Annex I: Atlas of Global and Regional Climate Projections

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Date of Draft: 5 October 2012

Notes: TSU Compiled Version

Introduction and Scope

This Annex presents a series of figures showing global and regional patterns of climate change computed from global climate model output gathered as part of the Coupled Model Intercomparison Project Phase 5 (CMIP5; Taylor et al., 2012). Maps of surface air temperature change and relative precipitation change (i.e., change expressed as a percentage of mean precipitation) in different seasons are presented for the globe and for a number of different sub-continental-scale regions. Twenty-year average changes for the near-term (2016–2035), for 2046–2065, and for the long-term (2081–2100) are given, relative to a reference period of 1986–2005. Time series for temperature and relative precipitation changes are shown for global land and sea averages, the 26 sub-continental SREX regions (IPCC, 2012) augmented with polar regions and the Caribbean, 2 Indian Ocean and 3 Pacific Ocean regions. In total this Atlas gives projections for 35 regions, 2 variables, and 2 seasons. The projections are made under the Representative Concentration Pathway scenarios, or RCPs, which are introduced in Chapter 1 with more technical detail given in Chapter 12, section 12.3 (also note the discussion of near-term biases in Sections 11.5.3.1 and 11.3.6.1). Maps are only shown for the RCP4.5 scenario, however the time series presented show how the area-average response varies among the RCP2.6, RCP4.5, RCP6.0 and RCP8.5 scenarios. Spatial maps for the other RCP scenarios are presented in the supplementary material. Figures AI-1 and AI-2 give a graphical explanation of aspects of both the time series plots and the spatial maps. While some of the background to the information presented is given here, discussion of the maps and time-series, and important additional background is provided in Chapters 9, 11, 12 and 14 and figure captions on each page reference the specific sub-sections relevant to the regions considered on that page.

The projection of future climate change involves the careful evaluation of models, taking into account uncertainties in observations and considering the physical basis of the findings, in order to characterise the credibility of the projections and assess their sensitivity to uncertainties. As discussed in Chapter 9, different climate models have varying degrees of success in simulating past climate variability and mean state when compared to observations. Verification of regional trends is discussed in Box 11.2 and provide further information on the credibility of model projections. The information presented in this Atlas is based entirely on all available CMIP5 model output with equal weight given to each model or version with different parametrisations.

Complementary methods for making quantitative projections, in which model output is combined with information about model performance using statistical techniques, exist and should be considered in impacts studies (see Chapters 9, 11 and 12). While results from the application of such methods can be assessed alongside the output from CMIP5 presented here, this is beyond the scope of this Atlas. Nor do the simple maps provided represent a robust estimate of the uncertainty associated with the projections. Here the range of model spread is provided as a simple, albeit imperfect, guide to the range of possible futures. Alternative approaches used to estimate projections' uncertainty are discussed in Chapters 11 and 12. The time series and maps are not 'forecasts' and should not be interpreted as such.

Projections of future climate change are conditional on assumptions of climate forcing, affected by shortcomings of climate models and inevitably also subject to internal variability when considering specific periods. Projected patterns of climate change may differ from one climate model generation to the next due to improvements in models. Some model-inadequacies are common to all models, but so are many patterns of change across successive generations of models, which gives some confidence in projections. Consequently, the time series and maps should not be interpreted literally as probability density functions. The information presented is intended to be a starting point only for anyone interested in more detailed information on projections of future climate change and complements the assessment in the Chapters 11 and 12.

Technical Notes

Data and Processing: The figures have been constructed using the CMIP5 model output available at the time of writing (31 July 2012). This dataset comprises 28/37/20/35 scenario experiments for RCP 2.6/4.5/6.0/8.5 from 34 climate models (Table AI-1). Only concentration-driven experiments are used (i.e., those in which concentrations rather than emissions of greenhouse gases are prescribed) and only one ensemble member from each model is selected, even if multiple realisations exist with different initial conditions and different realisations of natural variability. Hence each model is given equal weight. We show maps from one scenario (RCP4.5) but include time series from all RCPs.

Table AI-1: The CMIP5 models used in this Annex for each of the historical and RCP scenario experiments. A '1' indicates that a single ensemble member from that model is used and a blank indicates no run was used, usually because that scenario run was not available. For the pre-industrial control column (piControl), a 'tas' indicates that those control simulations are used in the estimate of internal variability of surface air temperature and a 'pr' indicates that those control simulations are used in the estimate of precipitation internal variability.

CMIP5 Model Name	piControl	Historical	RCP2.6	RCP4.5	RCP6.0	RCP8.5
ACCESS1-0		1		1		1
ACCESS1-3	tas/pr	1		1		1
BNU-ESM	tas/pr	1	1	1		1
CanESM2	tas/pr	1	1	1		1
CCSM4	tas/pr	1	1	1	1	1
CESM1-BGC	tas/pr	1		1		1
CESM1-CAM5		1	1	1	1	1
CMCC-CM		1		1		1
CMCC-CMS	tas/pr	1		1		1
CMCC-CEMS		1				
CNRM-CM5	tas/pr	1	1	1		1
CSIRO-Mk3-6-0	tas/pr	1	1	1	1	1
EC-EARTH		1	1	1		1
FGOALS-g2	tas/pr	1	1	1		1
FGOALS-s2	tas/pr					
FIO-ESM	tas/pr	1	1	1	1	1
GFDL-CM3	tas/pr	1	1	1	1	1
GFDL-ESM2G	tas/pr	1	1	1	1	1
GFDL-ESM2M	tas/pr	1	1	1	1	1
GISS-E2-H-CC p2	tas/pr	1		1		
GISS-E2-H-CC p3	tas/pr					
GISS-E2-R p1		1	1	1	1	1
GISS-E2-R p2	pr	1	1	1	1	1
GISS-E2-R p3	pr	1	1	1	1	1

GISS-E2-R-CC		1		1		
HadGEM2-AO		1	1	1	1	1
HadGEM2-CC		1		1		1
HadGEM2-ES		1	1	1	1	1
IPSL-CM5A-LR	tas/pr	1	1	1	1	1
IPSL-CM5A-MR		1	1	1		1
MIROC5	tas/pr	1	1	1	1	1
MIROC-ESM	tas/pr	1	1	1	1	1
MIROC-ESM-CHEM		1	1	1	1	1
MPI-ESM-LR	tas/pr	1	1	1		1
MPI-ESM-MR	tas/pr	1	1	1		1
MPI-ESM-P	tas/pr					
MRI-CGCM3	tas/pr	1	1	1	1	1
NorESM1-M	tas/pr	1	1	1	1	1
NorESM1-ME		1	1	1	1	1
bcc-csm1-1	tas/pr	1	1	1	1	1
inmcm4	tas/pr	1		1		1
Number of models		37	28	37	20	35

Baseline period: Projections are expressed as anomalies with respect to the baseline period of 1986–2005 for both time series and spatial maps. Thus the changes are relative the climate change that has already occurred since the pre-industrial period and which is discussed in Chapters 2–4 and 10.

