

## Relation between maximum temperatures and weather types as a method for statistical-dynamical downscaling of CMIP6 models

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### Key challenges

- Performance of the models
- Defining (changes in) dynamics
- Defining (changes in) extreme heat
- Selection criteria for downscaling



### Method

1. Evaluation of CMIP6 models: Agreement in Lamb Weather Types (LWTs) between ERA5 and CMIP6 for 1985 – 2014 using the PSS
2. Timing of Global Warming Levels
3. Relation LWTs and extreme heat: Adjusted, temperature-dependent LWT classification



### Metrics

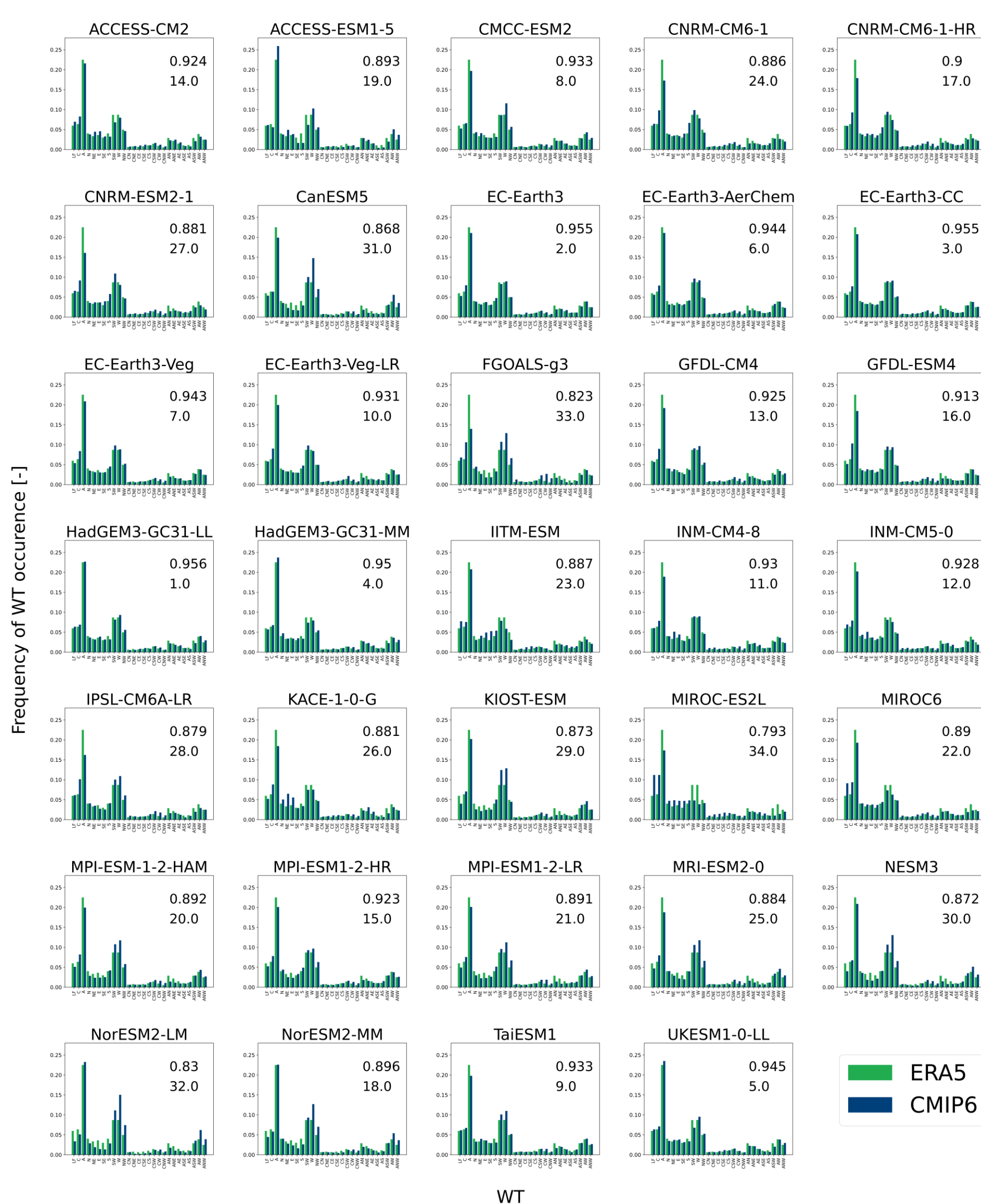
- Perkins Skill Score (PSS)
 
