1. INTRODUCTION

The presence of vegetated spaces in urban areas can affect the thermal field in adjacent streets and even extend with thermal changes at the urban scale. Due to a selective behavior in different wavelengths, solar radiation can be absorbed or reflected by the vegetation, affecting its microclimate. The data presented in Table 1 is based on calculations made by the Brazilian Corporation for the Development of Science and Technology (CNPq), which correlates the temperature of urban surfaces and vegetation with the number of trees.

![Fig 1 - Fisheye image with sun path for (a) Sete de Setembro and (b) Linha Verde](image)

For the total day input data for ENVI-met were average wind speed/direction and air humidity as given by the typical summer day. Temperature fluctuations. Average air temperature in summer is approximately 20°C, though average air temperature in winter is approximately 12°C. The climate of Curitiba (25.5ºS, 49ºW, 910 a.m.s.l.) is located in a tropical climate zone in a relatively high-altitude region of Brazil (Cfb/Köppen). It often experiences unstable meteorological conditions with large daily and annual air temperature fluctuations. Average annual precipitation is 1,845 mm.

![Table 2 – Perimeter and area of analysis at Sete de Setembro](image)

![Table 3 – Perimeter and area of analysis at Linha Verde](image)

![Fig 4 – Selected regions: (a) Sete de Setembro and (b) Linha Verde](image)

It should be stressed that average ambient temperatures are given for the region as a whole, and not for particular points. For each square in the maps, changes in vegetated fraction and building density were assessed and simulated. Changes in greenery refer to the horizontal 2D projection of trees with dense canopy in each grid section, which was added to the modeled perimeter. For this, the coordinates were drawn for other areas and also for other climatic conditions in future studies.

2. METHOD

![Table 4 – Results for air temperature changes as a function of vegetated fraction](image)

The Brazilian funding agency CAPES.

3. PROPRIETION OF AN INDEX

The index was developed so that the thermal effect from vegetated areas could be correlated to ambient temperature changes. For a given perimeter, the vegetated fraction over a given built-up area is related to changes in ambient temperature. The index is based on calculations made by the Brazilian Corporation for the Development of Science and Technology (CNPq), which correlates the temperature of urban surfaces and vegetation with the number of trees.