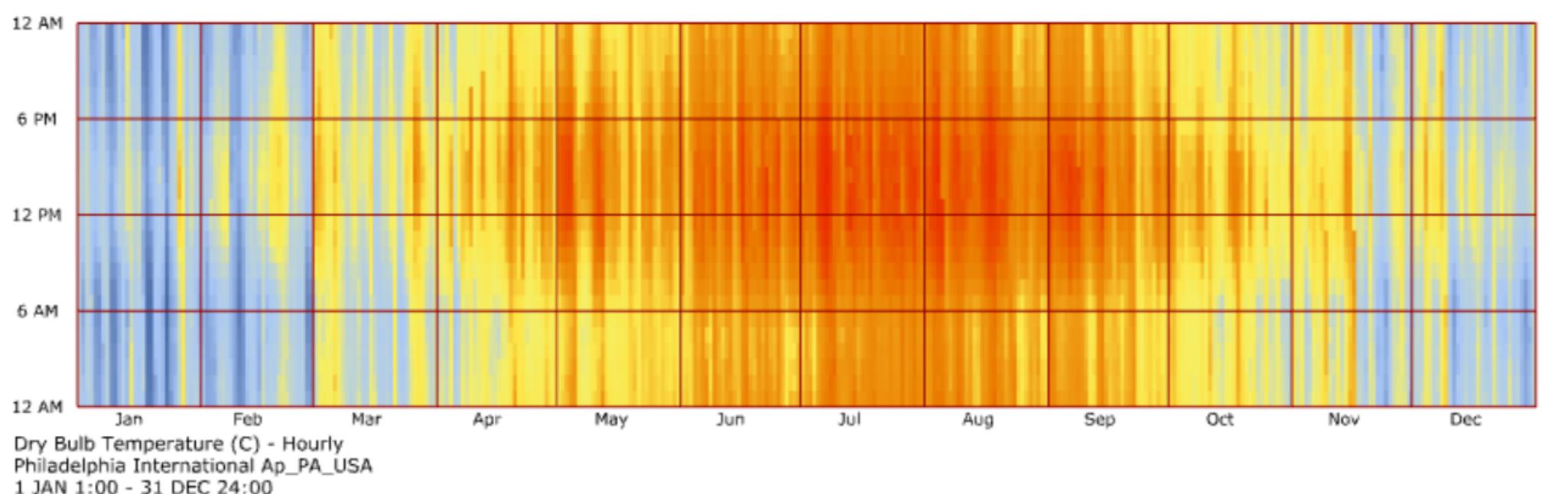


# Climate Analysis of Philadelphia

