

CLIMATE PROJECTIONS AND TIPPING POINTS

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and

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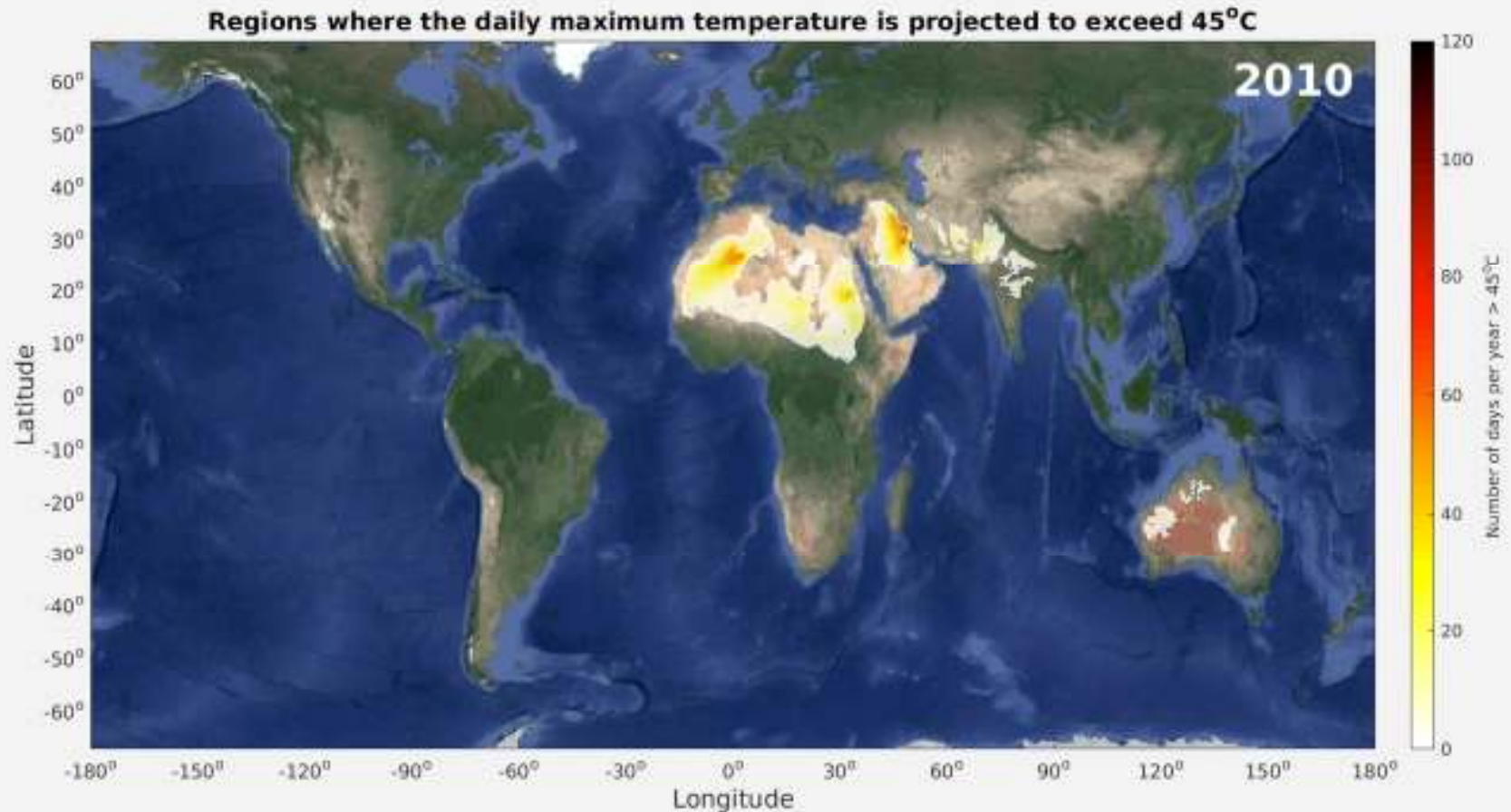
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Extreme Heat

- Use downscaled climate model projections to identify the global regions most vulnerable to extreme temperature in a warming climate
- Daytime maximum temperatures exceeding 45°C
- Nighttime minimum temperatures exceeding 30°C
- Analysis uses a NASA data product (NEX GDDP)
- Animation from the present to the year 2095



Annual Count of Days $> 45^{\circ}\text{C}$ (113°F)



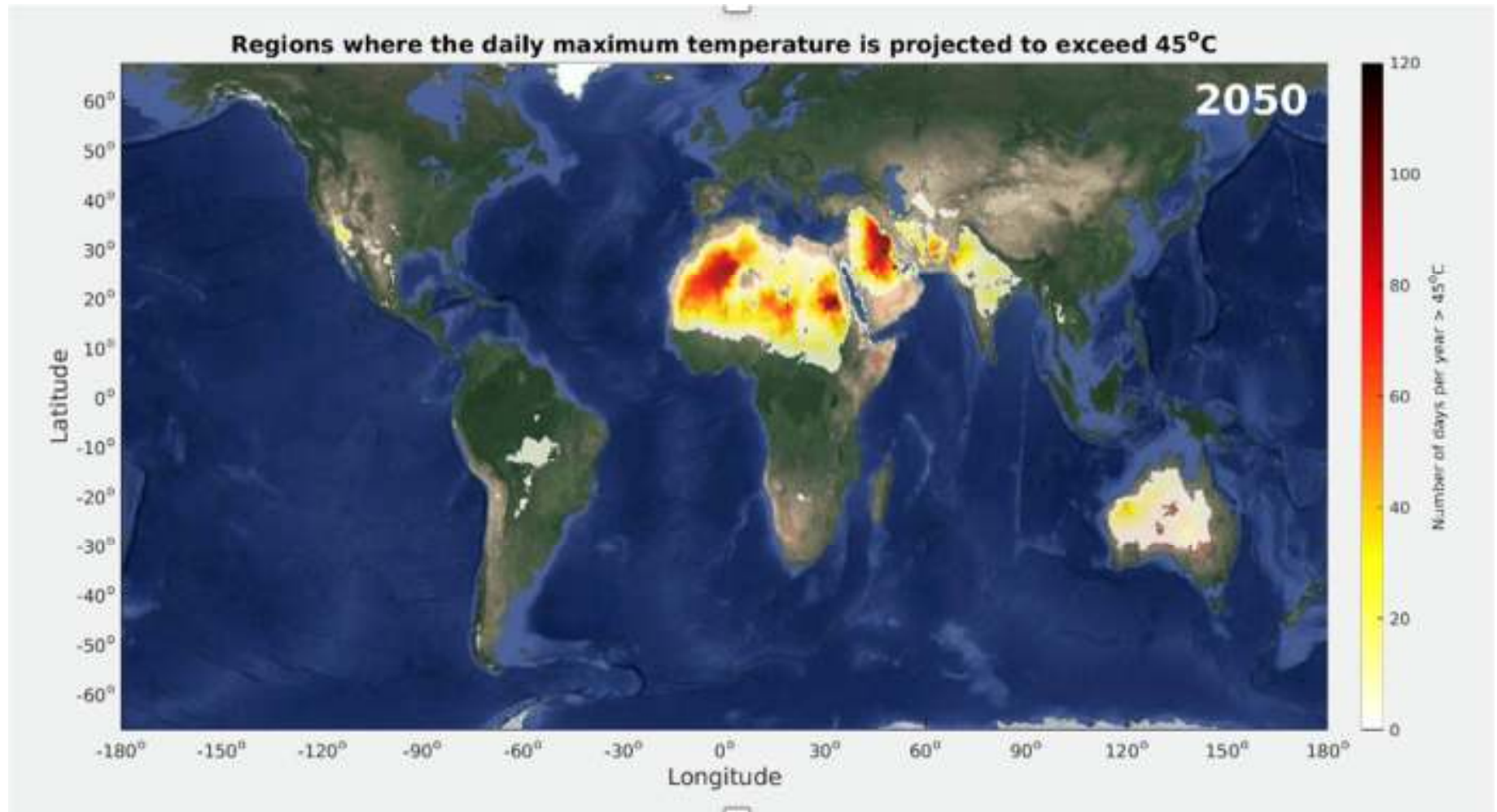
The 10-yr running climatology from 21 GCMs (multi-model ensemble mean)



