# Chapter 3 Thermal Comfort

## Thermal comfort

Thermal comfort is the condition of mind that expresses satisfaction with the thermal environment

and is assessed by subjective evaluation (ANSI/ASHRAE Standard 55).

## **ANSI/ASHRAE Standard 55**

(Thermal Environmental Conditions for Human Occupancy) is a standard that provides minimum requirements for acceptable thermal indoor environments.

The purpose of the Thermal standard is to specify the combinations of indoor thermal environmental factors and personal factors that will produce thermal environmental conditions acceptable to a majority of the occupants within the space. The standard addresses the four primary environmental factors (temperature, thermal radiation, humidity, and air speed) and two personal factors (activity and clothing) that affect thermal comfort.

It is applicable for healthy adults at atmospheric pressures in altitudes up to (or equivalent to) 3000 m (9800 feet), and for indoor spaces designed for occupancy of at least 15 minutes.

## Comfort zone

Refers to the combinations of air temperature, mean radiant temperature (tr),

and humidity that are predicted to be an acceptable thermal environment at particular values of

air speed, metabolic rate, and clothing insulation (Icl)

## CBE Thermal Comfort Tool for ASHRAE-55

In this chapter, we use data mining technical to do binary classifier for two different situations comfort / un-comfort with input: indoor and outdoor temperatures.

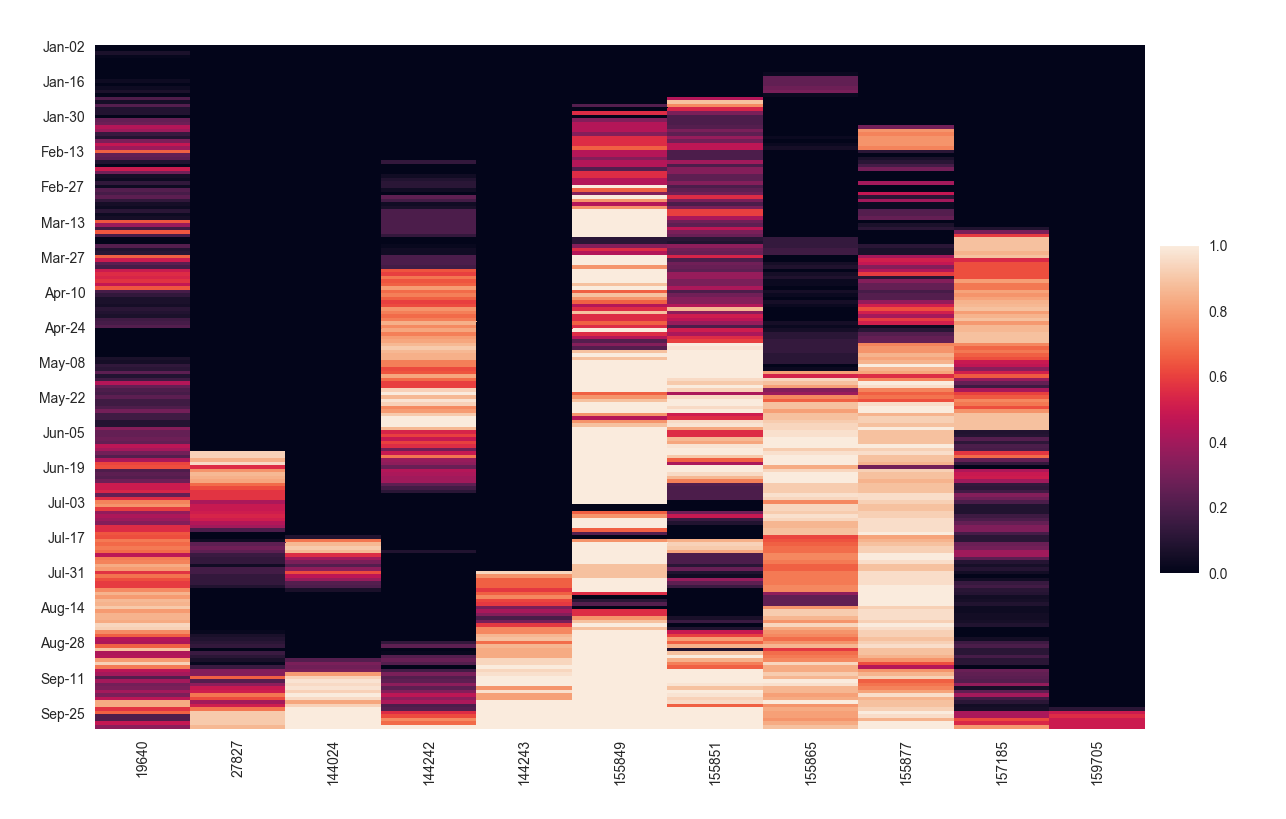


Fig. X a summary of all the sites participating in the GAIA platform is provided for a period of ten months (from Jan/2017 to Oct/2017).

One reason for those long-term uncomfortable situation is inactivity of the sites which has no indoor temperature data.

For schools during the active period:

* School 155877 and 155849 indicate better comfort compared with other school
* School 19640 is continuously switching between comfort and un-comfort

The location for school 155877 is on the south of Greece while school 19640 is on the north. The geography location could be one of the reason.

The school 155849 is close to the capital which might have better financial situation to provide considerably better comfortable environment.

Apart from the external weather conditions, there are other reasons that affect thermal comfort, e.g., such as the construction materials, the location and surround environment of the school and orientation and location of the classroom which affect the day time exposed in the sunlight and also the position of the air conditioner system inside the classrooms.

Part of those data are not included in the GAIA platform which is hard to determine which is the key effect on the comfort KPI.

Below the figures indicate different rooms’ comfort for one single site

