

Letters to the Editor

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A STUDY OF URBAN HEAT ISLAND OVER BHOPAL

Urban temperature is of interest in air pollution studies. A characteristic feature of cities is the urban heat island which is found even in small cities.

The complicated horizontal structure of the urban heat island have been studied for Poona and Bombay by Daniel (1973), Philip (1973), Mukherjee (1976) and studies in respect of other cities are in progress by various workers.

In this note heat island based on mobile survey during winter months over Bhopal which is the capital of Madhya Pradesh is discussed.

2. Bhopal is situated at Lat. $23^{\circ}17'N$ and Long. $77^{\circ}21'E$. It is surrounded by small hills and lakes. It is 550 to 600 metres above mean sea level. The city is expanding and developing. Hence this study is of importance for planning of industries and the city.

3. It is well known that the heat island effect is most significantly noticed near the minimum temperature time. Hence, temperature observations were taken at fixed hours, viz., 0630 and 0730 IST at places (1) Bairagarh, (2) Arera Colony, (3) Bharat Heavy Electricals Complex, (4) Shastri Nagar, (5) Bhadbhada, (6) Bogdapul, (7) Vallabh Bhavan (Secretariat), (8) Moti Masjid, (9) Bharat Talkies & (10) Rang Mahal (T.T. Nagar). These locations were chosen to take into account altitude, exposure, site peculiarities and population density of Bhopal so that the pattern can bring out the effects of various factors on heat island.

4. Observers of EPCO and of Meteorological Centre were stationed with thermometers and Assman psychrometers. The observations were taken on 19 and 26 February 1984 at 0630 and 0730 IST.

It was observed that on 19 February at 0630 and 0730 IST, the core of heat island was over heart of the city around Bharat Talkies and Bogdapul respectively. The

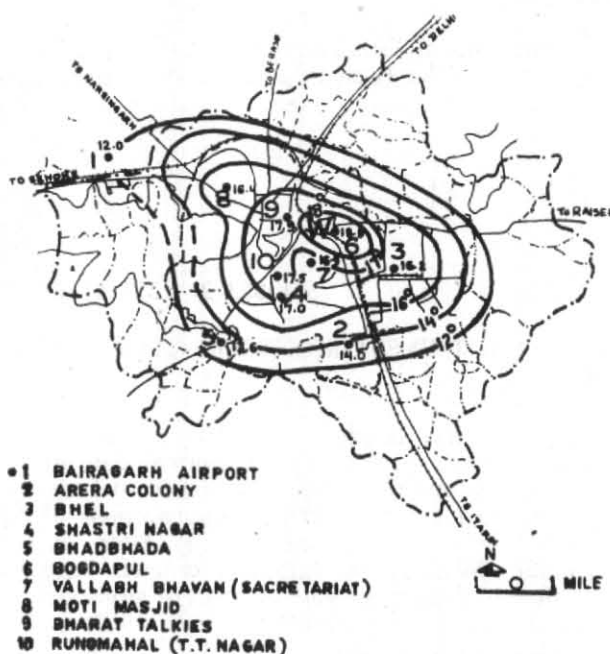


Fig. 1. Temperature distribution at 0730 IST of 19 February 1984 over Bhopal

coldest area was seen over Bhadbhada and Bairagarh respectively which is situated at the outer boundary of the city. The intensity of heat island is observed to be of the order of $6.5^{\circ}C$. The warm tongue was extending towards populated areas. The temperature distribution on 19 February at 0730 IST is presented in Fig.1.

On 26 February the pattern, more or less, resembled with that of 19 February. However, the intensity of heat island decreased from $6.5^{\circ}C$ at 0630 IST to $3.7^{\circ}C$ at 0730 IST.

The observations suggest that spatial variation of temperature away from central city becomes less pronounced and the structure of the heat island changes in space and time.

On 19 and 26 February the temperature from 0630 to 0730 IST showed a fall at Bharat Talkies. The fall of the order of 3° C on 26th is significant which suggests that radiational cooling was more pronounced on colder days in city area as compared to surroundings.

The rise in temperature of the order of 2.5° to 3.0°C observed on 26th at Secretariate, BHEL & Bogdapul during 0630 to 0730 IST can be attributed to radiational heating and human activity.

This study brings out that (1) over Bhopal during winter months maximum contrast of the order of 6.5°C is observed, (2) The heat island is found to be over thickly populated and large number of cement concrete buildings. The coldest area is found to be adjoining to well ventilated and open areas and the warm tongue is found to extend towards populated areas & (3) Radiational cooling is more pronounced on colder days as compared to warmer days.

5. We thank staff of EPCO and Meteorological Centre, Bhopal who willingly participated in observational work.

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