[Speaker Zoom video]

Heatwave Scenario in Asia Region

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What are Heatwaves?

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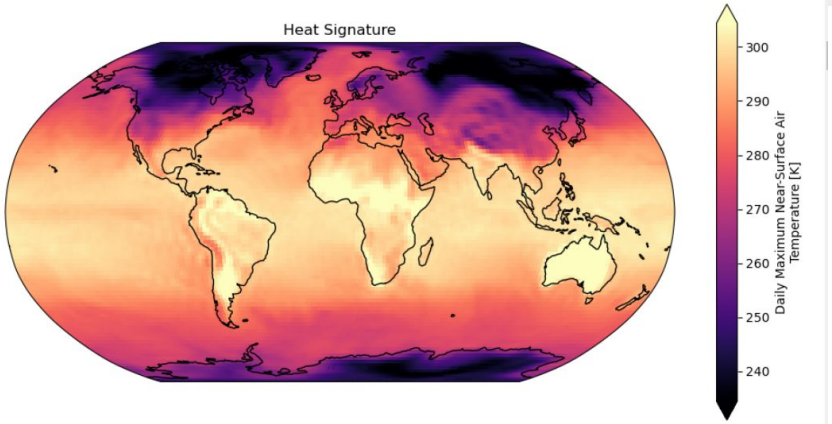
- Departure of temperature from normal which may be defined in term of the heat index based on temperature and humidity or based on extreme percentile of the temperatures.
- ***Percentile-based criterion*:** Daily T_{MAX} over the 1850-1880 period is taken for May, and the 95th percentile of the series (T_{MAX}-95p) is obtained, which is regarded as the threshold for defining a heatwave day. There are 30 days in May for total 31 years. Therefore, there are 310 × 30 = 930 days in total. The 95th percentile of these values is the threshold; if $T_{MAX} > T_{MAX}$-95p, it is a heatwave day.



Why analyse heatwaves?

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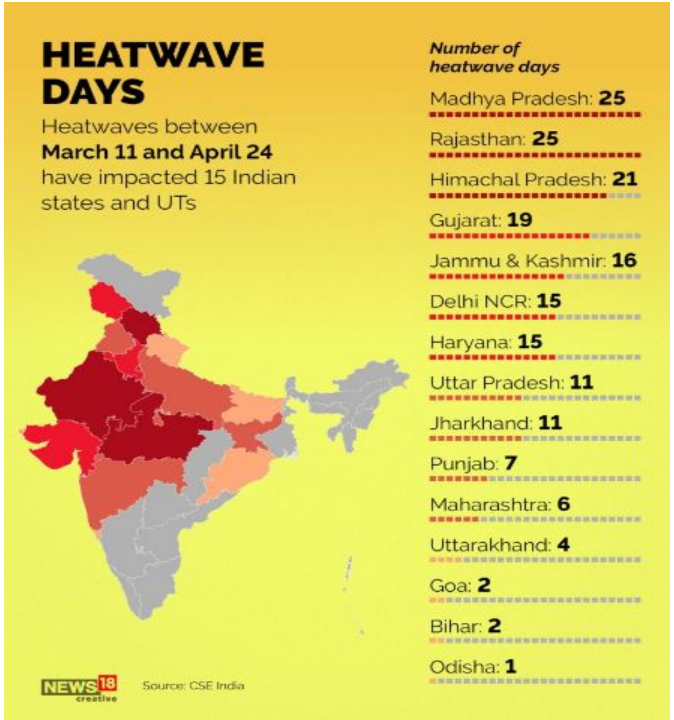
- Heatwaves are a direct implication of climate change and directly impact the lives and livelihood of people, especially in developing countries.
- There is substantial increase in the frequency of concurrent meteorological droughts and heatwaves across whole India. (Majumdar and Sharma, 2017)
- Analysing historical extremes is important to plan and prepare for mitigating associated impacts. Necessary to quantify heatwaves to understand associated risk.



Objectives of Study

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Assessment of Heatwave Scenarios in Asia using CMIP6 data.

Use a Global Climate Model (GCM), compute the heatwave day using a quantile based definition based on the things learned in the course and implement them for a selected study region.

Compare a historical time (1850-1880) with more recent time (1985-2014) to understand and visualize the changes in heatwaves.

Methodology

Selecting GCM (MPI-ESM1-2-LR), and temperature variable (tasmax) for month of May

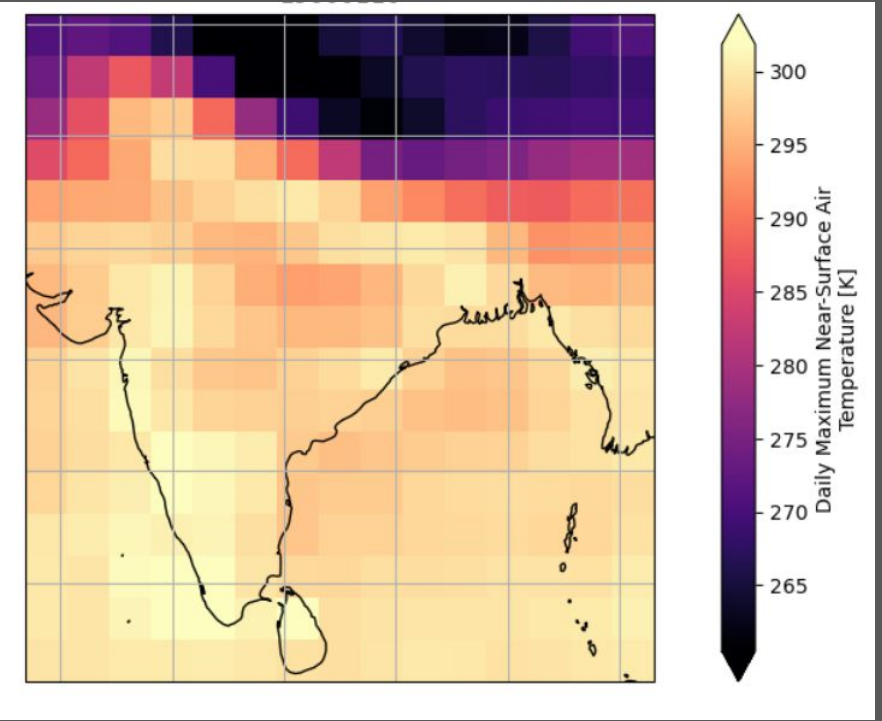
Selecting a region for study i.e. **India** as it experiences frequent and intense heatwaves (last slide)