$$= \sum_i^{LWTs} \text{minimum}(f_{i,ERA5}, f_{i,CMIP6})$$
- Absolute change in maximum temperature in the x<sup>th</sup>-percentile (eg. P95)
 
$$= Px_{Tmax,fut} - Px_{Tmax,hist}$$



## How to select periods to downscale based on future changes in dynamics and extreme heat?

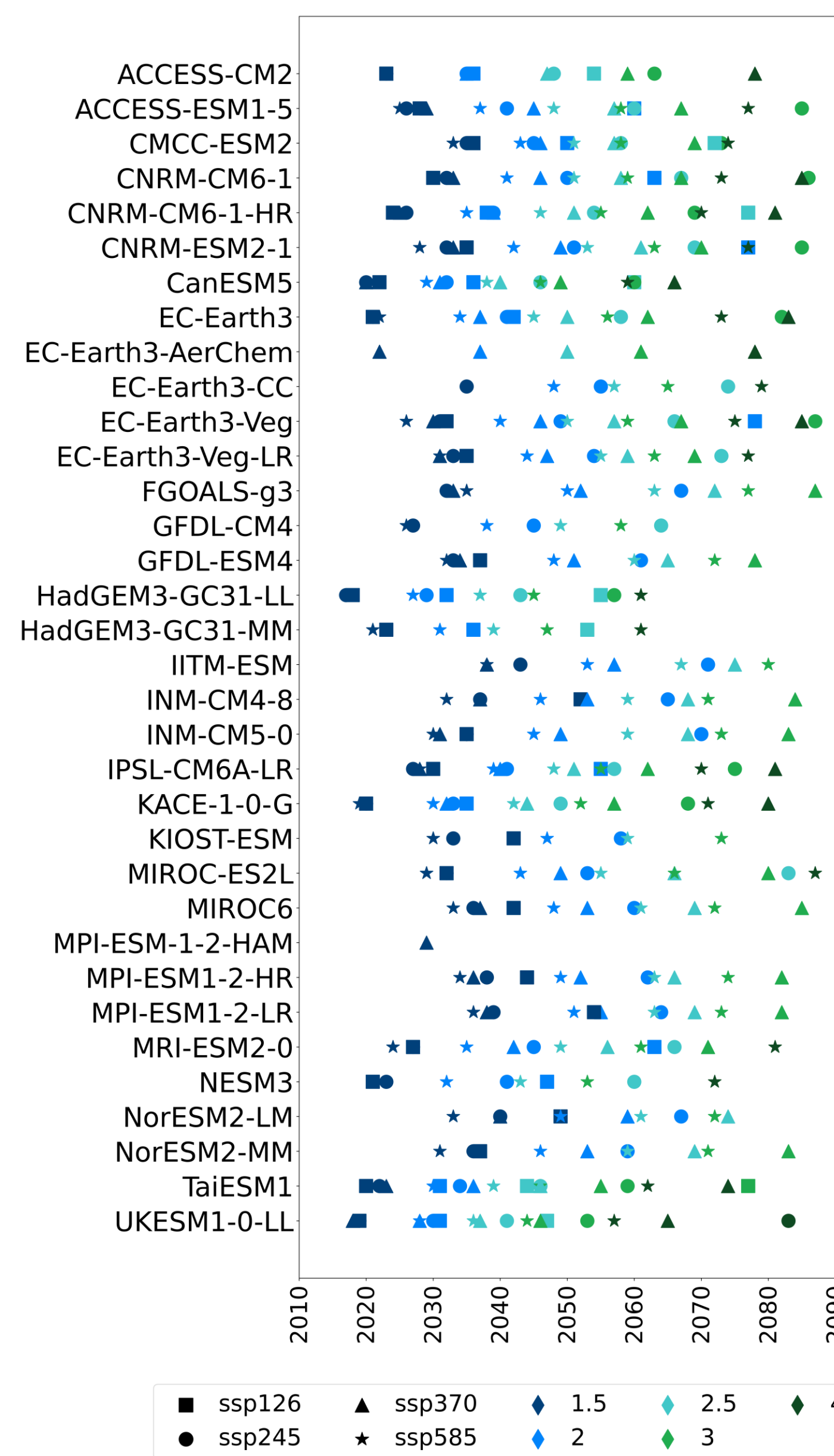
### 1. Evaluation of CMIP6

→ Top 75%



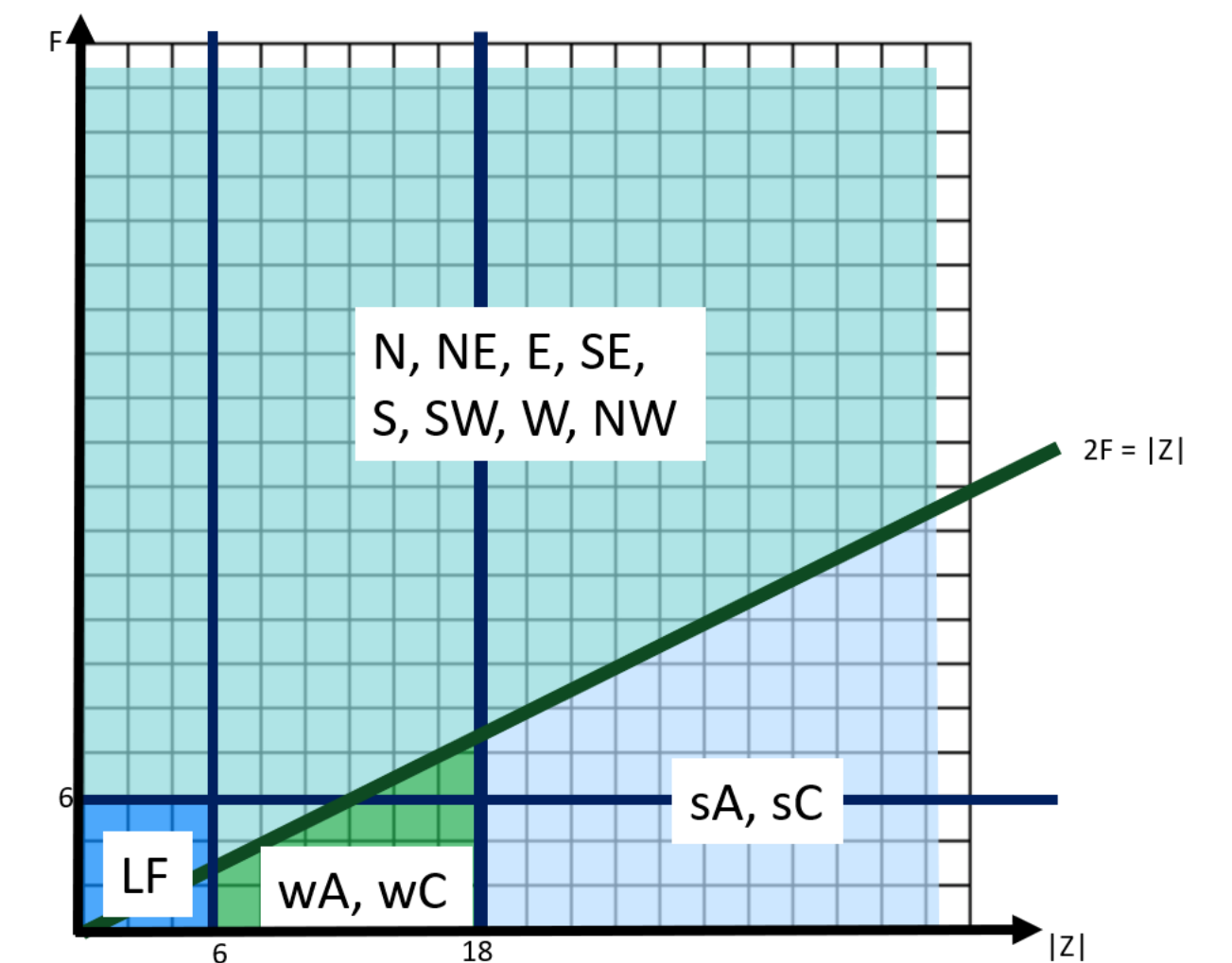
### 2. Timing of GWLs

→ Possible futures

