IMPACT OF HEIGHT/WIDTH PROPORTIONS ON THE THERMAL COMFORT OF COURTYARD TYPOLOGY FOR SPANISH CLIMATE ZONES

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1. Introduction.

Currently, international organizations such as UN admonish countries to adopt measures facing climate change effects. In the Paris Agreement (Nations, 2015) on climate change, global warming was limited up to 2°C. From the last climate change summit, held in Katowice (Poland) on December 3rd, 2018, the rules for a correct implementation of the Paris Agreement for 2020 were detailed. It is in this context of collective will to reduce the climate change effects, where courtyard acquires a singular meaning, especially in warm climates as the Spanish one.

2. Materials and methods.

Thermal behavior inside the courtyards is determined by different variables (Zamani, Heidari, & Hanachi, 2018). Not all these variables, and not in all cases the same variables, determine the same degree of courtyard internal microclimate modification. Some of them stand out with respect to others due to the relevance of different aspects in the courtyard thermal regulation ability and, as a result, in the reduction of the climate change effects. Characteristic aspects such as geometry, orientation and location in a climatic environment, are the most studied so far; but there are others, such as the use of shading elements (Soflaei, Shokouhian, Abraveshdar, & Alipour, 2017) and property (Wilmers, 1990), or albedo characteristics, which are also fundamental and influence the temperature of buildings. The aim of the present research is to assess the influence of the thermal variables and the distinctive parameters of the courtyard thermoregulatory performance as a positive tool against climate change aftermaths.

3. Results and conclusions.

Therefore, a set of courtyards with different characteristics and geographic locations were compared to analyze their thermal behavior. The results of the monitored case studies corroborate (Figure 1) the initial hypothesis, according to which when daytime temperatures begin to rise, the outdoor-versus-courtyard thermal gap is positively emphasized, while, when night temperatures are significantly lower, this thermal gap is negative. This tempering effect is positive for the courtyard's adjacent locals passive cooling, reducing the overall energy demand of the building and favoring, at the same time, a mean courtyard temperature within the thermal comfort range.

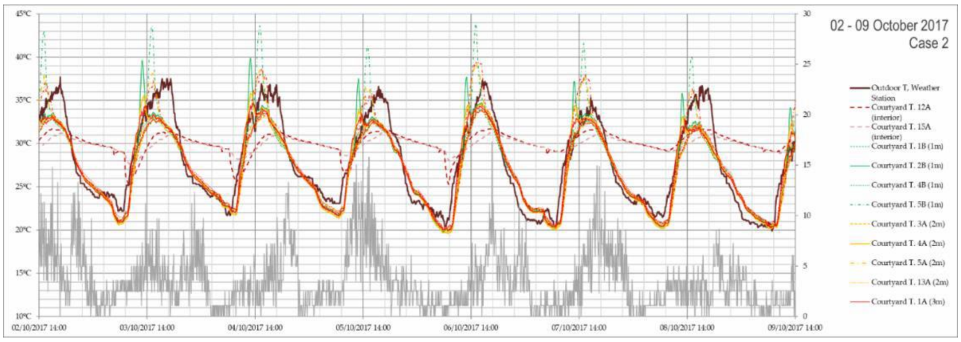

Figure 1: Example of the courtyard monitoring results graph.

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