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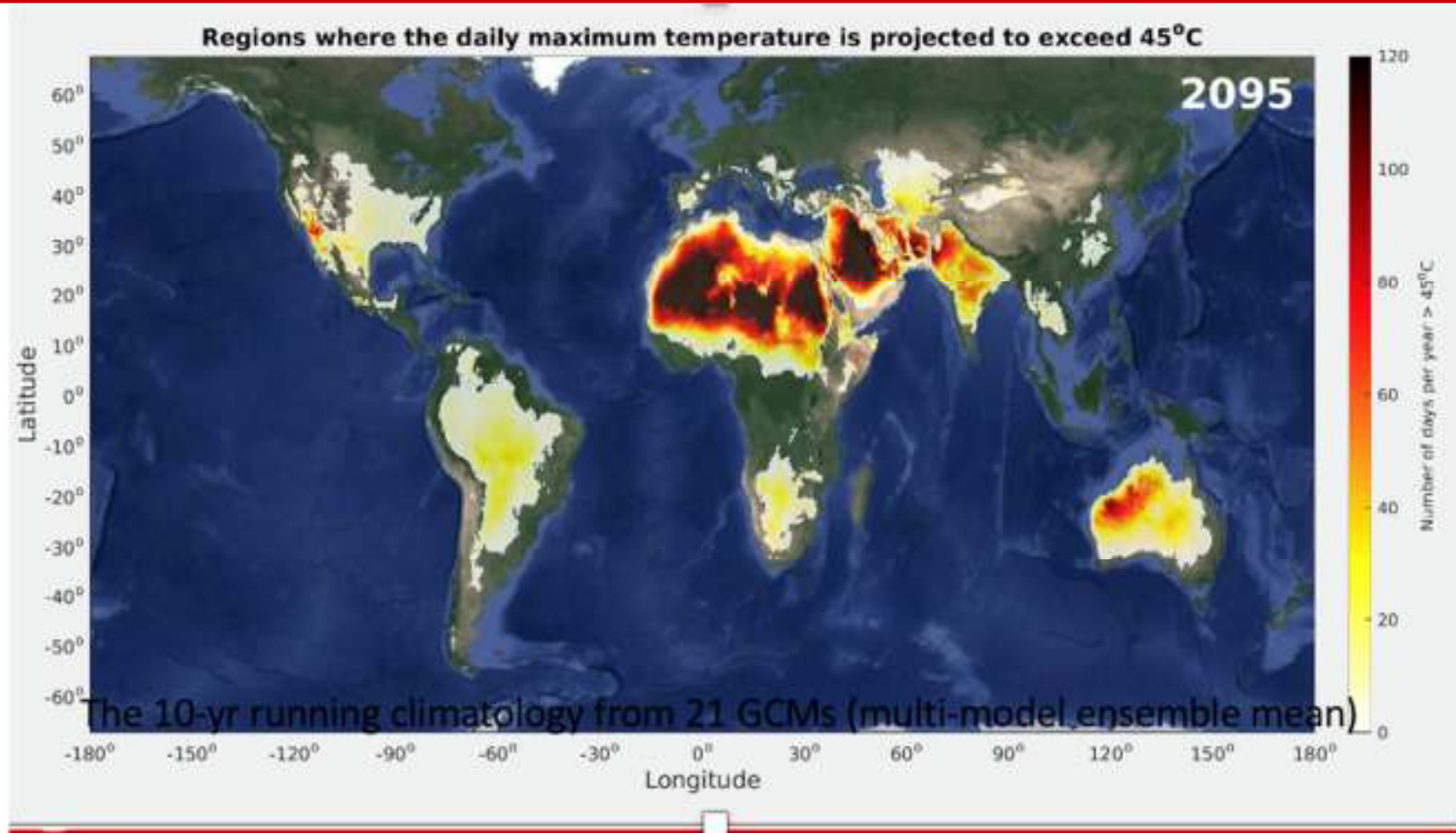
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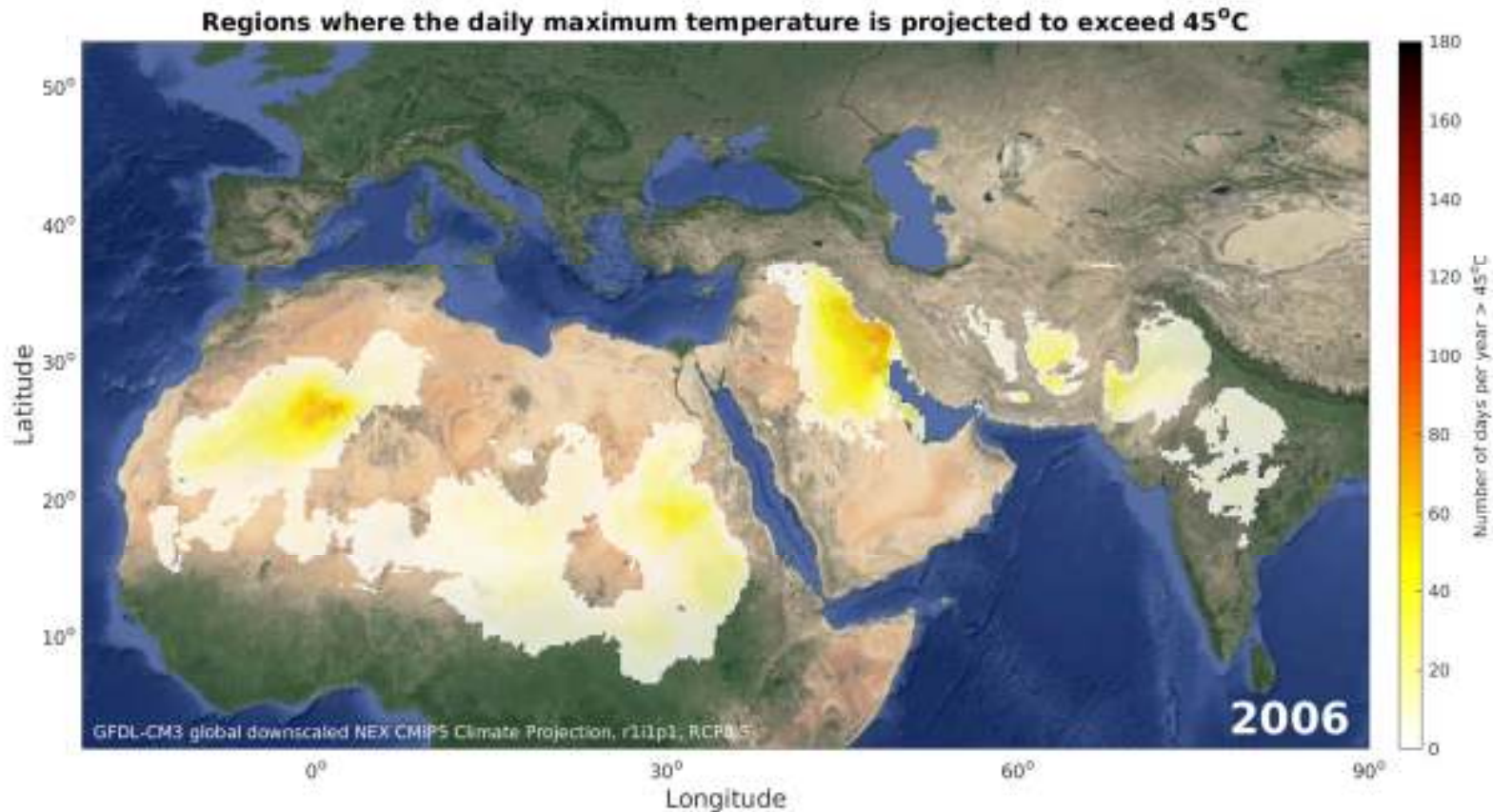
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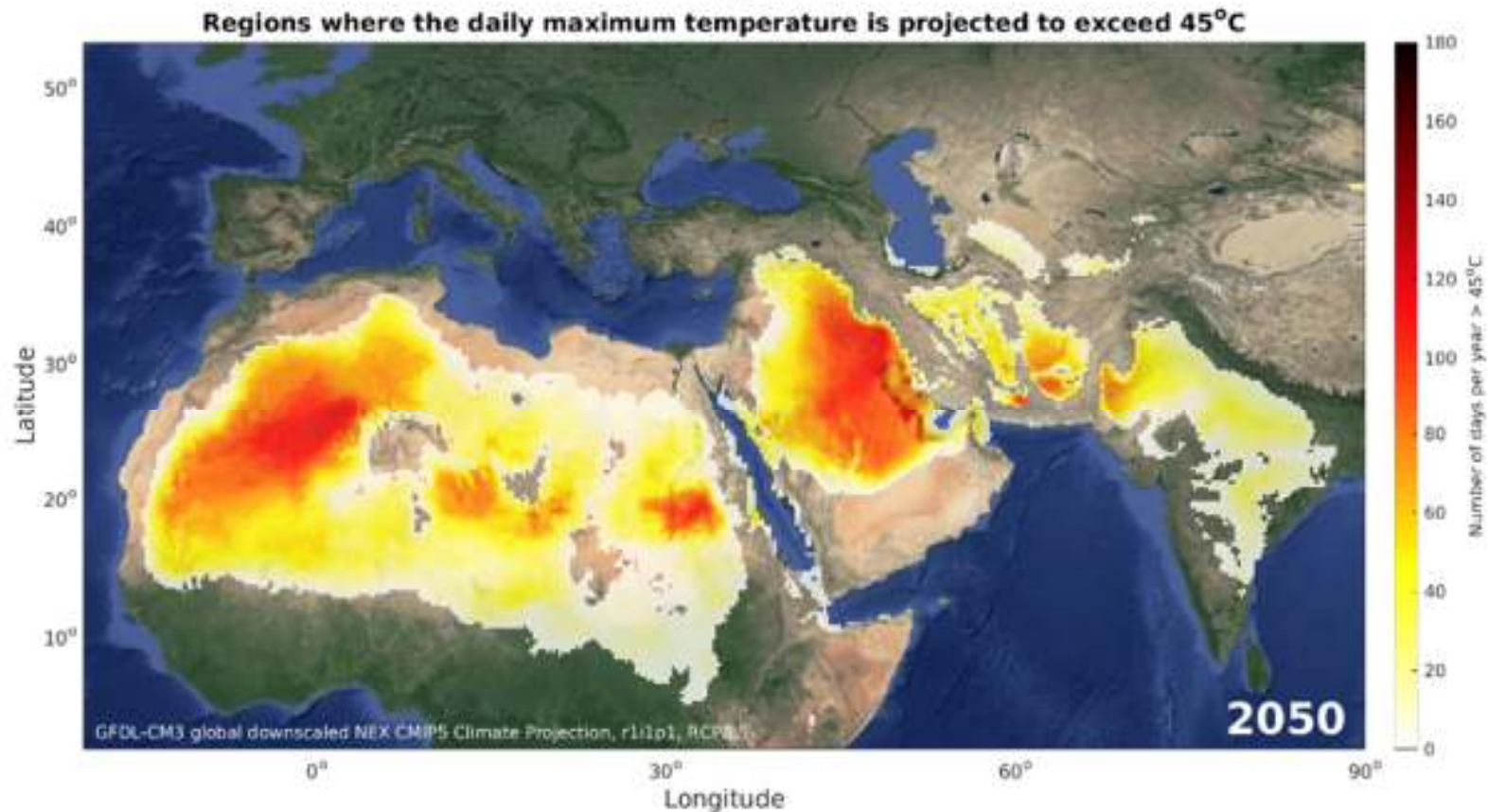
The 0.25° grid provides detail of vulnerable regions (note the expanded color axis)



