Worst case climate simulations show that heatwaves could cause major disruptions in the Paris 2024 Olympics: Supplementary information

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Abstract

This document contains supplementary material to the main paper: table of models used in the paper and SLP maps for CMIP6 models.

Keywords: Climate change, Rare events

This document contains the list of CMIP6 files used in this study and supplementary figures of SLP for each model during extreme heatwaves.

1 Supplementary table

The CMIP6 data that are used are summarized in Table 1 below. The 14 models were selected to yield four SSP scenario runs (SSP1-2.6, SSP2-4.5, SSP3-7.0, SSP5-8.5) and the availability of daily data for temperature and SLP fields on the French ESGF node (https://esgf-node.ipsl.upmc.fr/projects/esgf-ipsl/).

Table 1 List of CMIP6 models used in this study. The third column indicates the member identification from the ensemble.

Group ID	Model ID	Member ID	Reference
AS-RCEC	TaiESM1	r1i1p1f1	[1]
BCC	BCC-CSM2-MR	r1i1p1f1	[2]
CCCma	CanESM5	r1i1p1f1	[3, 4]
CMCC	CMCC-CM2-SR5	r1i1p1f1	[5]
CNRM-CERFACS	CNRM-ESM2-1	r1i1p1f2	[6]
CSIRO	ACCESS-ESM1-5	r1i1p1f1	[7]
EC-Earth-Consortium	EC-Earth3	r1i1p1f1	[8]
IPSL	IPSL-CM6A-LR	r1i1p1f1	[9]
MIROC	MIROC-ES2L	r1i1p1f2	[10]
MPI-M	MPI-ESM1-2-LR	r1i1p1f1	[11–16]
MRI	MRI-ESM2-0	r1i1p1f1	[17]
NCAR	CESM2-WACCM	r1i1p1f1	[18]
NCC	NorESM2-LM	r1i1p1f1	[19]
NOAA-GFDL	GFDL-ESM4	r1i1p1f1	[20]

2 Supplementary figures

Composite SLP for identified and simulated extreme heatwaves in CMIP6 simulations from the four SSP scenarios.

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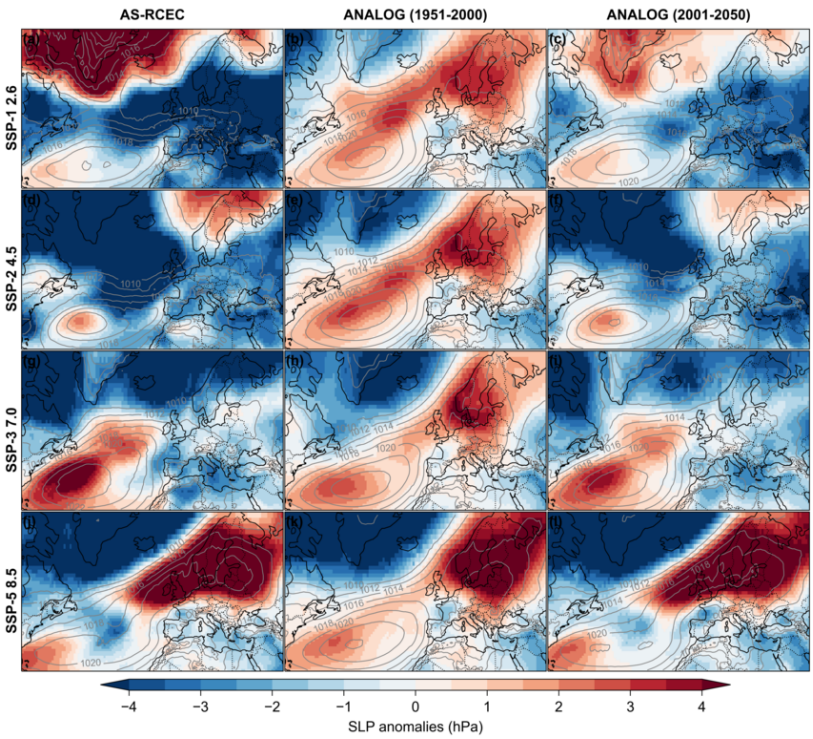

Fig. 1 SLP maps over the North Atlantic region during 15 day heatwaves detected in four AS-REC SSP simulations (left panels a, d, g, j). Extreme simulations with analogs in 1951-2000 (central panels b, e, h, k). Extreme simulations with analogs in 2001-2050 (right panels c, f, i, l). Colors represent SLP anomalies (hPa). Isolines represent SLP (hPa).

