

# ATMOSPHERIC SYNOPTIC CIRCULATIONS LINKED TO SHORT-TERM DROUGHTS OVER EUROPE: A CMIP6 evaluation

Pedro Herrera-Lormendez<sup>1</sup>, Amal John<sup>2</sup>, Hervé Douville<sup>2</sup>, Jörg Matschullat<sup>1</sup>

<sup>1</sup>TUBAF, <sup>2</sup>Météo-France



## Motivation

Investigate links between large-scale near-surface atmospheric circulation and 1-month meteorological droughts over Europe. Explore the ability of CMIP6 Global Climate Models (GCMs) to reproduce these features during the 1950-2000 reference climate period.

## Methods

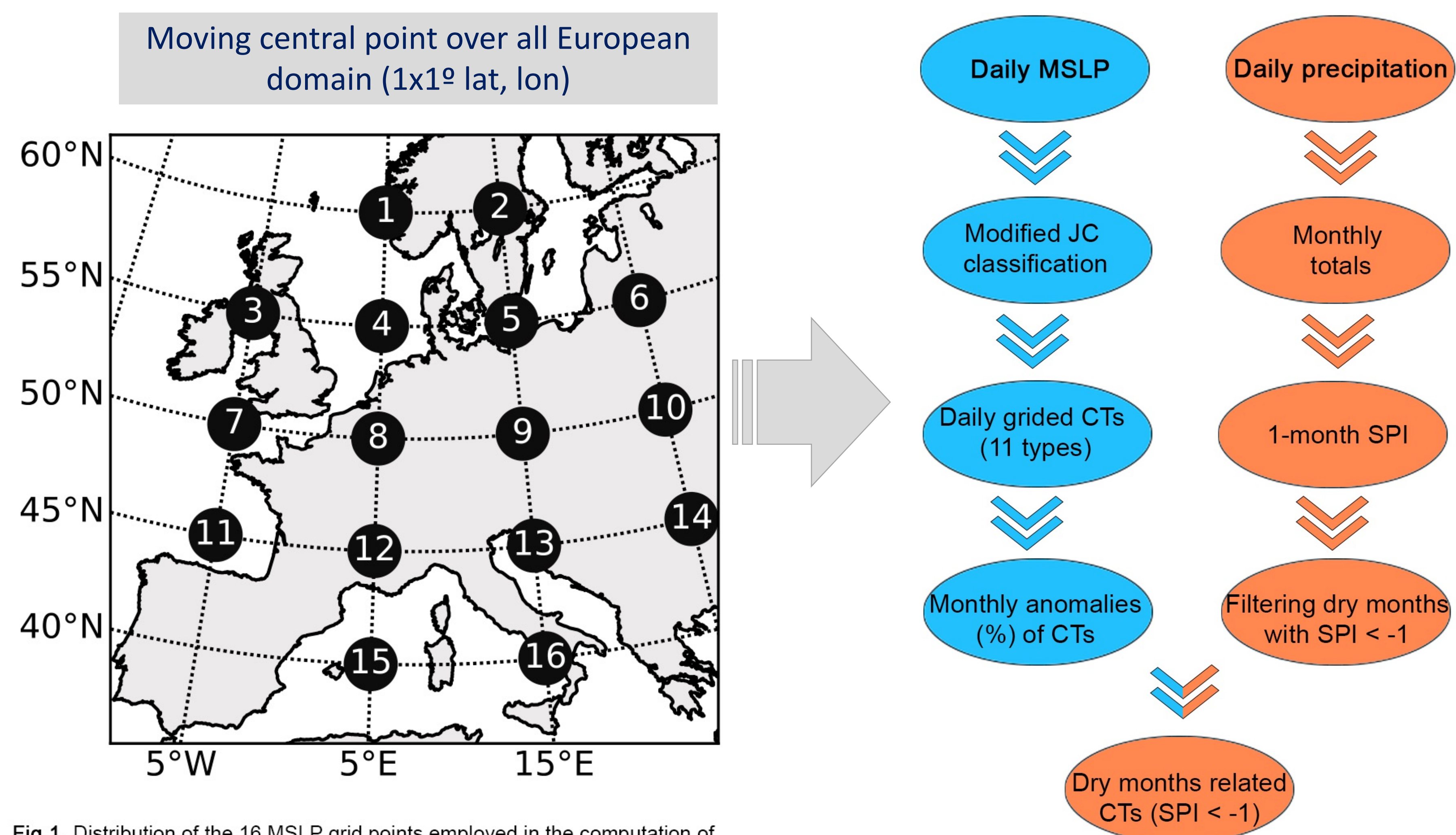


