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Supplement of

Atmospheric regional climate projections for the Baltic Sea region until 2100

Ole Bøssing Christensen et al.

Correspondence to: Ole Bøssing Christensen (obc@dmi.dk)

We here show figures corresponding to Figures 1, 2 and 7 of the main paper, but for two periods (1981-2010 versus 2041-2070 and versus 2071-2100) and three greenhouse gas concentration scenarios (RCP2.6, RCP4.5 and RCP8.5). Summer (June-August) and winter (December-February) 2m air temperature, precipitation, 10m wind speed, surface insolation, and winter sea ice concentration are displayed.

In all following figures, the mid column depicting median values at every grid point is only coloured when 75% of simulations agree on the sign of the change. For ease of comparison, the RCP8.5 maps of the paper are replicated here.

Also, we show tables of regional averages of ensemble means and ensemble standard deviations for temperature and precipitation of EURO-CORDEX and ENSEMBLES simulations for 2041-2071 vs. 1981-2010 as well as for 2071-2100 vs. 1981-2010, for the scenarios RCP2.6, RCP4.5, RCP8.5 and the SRES A1B.

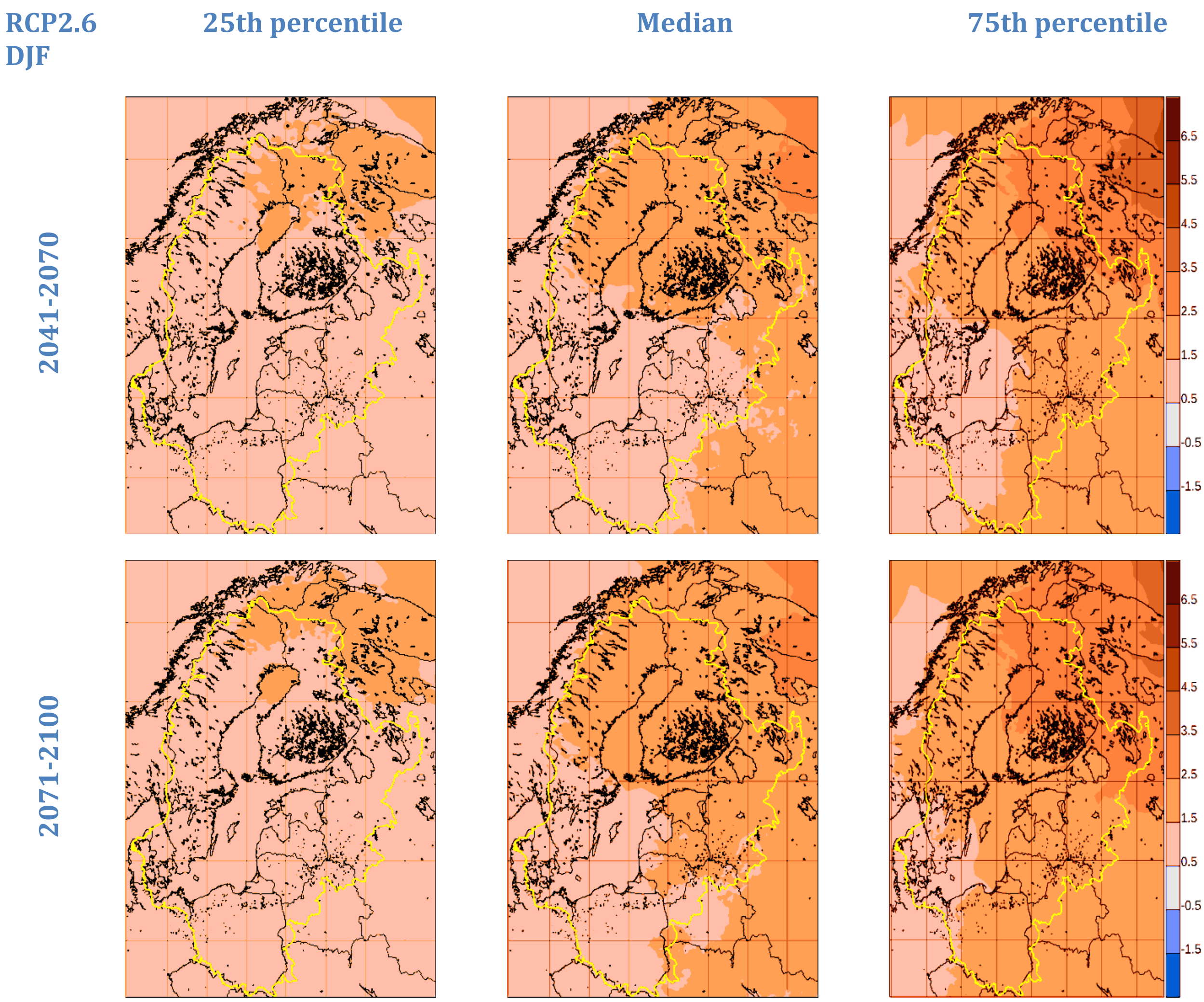

Figure S1. Temperature change for winter (DJF) between 1981-2010 and 2041-2070 (top row) and for 2071-2100 (bottom row) for 30 simulations from Euro-CORDEX according to the RCP2.6 scenario. Left column: lowest quartile; mid column: median value; right column: higher quartile.

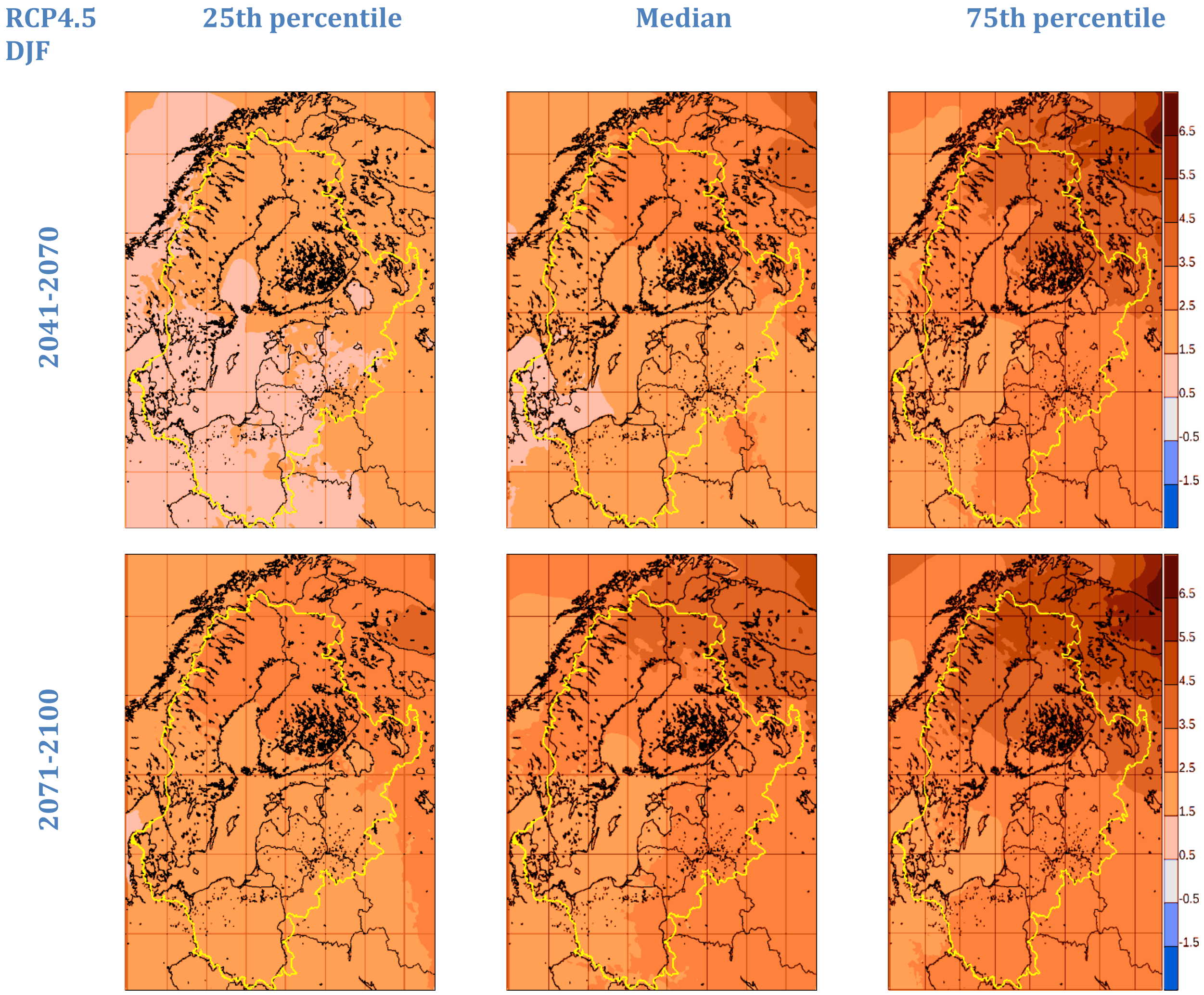

Figure S2. Temperature change for winter (DJF) between 1981-2010 and 2041-2070 (top row) and for 2071-2100 (bottom row) for 22 simulations from Euro-CORDEX according to the RCP4.5 scenario. Left column: lowest quartile; mid column: median value; right column: higher quartile.

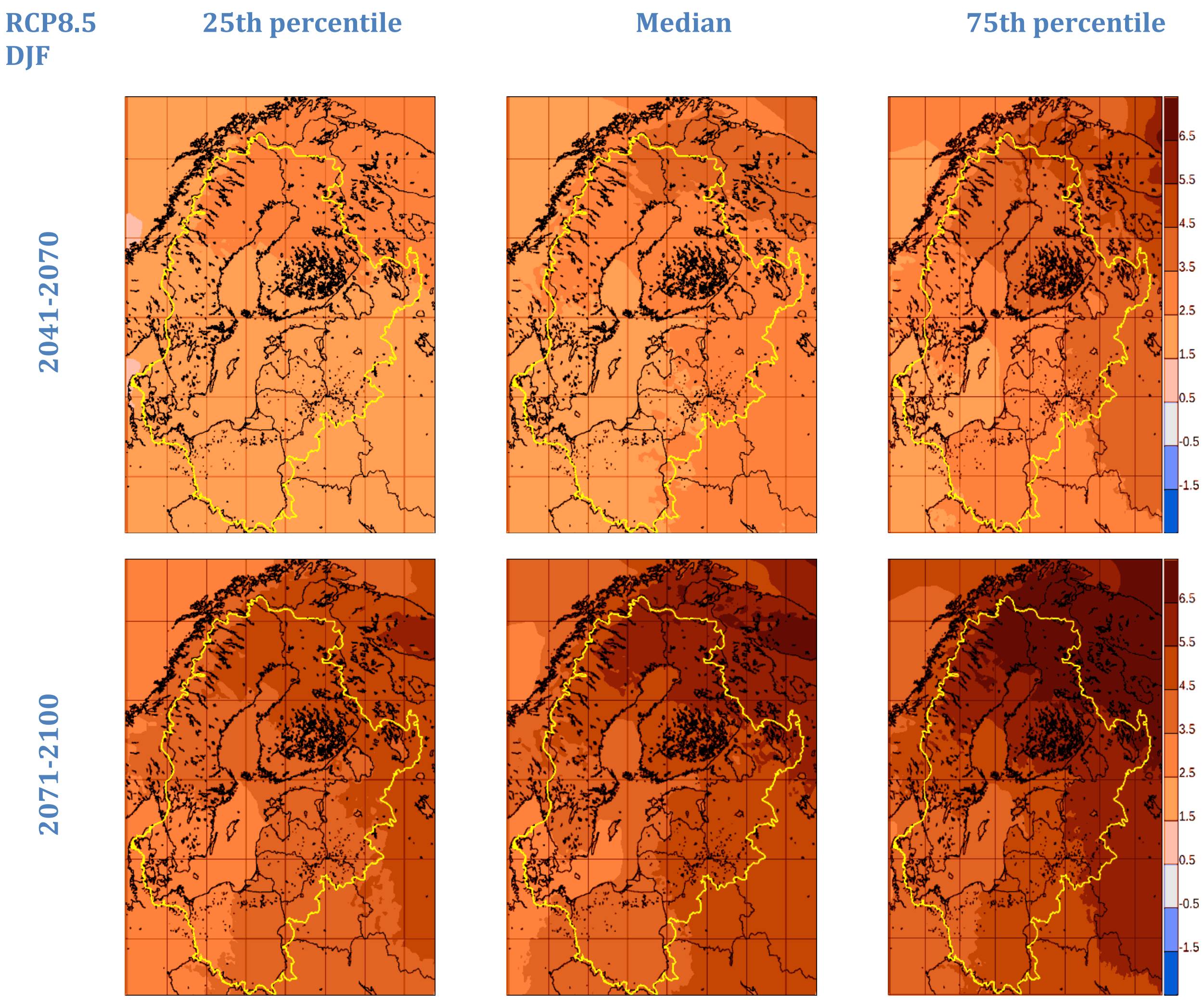

Figure S3. Temperature change for winter (DJF) between 1981-2010 and 2041-2070 (top row) and for 2071-2100 (bottom row) for 72 simulations from Euro-CORDEX according to the RCP8.5 scenario. Left column: lowest quartile; mid column: median value; right column: higher quartile.