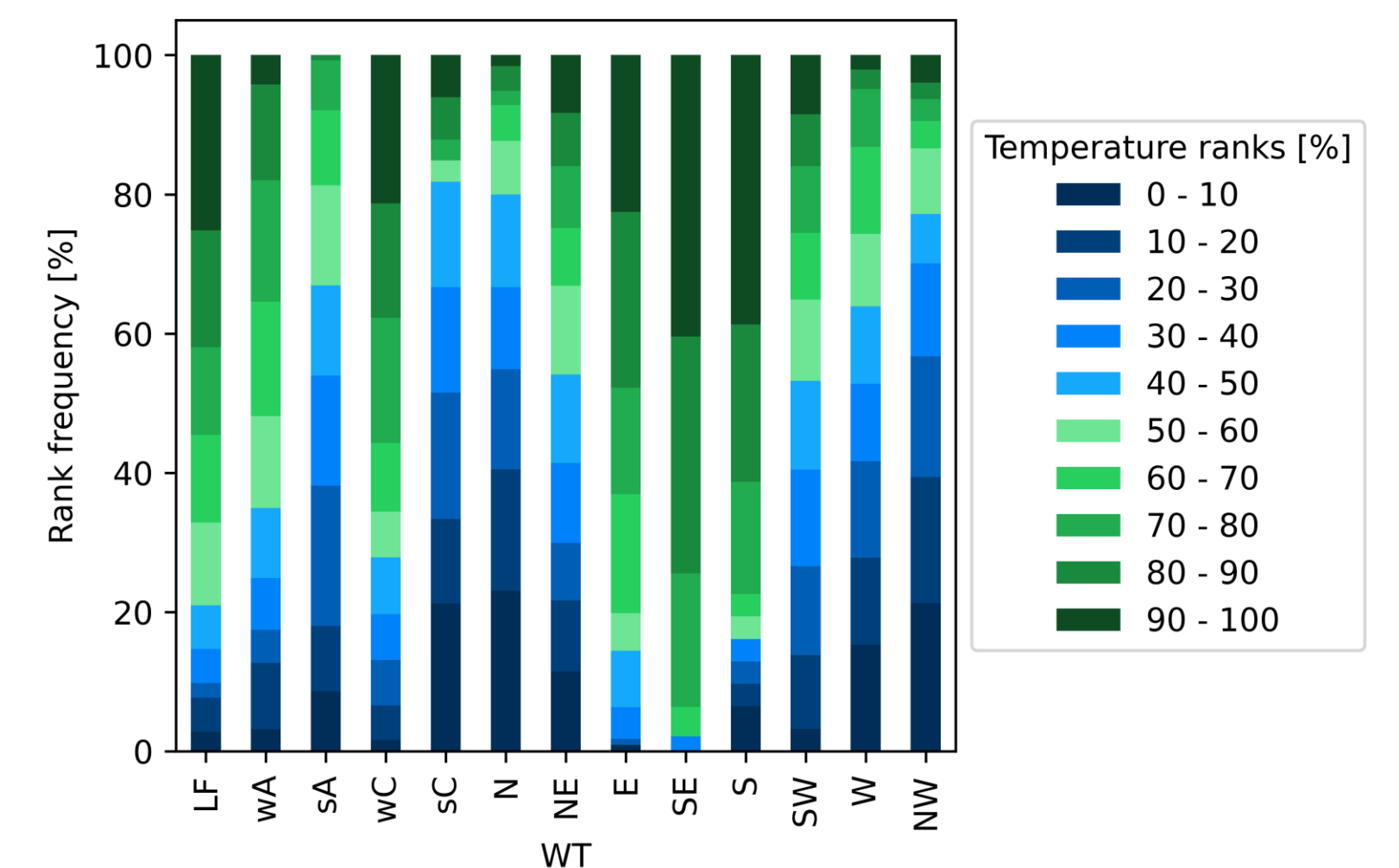


### 3. Relation LWTs and extreme heat

→ Adjusted classification:



→ LWT and maximum temperature:



## Results

→ Starting point for final downscaling selection

