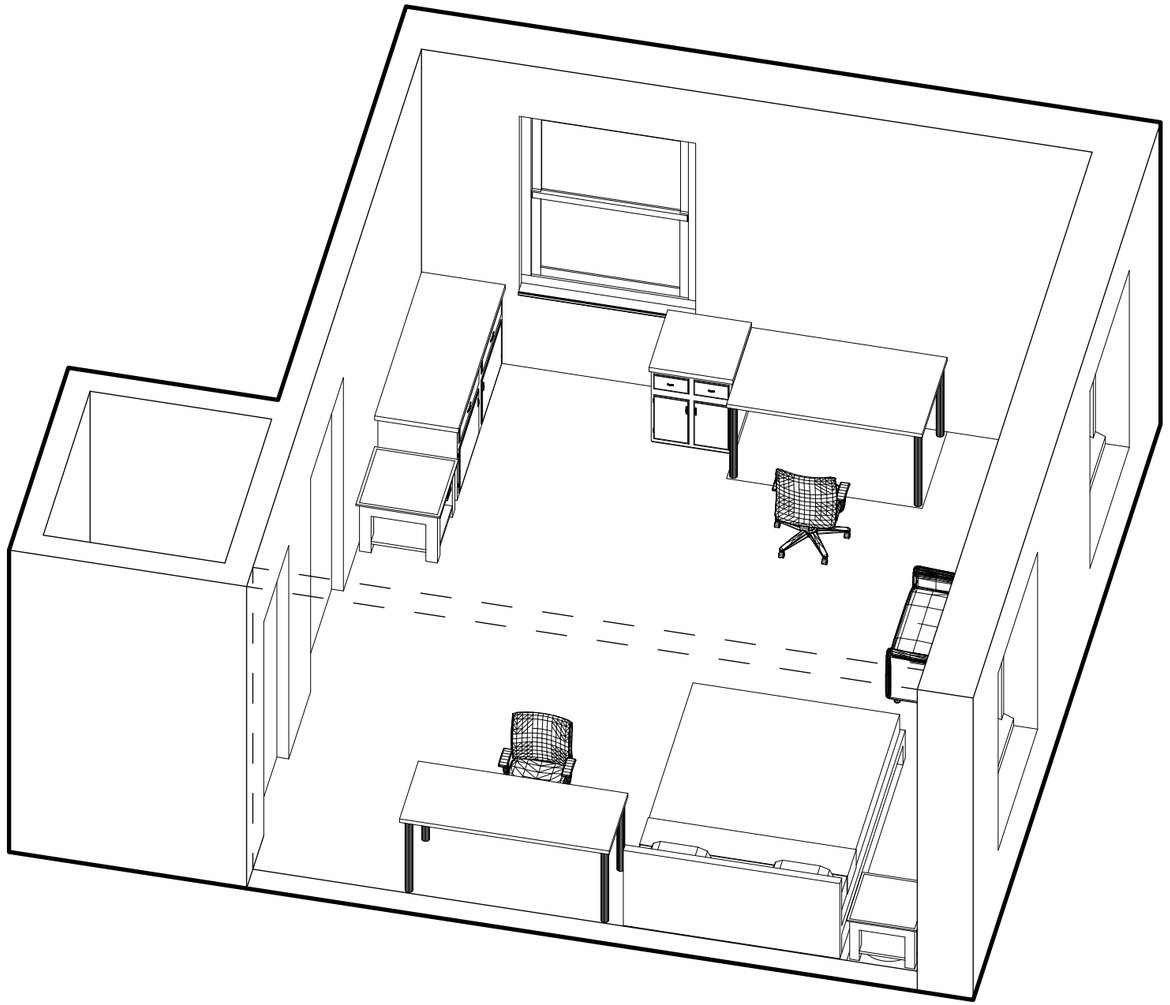
Home Enviroment Analysis

Week 3

Fan Cao



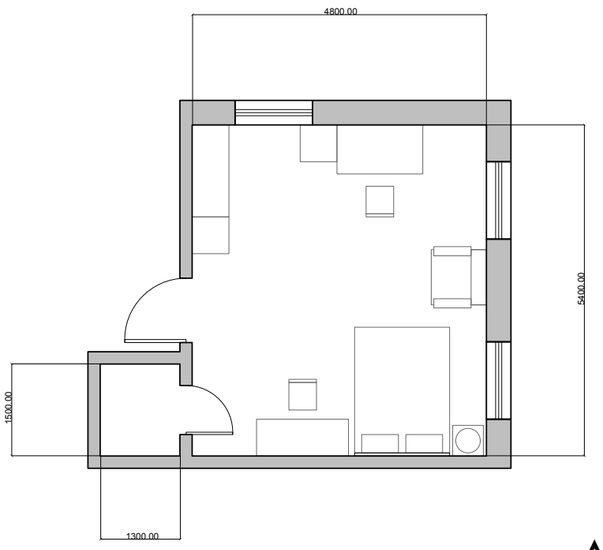
Isometric View

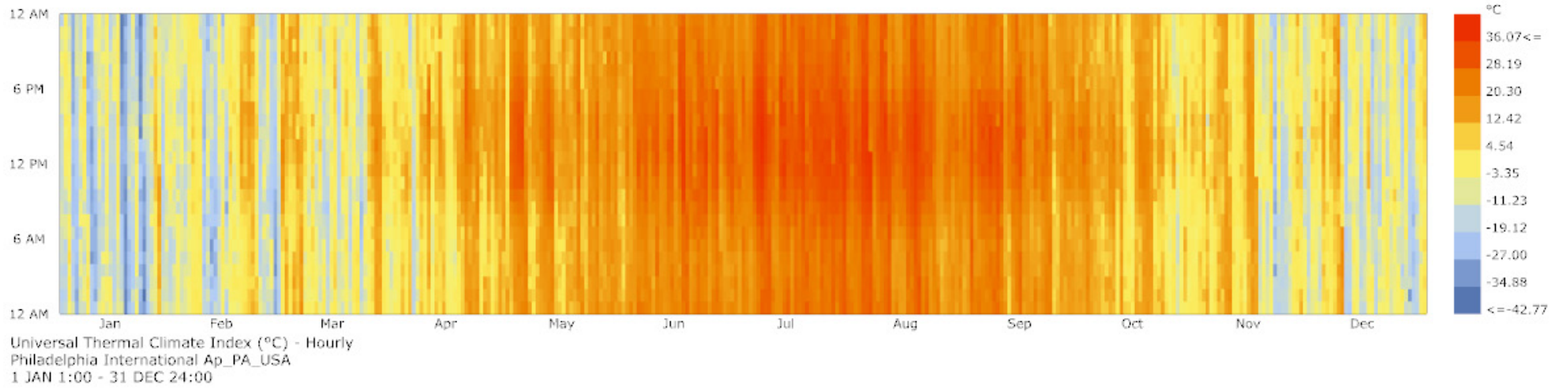
Different Clothes

The clothes you wear is also an important factor for your to feel the environment. During the winter and summer, even the temperature is the same, cause the clothes you wear, you will also feel different. So the **thickness** of your clothes is the most important.