Equal model weighting: Model evaluation uses a multitude of techniques (see Chapter 9) and there is no consensus in the community about how to use this information to assign likelihood to different model projections. Consequently the different CMIP5 models used for the projections in this Atlas are all considered to give equally likely projections in the sense of 'one model, one vote'.

Variables: Two variables have been plotted: temperature change and relative precipitation change. The relative precipitation change is defined as the percentage change from the 1986–2005 reference period in each ensemble member. For area averages, the variables are first averaged and next the changes from the reference period are computed.

Seasons: For temperature, the standard meteorological seasons June-August and December-February are shown, as these often correspond roughly with the warmest and coldest seasons in which changes have the largest impact. For precipitation, the half years April-September and October-March are shown so that in most monsoon areas the local rain seasons are entirely contained within the season plotted. As first the seasonal average is computed and next the percentile change, these numbers are dominated by the rainy months within the half-year.

Regions: In addition to the global maps, we use the list of areas defined in (IPCC, 2012) with the addition of the two polar regions and the addition of six regions containing the Caribbean, Indian Ocean and Pacific Island States. Note that temperature and precipitation over the islands may be very different from that over the surrounding sea.

Time Series: For each of the resulting areas the areal mean was computed on the original model grid using either only land or only sea points, depending on the definition of the region. A gird box is considered land if the land fraction is larger than 50%. SREX regions with long coastlines (West coast of South America, North Europe, Southeast Asia) therefore include some influence of the ocean. As an indication of the model uncertainty and natural variability, the time series of each model and scenario over the common period 1900–2100 are shown on the top of the page as anomalies relative to 1986–2005 (the seasons December-February and October-March are counted towards the second year in the interval). The multi-model ensemble means are also shown. Finally, for the period 2081–2100 the 20-year means are computed and the box-and-whiskers plots show the 5th, 25th, 50th (median), 75th and 95th percentiles sampled over the distribution of the model time series indicated in table AI-1, including both natural variability and model spread. In the 20-year means the natural variability is suppressed relative to the annual values in the time series whereas the model uncertainty is the same.

Spatial Maps: The maps in the Atlas show, for an area encompassing two or more regions, the difference between the periods 2016–2035, 2046–2065 and 2081–2100 and the reference period 1986–2005. As local projections of climate change are very uncertain (cf. Chapters 9–12), a measure of the range of model projections is shown in addition to the median response of the model ensemble, bilinearly interpolated to a common 2.5° grid. It should again be emphasized (see above) that this range does not represent the full uncertainty in the projection. On the left the 25th percentile of the distribution of ensemble members is shown, on the right the 75th percentile. The median is shown in the middle (different to similar plots in Chapters 11 and 12 which show the mean). The distribution combines the effects of natural variability and model spread. The colour scale is kept constant over all maps.

Hatching: Hatching indicates regions where the magnitude of the 25th, median or 75th percentile of the 20-year mean change is less than one standard deviation of model-estimated present-day natural variability of 20-year mean differences. The natural variability is estimated using all pre-industrial control runs which are at least 500 year long. The first 200 years of the pre-industrial are ignored and a quadratic fit is subtracted from the time series at every grid point from the remaining time period to eliminate model drift. The natural variability is then calculated for every grid point as the standard deviation of non-overlapping 20-year means, multiplied by the square root of 2. The median across all models of that quantity is used. This characterizes the typical difference between two 20-year averages that would be expected due to unforced internal variability.

The hatching can be interpreted as some indication of the strength of the future anomalies from present-day climate, when compared to the strength of present day internal 20-year variability. It either means that the change is relatively small or that there is little agreement between models on the sign of the change. It is only presented as a guide to assessing the strength of change as the difference between two 20-year intervals. Using other measures of climate change would give smaller or larger hatched areas, but the colours underneath the hatching would not change much. Other methods of hatching and stippling are possible (see Box 12.1) and, in cases where such information is critical, it is recommended that thorough attention is paid to assessing significance using a statistical test appropriate to the problem being considered.

Scenarios: Spatial patterns of changes for scenarios other than RCP4.5 can be found in the Supplementary Material.

[INSERT FIGURE AI-1 HERE]
Figure AI-1: Explanation of the features of a typical time series figure presented in the Annex.

[INSERT FIGURE AI-2 HERE]
Figure AI-2: Explanation of the features of a typical spatial maps presented in the Annex. Hatching indicates regions where the magnitude of the 25th, median or 75th percentile of the 20-year mean change is less than one standard deviation of model-estimated natural variability of 20-year mean differences.

References

IPCC, 2012. *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change [C.B. Field, V. Baros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor and P.M. Midgley (Eds.). Cambridge University Press, UK, and New York, NY, USA, pp. 582.

Taylor, K.E., Stouffer, R.J. and Meehl, G.A., 2012. A Summary of the CMIP5 Experiment Design. *Bull. Amer. Meteor. Soc*., **93**, 485-498.