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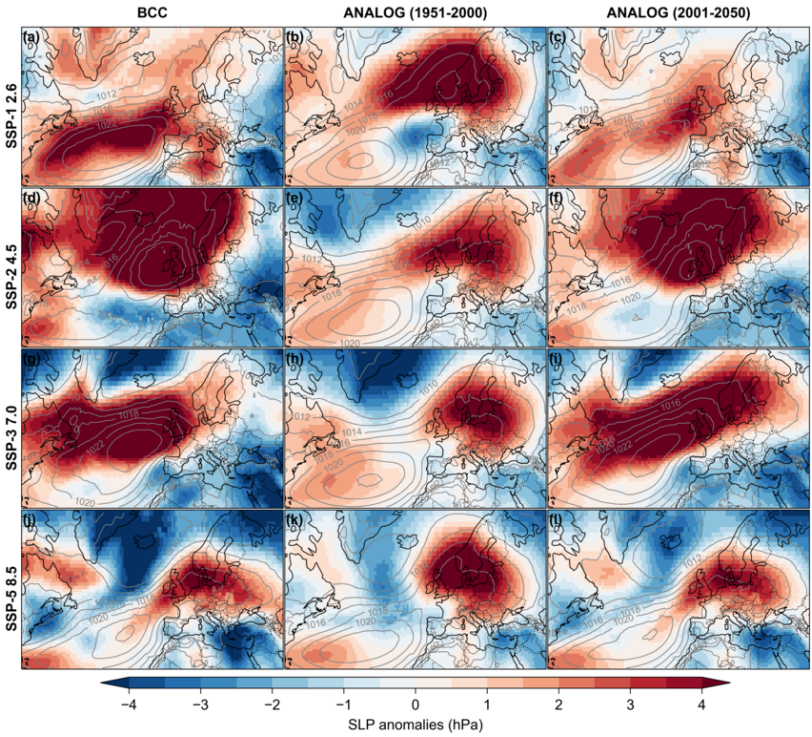

Fig. 2 SLP maps over the North Atlantic region during 15 day heatwaves detected in four BCC SSP simulations (left panels a, d, g, j). Extreme simulations with analogs in 1951-2000 (central panels b, e, h, k). Extreme simulations with analogs in 2001-2050 (right panels c, f, i, l). Colors represent SLP anomalies (hPa). Isolines represent SLP (hPa).

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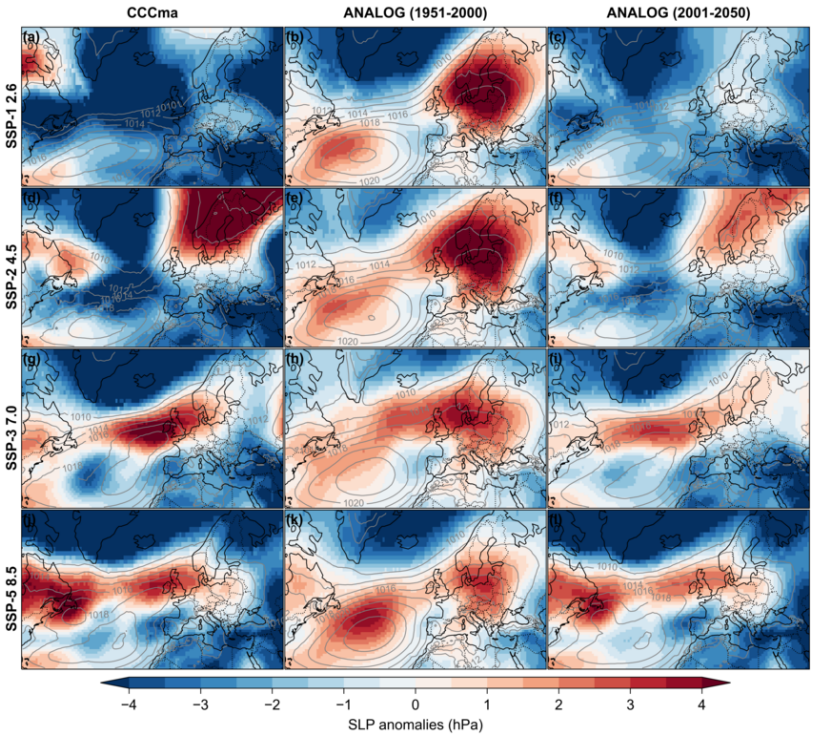