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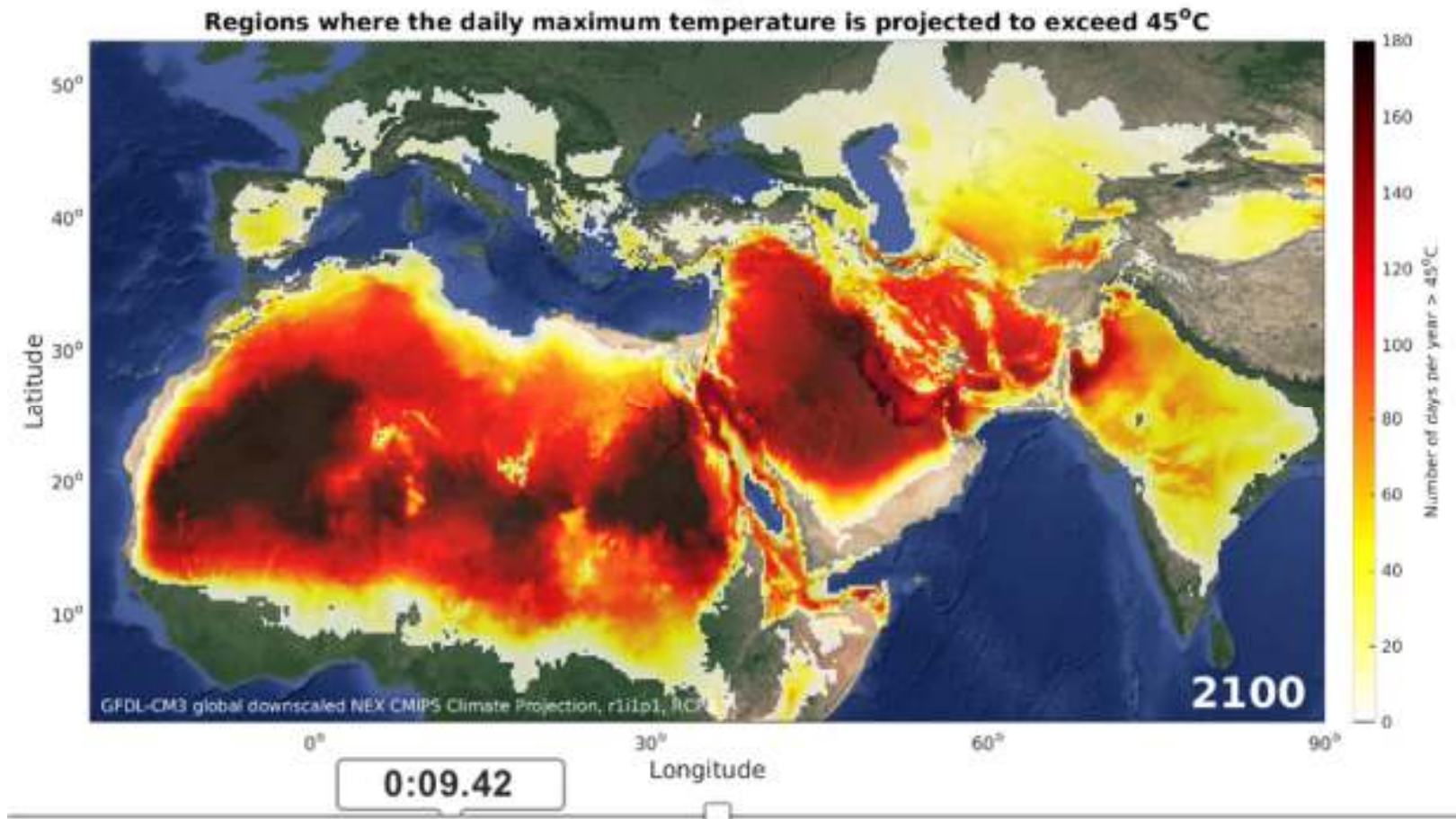
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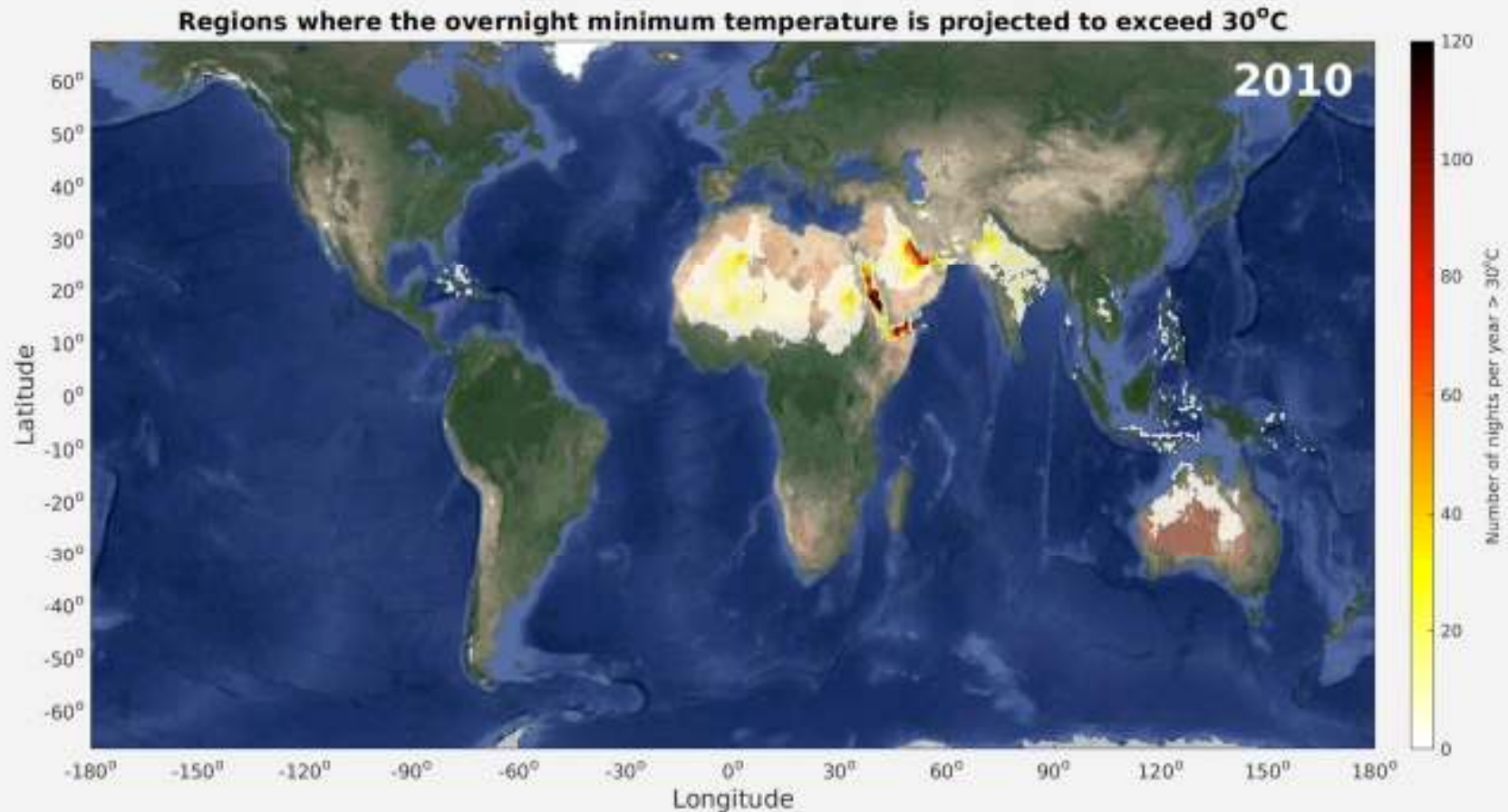
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Annual Count of Nights $> 30^{\circ}\text{C}$ (86°F)