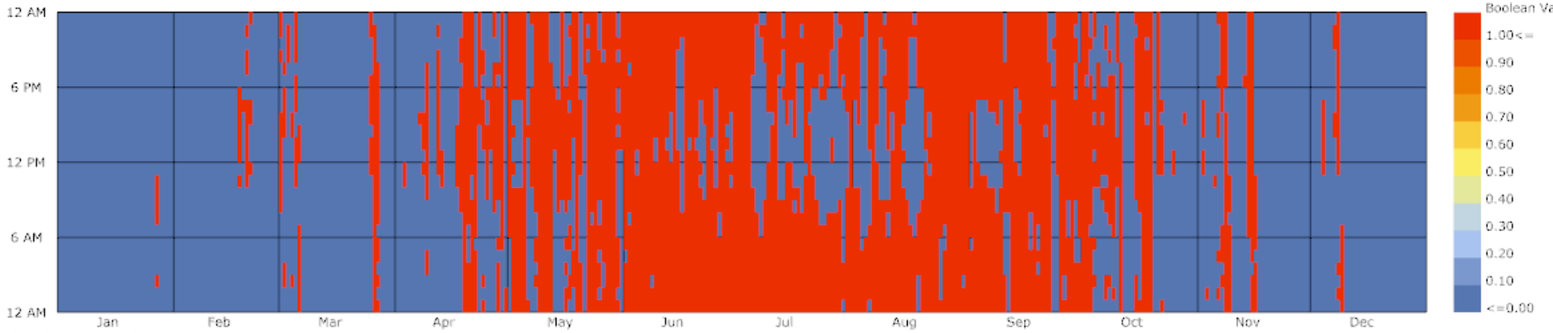
Different Temperature Tendency

One factor I think is also important for the environmental comfort is the **tendency**. When the season is from summer to autumn, the temperature is become lower. So, it is sensitive for you to feel the colder temperateure. During that time, even if the temperature is become higher, you will also hard to feel it.