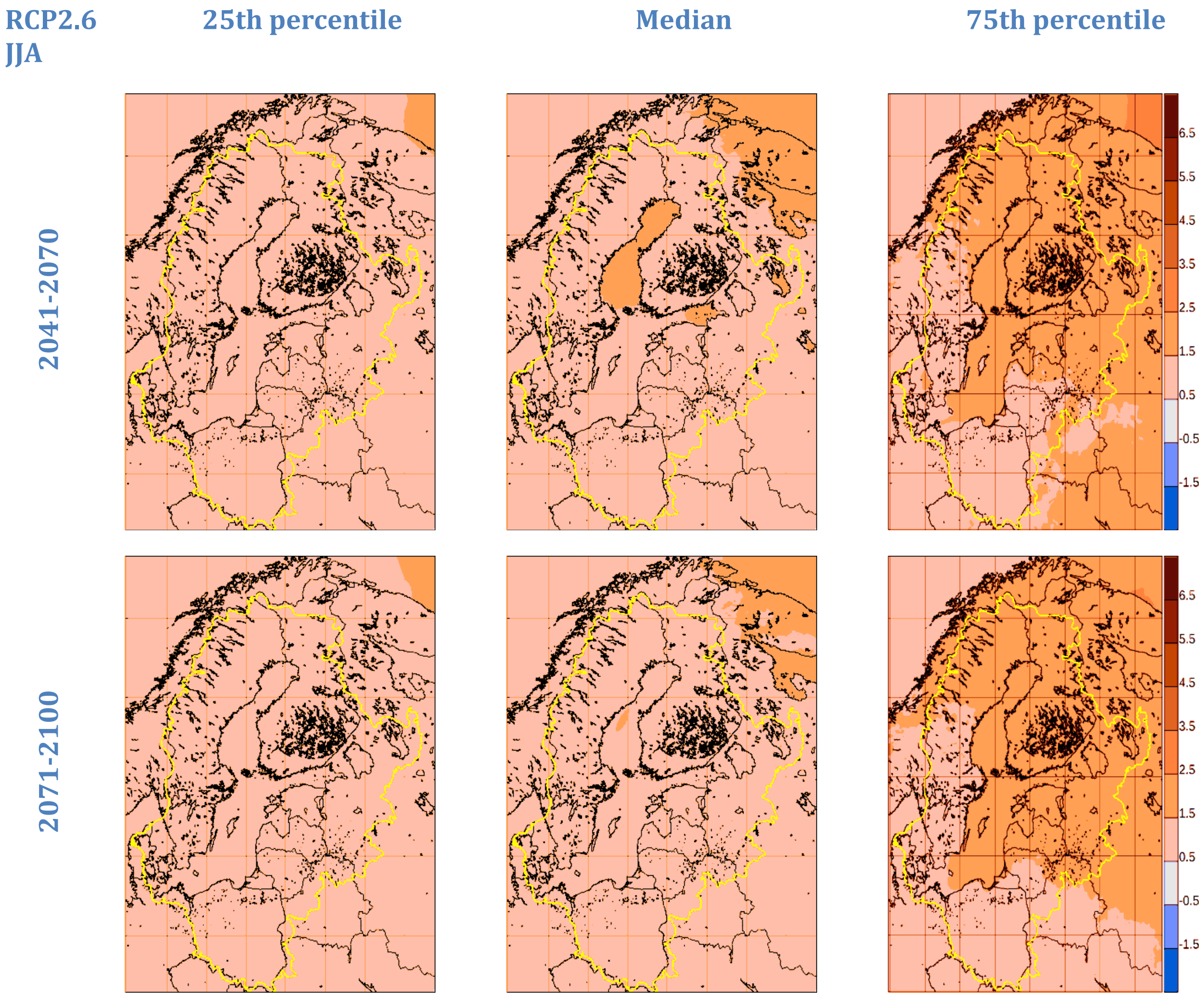

Figure S4. Temperature change for summer (JJA) between 1981-2010 and 2041-2070 (top row) and for 2071-2100 (bottom row) for 30 simulations from Euro-CORDEX according to the RCP2.6 scenario. Left column: lowest quartile; mid column: median value; right column: higher quartile.

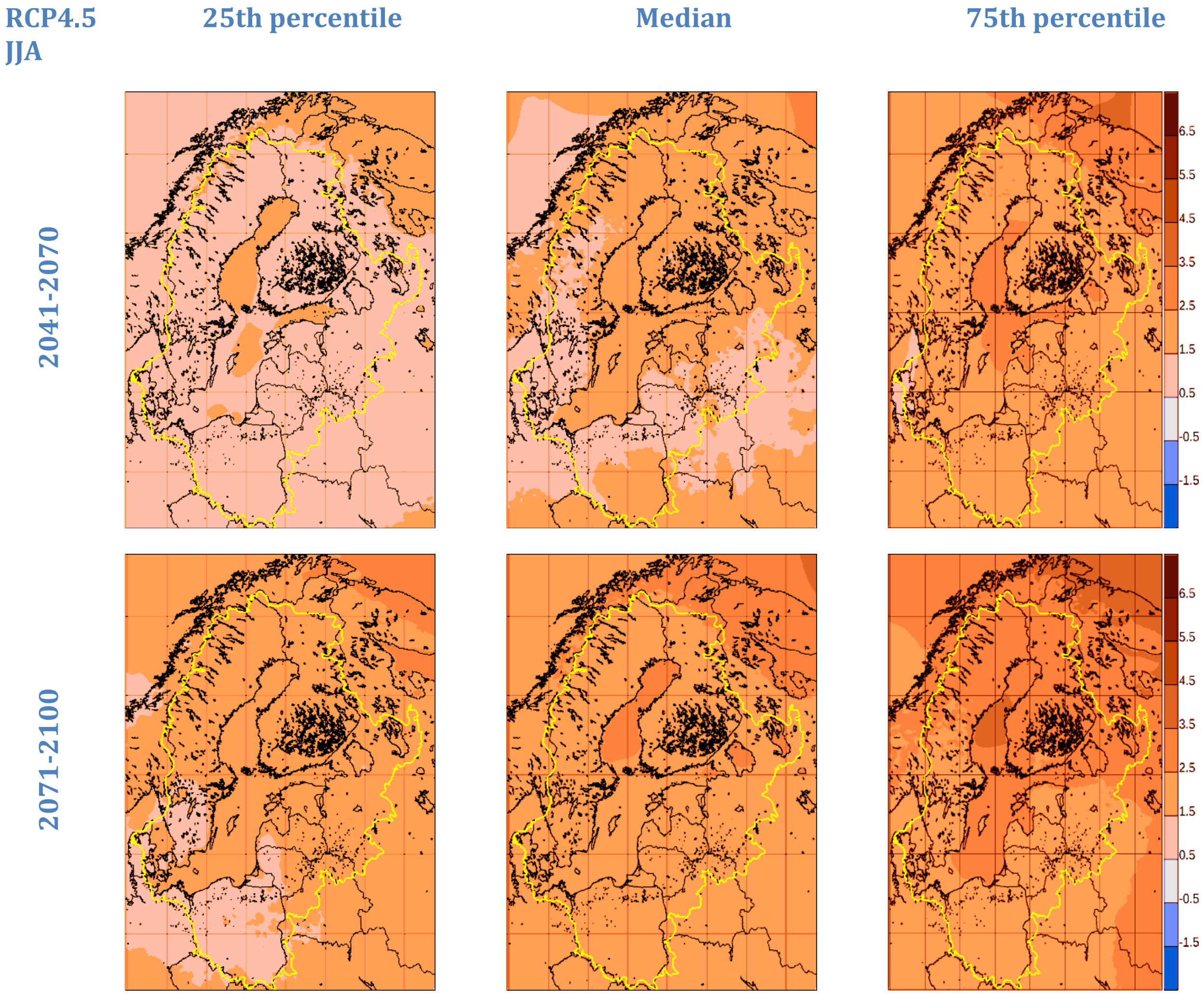

Figure S5. Temperature change for summer (JJA) between 1981-2010 and 2041-2070 (top row) and for 2071-2100 (bottom row) for 22 simulations from Euro-CORDEX according to the RCP4.5 scenario. Left column: lowest quartile; mid column: median value; right column: higher quartile.

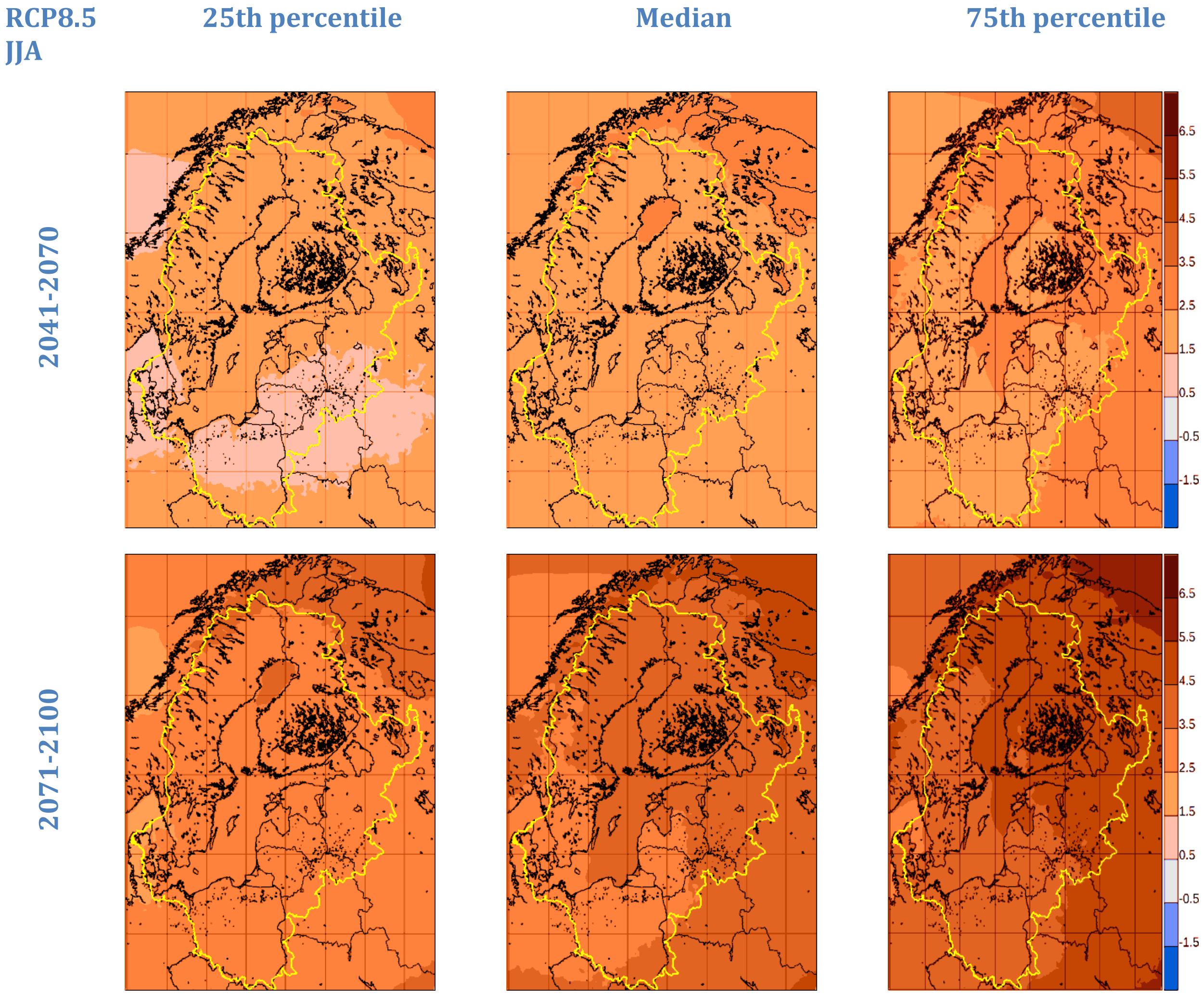

Figure S6. Temperature change for summer (JJA) between 1981-2010 and 2041-2070 (top row) and for 2071-2100 (bottom row) for 72 simulations from Euro-CORDEX according to the RCP8.5 scenario. Left column: lowest quartile; mid column: median value; right column: higher quartile.

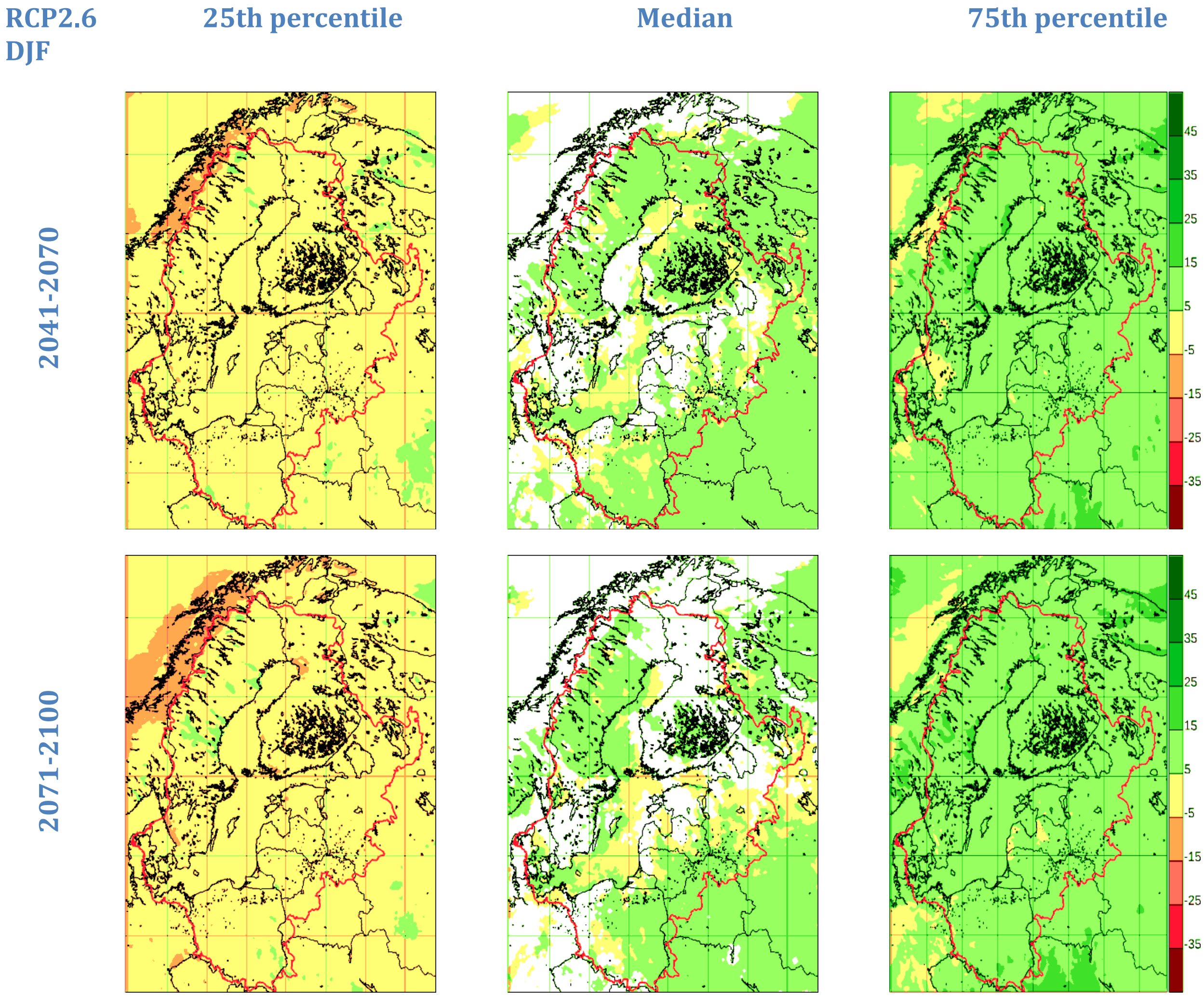

Figure S7. Precipitation relative change (%) for winter (DJF) between 1981-2010 and 2041-2070 (top) and for 2071-2100 (bottom) for 30 simulations from Euro-CORDEX according to the RCP2.6 scenario. Left column: lowest quartile; mid column: median value; right column: higher quartile.