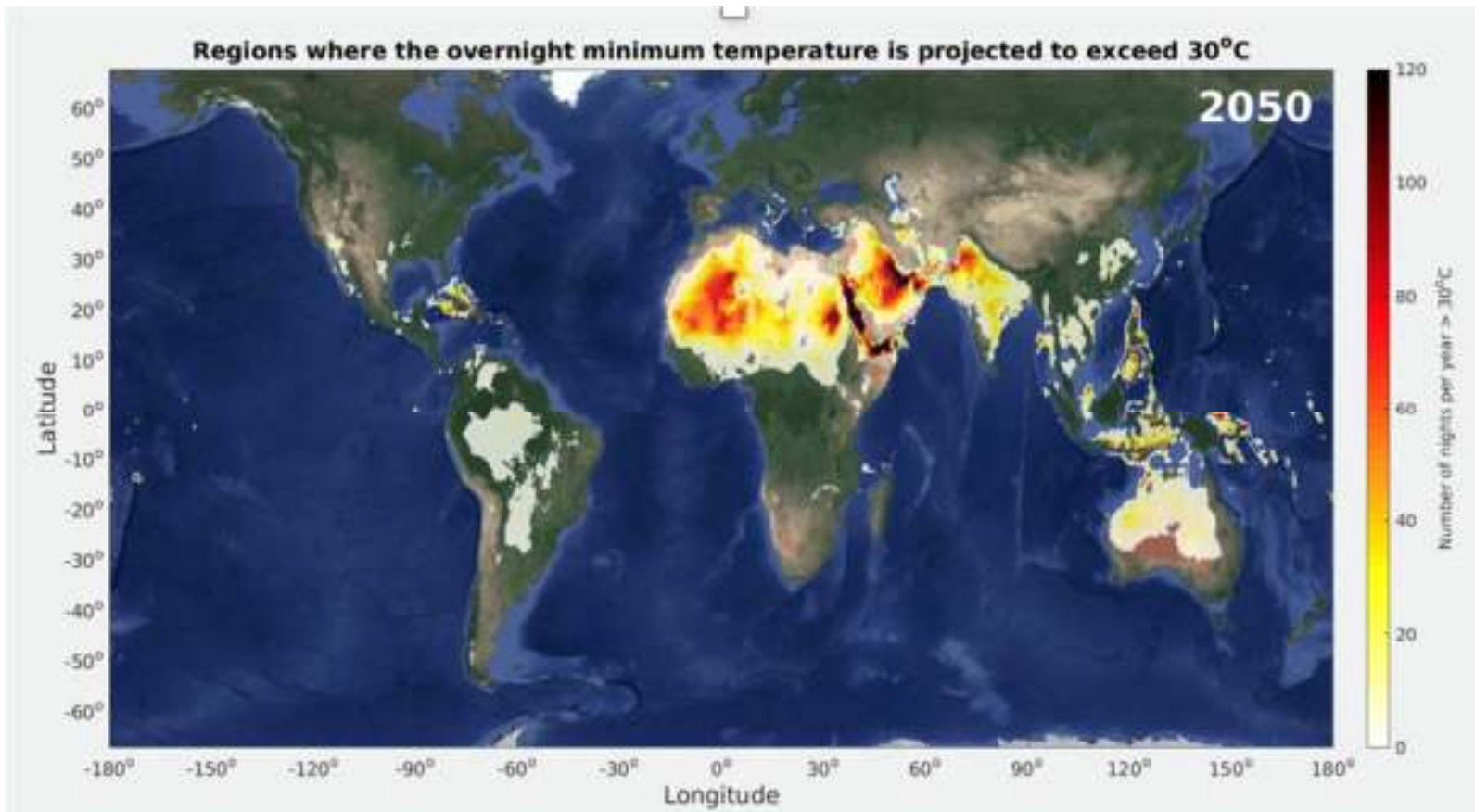
Overnight minimum temperature is also a key consideration