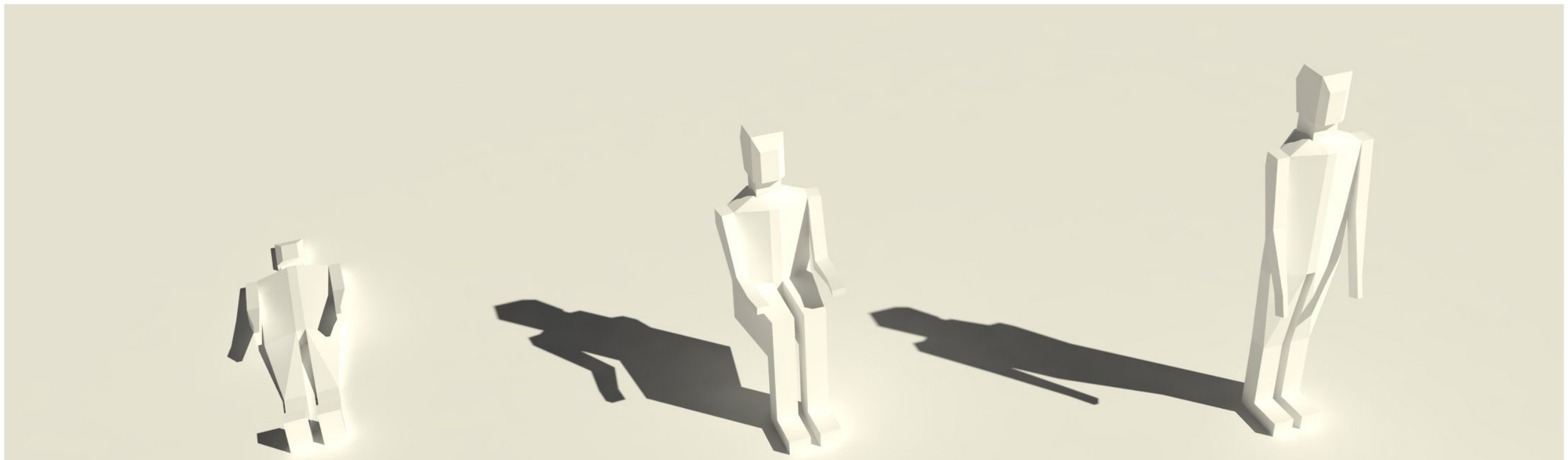
Universal Thermal Climate Index (°C) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00



Comfort or Not (Boolean Value) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00

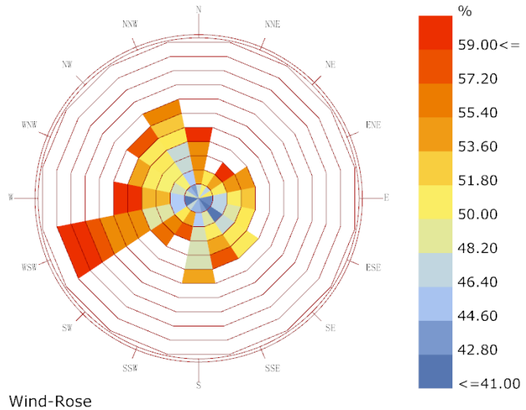
Different Activities

The feeling of comfot is not only determent by the environment, but also by the activity of the user doing. The intensity of the activiey determent the requirment of the temperature. But the major activities I will do in this room is **Sleeping** and **Reading**. So the metabolic will not be very fast.

