

Assignment 3

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1 Answering Questions

Q: What is the highest HI observed in 2023?

A: The maximum is 55.26 deg C

Q: What is the day and time when the highest HI was observed?

A: The highest was on 2023-08-21 at 10:00:00

Q: What is the local time of the highest HI?

A: 10:00 am in UTC is 1:00 pm in Jeddah

Q: What air temperature and relative humidity were observed at this moment?

A: On 2023-08-21, Temperature was = 38 deg C, and RH = 60.43

Q: Based on the National Weather Service's HI categories, what physical effects on the body might be expected at this HI level?

A: This temperature and relative humidity is classified as extremely dangerous and it has a high chance of causing a heat stroke

Q: Can this event of high temperature and humidity be called a heatwave?

A: The definition of a heatwave is where the daily max temperature of more than five days exceeds the maximum average by 5 deg c. Therefore, based on this, we can't conclude if this is a *heatwave*. However, I included a block in the code (can be viewed on Github by the end of this document) that tries to identifies heatwaves.

Q: Is it possible to calculate the HI using daily weather data instead of hourly data?

A: Yes, it is possible, by resampling the data and taking the average of a 24 hrs

Q: For Jeddah, based on CMIP6 models, the projected increase in air temperature from 1991– 2010 to 2081–2100 under the 'middle-of-the-road' SSP2-4.5 scenario is approximately 3°C. To assess the potential impact of climate change on hot spells in Jeddah, apply this projected warming to the air temperature data and recalculate the HI. What is the increase in the highest HI value when this additional warming is considered?

A: After the increase, is from 55.26 to 67.2 = 12 deg C

2 Plots

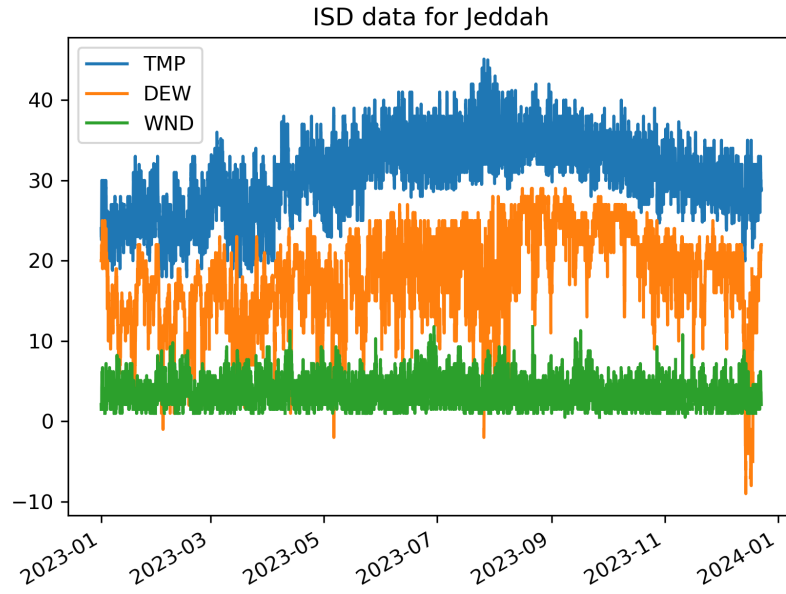


Figure 1: Hourly meteorological data for Jeddah. Temperature (Blue) measured in deg c, Dew point (Orange) measured in deg c, and wind speed (Green) measured in m/s

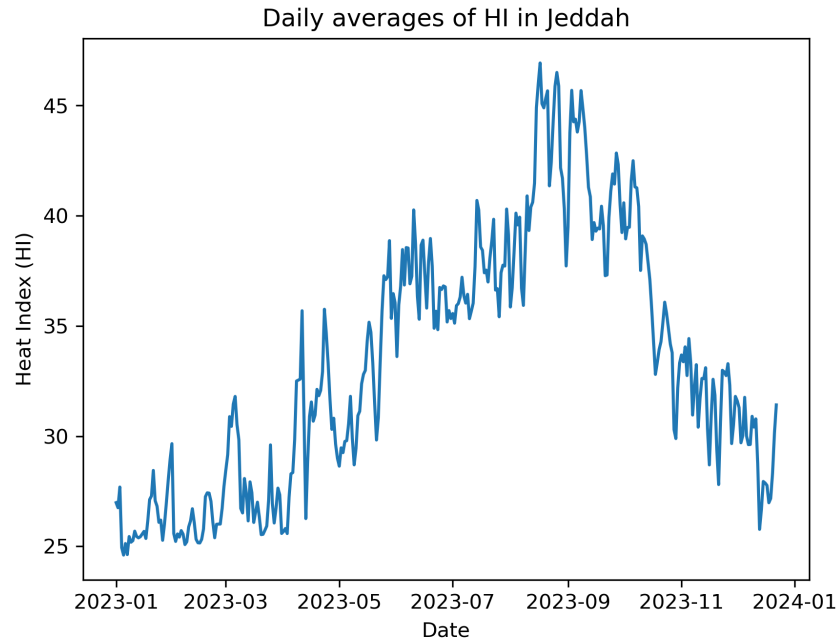


Figure 2: Mean heat index (averaged for 24 hrs) for Jeddah

3 Additional info

Additional information and the code provided can be found on my Github account.

[Github](#)