Fig 1. Distribution of the 16 MSLP grid points employed in the computation of the JC classification (Source: Herrera-Lormendez et al., 2021)

## GCMs' evaluation

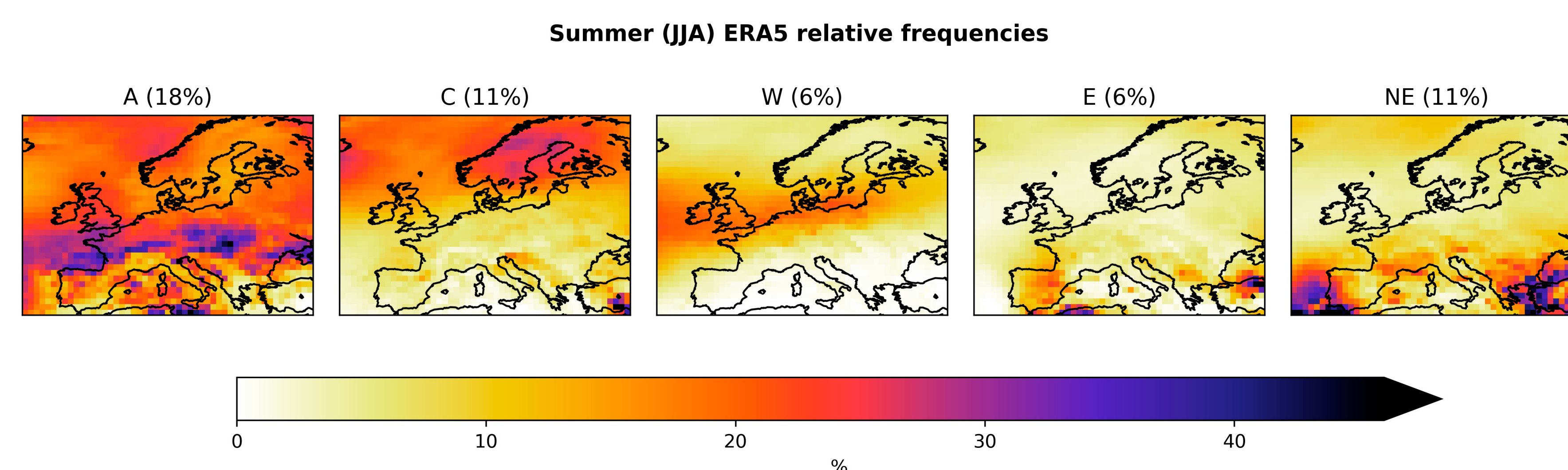


Fig 2. ERA5 summer relative frequencies of five main CTs.

CMIP5 GCMs perform relatively well in simulating the spatial patterns of the relative frequency of summer CTs.

Disagreement in simulating the relative frequency of westerlies with GCMs underestimating them.

Higer than average ocurrence of anticyclones (everywhere) and easterlies (W EU) during dry months

Lower than average ocurrence of cyclones (everywhere) and westerlies (W EU) during dominant dry months