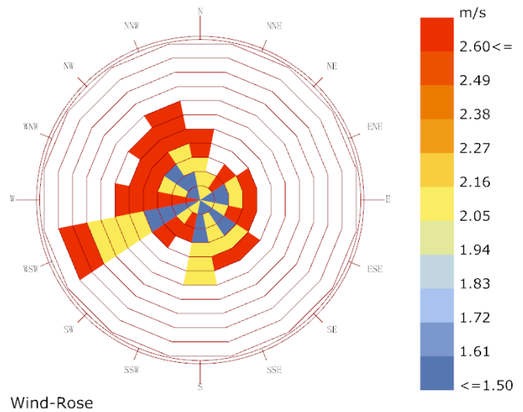


Different Pose

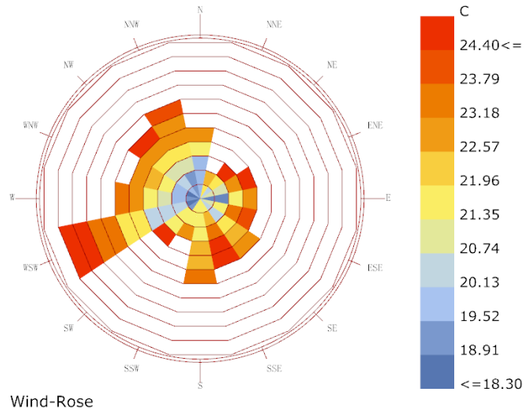
Standing, sitting and walking, these are the most frequent status I will be when I am in this room. In each **status**,
I will be in a different status which will cause different feeling.



Wind-Rose
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00
Hourly Data: Relative Humidity (%)
Calm for 0.00% of the time = 0 hours.
Each closed polyline shows frequency of 0.0%. = 1 hours.
... ...
Conditional Selection Applied:
18 < Dry Bulb Temperature < 25
and 40 < Relative Humidity <60
and 1 < Wind Speed < 3
79.0 hours of total 8760.0 hours (0.90%).



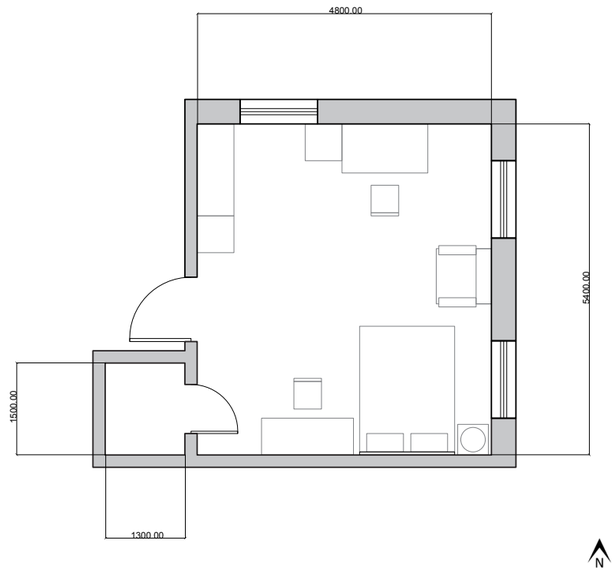
Wind-Rose
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00
Hourly Data: Wind Speed (m/s)
Calm for 0.00% of the time = 0 hours.
Each closed polyline shows frequency of 0.0%. = 1 hours.
... ...
Conditional Selection Applied:
18 < Dry Bulb Temperature < 25
and 40 < Relative Humidity <60
and 1 < Wind Speed < 3
79.0 hours of total 8760.0 hours (0.90%).

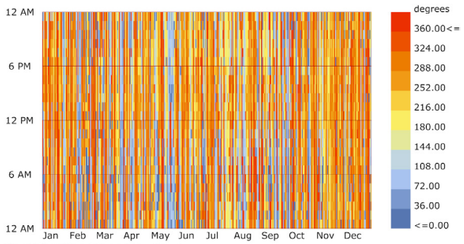


Wind-Rose
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00
Hourly Data: Dry Bulb Temperature (C)
Calm for 0.00% of the time = 0 hours.
Each closed polyline shows frequency of 0.0%. = 1 hours.
... ...
Conditional Selection Applied:
18 < Dry Bulb Temperature < 25
and 40 < Relative Humidity <60
and 1 < Wind Speed < 3
79.0 hours of total 8760.0 hours (0.90%).