Fig. 3 SLP maps over the North Atlantic region during 15 day heatwaves detected in four BCC SSP simulations (left panels a, d, g, j). Extreme simulations with analogs in 1951-2000 (central panels b, e, h, k). Extreme simulations with analogs in 2001-2050 (right panels c, f, i, l). Colors represent SLP anomalies (hPa). Isolines represent SLP (hPa).

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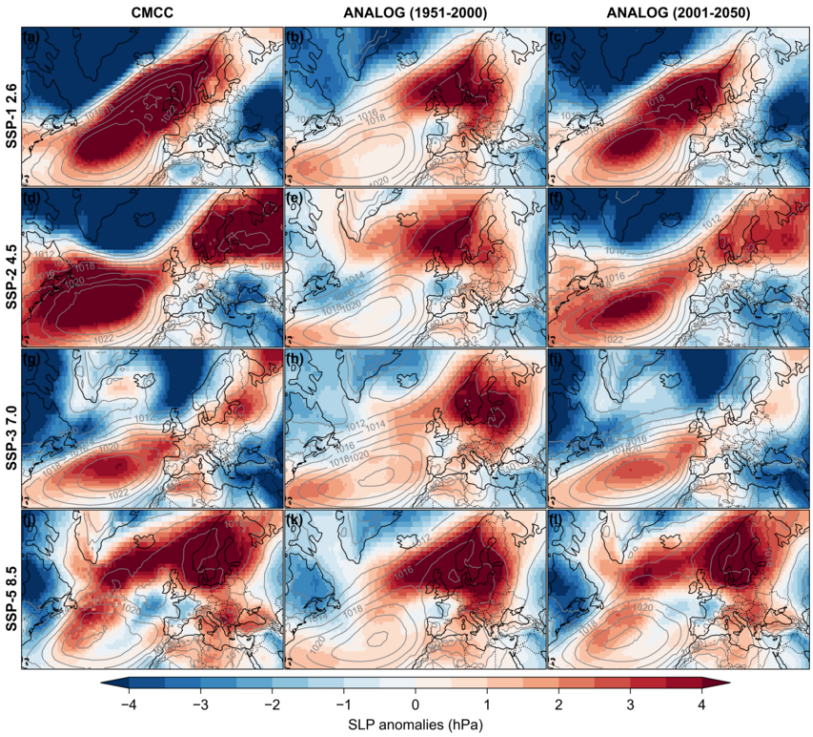

Fig. 4 SLP maps over the North Atlantic region during 15 day heatwaves detected in four CMCC SSP simulations (left panels a, d, g, j). Extreme simulations with analogs in 1951-2000 (central panels b, e, h, k). Extreme simulations with analogs in 2001-2050 (right panels c, f, i, l). Colors represent SLP anomalies (hPa). Isolines represent SLP (hPa).