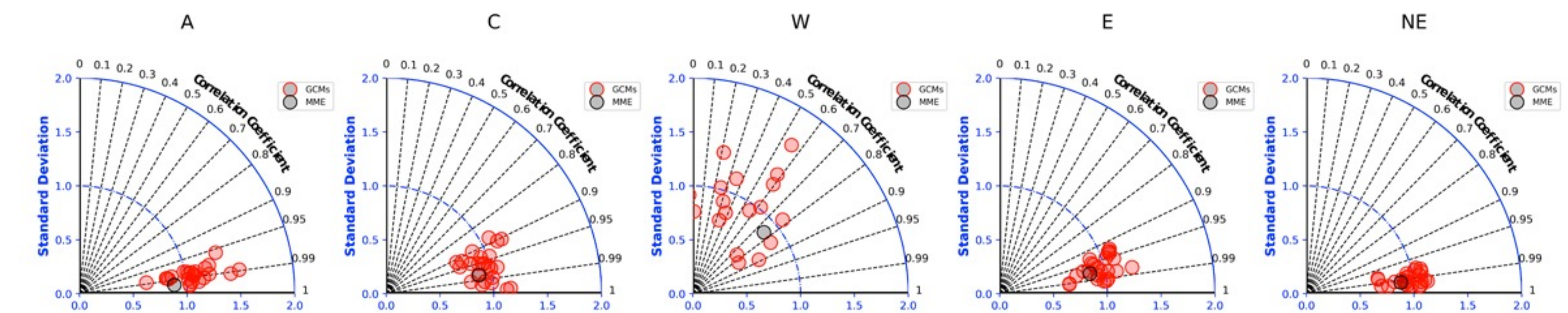


Fig 3. Taylor diagrams assessing the CMIP6 GCMs and MME skill simulating the summer (JJA) relative frequencies of five main CTs over Europe. Anticyclonic (A), Cyclonic (C), Westerly (W), Easterly (E) and North-easterly (NE). Normalized values are shown.

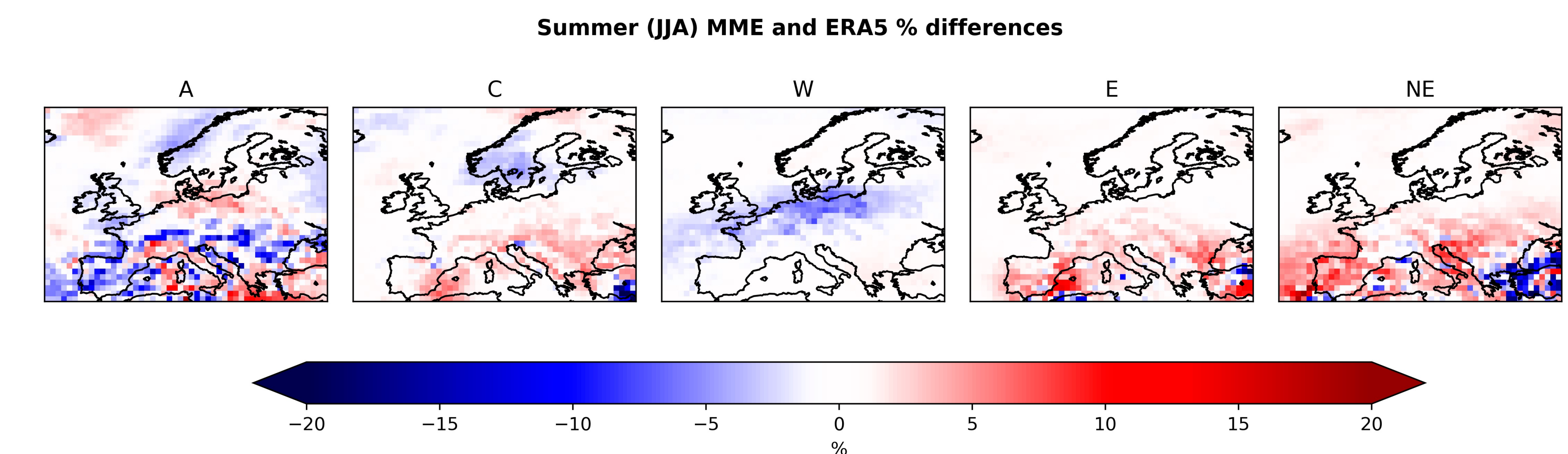


Fig 4. Summer relative frequency differences between MME and ERA5.