Calculating area weighted values for Tasmax, normalizing Tasmax values and removing seasonality

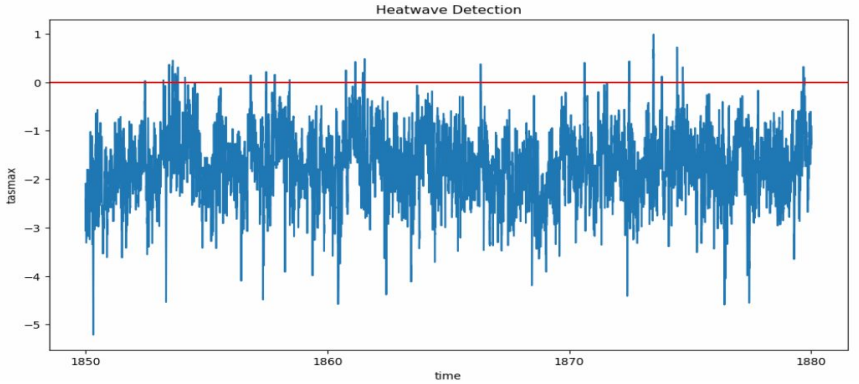
Defining threshold for heatwaves based on 95th percentile

Visualizing the quantile based results

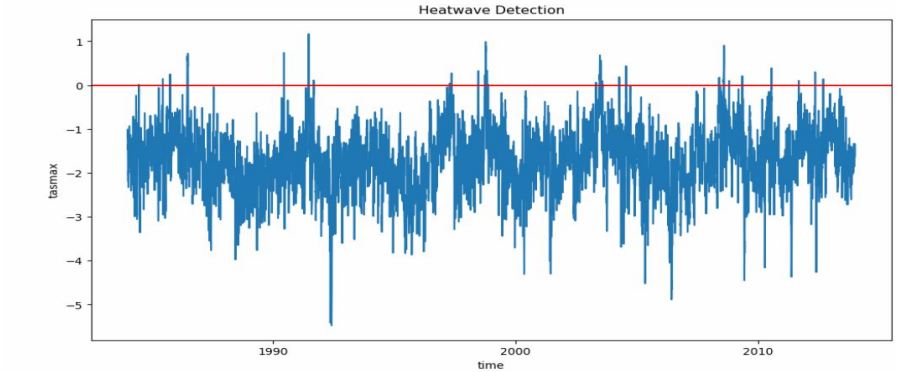
[Speaker Zoom video]



Results



Heatwave occurrence (1850-2014)



Heatwave occurrence (1985-2014)

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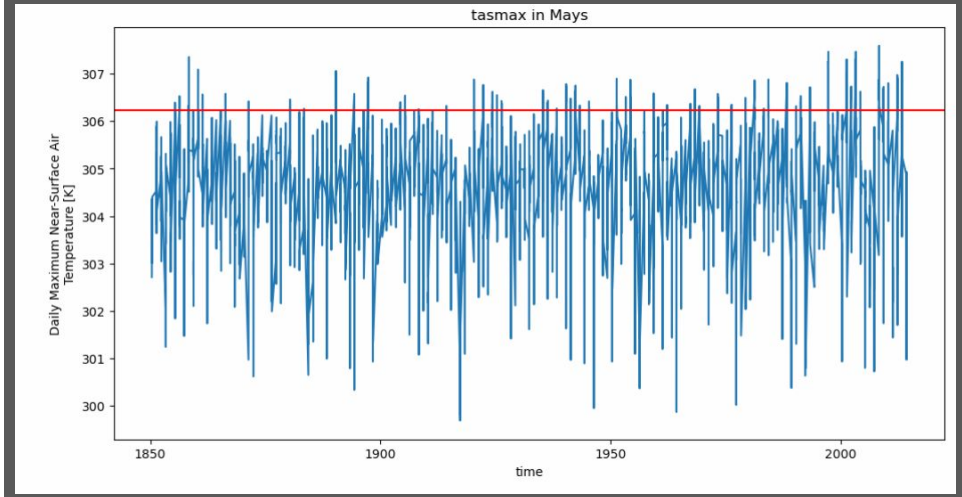

Heatwave occurrence throughout history (1850-2014)

Conclusion

We can use global climate models (GCM) for heatwave analysis to develop better understanding in order to mitigate risk and contribute to a sustainable future.

The present study is limited in scope due to time constraints. The study can be improved by using different definitions of heatwaves, multiple climate models and multiple scenarios based on GCMs.

[Speaker Zoom video]