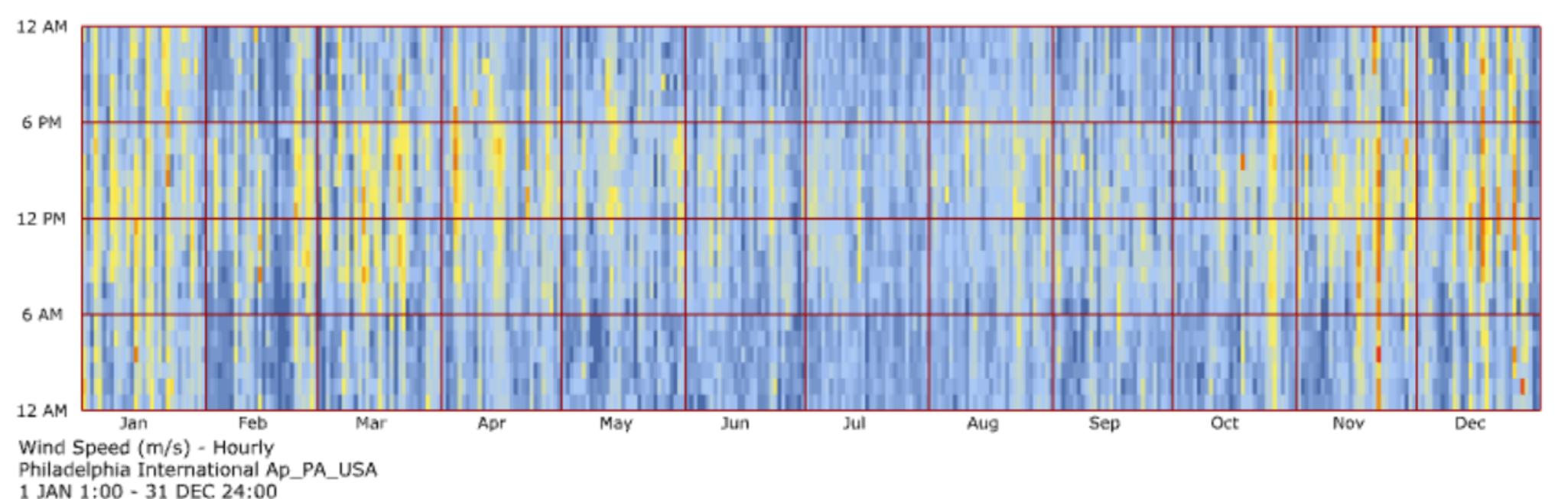
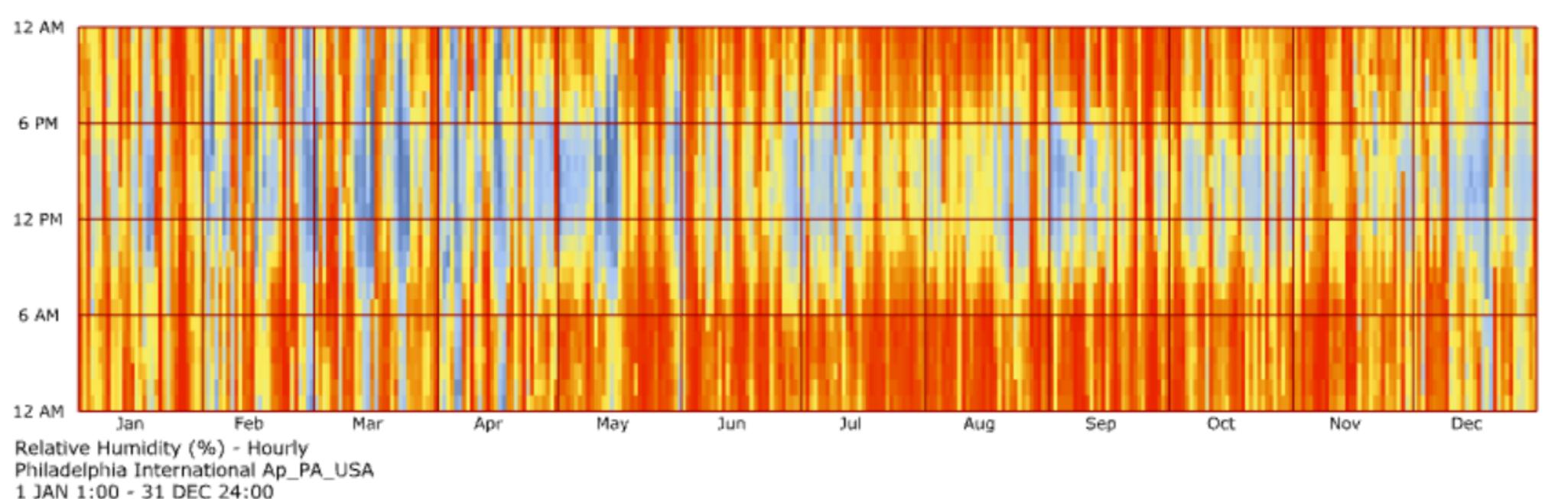
Yunqian Li