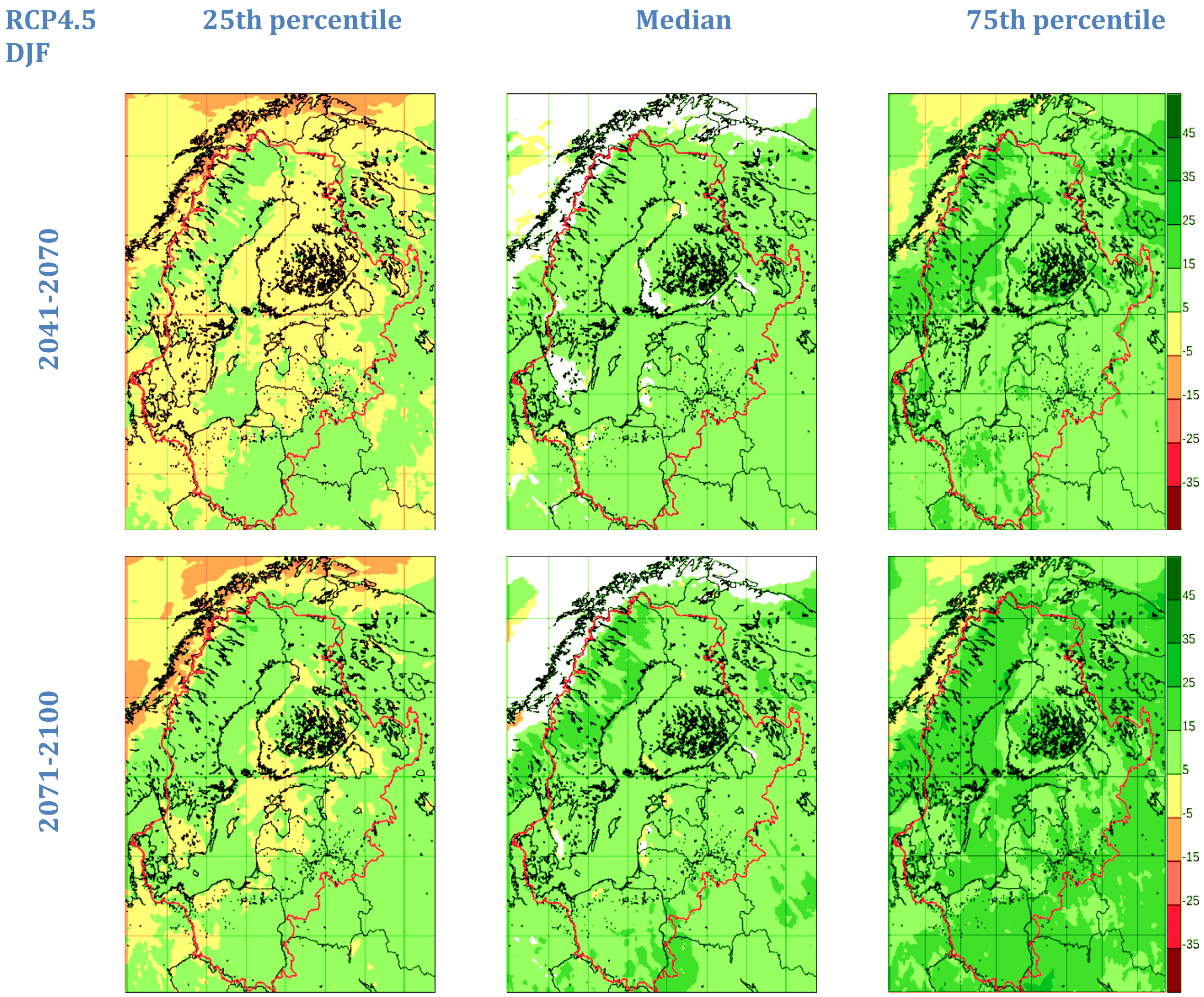

Figure S8. Precipitation relative change (%) for winter (DJF) between 1981-2010 and 2041-2070 (top) and for 2071-2100 (bottom) for 22 simulations from Euro-CORDEX according to the RCP4.5 scenario. Left column: lowest quartile; mid column: median value; right column: higher quartile.

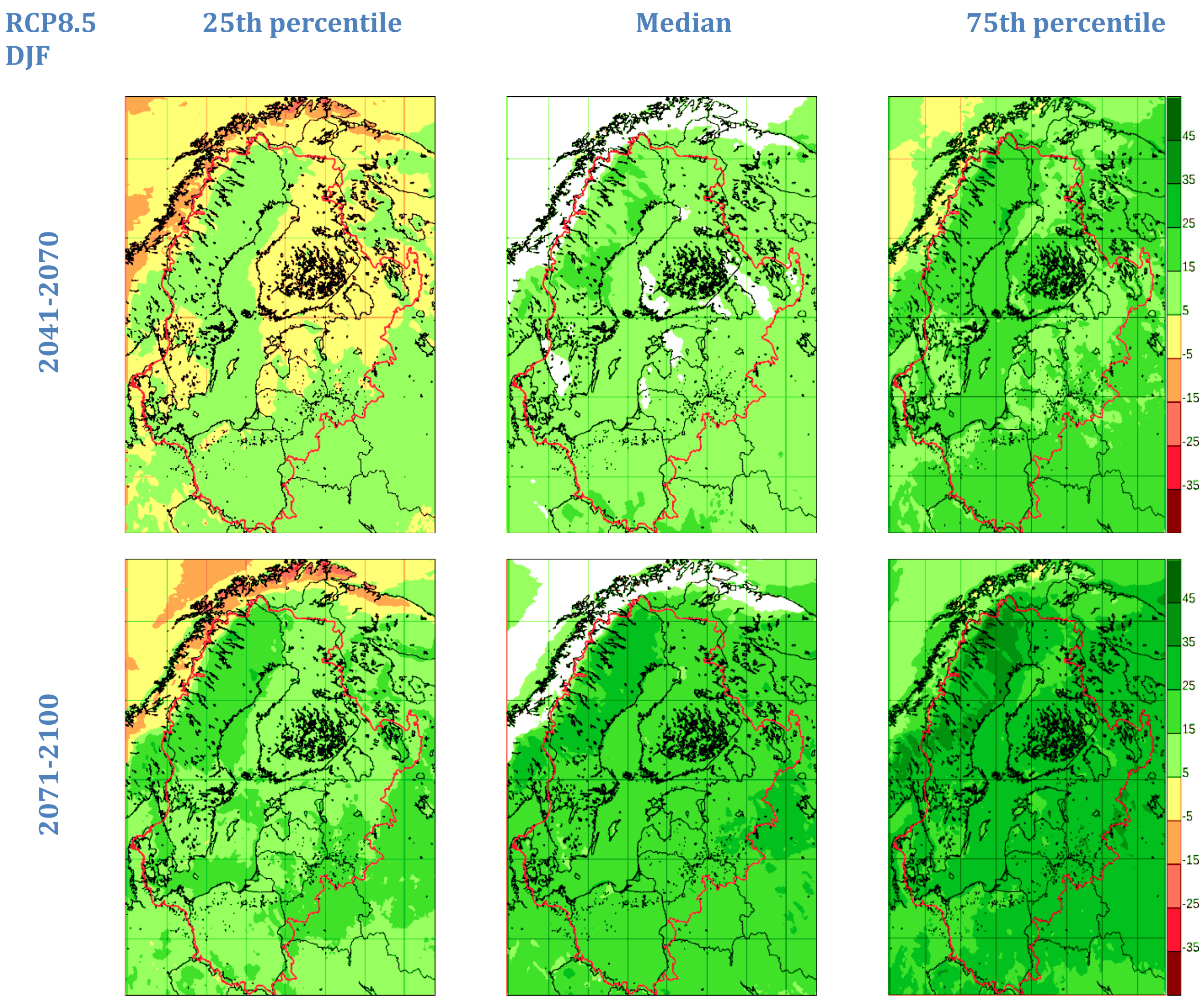

Figure S9. Precipitation relative change (%) for winter (DJF) between 1981-2010 and 2041-2070 (top) and for 2071-2100 (bottom) for 72 simulations from Euro-CORDEX according to the RCP8.5 scenario. Left column: lowest quartile; mid column: median value; right column: higher quartile.

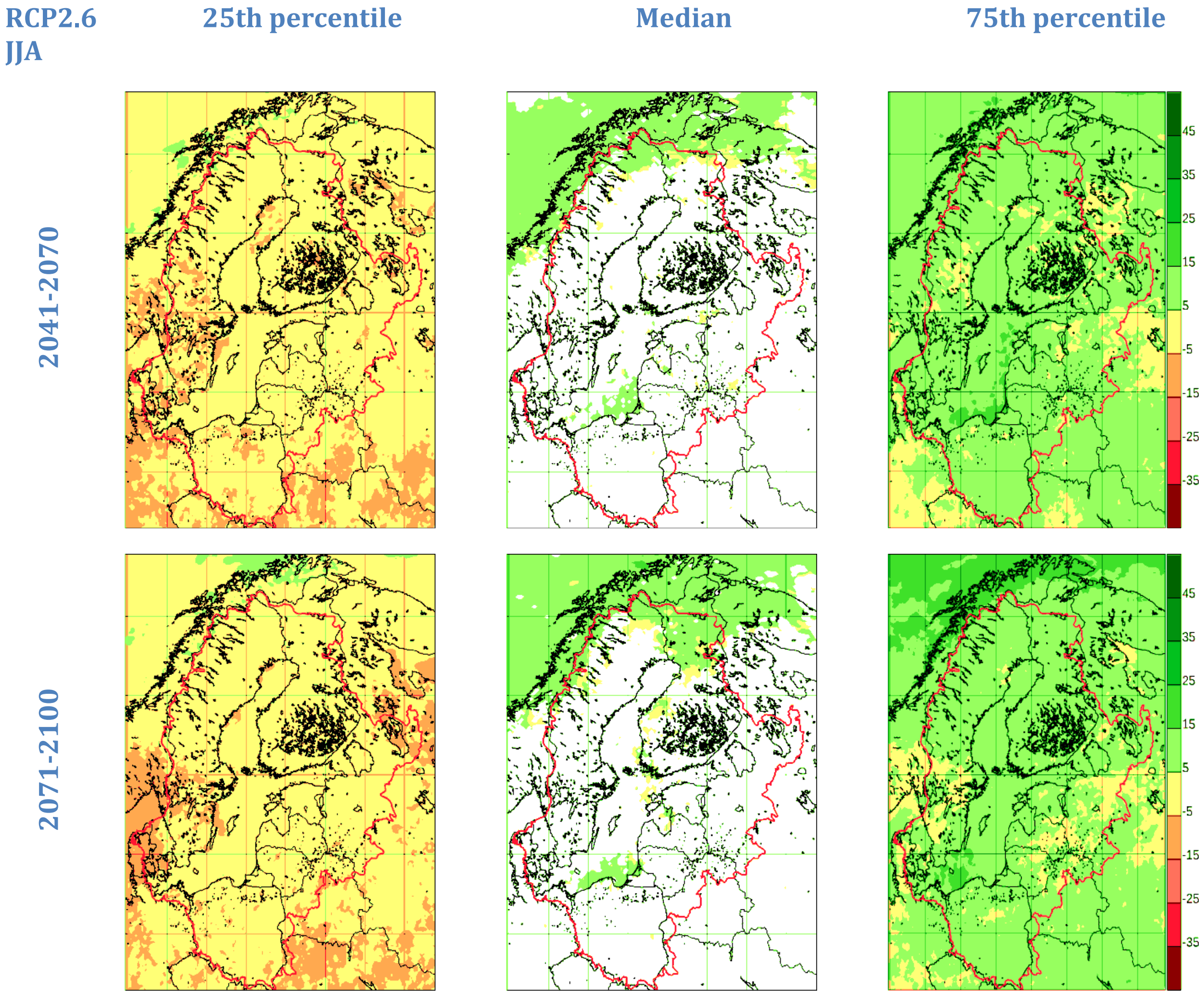

Figure S10. Precipitation relative change (%) for summer (JJA) between 1981-2010 and 2041-2070 (top) and for 2071-2100 (bottom) for 30 simulations from Euro-CORDEX according to the RCP2.6 scenario. Left column: lowest quartile; mid column: median value; right column: higher quartile.

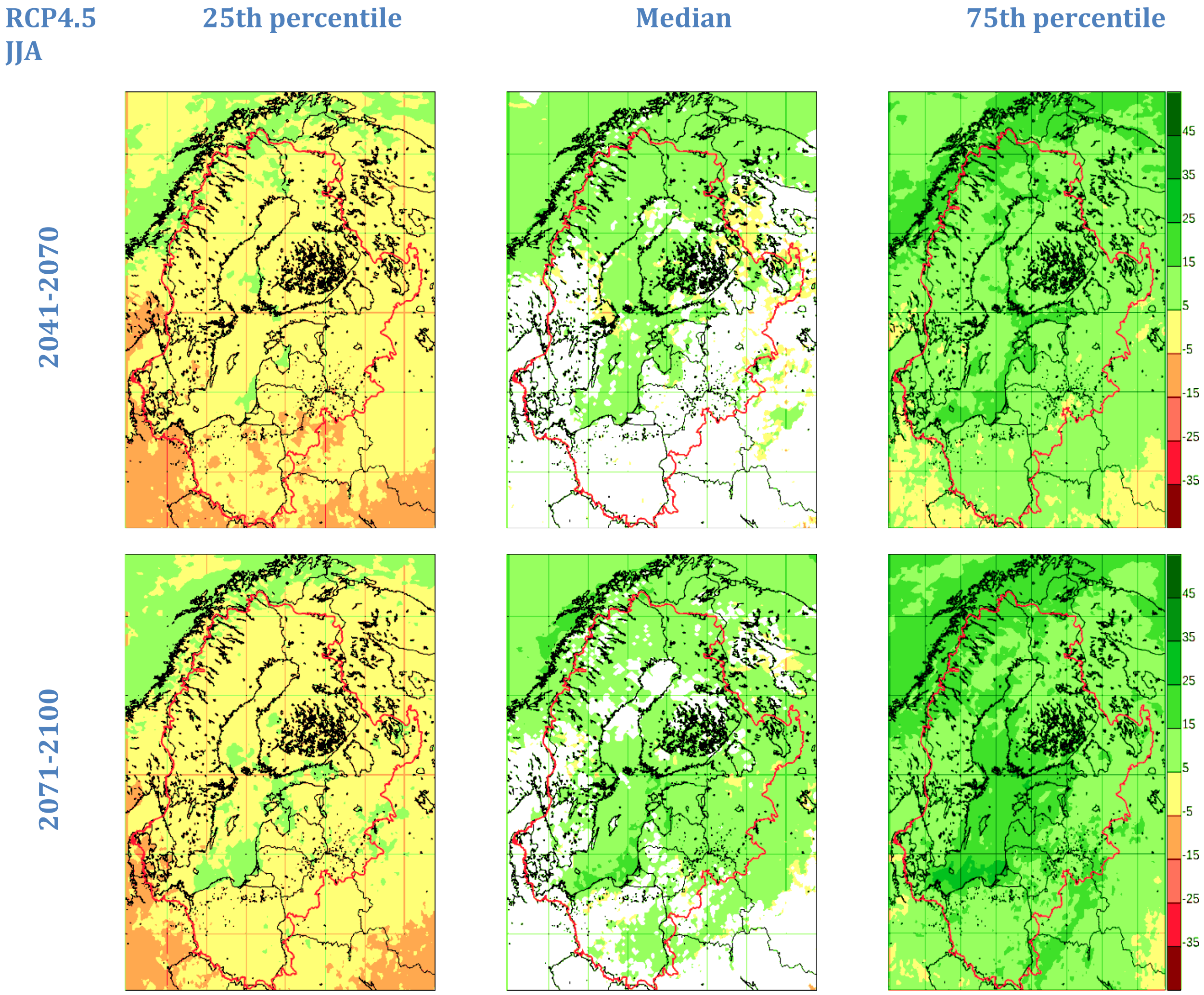

Figure S11. Precipitation relative change (%) for summer (JJA) between 1981-2010 and 2041-2070 (top) and for 2071-2100 (bottom) for 22 simulations from Euro-CORDEX according to the RCP4.5 scenario. Left column: lowest quartile; mid column: median value; right column: higher quartile.