Figures

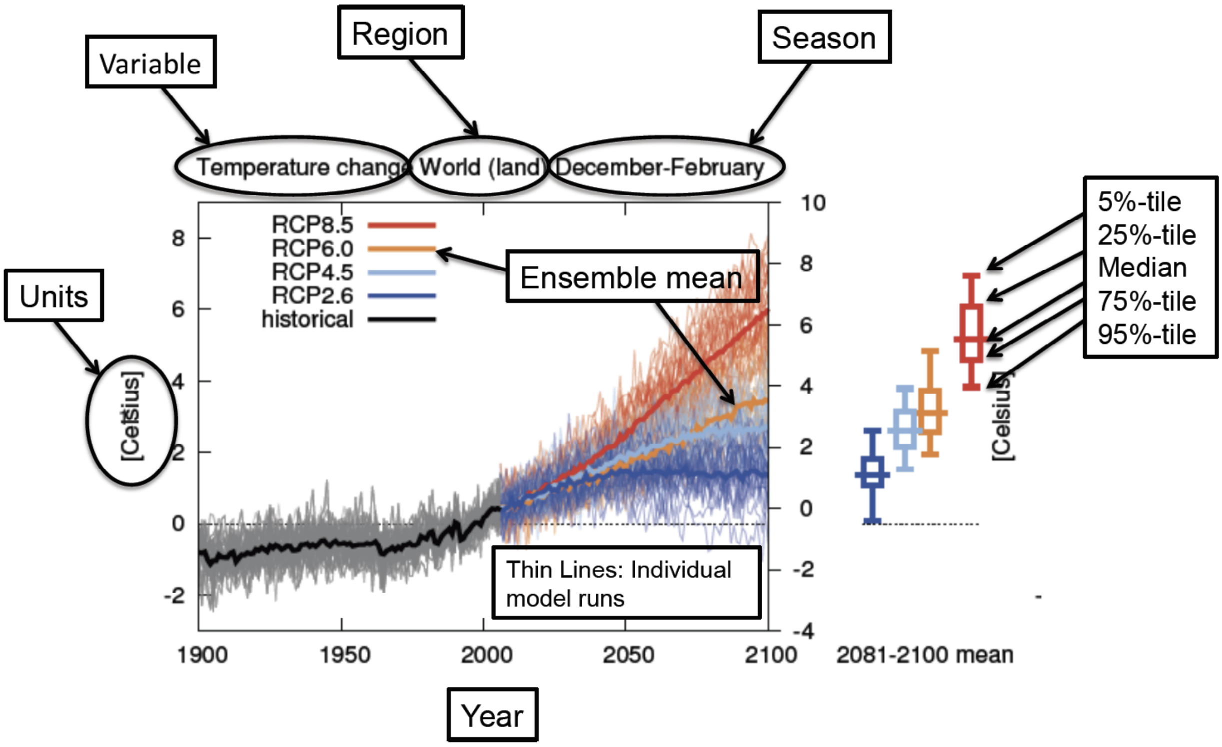

Figure AI-1: Explanation of the features of a typical time series figure presented in the Annex.

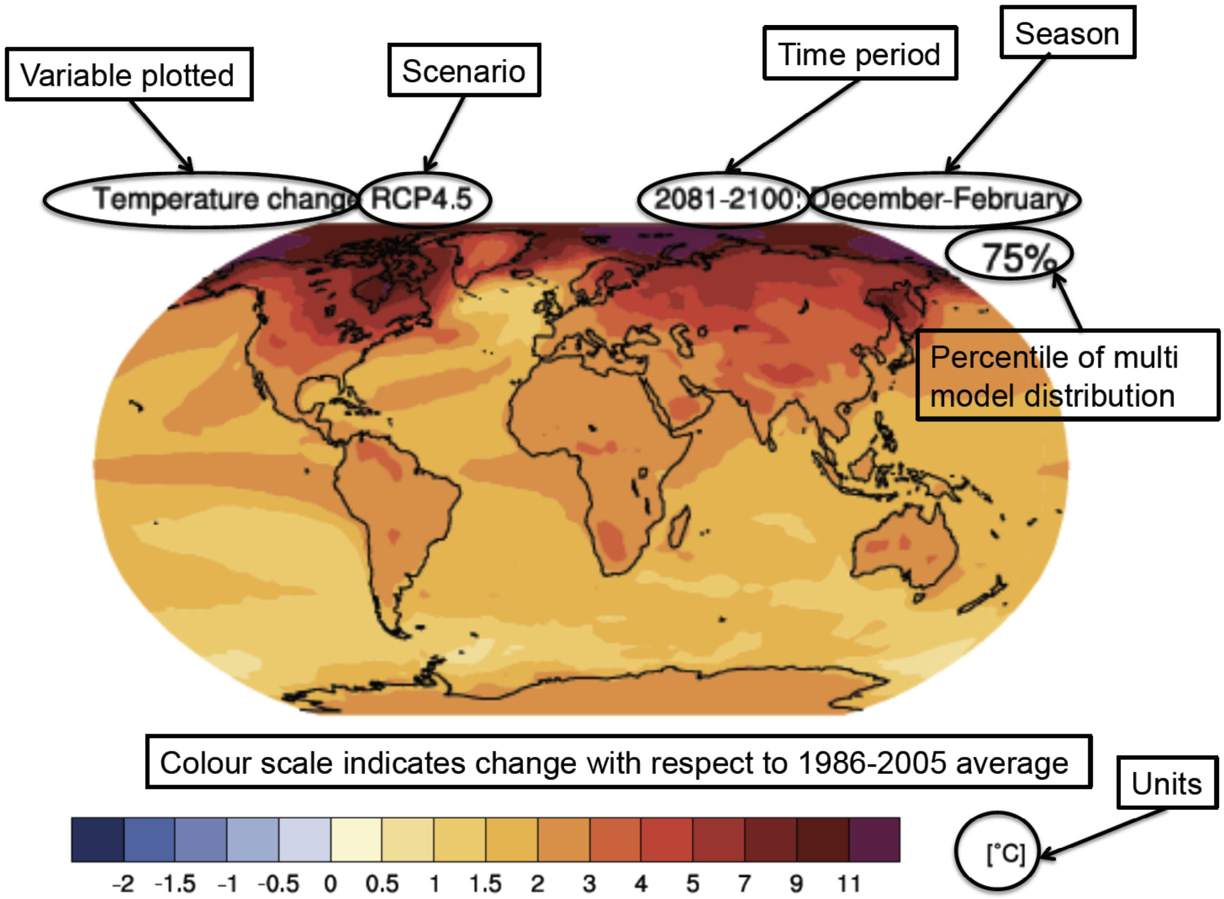

Figure AI-2: Explanation of the features of a typical spatial maps presented in the Annex. Hatching indicates regions where the magnitude of the 25th, median or 75th percentile of the 20-year mean change is less than one standard deviation of model-estimated natural variability of 20-year mean differences.