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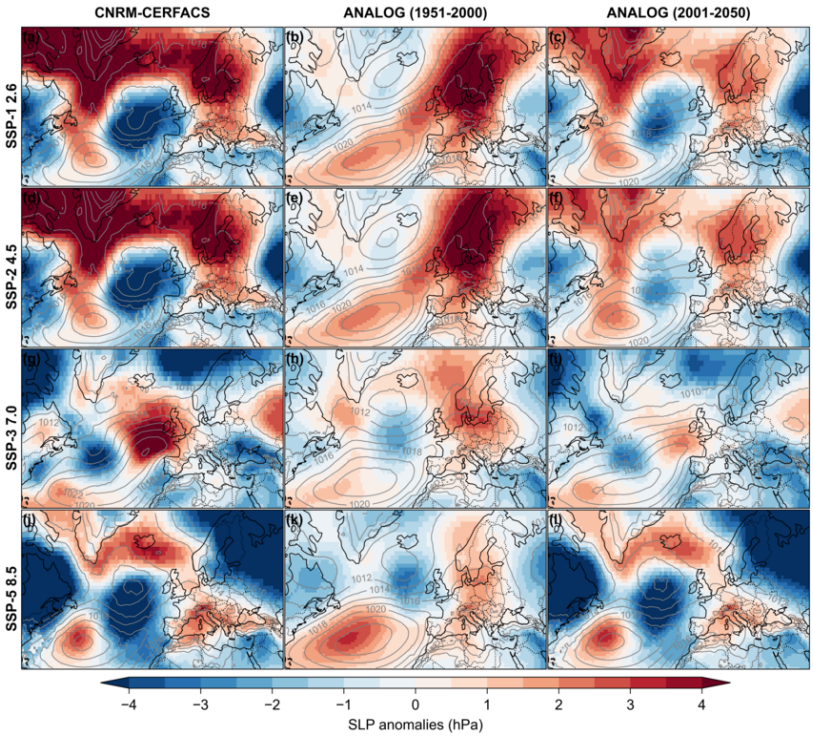

Fig. 5 SLP maps over the North Atlantic region during 15 day heatwaves detected in four CNRM-CERFACS SSP simulations (left panels a, d, g, j). Extreme simulations with analogs in 1951-2000 (central panels b, e, h, k). Extreme simulations with analogs in 2001-2050 (right panels c, f, i, l). Colors represent SLP anomalies (hPa). Isolines represent SLP (hPa).

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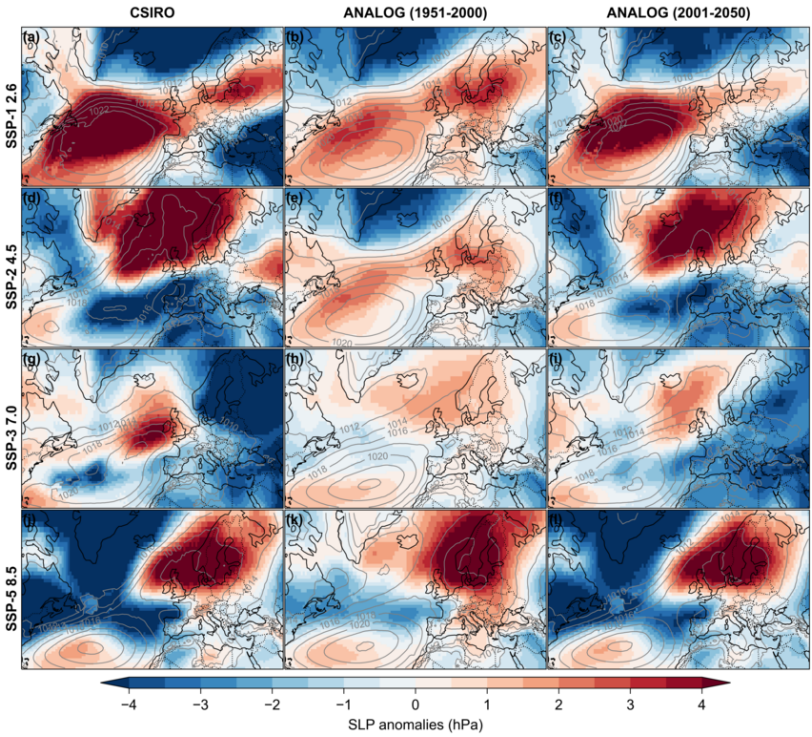

Fig. 6 SLP maps over the North Atlantic region during 15 day heatwaves detected in four CSIRO SSP simulations (left panels a, d, g, j). Extreme simulations with analogs in 1951-2000 (central panels b, e, h, k). Extreme simulations with analogs in 2001-2050 (right panels c, f, i, l). Colors represent SLP anomalies (hPa). Isolines represent SLP (hPa).

