[Speaker Zoom video]

AUTOMATED HEAT WAVES DETECTION USING HISTORICAL SIMULATIONS FROM CMIP6

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Introduction and objective

[Speaker Zoom video]

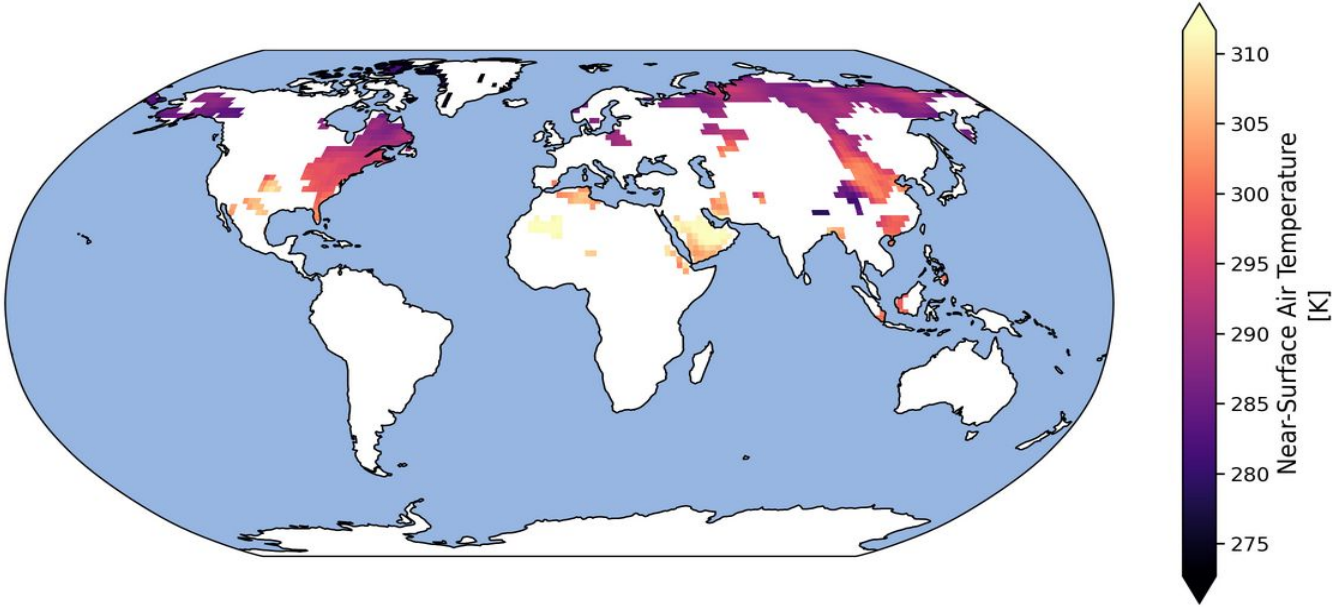
- Heat waves are phenomena with no universal definition.
- Our main objective is to design an **algorithm** to detect heat waves with which we can evaluate and compare various definitions of heatwaves
  - For example, we want to vary:
    - Minimum number of days
    - Minimum region size
    - Minimum near surface temperature (TAS)
- To start, we chose (according to Q7) these parameters as defining features:
  - Minimum number of days: 7
  - Minimum region size: 200x200 km^2
  - TAS: 95th quantile compared to 10-days average of climatology mean (1979-2020)

Global heat cells for 1 day (temp>95% quantile)

[Speaker Zoom video]

We define a mask that masks outs **heat cells**.