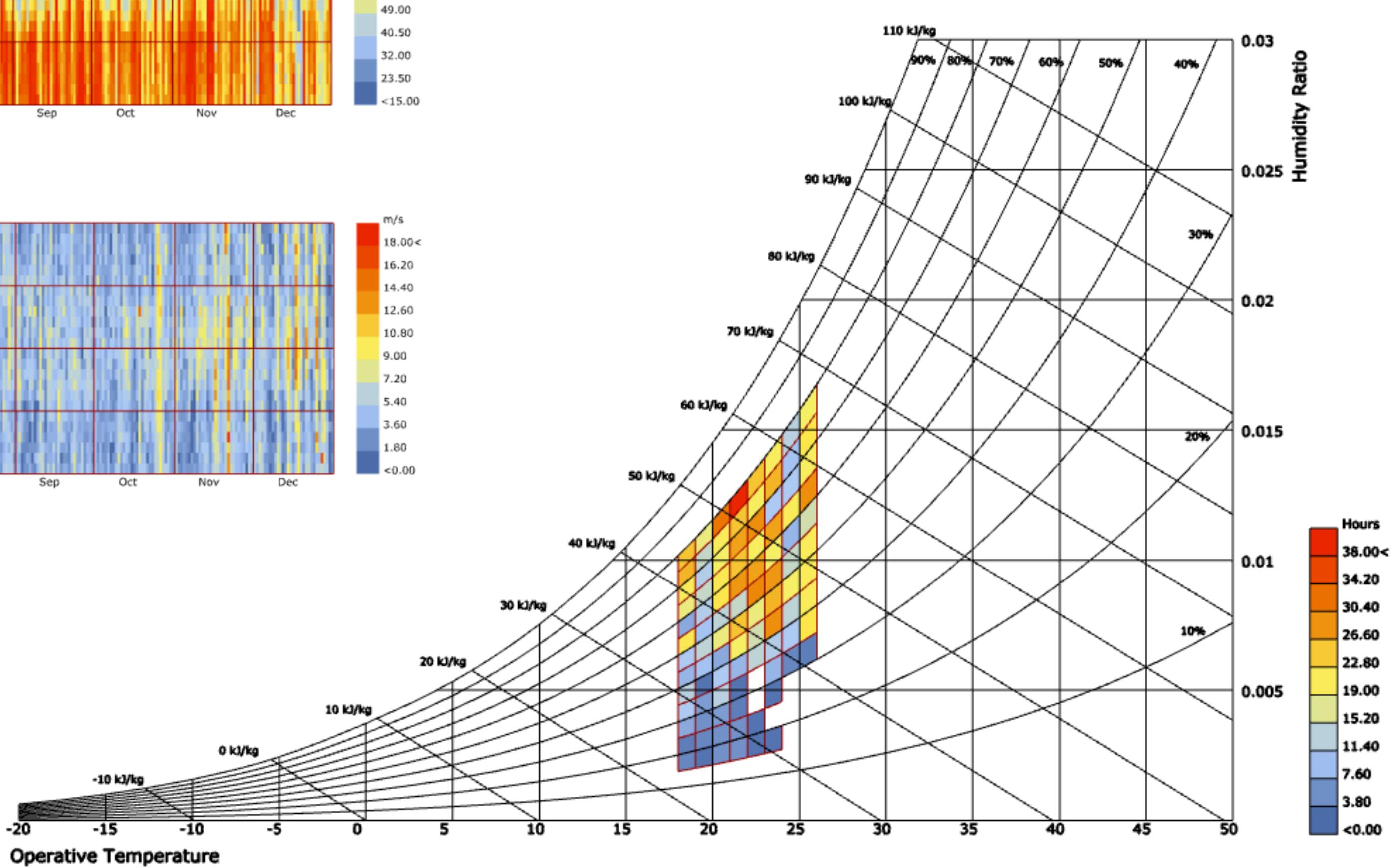
According to the Trewartha climate classification, Philadelphia has a temperate maritime climate. Summers are typically hot and muggy, fall and spring are generally mild, and winter is cold.

According to the chart shows on the left, the dry-bulb temperature in philadelphia ranges from -13.9 to 36.7 celcius degree. The relative humidity ranges from 15% to 100%. The wind speed ranges from 0 to 18 m/s.