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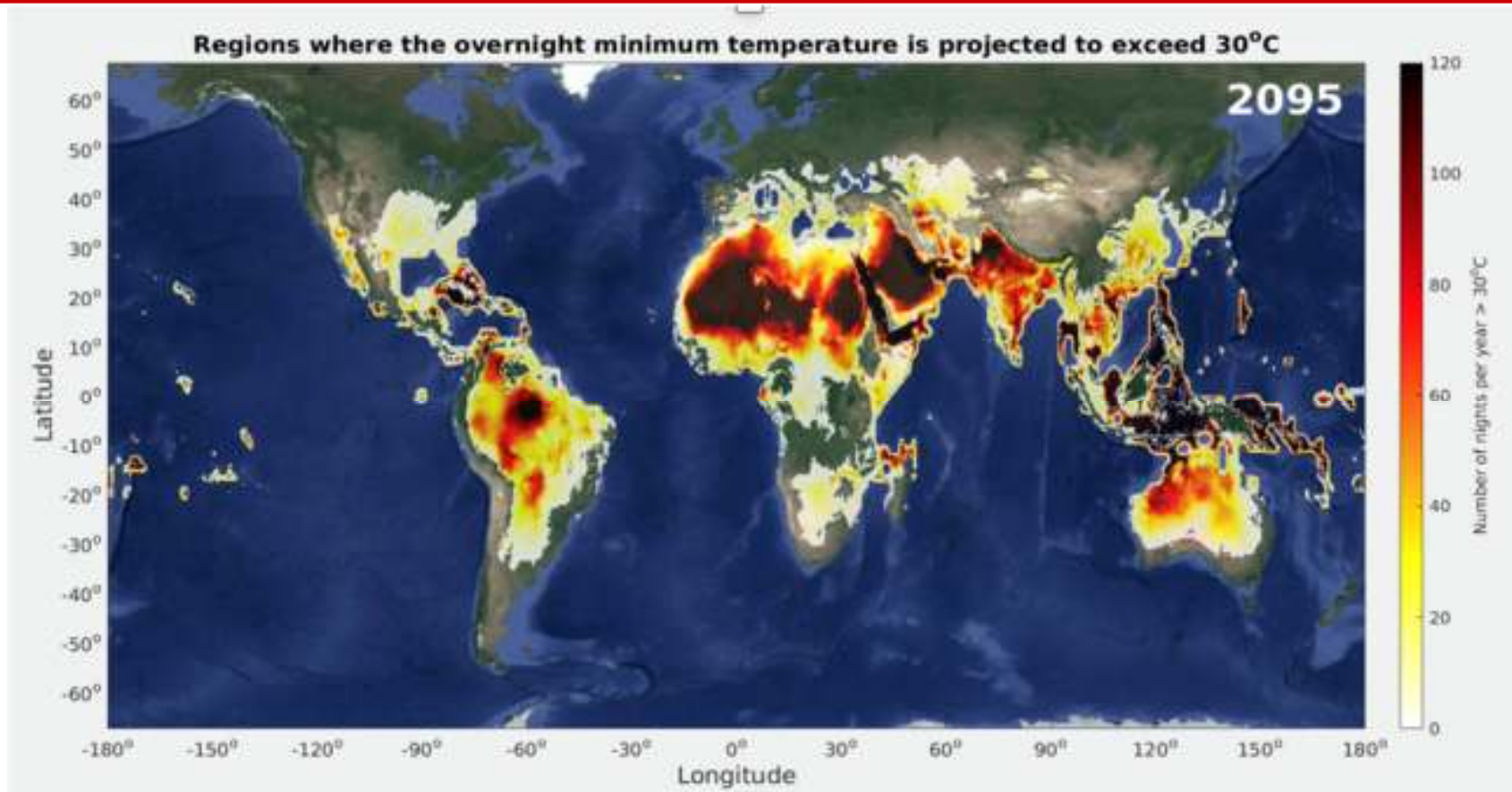
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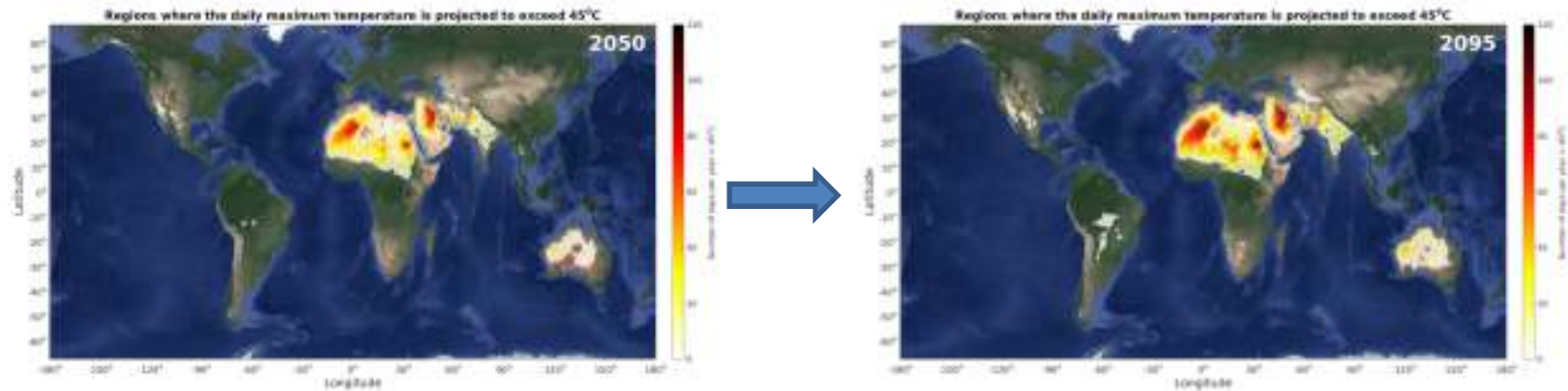