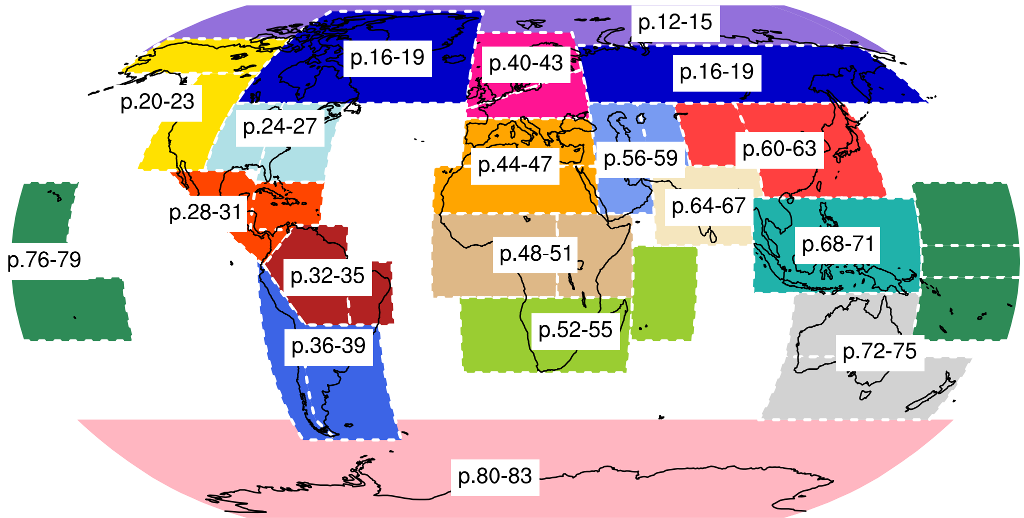

Figure AI.3: Overview of the SREX, ocean and polar regions used.

Figures AI-4 to AI-7, p.8–11: World
Figures AI-8 to AI-11, p.12–15: Arctic
Figures AI-12 to AI-15, p.16–19: High latitudes
Figures AI-16 to AI-19, p.20–23: North America (West)
Figures AI-20 to AI-23, p.24–27: North America (East)
Figures AI-24 to AI-27, p.28–31: Central America and Caribbean
Figures AI-28 to AI-31, p.32–35: Northern South America
Figures AI-32 to AI-35, p.36–39: Southern South America
Figures AI-36 to AI-39, p.40–43: North and Central Europe
Figures AI-40 to AI-43, p.44–47: Mediterranean and Sahara
Figures AI-44 to AI-47, p.48–51: West and East Africa
Figures AI-48 to AI-51, p.52–55: Southern Africa and West Indian Ocean
Figures AI-52 to AI-55, p.56–59: West and Central Asia
Figures AI-56 to AI-59, p.60–63: Eastern Asia and Tibetan Plateau
Figures AI-60 to AI-63, p.64–67: South Asia
Figures AI-64 to AI-67, p.68–71: Southeast Asia
Figures AI-68 to AI-71, p.72–75: Australia and New Zealand
Figures AI-72 to AI-75, p.76–79: Pacific Islands region
Figures AI-76 to AI-79, p.80–83: Antarctica

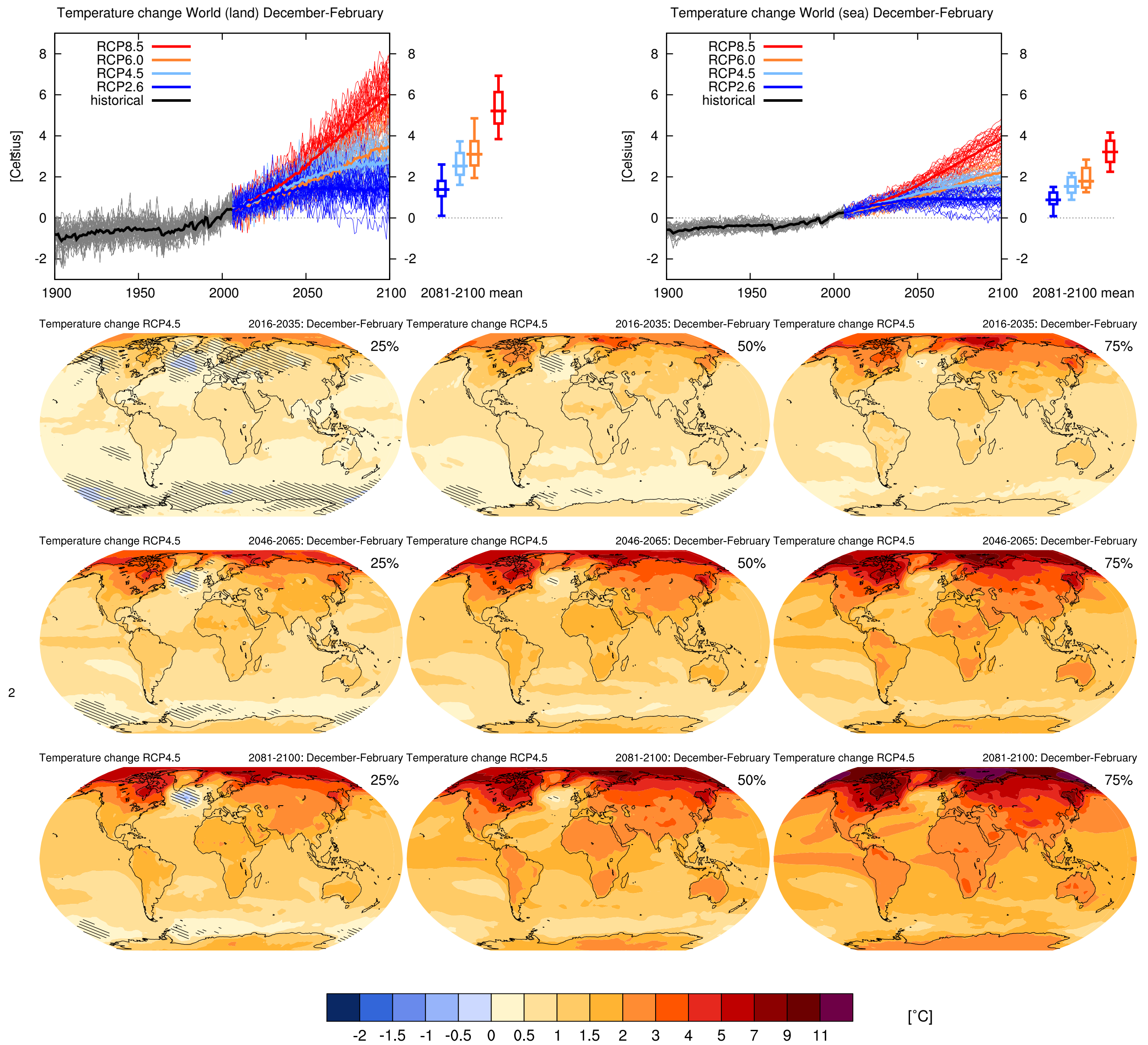

Figure AI.4: top left: time series of temperature averaged over land grid points over the globe in December–February. Top right: same for sea grid points. Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.4.1, 9.4.2, 10.3, 11.3.2.2, 11.3.3.1, Box 11.2, 12.4.3 and 12.4.7 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