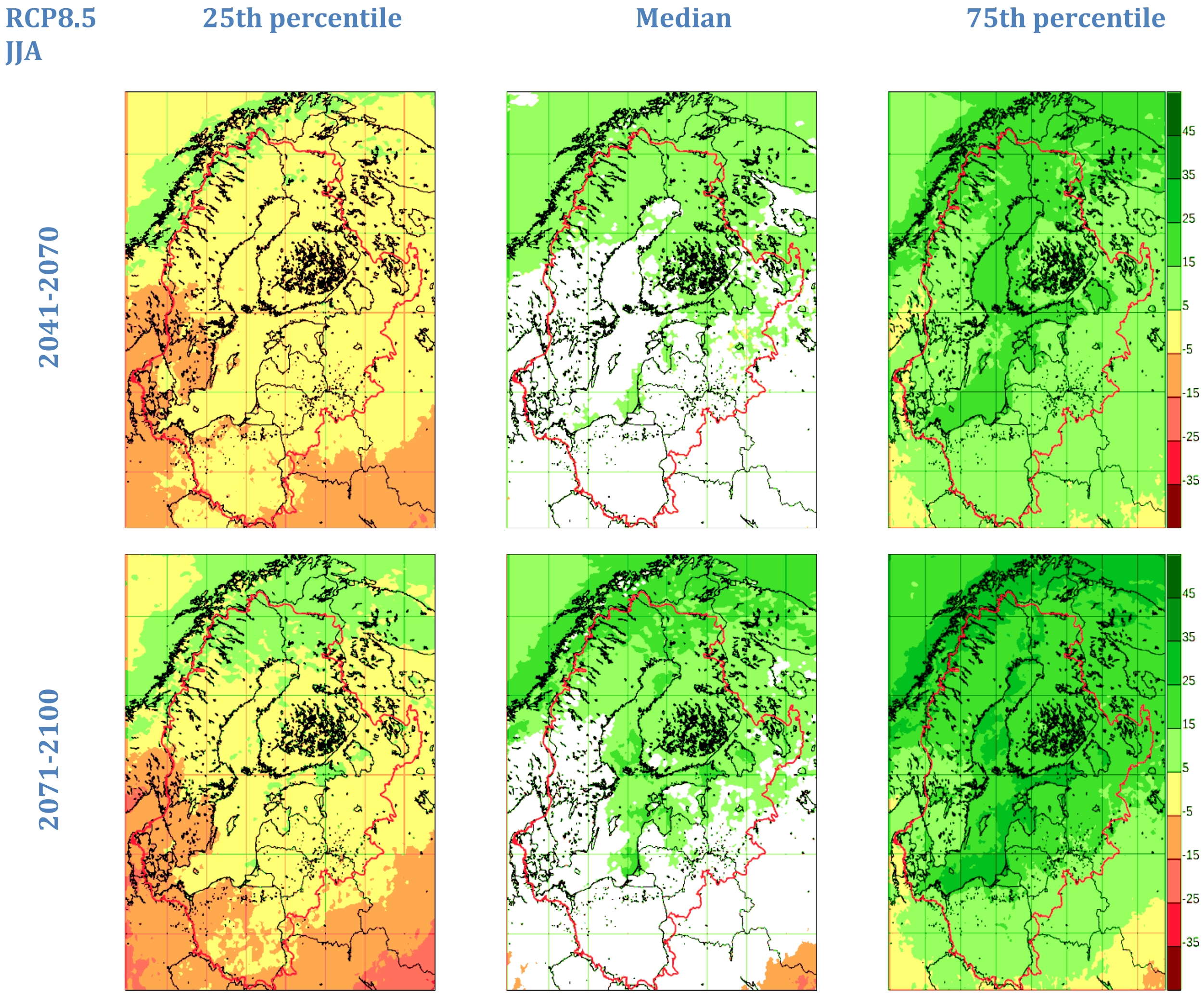

Figure S12. Precipitation relative change (%) for summer (JJA) between 1981-2010 and 2041-2070 (top) and for 2071-2100 (bottom) for 72 simulations from Euro-CORDEX according to the RCP8.5 scenario. Left column: lowest quartile; mid column: median value; right column: higher quartile.

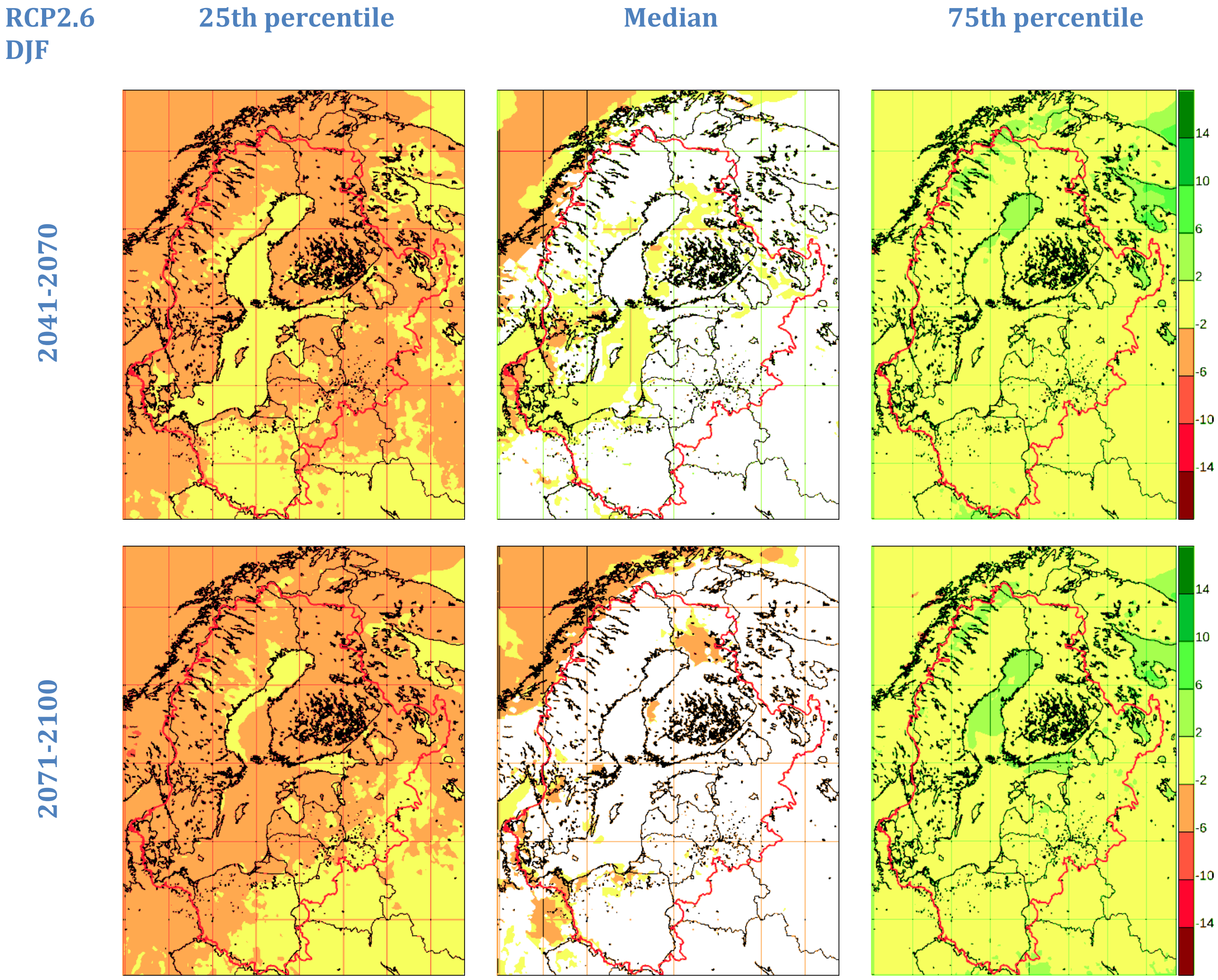

Figure S13. Average 10m wind relative change (%) for winter (DJF) between 1981-2010 and 2041-2070 (top) and for 2071-2100 (bottom) for 30 simulations from Euro-CORDEX according to the RCP2.6 scenario. Left: lowest quartile; mid: median value; right: higher quartile.

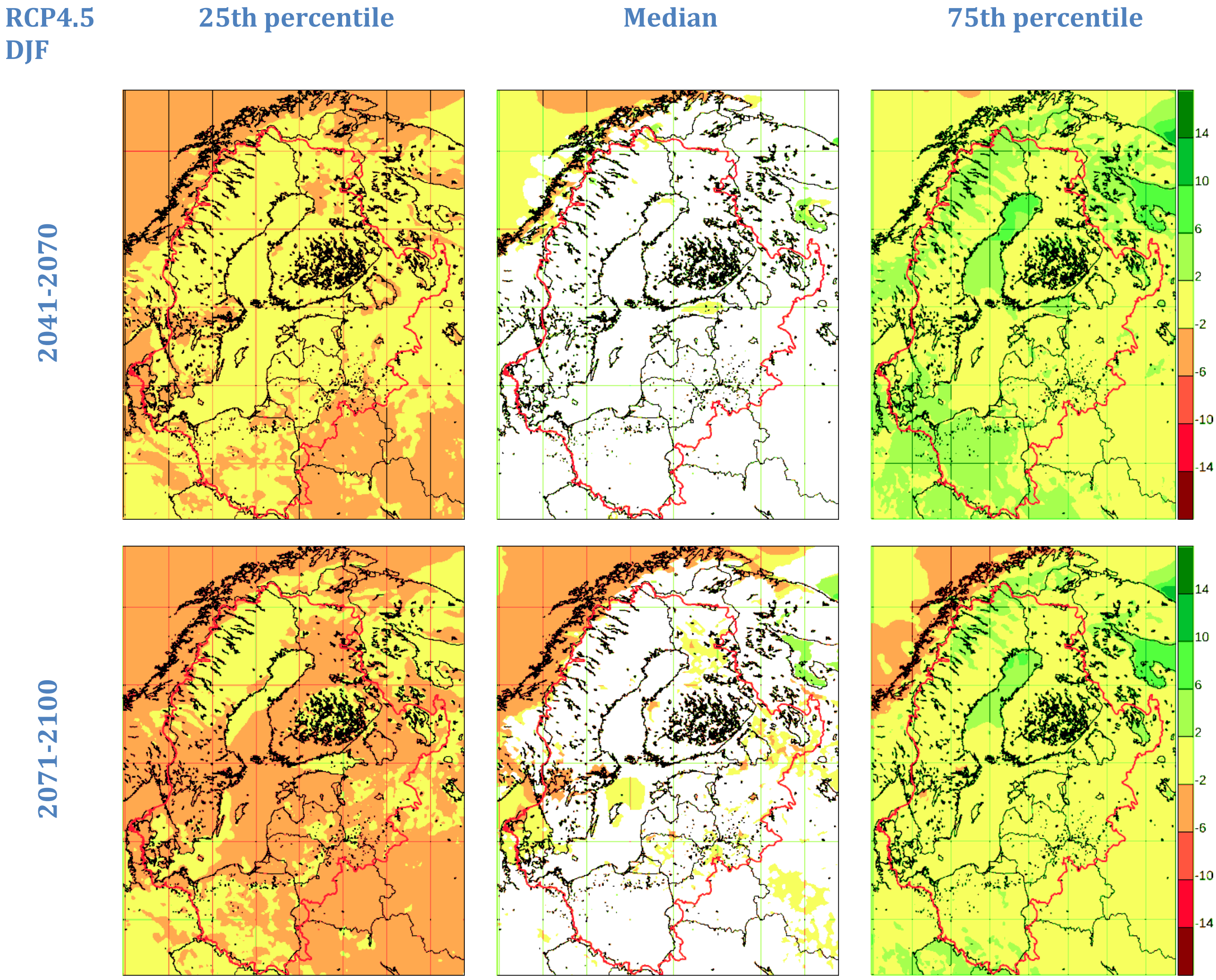

Figure S14. Average 10m wind relative change (%) for winter (DJF) between 1981-2010 and 2041-2070 (top) and for 2071-2100 (bottom) for 22 simulations from Euro-CORDEX according to the RCP4.5 scenario. Left: lowest quartile; mid: median value; right: higher quartile.

