

The Conceptual Framework on Formation of Urban Heat Island in Tehran Metropolitan, Iran: A Focus on Urbanization Factor

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Abstract: - In an urban area, one of the great problems is urban heat island effect, which is due to many factors such as urbanization and climatic factors, resulting from the production and accumulation of heat in the urban mass. The main characteristics of UHI effect are the raised temperatures in the city centre, leading to excessive energy use for cooling and putting urban population at great morbidity and mortality risks. Therefore, it becomes increasingly important to study that how could various factors form UHI over the city in order to reduce environmental challenges. This paper, therefore, is focused on urbanization and climatic factors to understand the influence way of these factors on formation of UHI. The percentage of UHI formation is high when great interaction exists. This paper explores literally the conceptual framework of interaction between urbanization and climatic factors on formation of UHI with the case study of city of Tehran. The urbanization factors that affect Tehran are discussed in relation to location of the city, the size of the city and population, density of built-up area, urban geometry, thermal property of fabric, surface waterproofing, anthropogenic heat, air pollution, land use and wind speed.

Key-Words: Climatic Factors, Environmental Challenge, Tehran, Urban, Urban Heat Island, Urbanization Factors

1 Introduction

Since urban heat island is due to two factors, urbanization and climatic factors, many features of the physical structure of the city can affect the urban climate and with negative impacts lead to increase urban heat island intensity. In addition, it is not always a one way influence from urbanization toward climate. Increasing of temperature and sunlight, decreasing wind speed, humidity and precipitation can be major factors on formation of urban heat island. As a matter of fact, existing the interaction between urbanization and climatic factors may influence greatly on formation of UHI. In other words, the percentage of UHI formation is high when great interaction exists.

Therefore, according to the above concept, it becomes increasingly important to investigate effective factors on formation of heat island and the interaction between these factors in order to recognize the formation way of UHI (Shahmohamadi et al, 2010).

Thus, this paper studies the major factors which affect urban heat island formation, such as urbanization and climatic factors. Then, it explores a conceptual framework in order to show the interaction between these two factors and how they can influence on formation of urban heat island on different layers of city. However, this paper only focuses on urban canopy layer heat island which is from urban design perspective

2 Recognition of All Dimension of UHI as Environmental Challengers

The majority of cities are sources of heat, pollution and the thermal structure of the atmosphere above them is affected by the so-called "heat island" effect. A heat island is best visualized as a dome of stagnant warm air over the heavily built-up areas of cities (Emmanuel 2005). The heat that is absorbed during the day by the buildings, roads and other constructions in an urban area is re-emitted after sunset,