Geophysical Research Abstracts
Vol. 12, EGU2010-486, 2010
EGU General Assembly 2010

The urban heat island of a tropical coastal city: the case of Muscat, Oman

yassine charabi
(yassine@squ.edu.om)Department of Geography, Sultan Qaboos University,

The urban heat island of a tropical coastal city: the case of Muscat, Oman
Yassine Charabi
Department of Geography, Sultan Qaboos University,
Po. Box 42, PC. 123 Al-koudh, Muscat , Oman
Yassine@squ.edu.om Tel: 96824142003, Fax 96824141851
Muscat, the capital of the Sultanate of Oman (23° 25´N and 57°00 E), it extended along a coastline that runs around 200 km along the Gulf of Oman. By virtue of its position astride the Tropic of Cancer, Muscat city is located in an arid environment with scanty rainfall, and a dry, hot climate with high evaporation rate. The study area is exposed regularly to sea breeze circulation during day time, while very weak land breeze turning to calm conditions at night. The city is situated in complex and varying topography; the Mountains and hills of the eastern Hajar chain border the city from the south and west and, sometimes, they join the sea in the form of rough slopes and coarse cliffs particularly alongside the eastern coastal fringe.

Muscat city witnessed a spectacular socioeconomic development since 1970, stimulated by oil exploration and production. The primacy given to the capital triggered an unprecedented demographic rush. The new developments led to the growth of population size from 56 to 236 thousand in one decade (1970-1980) with an enormous annual growth rate of 12.3 %. This sustained growth raised the population of Muscat to more than 549 thousand in 1993 to 796 thousand in 2007 constituting, thus, 27 % of the total population in Oman.

Most of Muscat built-up area is characterized by a high sky-view factor, even in the city centre, except for the CDB area of Riwi, where some of the buildings are over ten stories high. The old city of Muscat and Mutrah is extremely compact with very low sky-view factor. The buildings are two to three stories high. The streets are narrow and cut deep canyons through the old city. The street net work is irregular which increases the mutual shading by buildings.

The specific attributes of Muscat, has motivated the elaboration of a multidisciplinary research in sultan Qaboos University (Sultanate of Oman), about the urban climate and air pollution in Muscat city: Multi-scale approach. This paper presents the results of the preliminary research. The [U+F044]T(u-r) from the mobile measurements show that in the early morning (7 hours after the sunset), the average urban heat island intensity over the year is 3.7°C, which is 0.8°C stronger than the average urban heat intensity calculated from the fixed meteorological stations. The warmest sites of measurements are usually encountered in the canyon streets of the old districts of Muscat. The range between those warmest sites and the coldest one was 5.3°C.