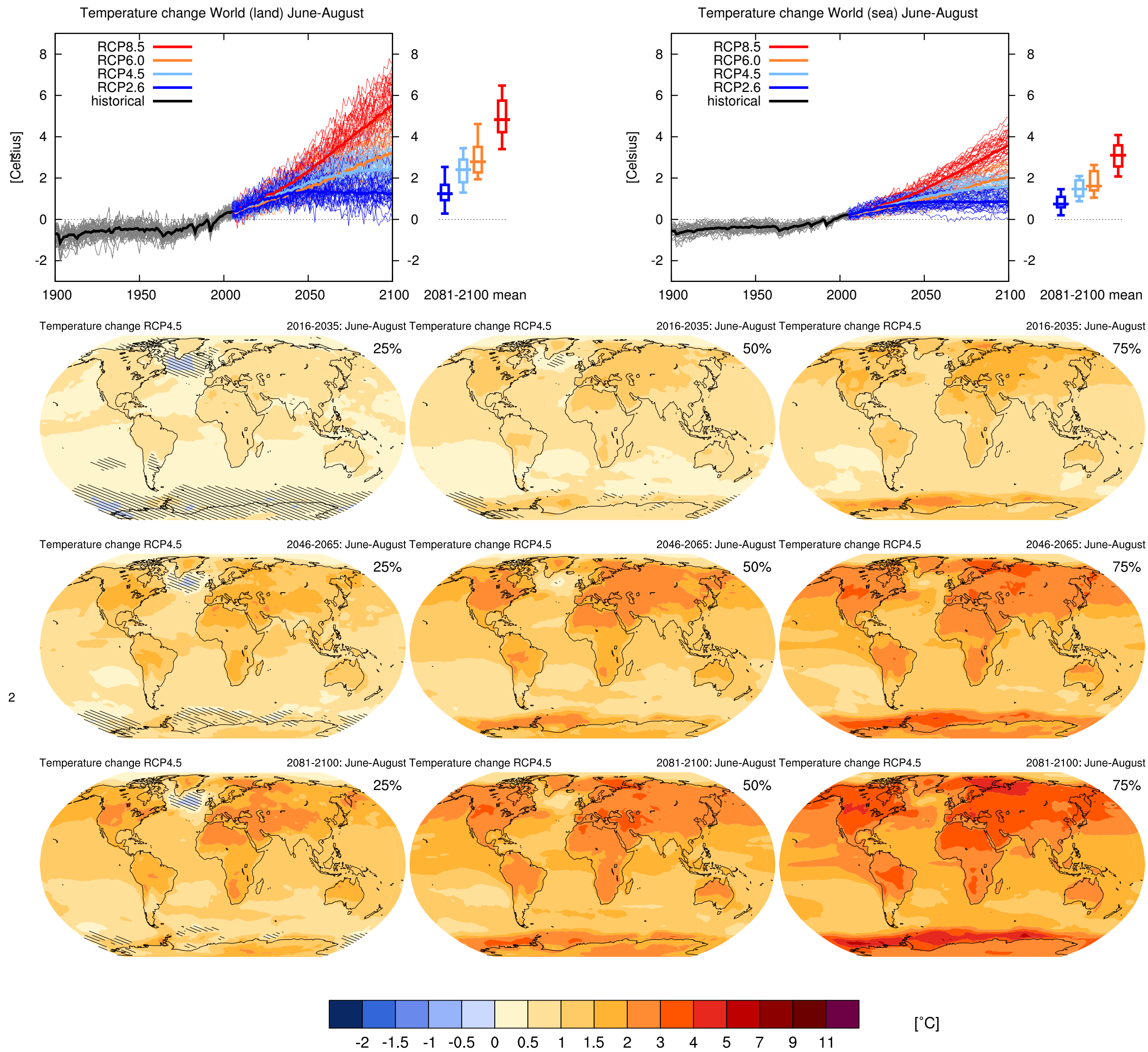

Figure AI.5: top left: time series of temperature averaged over land grid points over the globe in June–August. Top right: same for sea grid points. Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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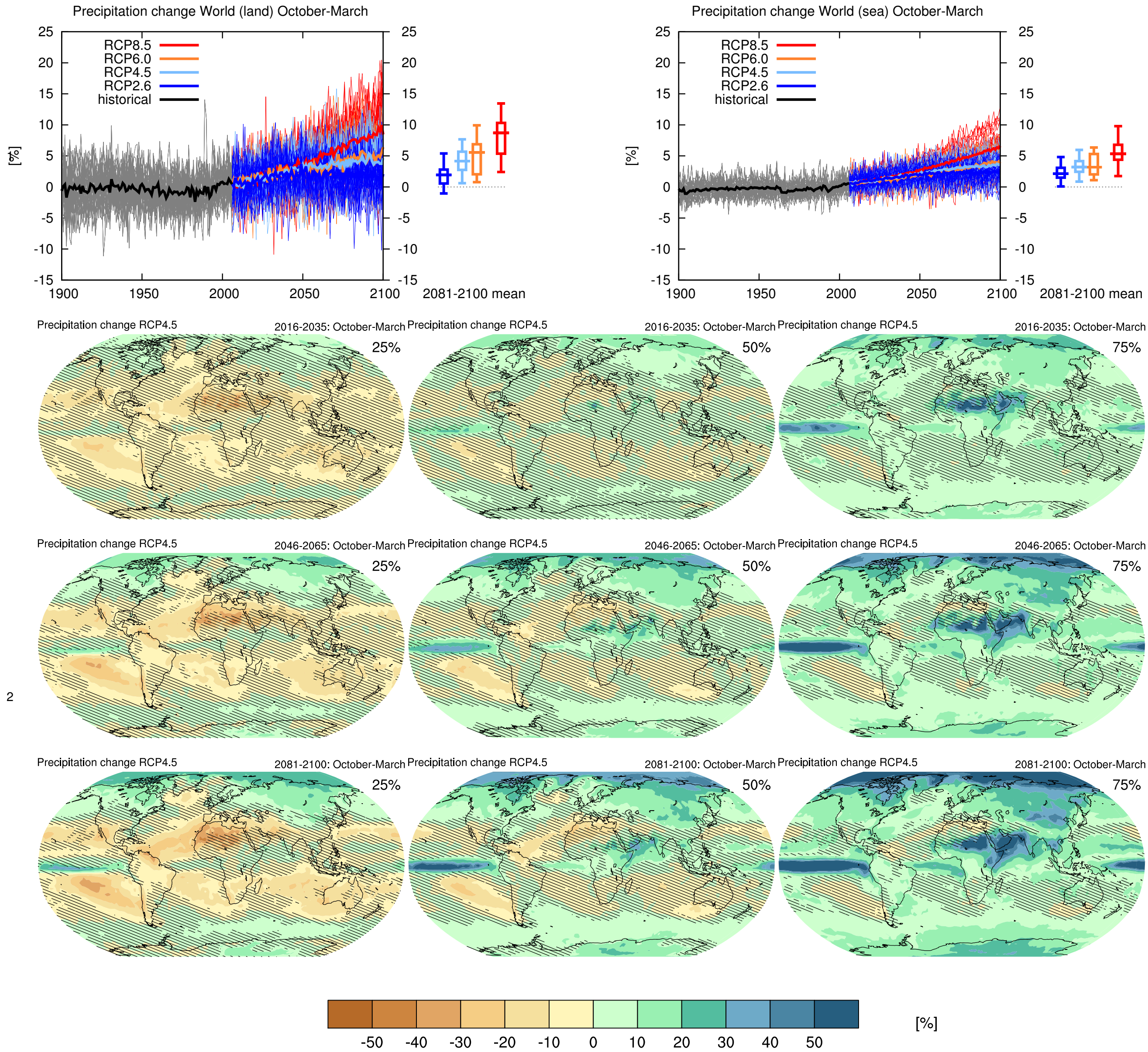

Figure AI.6: top left: time series of relative precipitation averaged over land grid points over the globe in October–March. Top right: same for sea grid points. Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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Sections 9.4.4, 11.3.2.3, Box 11.2, 12.4.5 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

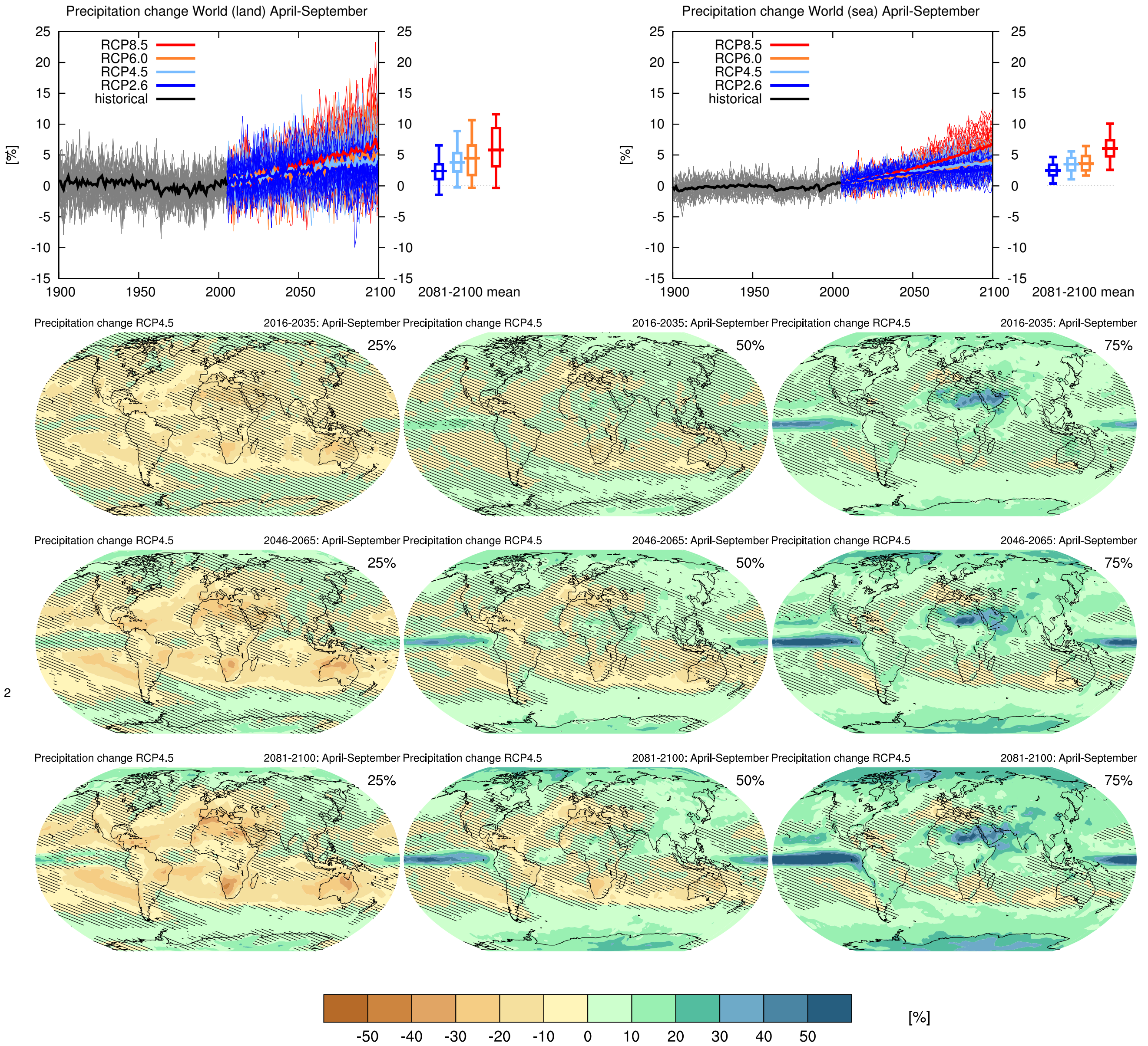

Figure AI.7: top left: time series of relative precipitation averaged over land grid points over the globe in April–September. Top right: same for sea grid points. Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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Sections 9.4.4, 11.3.2.3, Box 11.2, 12.4.5 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