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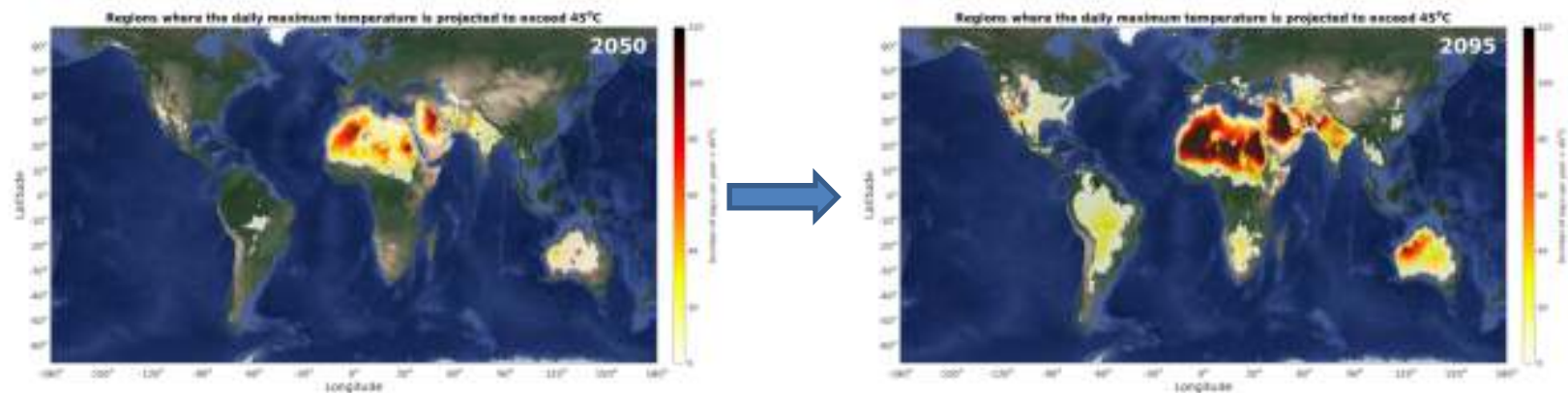
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Different emissions scenarios

Lower emissions scenario (RCP4.5)



Higher emissions scenario (RCP8.5)