Heat cells are cells, where TAS is above the 95% quantile compared to a 10-days average of the climatology mean (1979-2020)

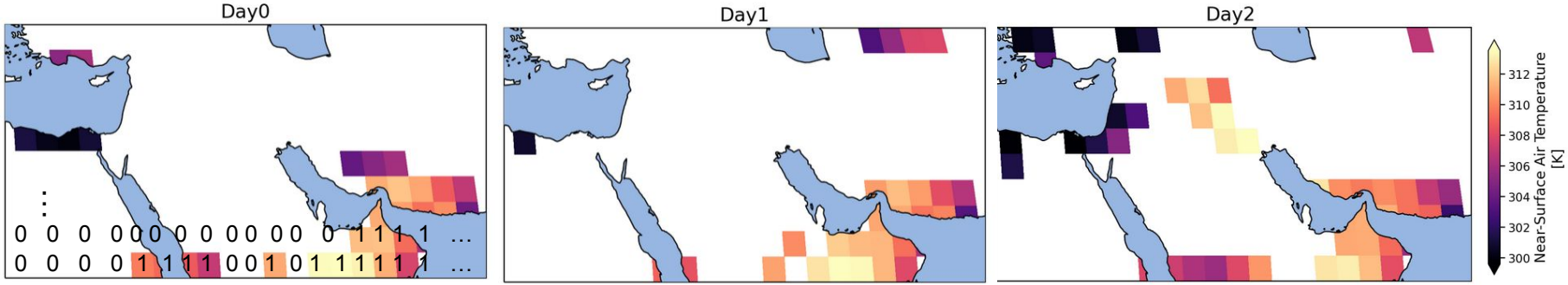


2000-07-03

Masking areas

[Speaker Zoom video]

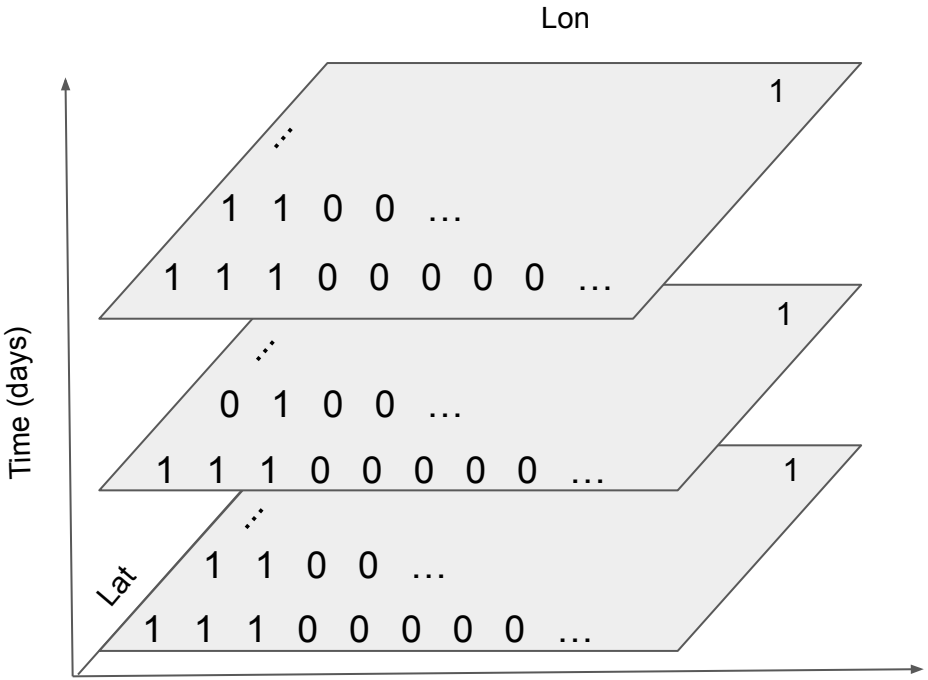
(for selected region, here middle east)



We apply this mask for 7 days (3 days shown three).

Detection Algorithm

[Speaker Zoom video]