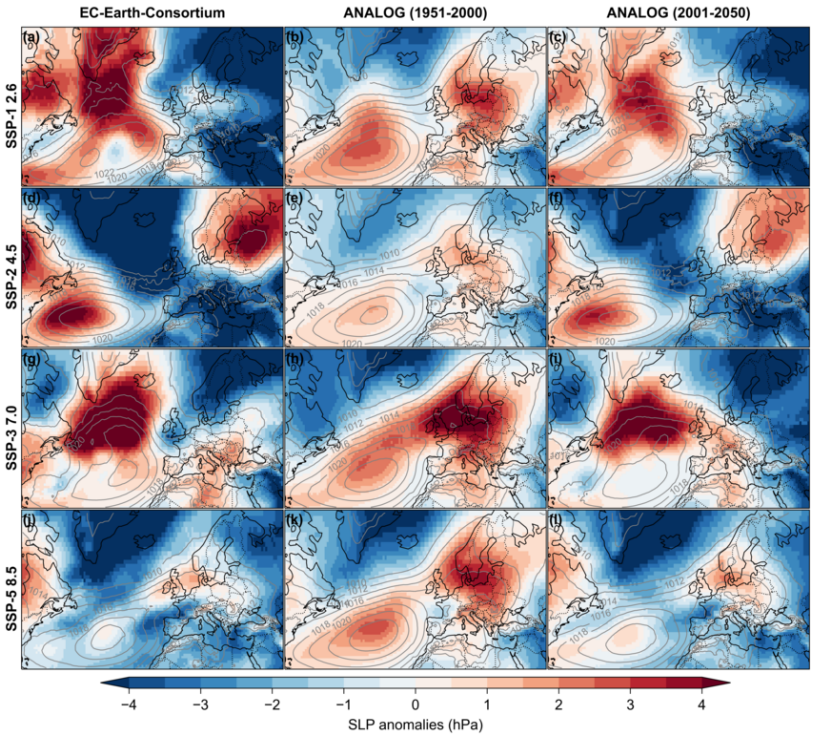

Fig. 7 SLP maps over the North Atlantic region during 15 day heatwaves detected in four EC-Earth SSP simulations (left panels a, d, g, j). Extreme simulations with analogs in 1951-2000 (central panels b, e, h, k). Extreme simulations with analogs in 2001-2050 (right panels c, f, i, l). Colors represent SLP anomalies (hPa). Isolines represent SLP (hPa).