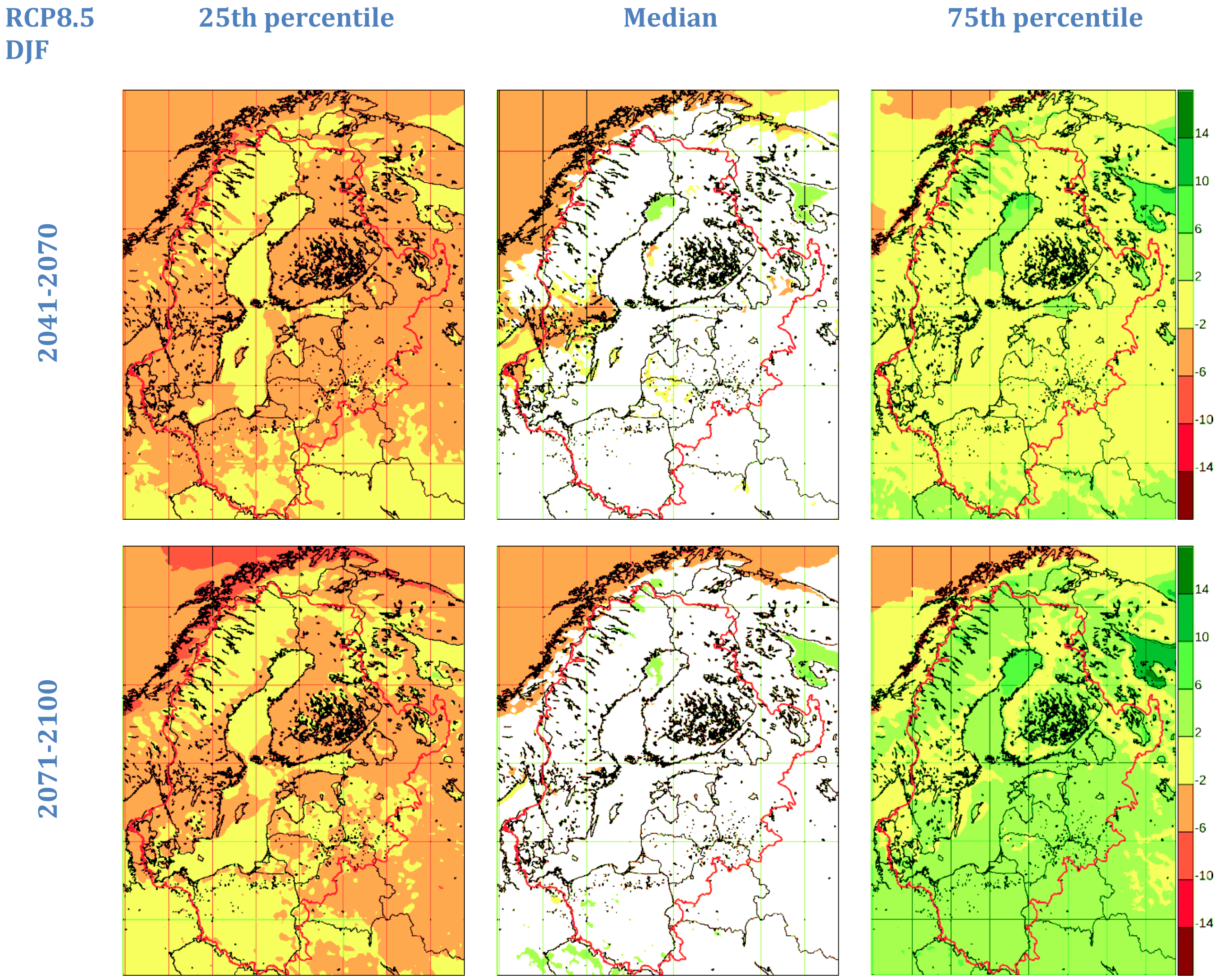

Figure S15. Average 10m wind relative change (%) for winter (DJF) between 1981-2010 and 2041-2070 (top) and for 2071-2100 (bottom) for 72 simulations from Euro-CORDEX according to the RCP8.5 scenario. Left: lowest quartile; mid: median value; right: higher quartile.

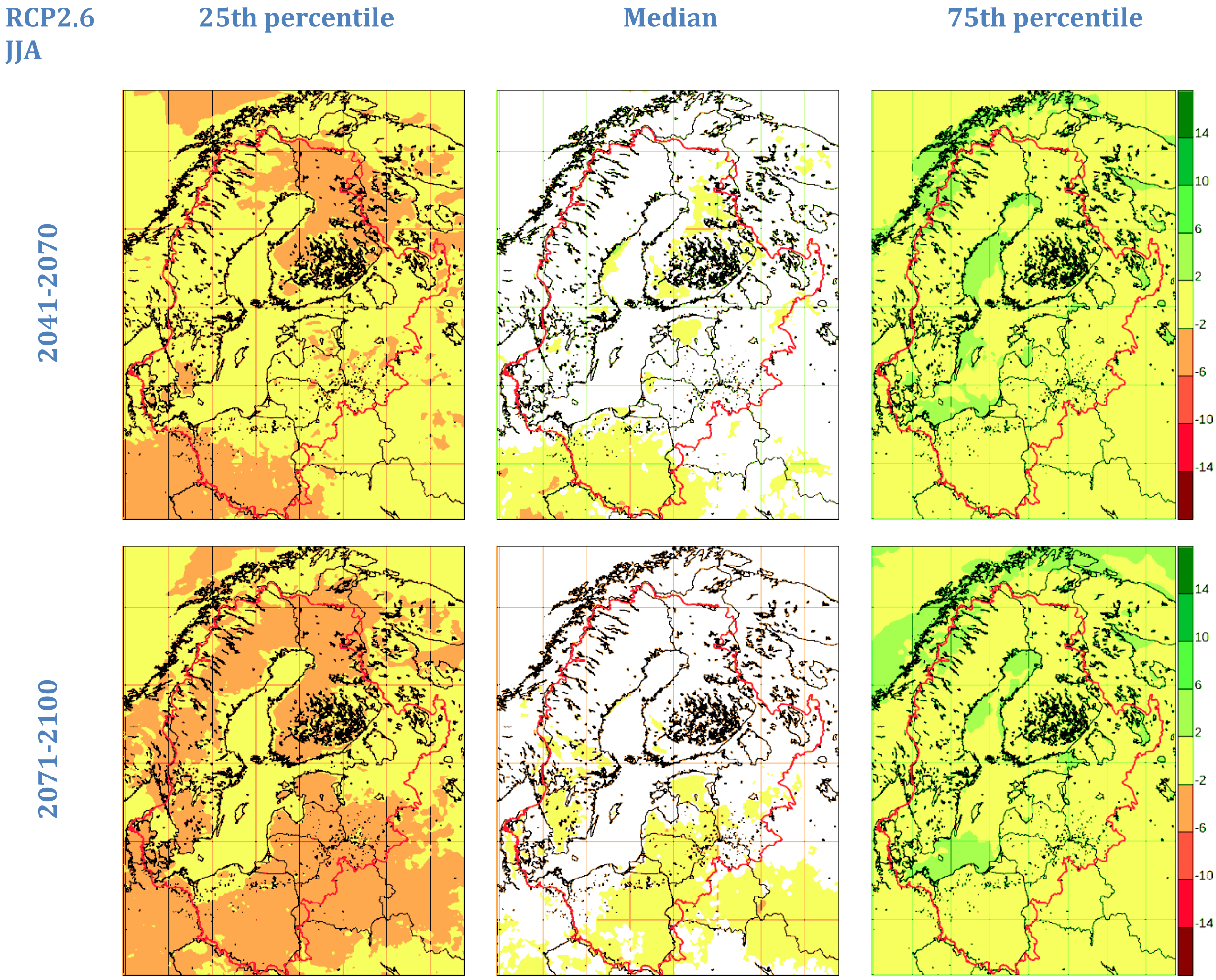

Figure S16. Average 10m wind relative change (%) for summer (JJA) between 1981-2010 and 2041-2070 (top) and for 2071-2100 (bottom) for 30 simulations from Euro-CORDEX according to the RCP2.6 scenario. Left: lowest quartile; mid: median value; right: higher quartile.

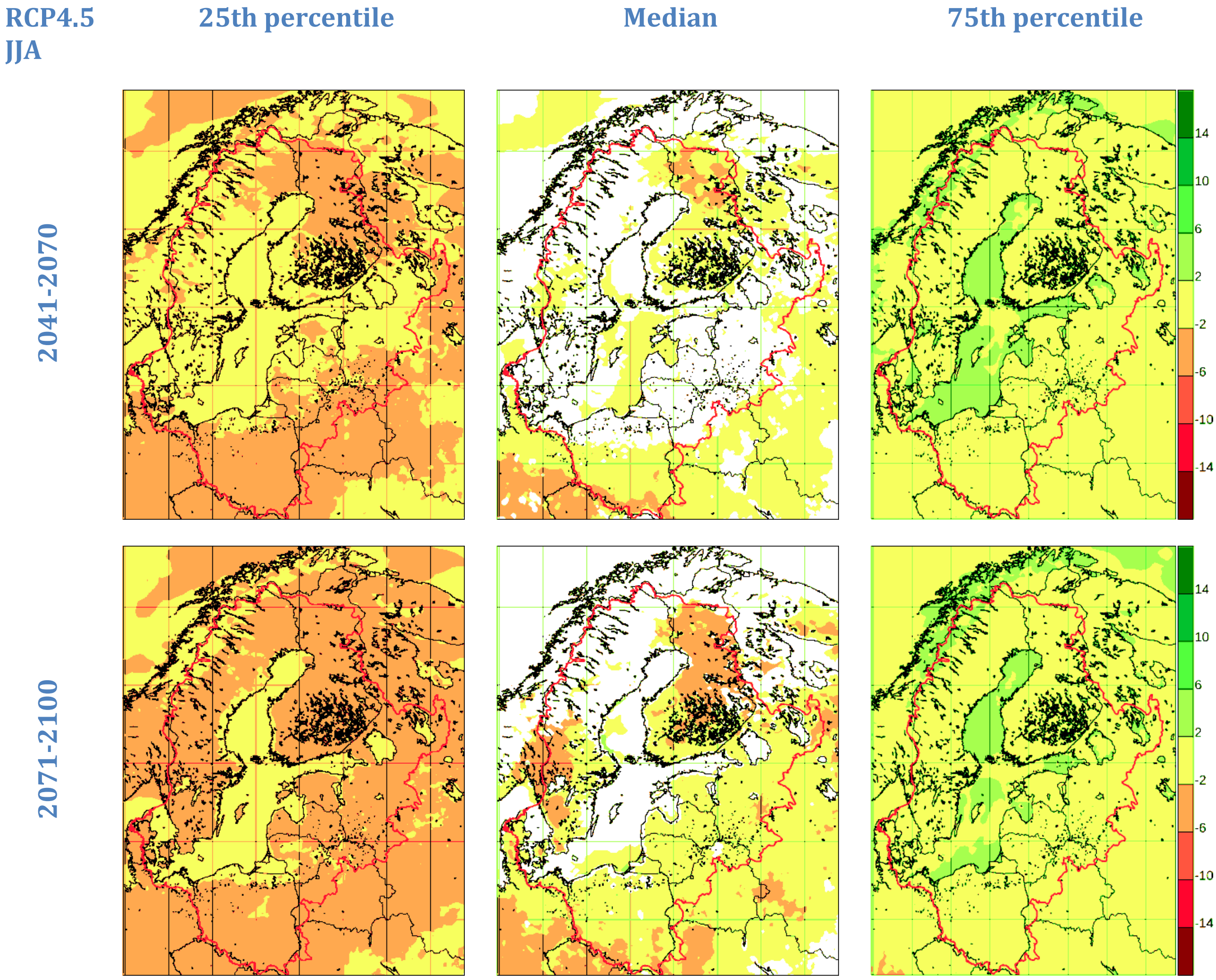

Figure S17. Average 10m wind relative change (%) for summer (JJA) between 1981-2010 and 2041-2070 (top) and for 2071-2100 (bottom) for 22 simulations from Euro-CORDEX according to the RCP4.5 scenario. Left: lowest quartile; mid: median value; right: higher quartile.

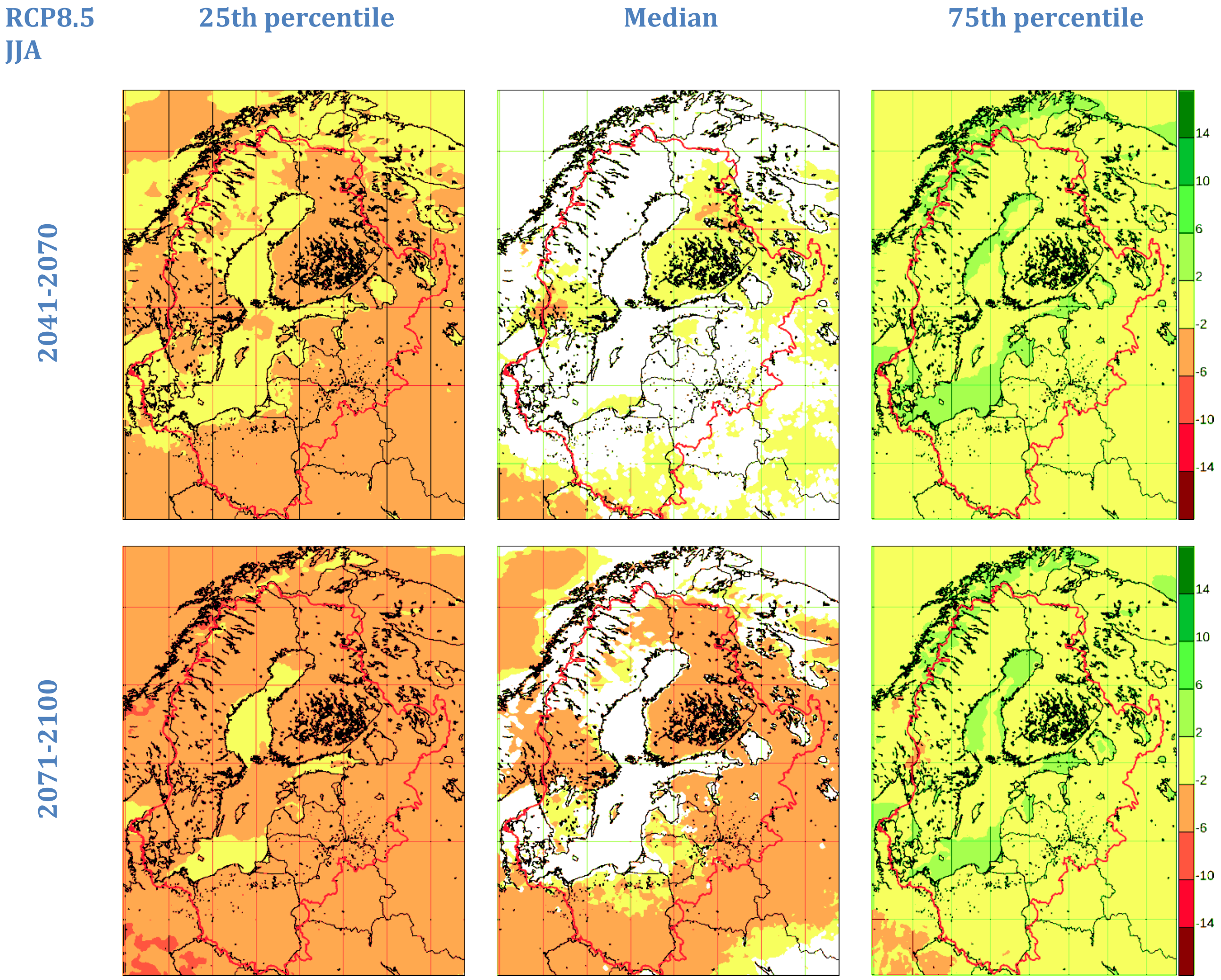

Figure S18. Average 10m wind relative change (%) for summer (JJA) between 1981-2010 and 2041-2070 (top) and for 2071-2100 (bottom) for 72 simulations from Euro-CORDEX according to the RCP8.5 scenario. Left: lowest quartile; mid: median value; right: higher quartile.

