all the staffs of Meteorological Centre, Agartala whose hard work for continuous observations made the data available for this study.

Author's Contributions

Ravi Ranjan Kumar and Kader Ali Sarkar: The data analysis and the initial drafting of the manuscript, Interpreting the results and organizing the presentation of findings.
Digvijay Singh Dhakre and Debasis Bhattacharya: Refinement of the study and methodology, In-depth interpretation of analytical outputs and critical revisions of the manuscript.

Disclaimer: The contents and views expressed in this research paper are the views of the authors and do not necessarily reflect the views of the organizations they belong to.

References

Basu S (1957) Fog Over Upper Assam, MAUSAM, vol. 8, no. 1, pp. 67–71, Jan. 1957, doi:. https://doi.org/10.54302/mausam.v8i1.4994

Jenamani R (2012) Development of intensity-based fog climatological information system (daily and hourly) at IGI airport, New Delhi for use in fog forecasting and aviation. *Mausam*, **63**, 1, 89 – 112.https://doi.org/10.54302/mausam.v63i1.1459

India Meteorological Department (2015) Climatological Tables of Observatories in India (1981-2010). 35-156.

India Meteorological Department (2021) Standard Operation Procedure – Weather Forecasting and Warning Services. 12-45.

Laskar SI, Roy Bhowmik SK, Sinha V (2013) Some statistical characteristics of occurrence of fog over Patna airport. Mausam, 64, 2, 345-350.https://doi.org/10.54302/mausam.v64i2.690

Mishra S, Mohapatra M (2004) Some climatological characteristics of fog over Bhubaneswar airport. Mausam, 55, 4, 695-698.https://doi.org/10.54302/mausam.v55i4.1404

Mohapatra M, Thulasi Das A (1998) Analysis and forecasting of fog over Bangalore airport. Mausam, 49, 135-142.

Ram S, Mohapatra M (2008) Some characteristics of fog over Guwahati airport. Mausam, 59, 2, 159-166. https://doi.org/10.54302/mausam.v49i1.3607

Sawaisarje GK, Khare P, Shirke CY, Deepkumar S, Narkhede NM (2014) Study of winter fog over Indian subcontinent: Climatological perspectives. Mausam, 65, 1, 19 – 28. https://doi.org/10.54302/mausam.v65i1.858

Singh J, Kant S (2006) Radiation fog over north India during winter from 1989-2004. Mausam, 57, 2, 271-290. https://doi.org/10.54302/mausam.v57i2.474

Suresh R, Janakiramayya MV, Sukumar ER (2007) An account of fog over Chennai. Mausam, 58, 4, 501-512. https://doi.org/10.54302/mausam.v58i4.1434

NAHUSH KULKARNI,
PARTHA ROY%,
SHRIKANT BHAGWAT,
RANJAN PHUKAN,
RESHMA PATHAN
RAKESH KUMAR#,
ASHISH KUMAR ## and
MANISH RANALKAR$

India Meteorological Department, Ministry of Earth Sciences, Goa , India – 403001
%India Meteorological Department, Ministry of Earth Sciences, Agartala , India – 799009
India Meteorological Department, Ministry of Earth Sciences, Pune, India – 411005
#India Meteorological Department, Ministry of Earth Sciences, Patiala India -793002
##India Meteorological Department, Ministry of Earth Sciences, Patna, India -800002
$India Meteorological Department, Ministry of Earth Sciences, Lucknow, India – 226009

(*Received 5 January 2024, Accepted 25 February 2025*)

***Corresponding author's email:** kulkarni.nahush@gmail.com