Urbanization and Urban Climate: An Overview of Synoptic Transformation of Spatial Environment.

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Abstract: **Urbanization is a spatial concomitant phenomenon involving the process of population concentration, structural transformation and socio- psychological change to adopt urbanism as a way of life. Urbanization which was seen as the hallmark of economic development and civilization brought many of its ills. The urban systems have played an important role in transforming the society with setting of major social, economic and political change. The tremendous pace of growth of urban system overburden on infrastructure, resources with concomitant effect on living condition and their climatic attributes too. The present article deals with the impact of urbanization on human environment in term of climate changes. As the structural changes destroy existing microclimate and create new ones of complexity depends on the design, density and function of the buildings of urban system. This great internal variation of urban climatic influences by modification of atmospheric composition, heat budget or surface characteristics. The present article also emphasize on urban climatic conditions dominated by geometry, composition of builtup surface and by human urban activates which represents the domain of micrometrology or boundary layer climates of urban system so far (Meiss, M. 1979).**

Keywords: **Urbanization, Urban climate, Heat budget, concomitant**

I. INTRODUCTION

Meteorological phenomenon encompasses a wide range of space and time scale. The boundary layer climate is typically 1 Km thick, but varies between 20 meters and several km in different location and at different times in the same location. The boundary layer is especially prone to nocturnal cooling and diurnal heating and within it the wind velocity decreases from the free velocity aloft to lower(frictional values near the surface).The urban surfaces have cause condition relationship regarding to their climatic conditions. The world population is forecast to increase to 8.2 billion in 2025 with the proportion of urban dwellers rising from 40-60 percent during same period. The constructions of house, road or infrastructure destroy existing microclimate and create new ones of great complexity that depends on the design, density and function of buildings.

II. MATERIAL AND METHODS

The effect of urban structure on urban environment studied under three categories.

1. *Modification of Atmospheric composition:* Urban pollution has effects that involve change in thermal properties of the atmosphere, cutting down the passage of sunlight and providing condensation nuclei. The urban atmosphere of mostly of cities comprises a complex mixture of gases and particulates including ozone, sulphur di oxide, nitrogen di oxide, mineral dust, carbon and complex hydrocarbon can be elaborated under following (a) To find out the concentration of aerosol, suspended particulate matter in ug /m3.(b)To find out the concentration of gases S0x, N0x,, C0, HC in Ppm.The polluted atmosphere commonly assume well marked physical configuration around urban areas, which are very dependent upon environmental lapse rate, particularly the presence of temperature inversion and on wind speed. A pollution dome forms as a result of the collection of pollution below an inversion forming urban boundary layer. (Terjung, W.H. and O. Rourke, P.A 1980).
2. *Modification of the Heat budget:* The thermal characteristics of urban areas are in marked to those of the surrounding countryside, and the generally higher urban temperatures are the result of the interaction of the following factors: (a) Change in the radiation balance due to atmospheric composition, (b) Change in the radiation balance due to the albedo and thermal capacity of urban surface material and canyon geometry(c)The production of heat by buildings, traffic and industry(d) The reduction of heat diffusion due to changes in airflow patterns as the result of urban roughness(e) The reduction in thermal energy required for evaporation and evapotranspiration due to the surface character, rapid drainage and generally lower wind speeds of urban areas (Bach,W.1979).
3. *Modification of surface characteristics*
   a. Airflow on average, urban wind speeds are lower than those recorded in the surrounding open country owing

to the sheltering effect of building and central average wind speed are usually at least 5 percent less than those of the suburbs. Urban structure have considerable effects on the movement of air both by producing turbulence as a result of their roughening the surface and by the channeling effects of the urban canyons. Structures play a major role in diffusion of pollution within urban canopy by formation of high velocity streams and eddies/vortices in dry dusty urban atmosphere

b. In urban areas absence of water bodies and extensive vegetational cover eliminates evapotranspiration, and this an important source of augmenting urban heat(Adebayo,Y.R 1991).

III. RESULTS

The climate change in urban areas as the result of long term result of possible anthropogenic activities can predicted by model strategies like

a. Black box modeling-involves the statistical extrapolation of mean atmospheric attributes from historical time series with sinusoidal changes on graph yearly basis.

b. Grey box modeling- the prediction empirical based with reliance on past based datas.

c. White box modeling-based on mathematic simulation with help of law of physics coupled with general circulation model including thermodynamics, conservation of momentum so on.

d. IPCC models –The prediction based on concentration of green house gases with pace economic growth, loss of vegetation cover, and CO2 emission under category of business as usual.

IV. DISCUSSION

Urban climates are dominated by geometry and composition of built-up surface and by effects of human urban activities. The composition of the urban atmosphere is modified by the addition of aerosol, producing smoke pollution and fogs by industrial gases and by chain chemical reaction initiated by automobile exhaust fumes, which cause smog and inhibits both incoming and outgoing radiation. Pollution domes and plumes are produced around cities under appropriate conditions of vertical temperature structure and wind velocity. The urban heat budget is dominated by H and G and as much as 70-80 percent of incoming radiation may become sensible heat which is variably distributed between the complex urban built environments (Changnon, S.A.1979).The Topography of the urban infrastructure effects on the climate by frictional movement of frontal system. The average state of the climate system is controlled by a combination of forcing external to system like atmospheric composition of the urban areas by fluctuation of green house gases in atmosphere, cloud cover, aerosol and surface albedo. These anthropogenic changes works as an agent of feedback mechanism, which can be either positive (self enhancing) or negative (self regulating) or damping. The change in atmospheric composition may modify the atmospheric heat budget in urban areas (Oke,T.R.1980).The forcing effects on urban climatic condition exerted by atmospheric pollution by SPM, due to human activities as to produce surface heating or cooling. In this studies we have emphasize on four categories of climate variable as atmospheric composition changes, surface properties, wind regimes, and hydrological components associated with urbanization and explosive growth of population. As far as concern of troposphere aerosol in climate there are four key aerosols like black carbon, water soluble inorganic species (SOx, NOx, NH4), condensed organic species and mineral dust. The relief and surface configuration have marked effects on weather condition and is treated as special climatic type.The disturbance in boundary layer near earth surface can be classified into altitudnal and horizontal scales(i.e synoptic and mesoscale), thermal, topographic and surface friction of heat islands (Roger, G. Bary and Richard J.Chorley 1998).

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