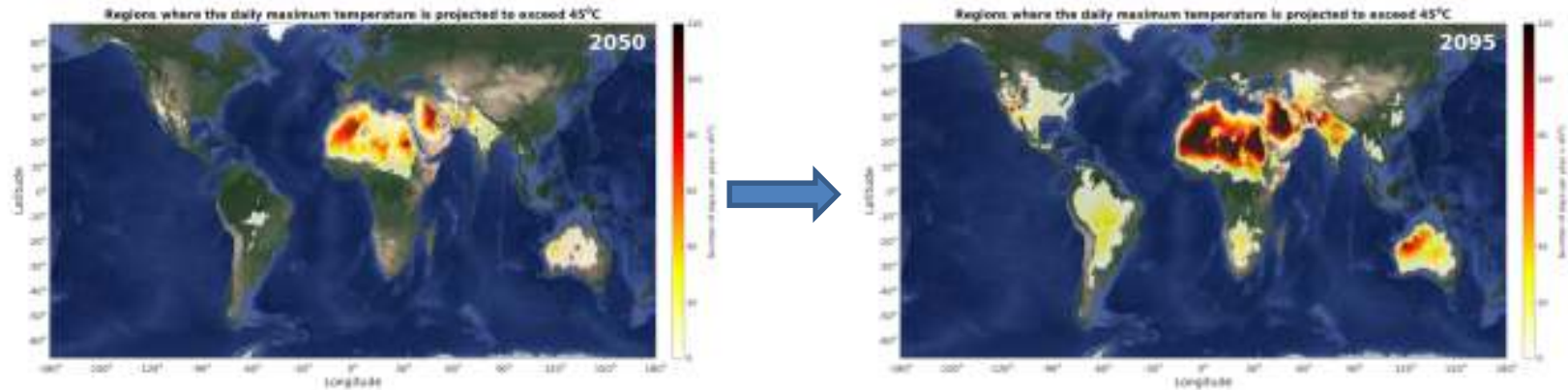


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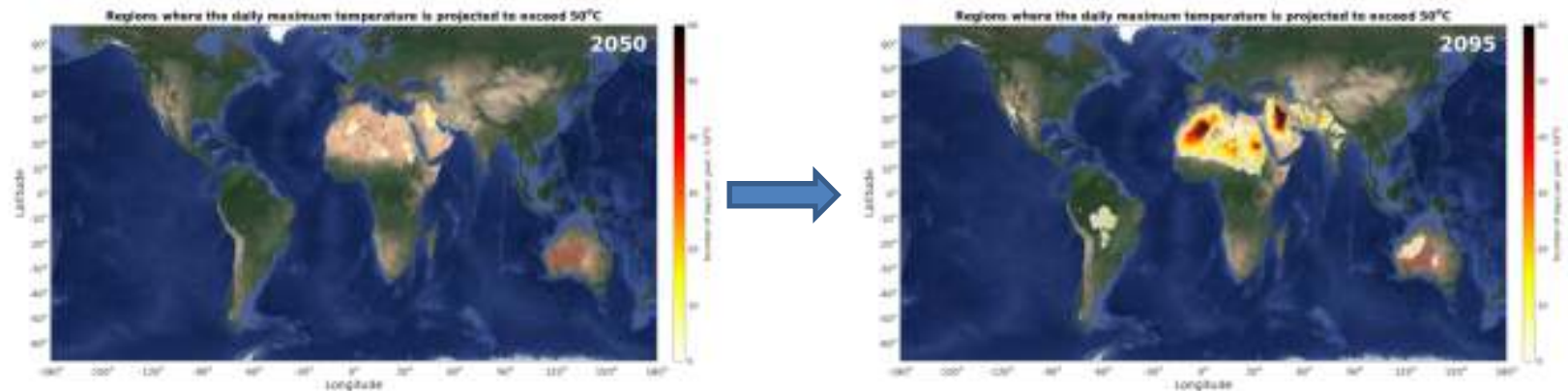
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Different temperature thresholds

Annual Count of Days $> 45^{\circ}\text{C}$ (113°F)



Annual Count of Days $> 50^{\circ}\text{C}$ (122°F)



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Our Capabilities

- Lead Scientist for technical support of the National Climate Assessment
- We provide foundational climate science material for the National Climate Assessment reports
- Deep experience and knowledge about historical and projected climate data



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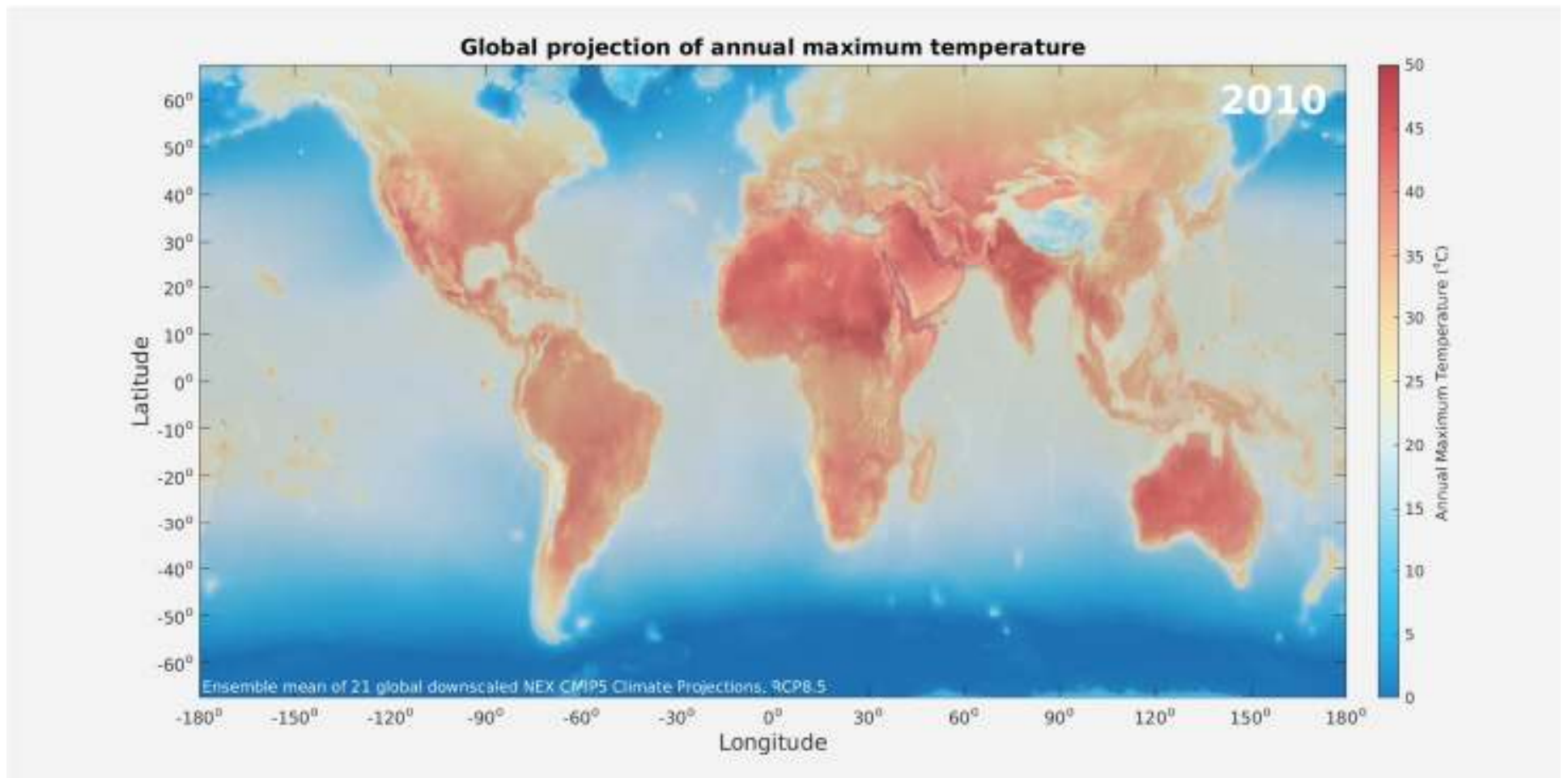
NASA NEX-GDDP Dataset

Summary of the dataset:

- 21 GCMs from the CMIP5 suite
- Historical and 2 Future scenarios (RCP4.5/RCP8.5)
- BCSD downscaling to $0.25^\circ \times 0.25^\circ$ (globally gridded)
- Three daily fields: T_{MAX} , T_{MIN} , Pr
- Retrieved from <ftp://ftp.nccs.nasa.gov/BCSD>
- More info at: <https://cds.nccs.nasa.gov/nex-gddp/>