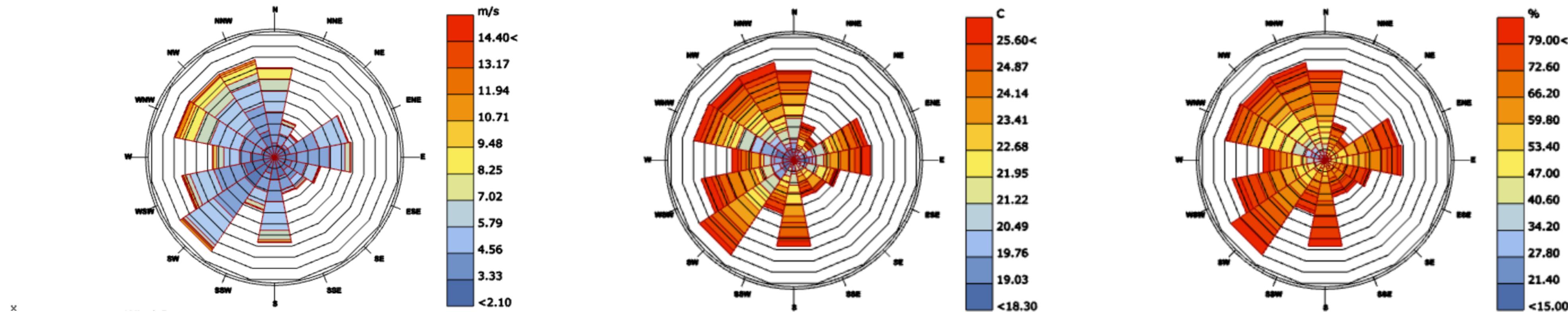
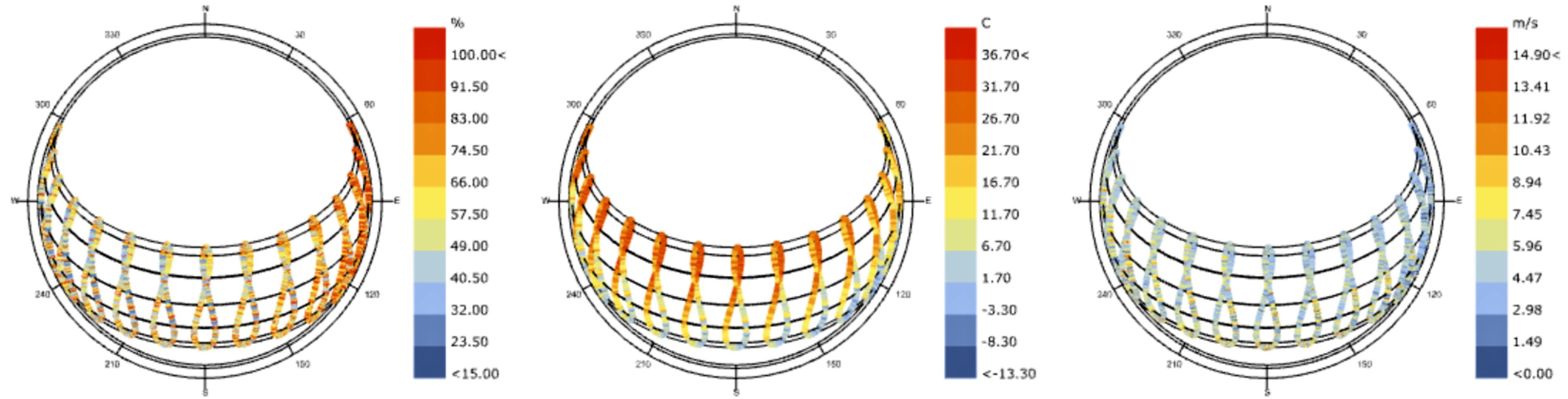
My ideal dry bulb temperature is 20-25 Celcius degree, and <80% humidity. According to the psychrometric chart below, the comfortable days happen more often in more humid condition.



Psychrometric Chart  
Philadelphia International Ap\_PA\_USA  
1 JAN 1:00 - 31 DEC 24:00



The three most important passive strategies in this climate for my "dream room" are thermal mass, passive shading, and natural ventilation.  
According to the sunpath below, it needs more sun-shading in the south and west direction, and it's more efficient to block the sunlight in an higher angle.  
According to the windrose below, the ideal direction of wind of my "dream room" is from northwest or northeast. Both direction is good for natural ventilation in the summer.