## Synoptic circulations linked to dry months

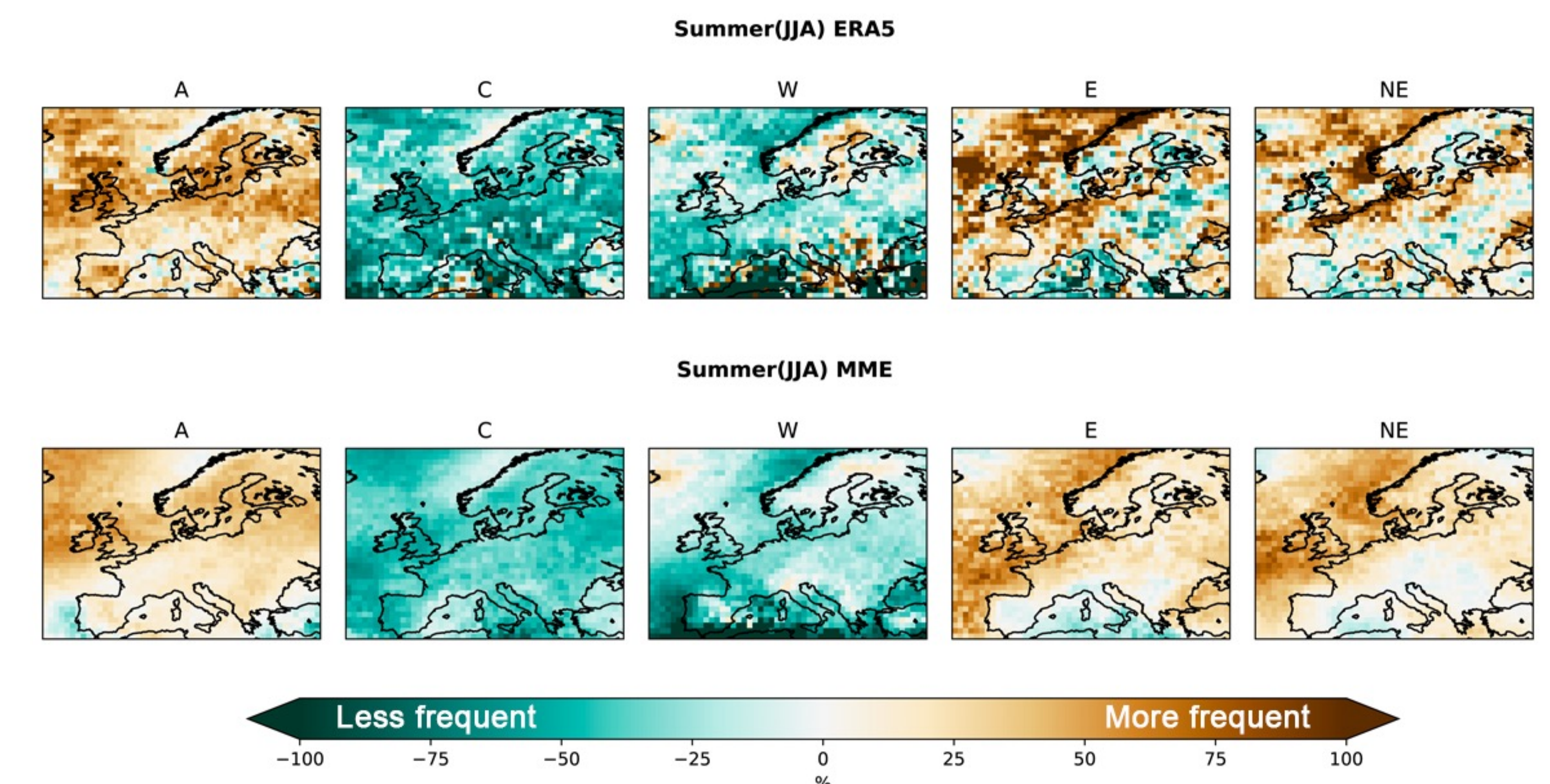


Fig 5. Summer comparison of ERA5 and CMIP6 GCMs MME of CTs frequency anomalies linked to 1-month dry months (SPI < -1)