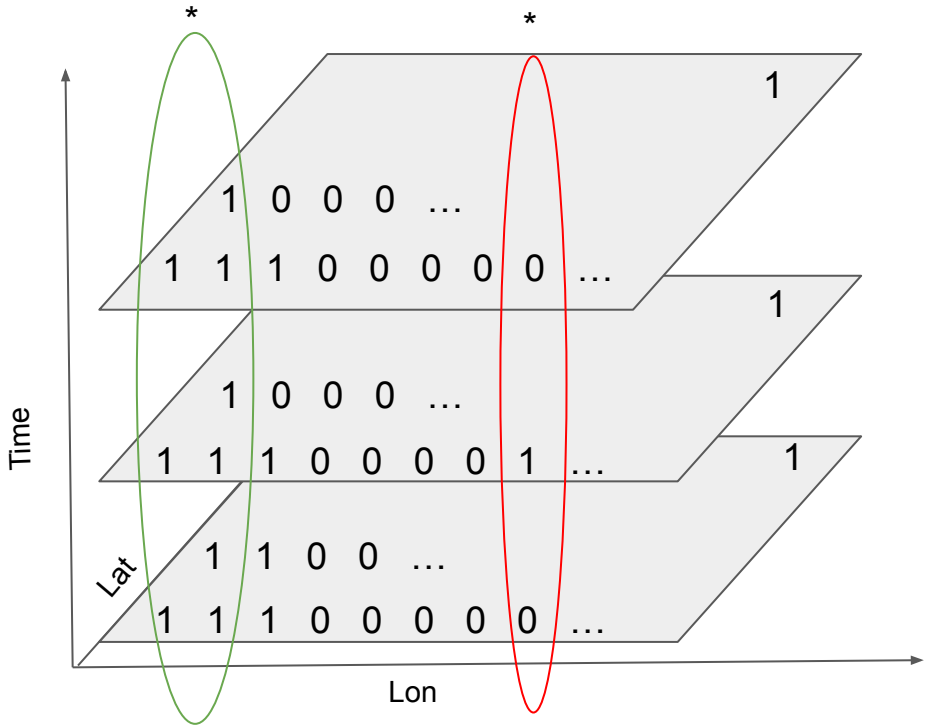
We found clusters in Mask over time (7 days, 3 days shown) and space (lon, lat).

We then thresholded found clusters by a minimum region size of 200x200m^2.

- To calculate region size:
  - Get the weights for each cells
  - Get area of cell with weight = 1
  - Weight all other cells

Algorithm

[Speaker Zoom video]



We found clusters in Mask over time (7 days, 3 days shown) and space (lon, lat).

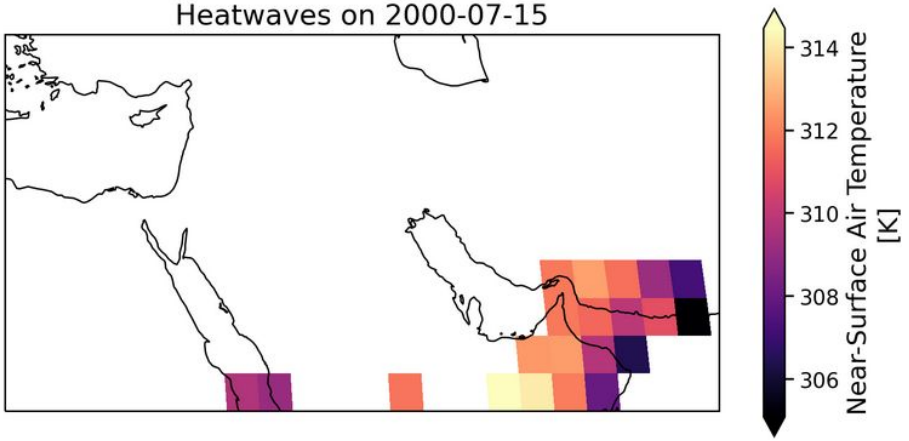
We then thresholded found clusters by a minimum region size of 200x200 km^2.

- To calculate region size:
  - Get the weights for each cell
  - Get area in km of cell with weight = 1 (≈208x208 km^2)
  - Weight all other cells

Analysis

[Speaker Zoom video]

Based on this algorithm we found 3 occuring heatwaves in the middle east on 15th July 2000:



Conclusion & Outlook

[Speaker Zoom video]

We found a heat-wave detection algorithm based on three parameters:

- minimum number of days (7),
- minimum region size (200x200 km2)
- TAS (>95%).

The task is now to evaluate whether our heat wave detection algorithm aligns with our intuition of what a heat wave is, or weather we still have to fit some parameters better.

Thanks for your attention!

References

[Speaker Zoom video]

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