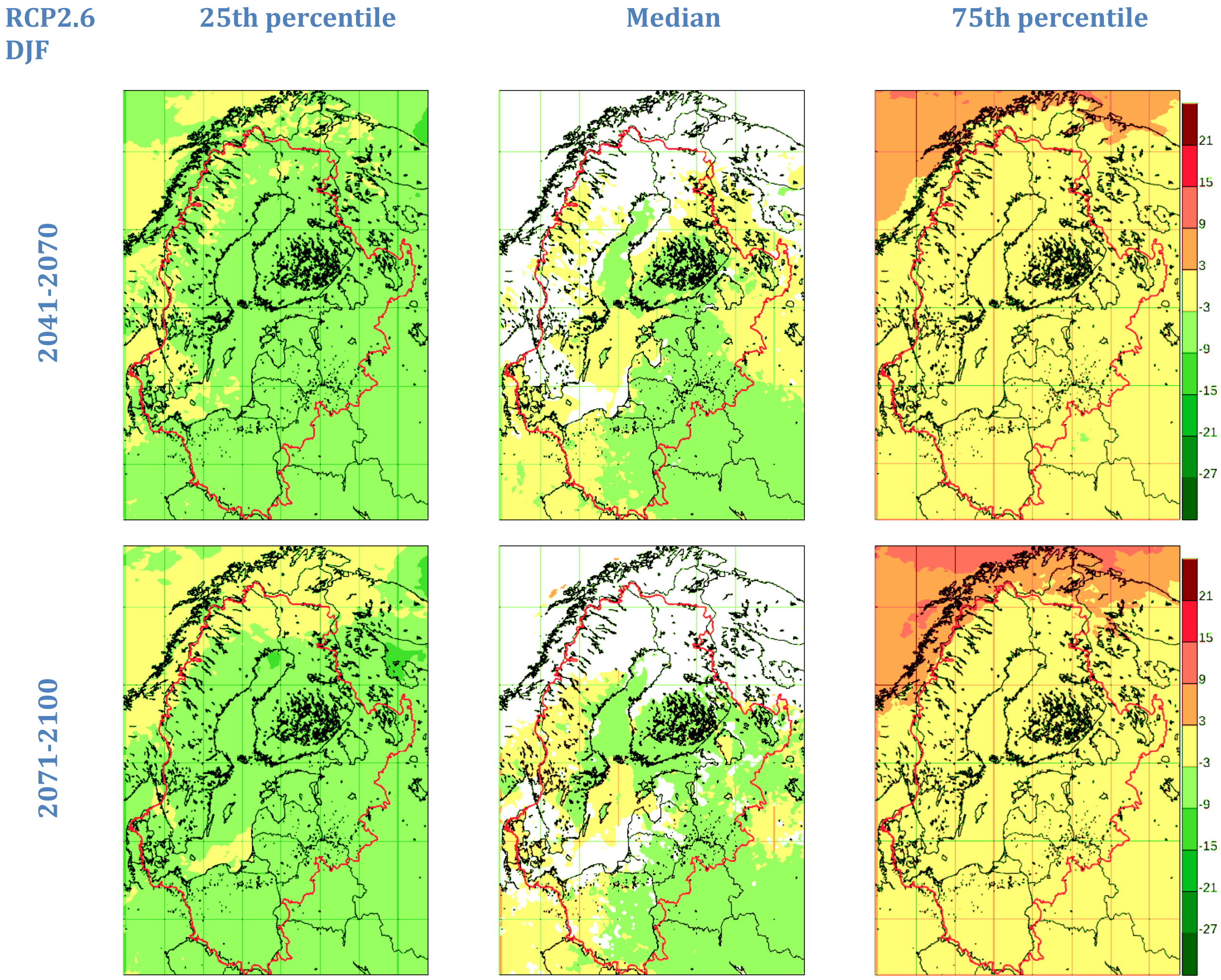

Figure S19. Average surface insolation relative change (%) for winter (DJF) between 1981-2010 and 2041-2070 (top) and for 2071-2100 (bottom) for 30 simulations from Euro-CORDEX according to the RCP2.6 scenario. Left: lowest quartile; mid: median value; right: higher quartile.

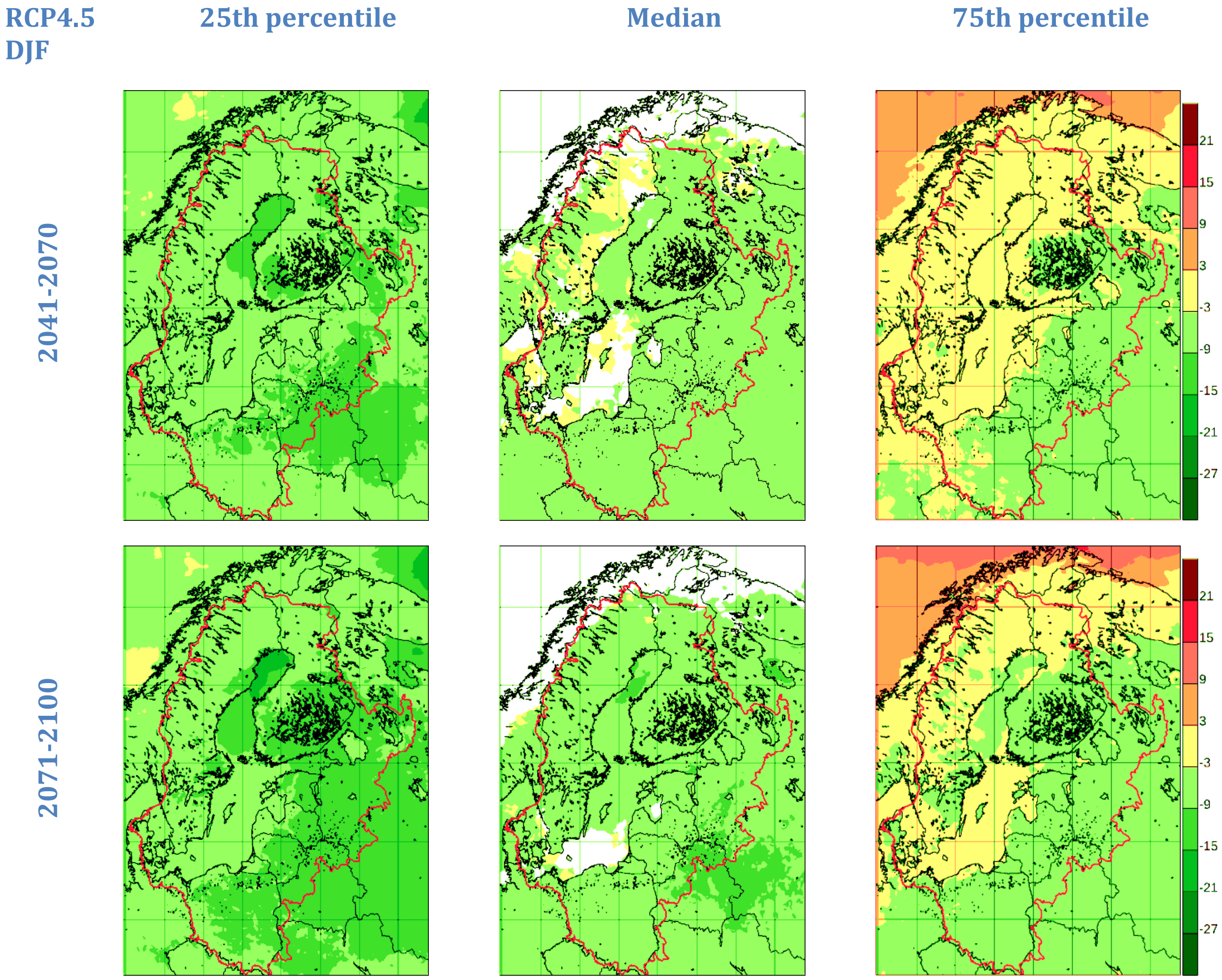

Figure S20. Average surface insolation relative change (%) for winter (DJF) between 1981-2010 and 2041-2070 (top) and for 2071-2100 (bottom) for 22 simulations from Euro-CORDEX according to the RCP4.5 scenario. Left: lowest quartile; mid: median value; right: higher quartile.

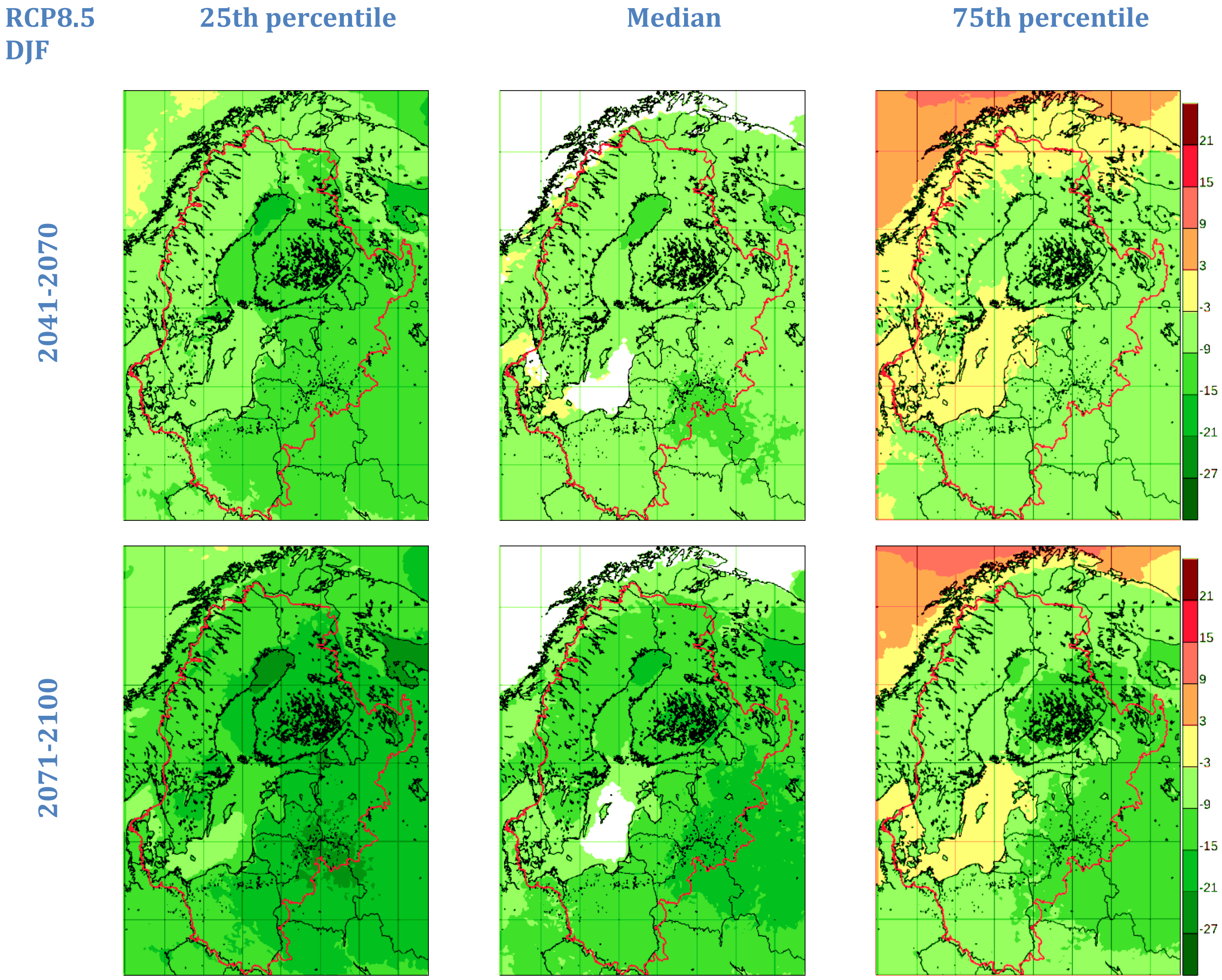

Figure S21. Average surface insolation relative change (%) for winter (DJF) between 1981-2010 and 2041-2070 (top) and for 2071-2100 (bottom) for 70 simulations from Euro-CORDEX according to the RCP8.5 scenario. Left: lowest quartile; mid: median value; right: higher quartile.

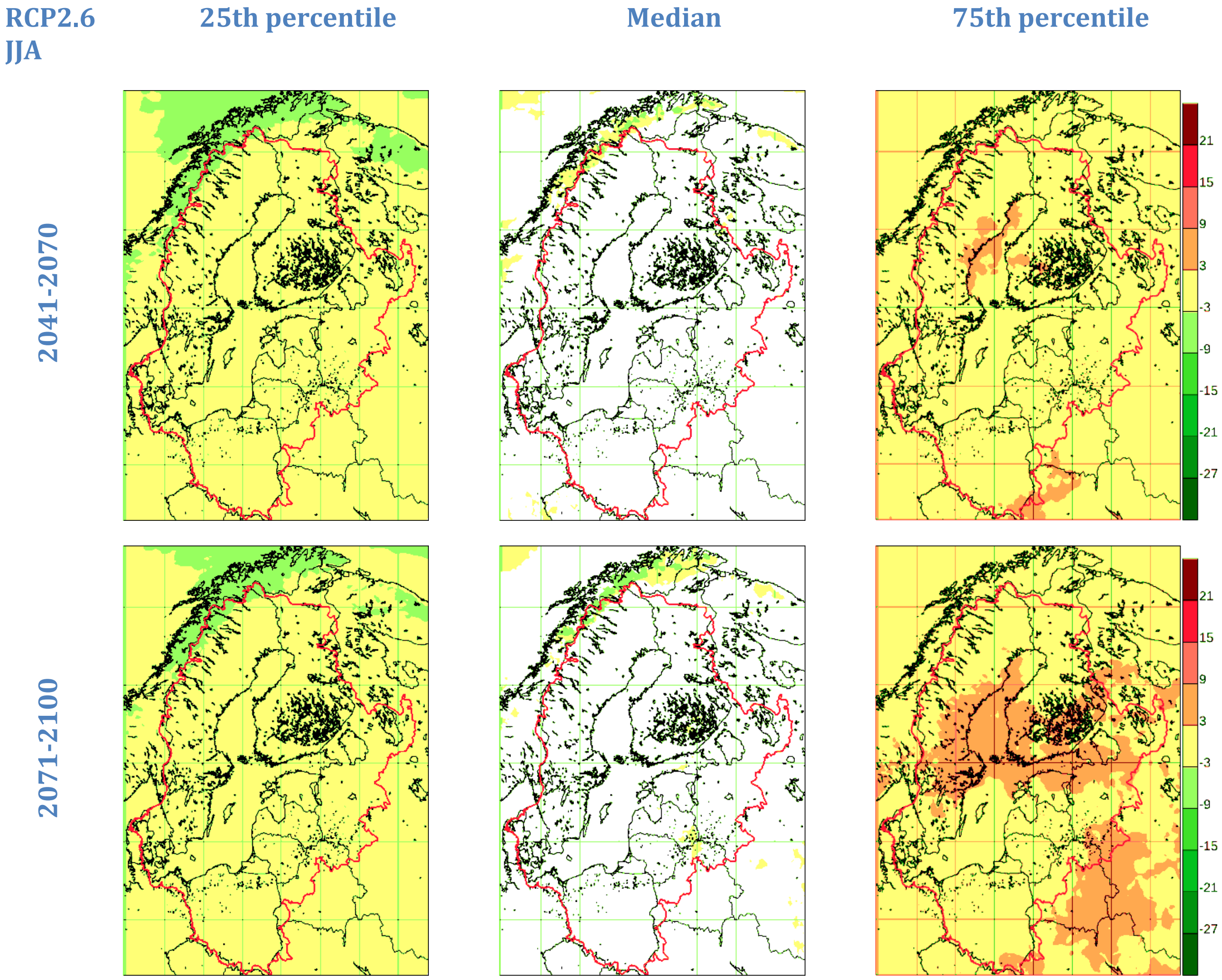

Figure S22. Average surface insolation relative change (%) for summer (JJA) between 1981-2010 and 2041-2070 (top) and for 2071-2100 (bottom) for 30 simulations from Euro-CORDEX according to the RCP2.6 scenario. Left: lowest quartile; mid: median value; right: higher quartile.