Annual Maximum Temperature



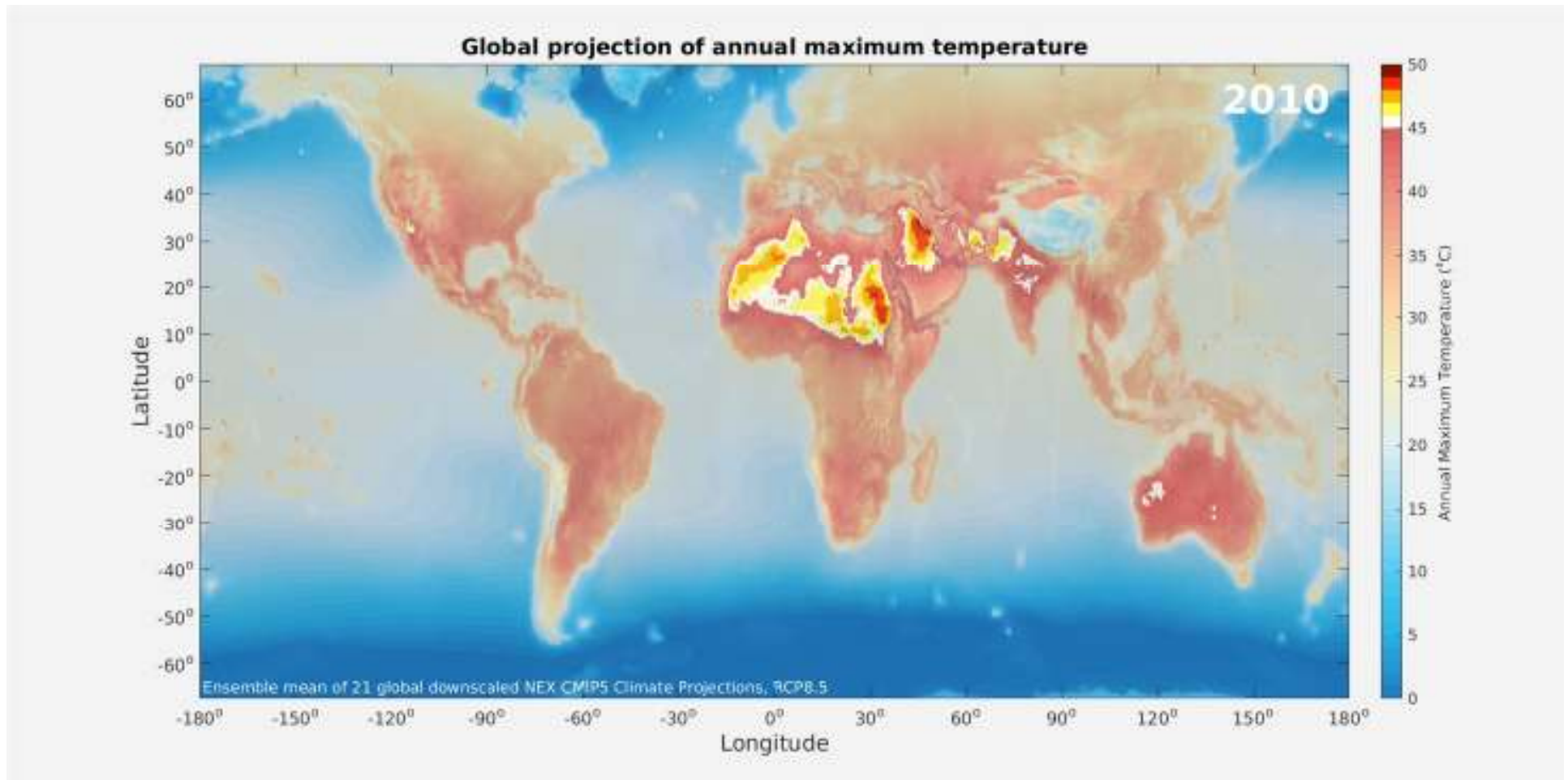
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Annual Maximum Temperature



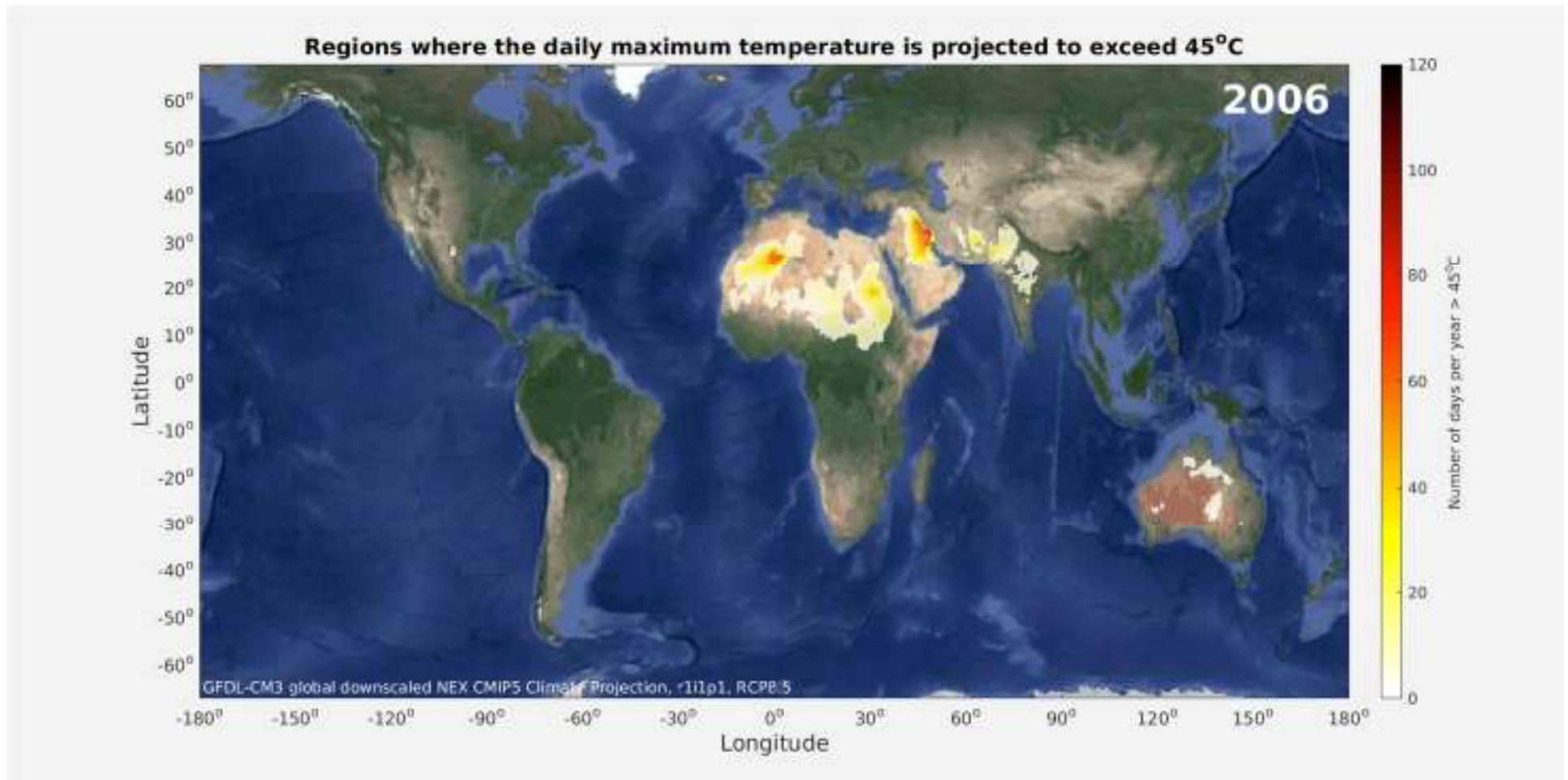
Regions experiencing a daily maximum temperature in excess of 45°C (113°F)



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Annual Count of Days $> 45^{\circ}\text{C}$ (113°F)



Displaying the annual variability from one of the models (representative example)



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