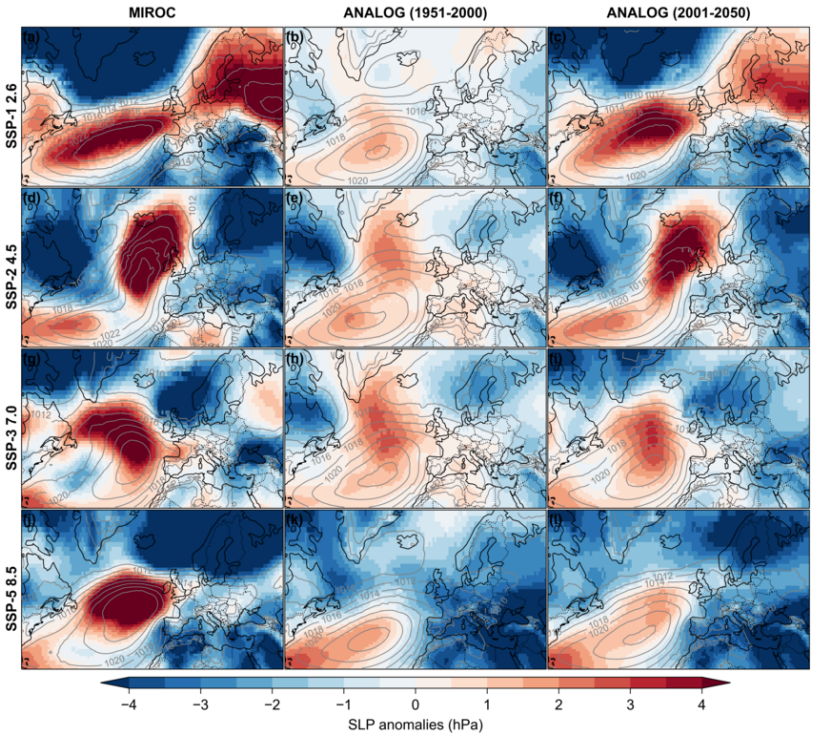

Fig. 8 SLP maps over the North Atlantic region during 15 day heatwaves detected in four MIROC SSP simulations (left panels a, d, g, j). Extreme simulations with analogs in 1951-2000 (central panels b, e, h, k). Extreme simulations with analogs in 2001-2050 (right panels c, f, i, l). Colors represent SLP anomalies (hPa). Isolines represent SLP (hPa).

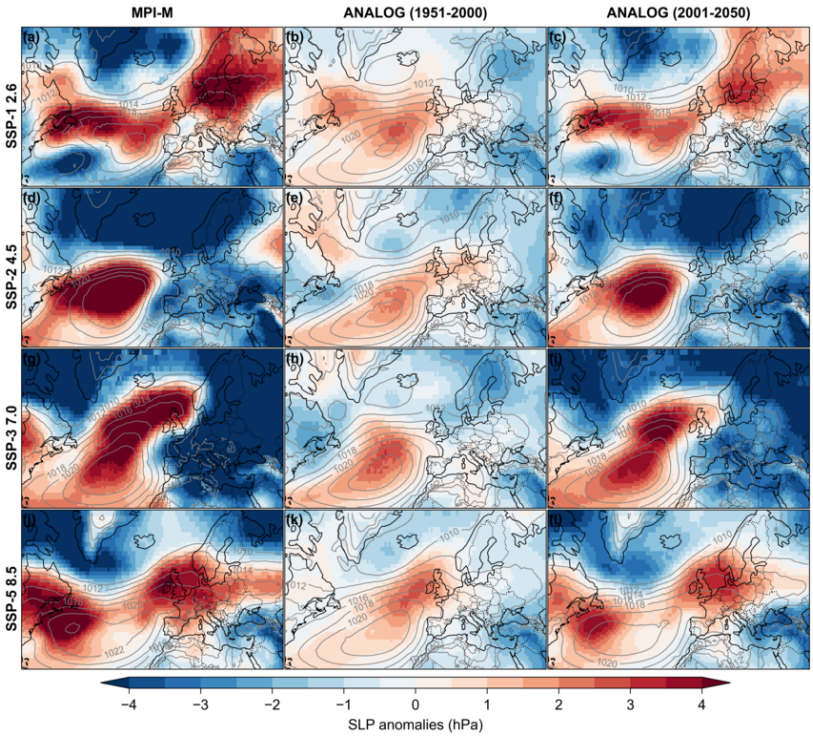

Fig. 9 SLP maps over the North Atlantic region during 15 day heatwaves detected in four MPI-M SSP simulations (left panels a, d, g, j). Extreme simulations with analogs in 1951-2000 (central panels b, e, h, k). Extreme simulations with analogs in 2001-2050 (right panels c, f, i, l). Colors represent SLP anomalies (hPa). Isolines represent SLP (hPa).