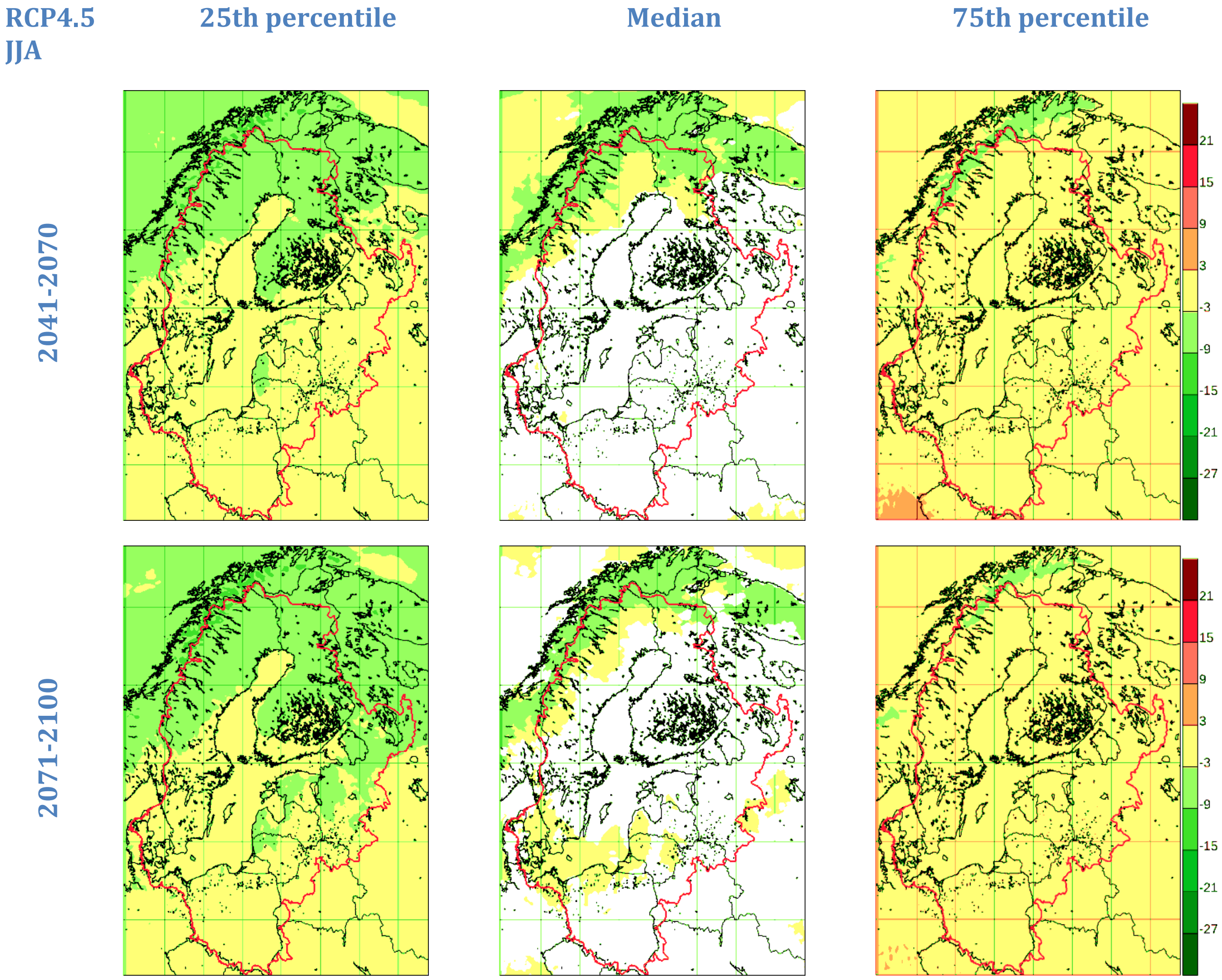

Figure S23. Average surface insolation relative change (%) for summer (JJA) between 1981-2010 and 2041-2070 (top) and for 2071-2100 (bottom) for 22 simulations from Euro-CORDEX according to the RCP4.5 scenario. Left: lowest quartile; mid: median value; right: higher quartile.

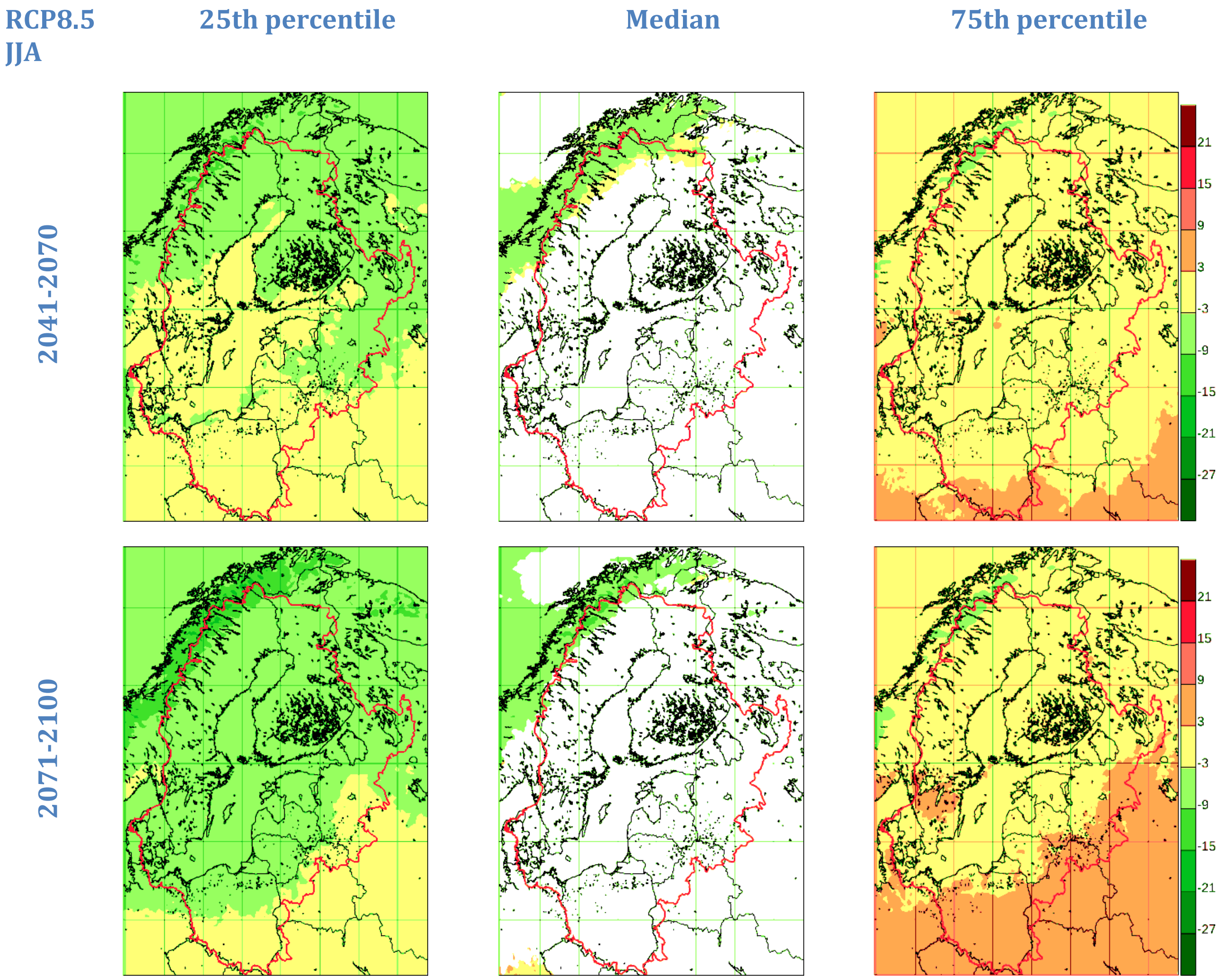

Figure S24. Average surface insolation relative change (%) for summer (JJA) between 1981-2010 and 2041-2070 (top) and for 2071-2100 (bottom) for 70 simulations from Euro-CORDEX according to the RCP8.5 scenario. Left: lowest quartile; mid: median value; right: higher quartile.

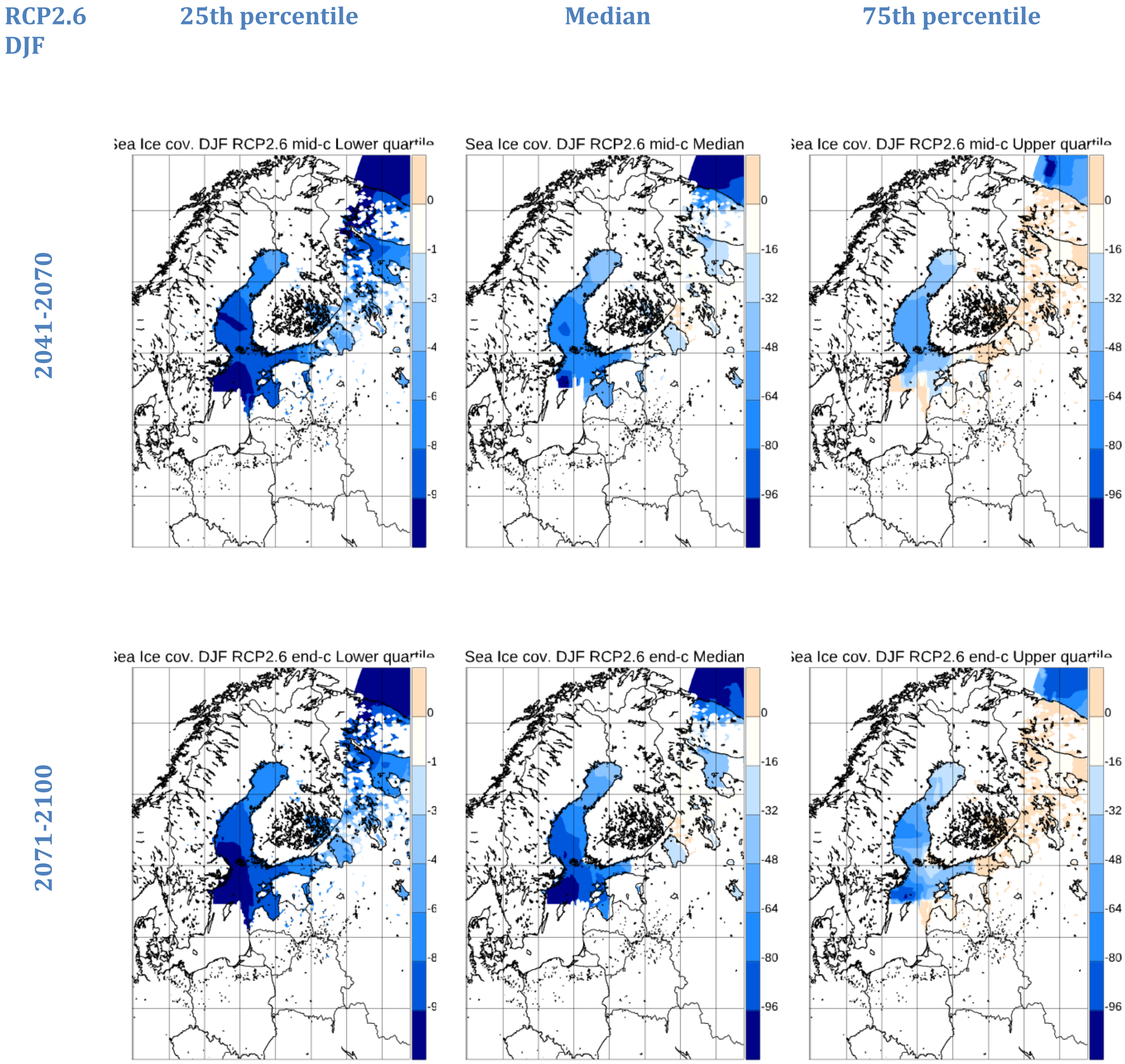

Figure S25. Average sea ice cover relative change (%) for winter (DJF) between 1981-2010 and 2041-2070 (top) and for 2071-2100 (bottom) for 20 simulations from Euro-CORDEX according to the RCP2.6 scenario. Left: lowest quartile; mid: median value; right: higher quartile.