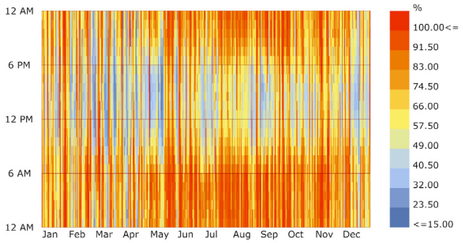
Through my anlysis of the environment situation, the wind condition combine with the most idea condition. The most comfortable environment condtion is, the temperature between 18 and 25, and the humidity is between 40 percent to the 60 percent; the wind speed is between 1meter per second to the 3 meters per second. Through this process, this part only take 0.9% of the whole year. And this part will not influence my building. Since this is the most idea period of time.

The most influencial wind would be WSW wind, so my room will be influence by this wind. But as each window is operable, so it still can be control.

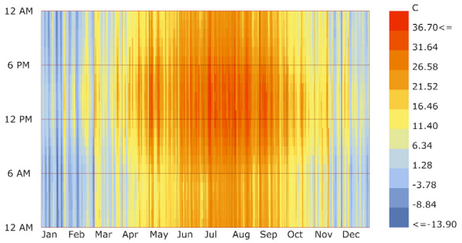




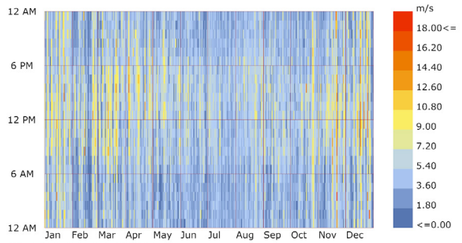
Wind Direction (degrees) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00



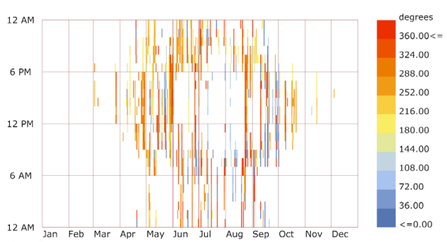
Relative Humidity (%) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00



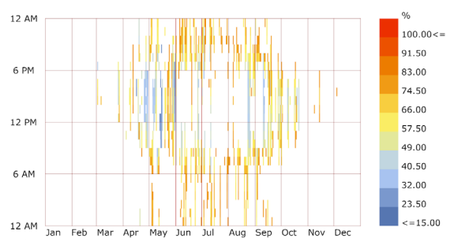
Dry Bulb Temperature (C) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00



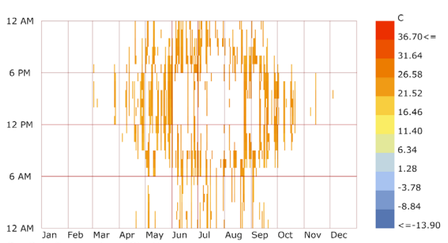
Wind Speed (m/s) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00



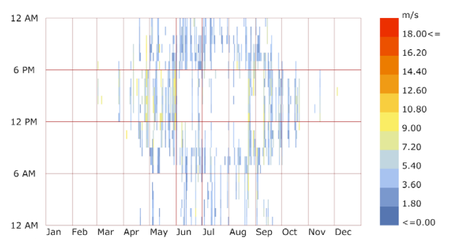
Wind Direction (degrees) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00