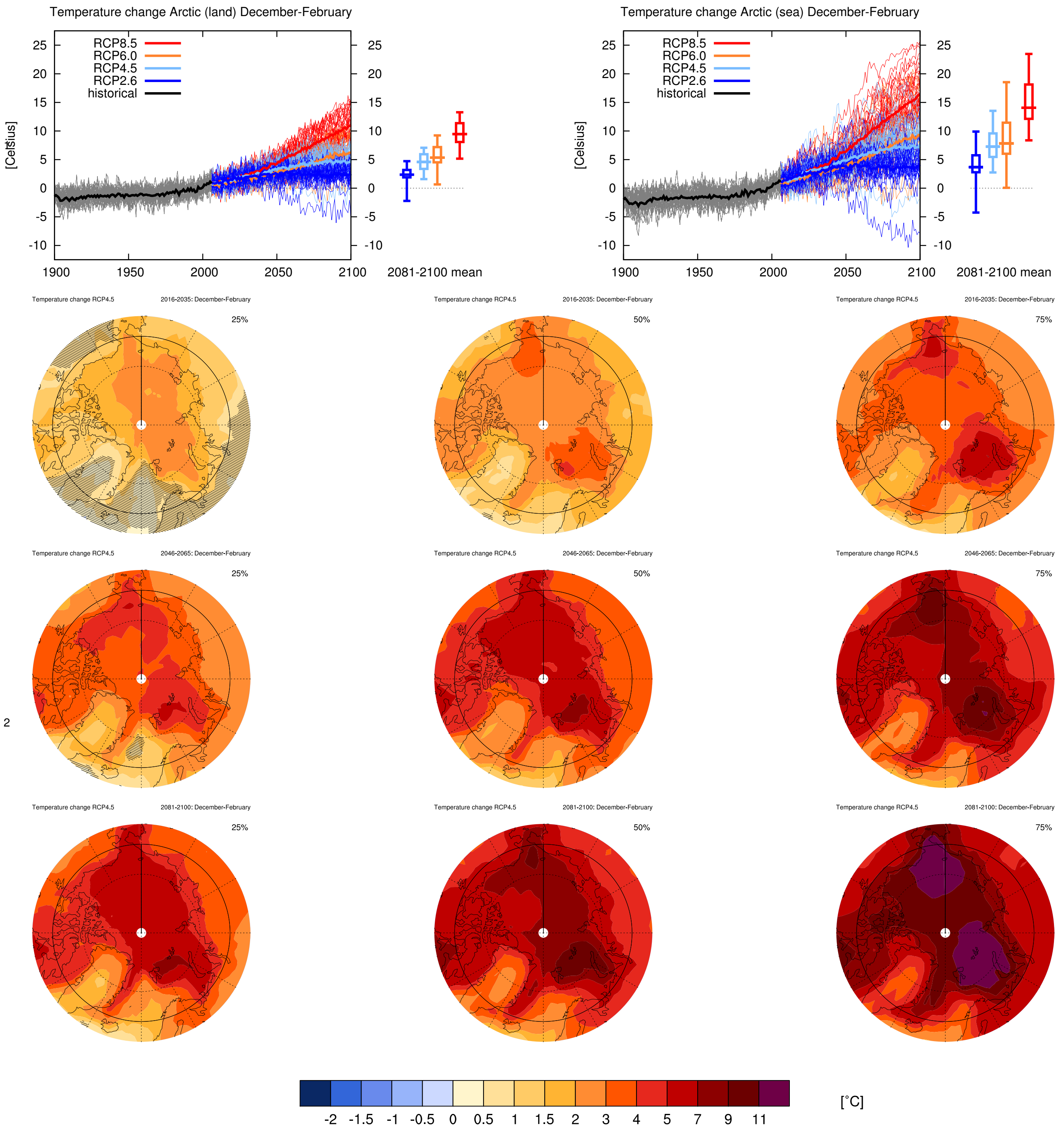

Figure AI.8: top left: time series of temperature averaged over land grid points in the Arctic (67.5°–90°N) in December–February. Top right: same for sea grid points. Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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Sections 9.6.1, 11.3.2.4.1, Box 11.2, 12.4.3, 14.9.2 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