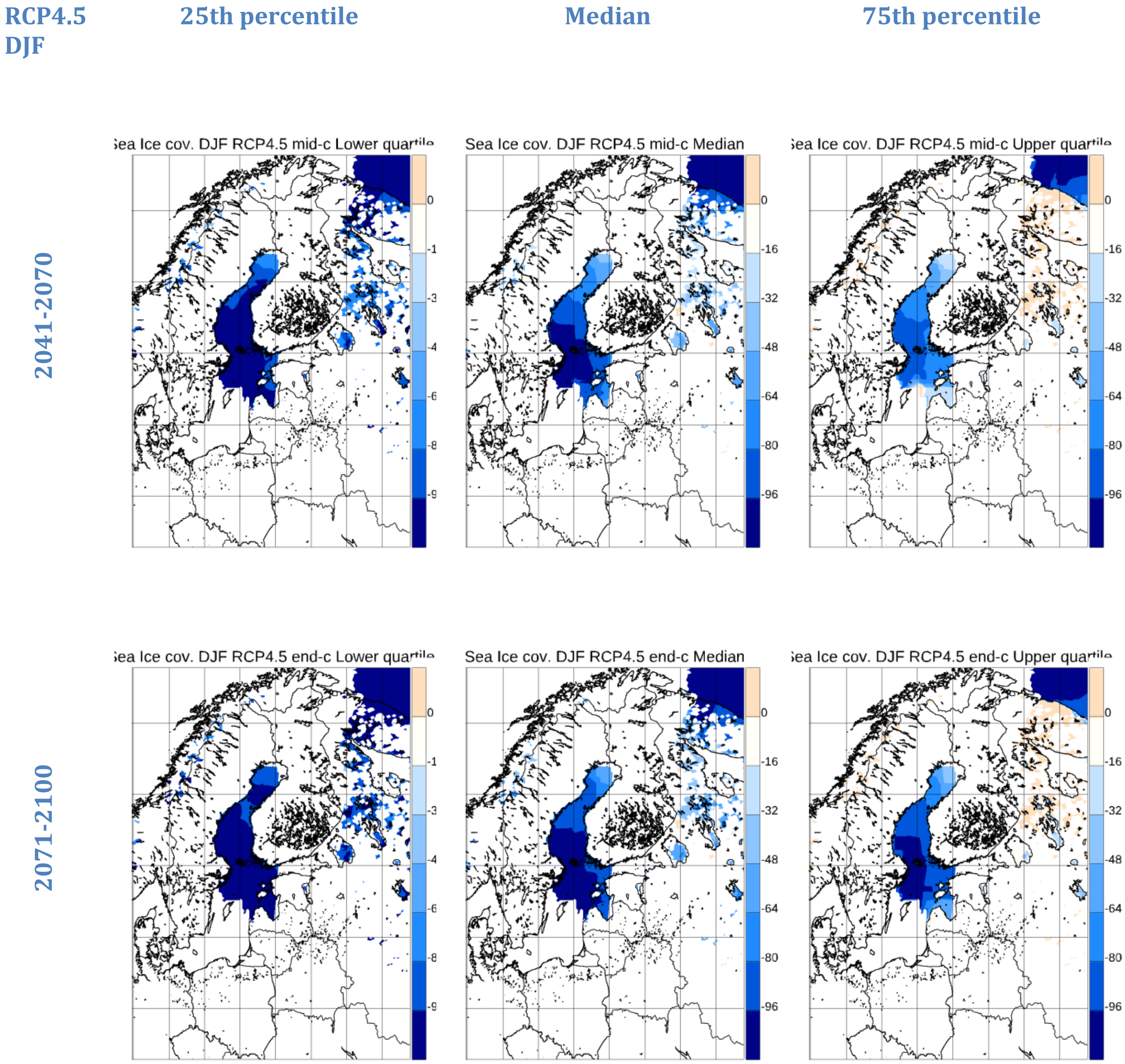

Figure S26. Average sea ice cover relative change (%) for winter (DJF) between 1981-2010 and 2041-2070 (top) and for 2071-2100 (bottom) for 17 simulations from Euro-CORDEX according to the RCP4.5 scenario. Left: lowest quartile; mid: median value; right: higher quartile.

RCP8.5 DJF | 25th percentile | Median | 75th percentile

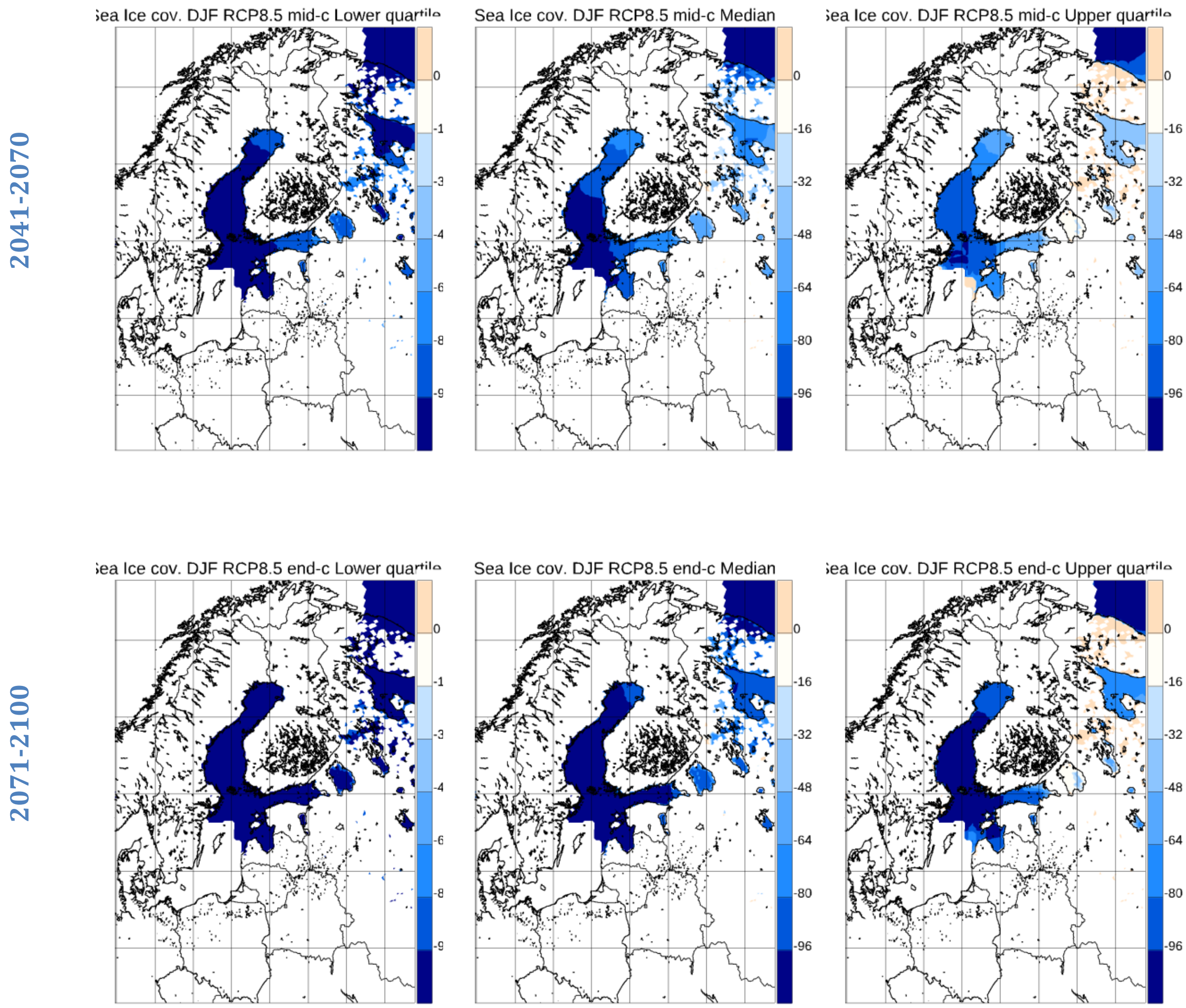

Figure S27. Average sea ice cover relative change (%) for winter (DJF) between 1981-2010 and 2041-2070 (top) and for 2071-2100 (bottom) for 40 simulations from Euro-CORDEX according to the RCP8.5 scenario. Left: lowest quartile; mid: median value; right: higher quartile.

Total area	DJF Mid-c	DJF Late-c	JJA Mid-c	JJA Late-c
RCP2.6	1.51	1.55	1.22	1.21
RCP4.5	2.19	2.72	1.60	2.03
RCP8.5	2.67	4.61	2.06	3.64
SRES A1B		4.77		2.96

Table S1 Ensemble mean temperature change (K) for the total catchment, for 4 scenarios, 2 periods, and two seasons.

Land area	DJF Mid-c	DJF Late-c	JJA Mid-c	JJA Late-c
RCP2.6	1.53	1.58	1.18	1.18
RCP4.5	2.25	2.78	1.55	1.98
RCP8.5	2.73	4.73	2.03	3.63
SRES A1B		4.88		2.84

Table S2 Ensemble mean temperature change (K) for land points in the catchment, for 4 scenarios, 2 periods, and two seasons.

Sea	DJF Mid-c	DJF Late-c	JJA Mid-c	JJA Late-c
RCP2.6	1.37	1.41	1.44	1.39
RCP4.5	1.90	2.37	1.87	2.32
RCP8.5	2.34	3.95	2.22	3.71
SRES A1B		4.27		3.57

Table S3 Ensemble mean temperature change (K) for sea points in the catchment, for 4 scenarios, 2 periods, and two seasons.

Land north of 60N	DJF Mid-c	DJF Late-c	JJA Mid-c	JJA Late-c
RCP2.6	1.82	1.86	1.26	1.27
RCP4.5	2.62	3.30	1.67	2.21
RCP8.5	3.18	5.34	2.18	3.82
SRES A1B		5.42		2.81

Table S4 Ensemble mean temperature change (K) for land points in the catchment north of 60N, for 4 scenarios, 2 periods, and two seasons.

Land south of 60N	DJF Mid-c	DJF Late-c	JJA Mid-c	JJA Late-c
RCP2.6	1.31	1.37	1.12	1.11
RCP4.5	1.96	2.39	1.46	1.80
RCP8.5	2.38	4.27	1.92	3.48
SRES A1B		4.36		2.86

Table S5 Ensemble mean temperature change (K) for land points in the catchment south of 60N, for 4 scenarios, 2 periods, and two seasons.

Total area	DJF Mid-c	DJF Late-c	JJA Mid-c	JJA Late-c
RCP2.6	5.05	4.55	2.88	2.89
RCP4.5	8.73	10.87	5.62	8.52
RCP8.5	10.30	20.40	6.48	8.86
SRES A1B		25.24		7.23

Table S6 Ensemble mean precipitation change (%) for the total catchment, for 4 scenarios, 2 periods, and two seasons.

Land area	DJF Mid-c	DJF Late-c	JJA Mid-c	JJA Late-c
RCP2.6	4.94	4.55	2.59	2.69
RCP4.5	8.62	10.84	5.27	8.05
RCP8.5	10.06	20.31	6.13	8.18
SRES A1B		25.60		6.50

Table S7 Ensemble mean precipitation change (%) for land points in the catchment, for 4 scenarios, 2 periods, and two seasons.

Sea	DJF Mid-c	DJF Late-c	JJA Mid-c	JJA Late-c
RCP2.6	5.59	4.59	5.01	4.32
RCP4.5	9.28	11.06	8.17	11.87
RCP8.5	11.66	21.31	8.93	13.86
SRES A1B		23.79		10.45

Table S8 Ensemble mean precipitation change (%) for sea points in the catchment, for 4 scenarios, 2 periods, and two seasons.

Land north of 60N	DJF Mid-c	DJF Late-c	JJA Mid-c	JJA Late-c
RCP2.6	5.38	4.99	2.89	3.65
RCP4.5	8.68	11.25	7.36	8.58
RCP8.5	9.71	20.85	8.43	12.33
SRES A1B		29.10		12.72

Table S9 Ensemble mean precipitation change (%) for land points in the catchment north of 60N, for 4 scenarios, 2 periods, and two seasons.

Land south of 60N	DJF Mid-c	DJF Late-c	JJA Mid-c	JJA Late-c
RCP2.6	4.63	4.29	2.32	1.84
RCP4.5	8.59	10.64	3.54	7.70
RCP8.5	10.42	20.03	4.11	4.66
SRES A1B		22.17		0.40

Table S10 Ensemble mean precipitation change (%) for land points in the catchment south of 60N, for 4 scenarios, 2 periods, and two seasons.

Total area	DJF Mid-c	DJF Late-c	JJA Mid-c	JJA Late-c
RCP2.6	0.59	0.73	0.51	0.56
RCP4.5	0.89	0.70	0.49	0.60
RCP8.5	0.74	0.85	0.53	0.93
SRES A1B		0.55		1.06

Table S11 Ensemble standard deviation of temperature change (K) for the total catchment, for 4 scenarios, 2 periods, and two seasons.

Land area	DJF Mid-c	DJF Late-c	JJA Mid-c	JJA Late-c
RCP2.6	0.61	0.75	0.50	0.56
RCP4.5	0.91	0.72	0.46	0.60
RCP8.5	0.76	0.89	0.53	0.95
SRES A1B		0.55		1.13

Table S12 Ensemble standard deviation of temperature change (K) for land points in the catchment, for 4 scenarios, 2 periods, and two seasons.

Sea	DJF Mid-c	DJF Late-c	JJA Mid-c	JJA Late-c
RCP2.6	0.50	0.64	0.55	0.60
RCP4.5	0.78	0.65	0.66	0.66
RCP8.5	0.66	0.73	0.55	0.88
SRES A1B		0.66		0.88

Table S13 Ensemble standard deviation of temperature change (K) for sea points in the catchment, for 4 scenarios, 2 periods, and two seasons.

Land north of 60N	DJF Mid-c	DJF Late-c	JJA Mid-c	JJA Late-c
RCP2.6	0.76	0.93	0.49	0.64
RCP4.5	1.11	0.97	0.55	0.73
RCP8.5	0.91	1.16	0.48	0.94
SRES A1B		0.65		1.02

Table S14 Ensemble standard deviation of temperature change (K) for land points in the catchment north of 60N, for 4 scenarios, 2 periods, and two seasons.

Land south of 60N	DJF Mid-c	DJF Late-c	JJA Mid-c	JJA Late-c
RCP2.6	0.53	0.63	0.53	0.52
RCP4.5	0.82	0.55	0.41	0.51
RCP8.5	0.69	0.73	0.60	1.00
SRES A1B		0.75		1.24

Table S15 Ensemble standard deviation of temperature change (K) for land points in the catchment south of 60N, for 4 scenarios, 2 periods, and two seasons.

Total area	DJF Mid-c	DJF Late-c	JJA Mid-c	JJA Late-c
RCP2.6	4.35	4.48	6.47	5.17
RCP4.5	5.21	4.25	6.27	7.77
RCP8.5	5.06	7.88	8.49	12.53
SRES A1B		7.50		9.07

Table S16 Ensemble standard deviation of precipitation change (%) for the total catchment, for 4 scenarios, 2 periods, and two seasons.

Land area	DJF Mid-c	DJF Late-c	JJA Mid-c	JJA Late-c
RCP2.6	4.12	4.43	6.13	5.04
RCP4.5	5.20	4.07	6.11	7.39
RCP8.5	5.22	8.13	7.98	11.94
SRES A1B		7.36		8.87

Table S17 Ensemble standard deviation of precipitation change for land points in the catchment, for 4 scenarios, 2 periods, and two seasons.

Sea	DJF Mid-c	DJF Late-c	JJA Mid-c	JJA Late-c
RCP2.6	5.88	5.62	9.44	7.02
RCP4.5	5.73	5.68	7.62	10.80
RCP8.5	5.36	8.08	12.94	17.67
SRES A1B		9.11		10.81

Table S18 Ensemble standard deviation precipitation change (%) for sea points in the catchment, for 4 scenarios, 2 periods, and two seasons.

Land north of 60N	DJF Mid-c	DJF Late-c	JJA Mid-c	JJA Late-c
RCP2.6	4.40	5.18	5.93	4.50
RCP4.5	5.93	4.82	5.69	7.55
RCP8.5	6.83	9.16	7.64	11.13
SRES A1B		8.23		6.51

Table S19 Ensemble standard deviation of precipitation change (%) for land points in the catchment north of 60N, for 4 scenarios, 2 periods, and two seasons.

Land south of 60N	DJF Mid-c	DJF Late-c	JJA Mid-c	JJA Late-c
RCP2.6	4.49	4.71	7.19	6.38
RCP4.5	5.03	4.47	7.37	8.50
RCP8.5	4.88	8.32	9.65	14.31
SRES A1B		7.57		12.31

Table S20 Ensemble standard deviation of precipitation change (%) for land points in the catchment south of 60N, for 4 scenarios, 2 periods, and two seasons.