Relative Humidity (%) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00

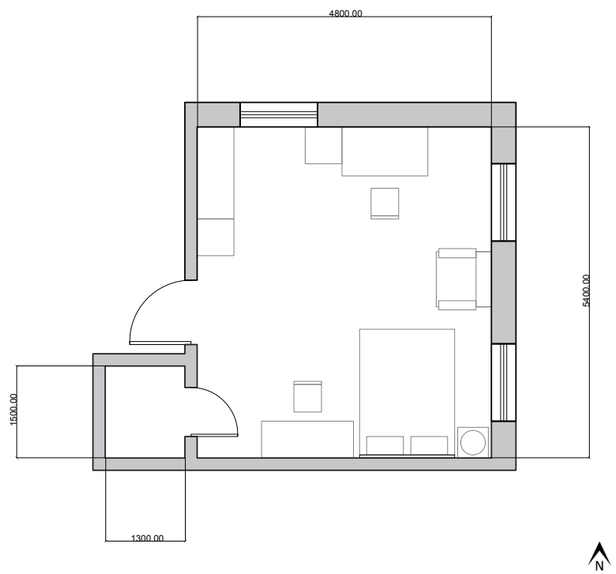


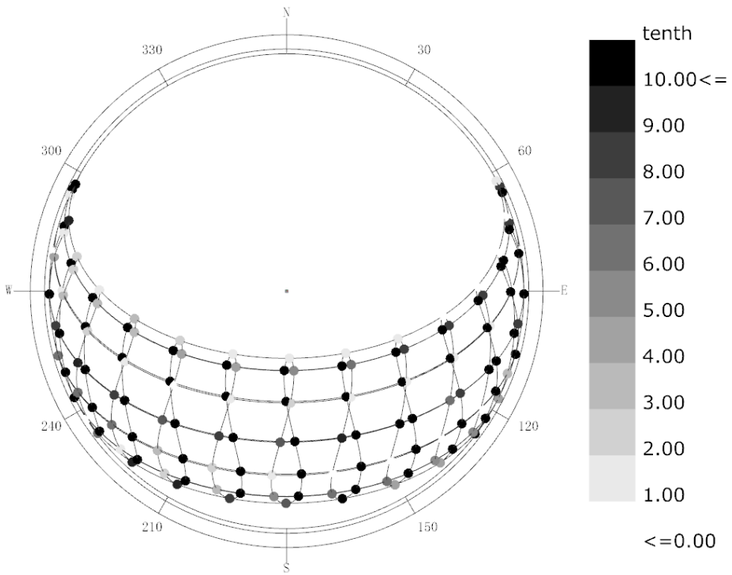
Dry Bulb Temperature (C) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00



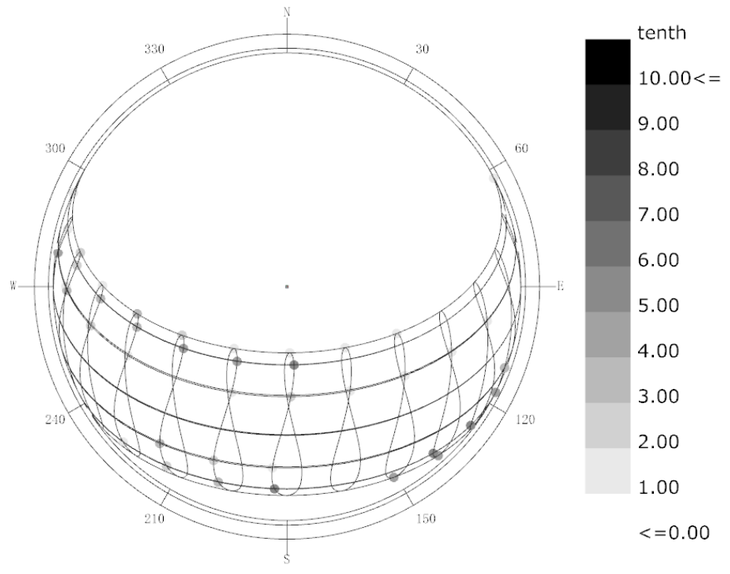
Wind Speed (m/s) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00

This is another way to illustrate the environment conditon, using the same parameters but did not combine with wind-rose. Using this way is much easier to understanding the relationship between the date and each parameter. So,most of the comfortable time will be from the end of spring to the end of summer. But through these chart, I thought the wind direction in this series is not that useful.





Sun-Path Diagram - Latitude: 39.87
Hourly Data: Total Cloud Cover (tenth)
Philadelphia International Ap_PA_USA



Sun-Path Diagram - Latitude: 39.87
Hourly Data: Total Cloud Cover (tenth)
Philadelphia International Ap_PA_USA
... ...
Conditional Selection Applied:
Total Cloud Cover < 6
54.0 hours of total 146.0 sun up hours(36.99%).

Cloud cover should be thought with sun path. Since when the altitude is not high, the cloud cover as high as better. So the cloud will block the sun ray and it would not influence the interior activities. But when the altitude is high, the sun ray would influence the interior activities. So, we should consider the season condition. If it is in the winter, the cloud cover should be low, vise versa. So, my room should add an additional operable shading system, so in the summer the room would be too hot. Since, there are two big windows in the east side.