[Speaker Zoom video]

Heatwave Characterization in Humid Prone Areas: India

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Heatwaves in India

[Speaker Zoom video]

- Heatwaves impact crop growth, droughts, and **human health**
- Consider the air's **humidity and temperature** to compute the **Heat Index**
  - HI = c1+ c2 * T + c3 * R - c4 * T * R - c5 * T^2 - c6 * R^2 + c7 * T^2 * R + c8 * T * R^2 - c9 * T^2 * R^2
    - T is the temperature in Fahrenheit; R is the relative humidity in percent; c are constants
- Understanding, characterizing, and predicting heat waves, especially in regions that are more susceptible to humid heat is important for **safeguarding vulnerable populations**
- Hypothesis:
  - **Heatwave intensity and frequency in India will increase in climate model projections for the coming decades compared to historical data.**

Methods

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Definition of Heatwaves:

3-consecutive days above the 90th percentile temperature

Target region: **India**

Dataset: **daily max temperature (tasmax)**

from MPI-ESM1-2-LR (r1i1p1f1)

- Reference period (historical):
  - 1985-2014
- Target periods (ssp585):
  - 2015-2023 (present) vs.
  - 2024-2030 (near future)

Preliminary Results

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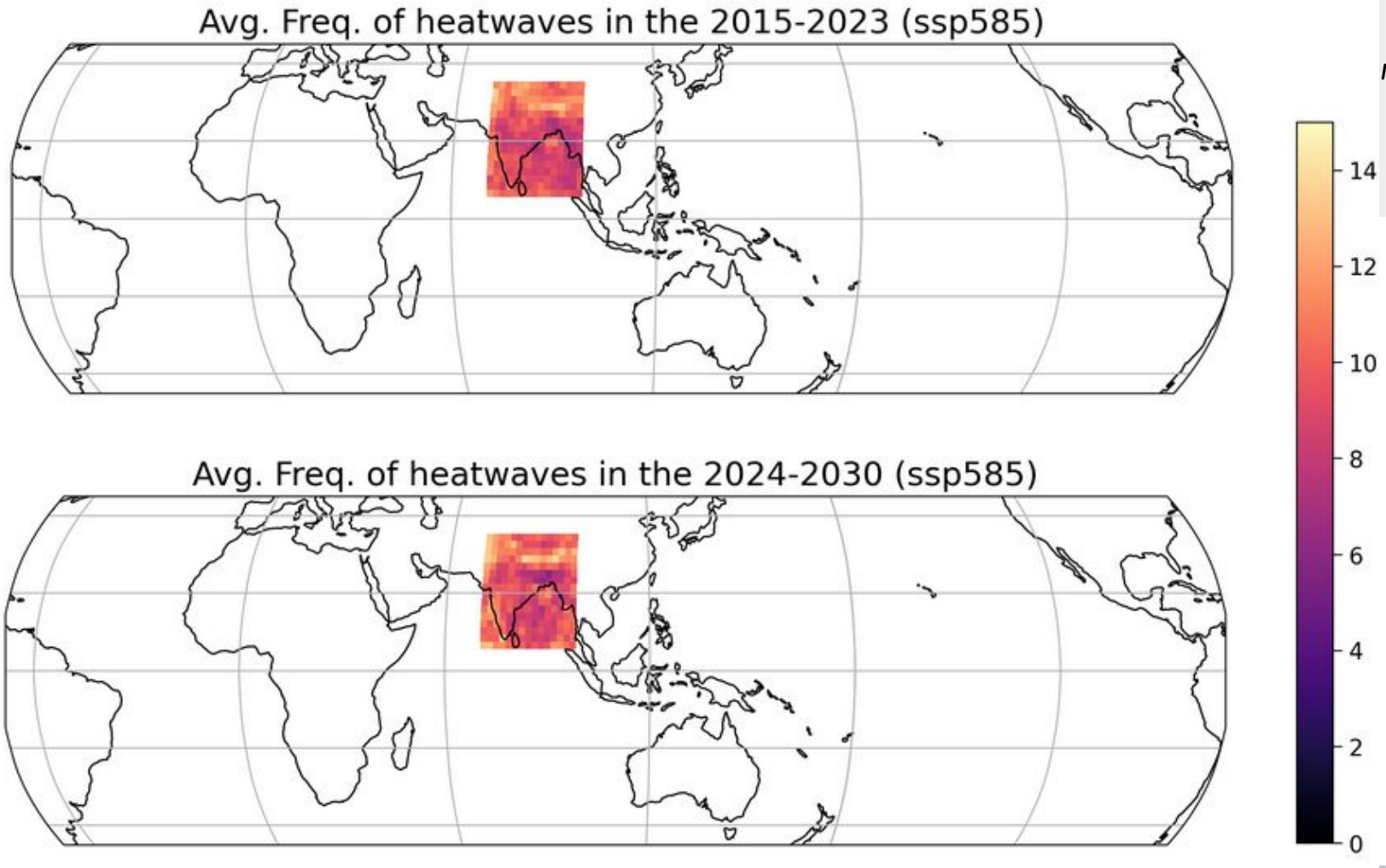
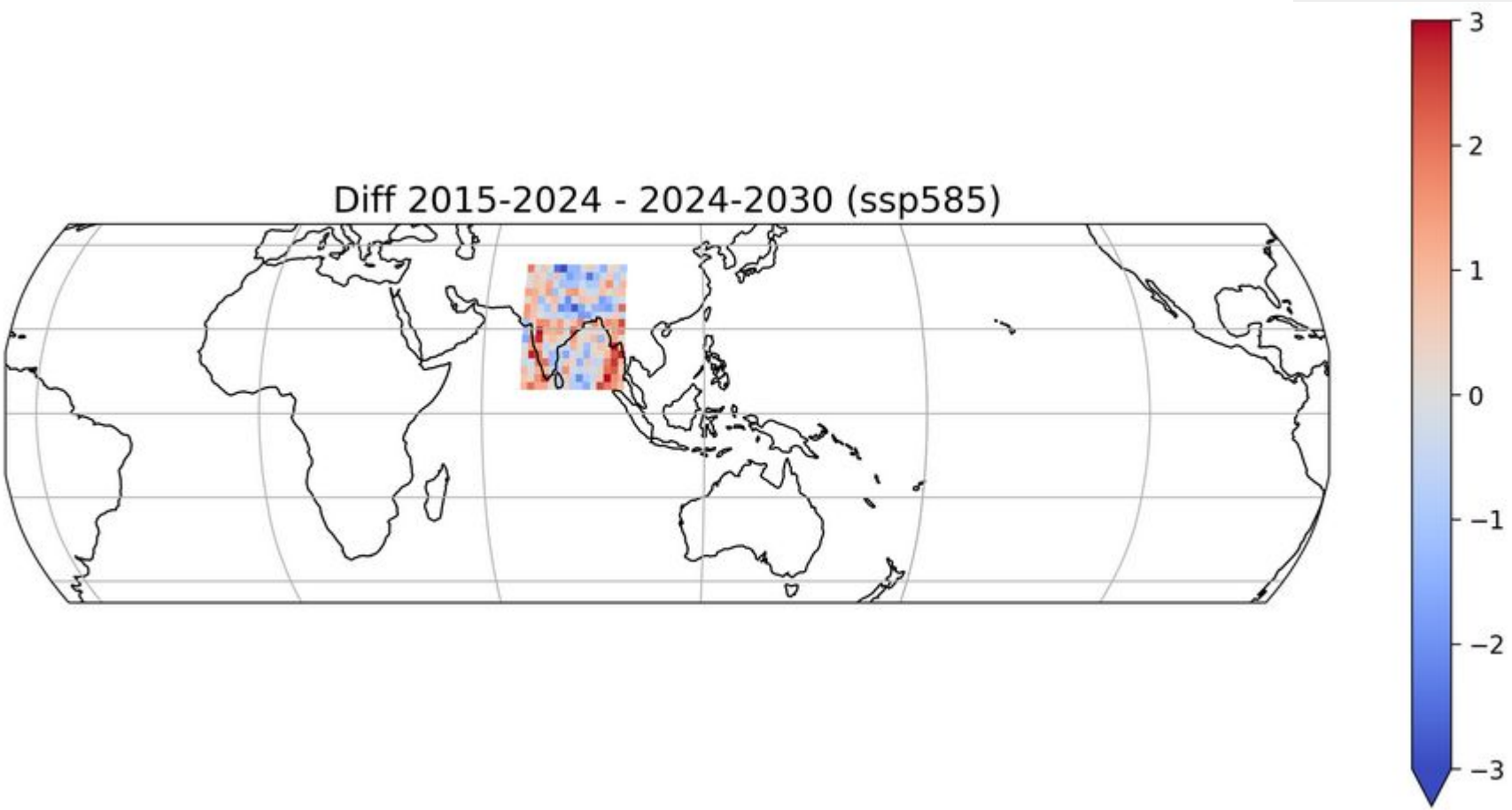
We achieved:

- Extracting daily maximum temperature (and humidity) for historical data and projections
- Filtering out a period from March to September per year
- Computing a rolling mean and the 90th percentile (threshold) of temperate per day
- Plotting days that are part of a heatwave
- Plotting the number of heatwaves occurring in a year
- Calculating the average frequency of heatwaves for our target periods


Avg. Freq. of heatwaves in the 2015-2023 (ssp585)
Avg. Freq. of heatwaves in the 2024-2030 (ssp585)
14
12
10
8
6
4
2
0


Diff 2015-2024 - 2024-2030 (ssp585)
3
2
1
0
−1
−2
−3

Conclusion & Future Work

[Speaker Zoom video]

Conclusion:

We can see a pattern of increase of heatwaves in the West coast of India in the upcoming future

Future work:

- add extension criteria
- incorporate relative humidity into the heat index (HI) equation
  - We have extracted humidity (huss) and need to process it to compute HI
- apply our analysis to other humid areas (e.g. China's East Coast)