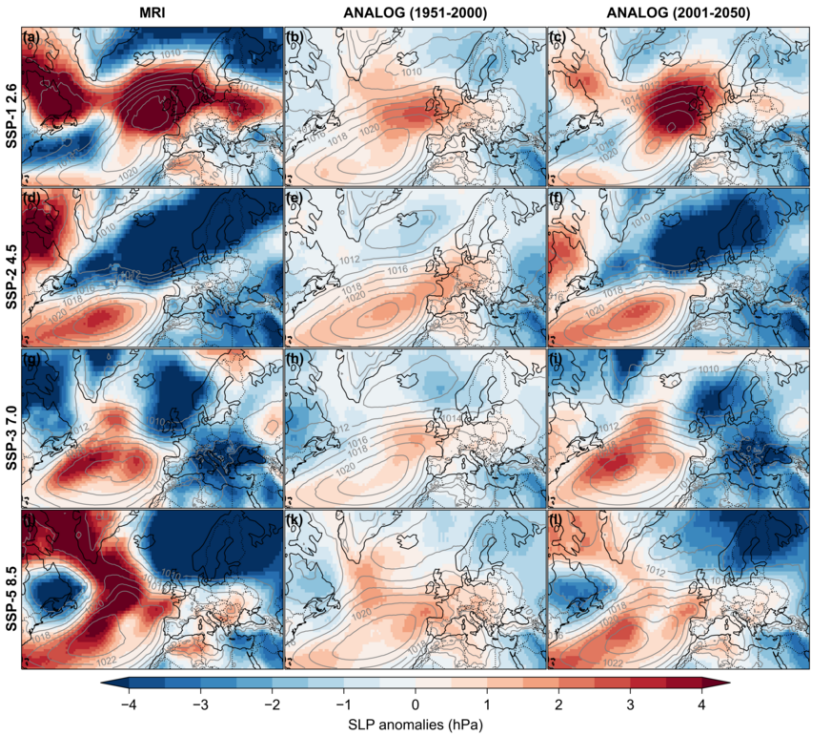

Fig. 10 SLP maps over the North Atlantic region during 15 day heatwaves detected in four MRI SSP simulations (left panels a, d, g, j). Extreme simulations with analogs in 1951-2000 (central panels b, e, h, k). Extreme simulations with analogs in 2001-2050 (right panels c, f, i, l). Colors represent SLP anomalies (hPa). Isolines represent SLP (hPa).

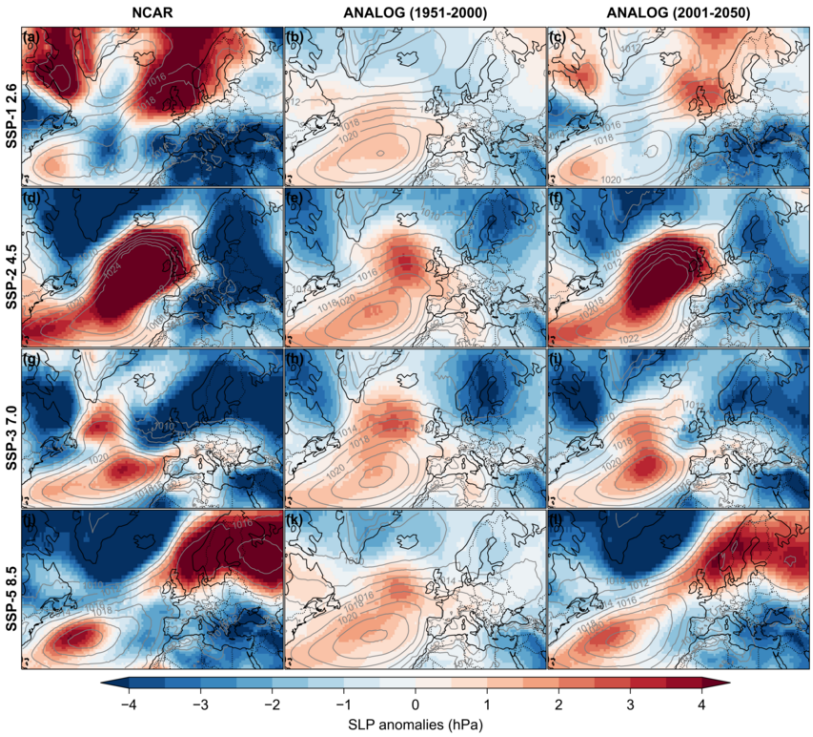

Fig. 11 SLP maps over the North Atlantic region during 15 day heatwaves detected in four NCAR SSP simulations (left panels a, d, g, j). Extreme simulations with analogs in 1951-2000 (central panels b, e, h, k). Extreme simulations with analogs in 2001-2050 (right panels c, f, i, l). Colors represent SLP anomalies (hPa). Isolines represent SLP (hPa).