**Wind-Rose**  
Philadelphia International Ap\_PA\_USA  
1 APR 1:00 - 30 SEP 24:00  
Hourly Data: Wind Speed (m/s)  
Calm for 0.00% of the time = 0 hours.  
Each closed polyline shows frequency of 0.2%. = 10 hours.

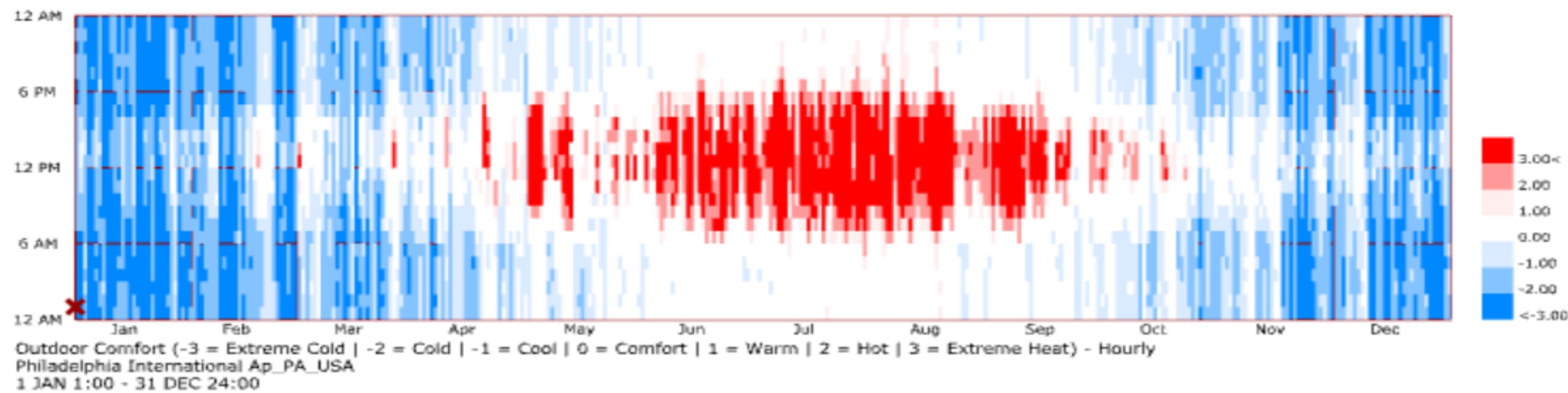
...  
Conditional Selection Applied:  
18 < Dry Bulb Temperature < 26  
and Relative Humidity < 80  
and Wind Speed > 2  
1095.0 hours of total 8760.0 hours (12.50%).  
1095.0 hours of analysis period 4392.0 hours (24.93%).

**Wind-Rose**  
Philadelphia International Ap\_PA\_USA  
1 APR 1:00 - 30 SEP 24:00  
Hourly Data: Dry Bulb Temperature (C)  
Calm for 0.00% of the time = 0 hours.  
Each closed polyline shows frequency of 0.2%. = 10 hours.

...  
Conditional Selection Applied:  
18 < Dry Bulb Temperature < 26  
and Relative Humidity < 80  
and Wind Speed > 2  
1095.0 hours of total 8760.0 hours (12.50%).  
1095.0 hours of analysis period 4392.0 hours (24.93%).

**Wind-Rose**  
Philadelphia International Ap\_PA\_USA  
1 APR 1:00 - 30 SEP 24:00  
Hourly Data: Relative Humidity (%)  
Calm for 0.00% of the time = 0 hours.  
Each closed polyline shows frequency of 0.2%. = 10 hours.

...  
Conditional Selection Applied:  
18 < Dry Bulb Temperature < 26  
and Relative Humidity < 80  
and Wind Speed > 2  
1095.0 hours of total 8760.0 hours (12.50%).  
1095.0 hours of analysis period 4392.0 hours (24.93%).



According to the Ourdoor Comfort Chart above, the most comfortable days happen usually during spring and fall, or at summer nights. Winters are always too cold for outdoor activities in Philadelphia.

Below is the percentage data of how much percentage a smart sun-shading can help people to be comfortable. The white portion shows comfortable hours with smart sun-shading, which is about 47.90% of the total hours.