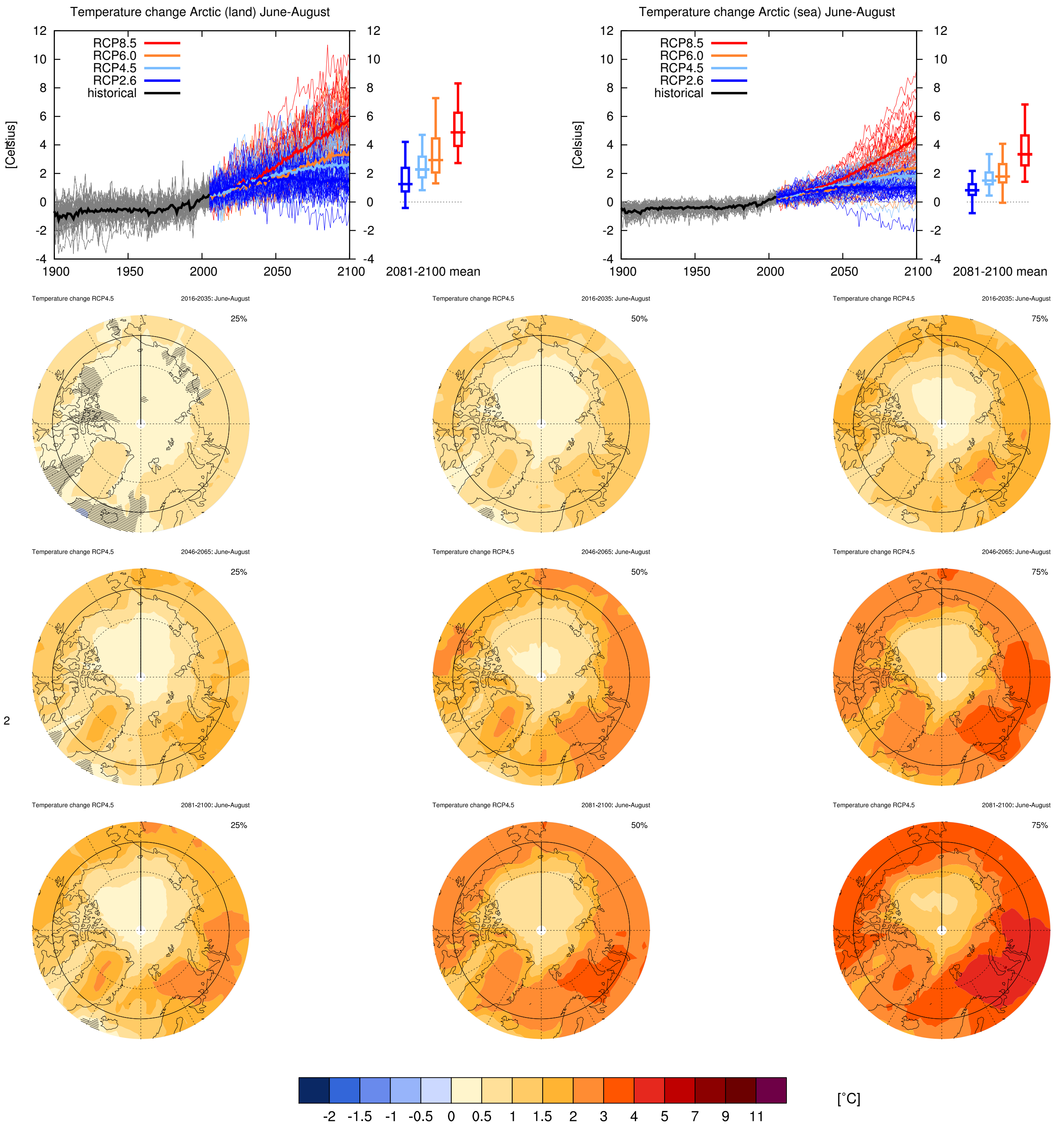

Figure AI.9: top left: time series of temperature averaged over land grid points in the Arctic (67.5°–90°N) in June–August. Top right: same for sea grid points. Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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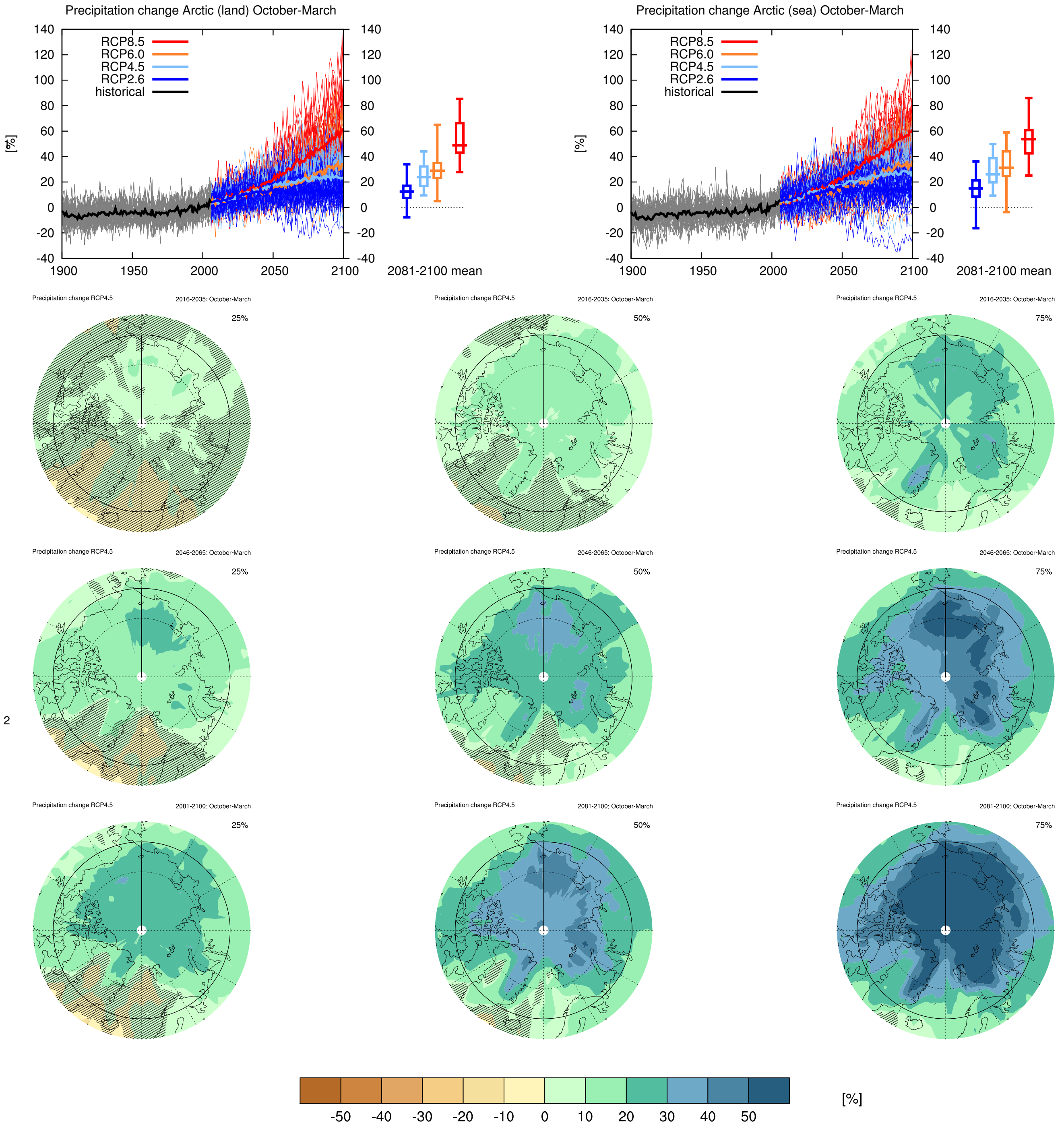

Figure AI.10: top left: time series of relative precipitation averaged over land grid points in the Arctic (67.5°–90°N) in October–March. Top right: same for sea grid points. Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of relative precipitation changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

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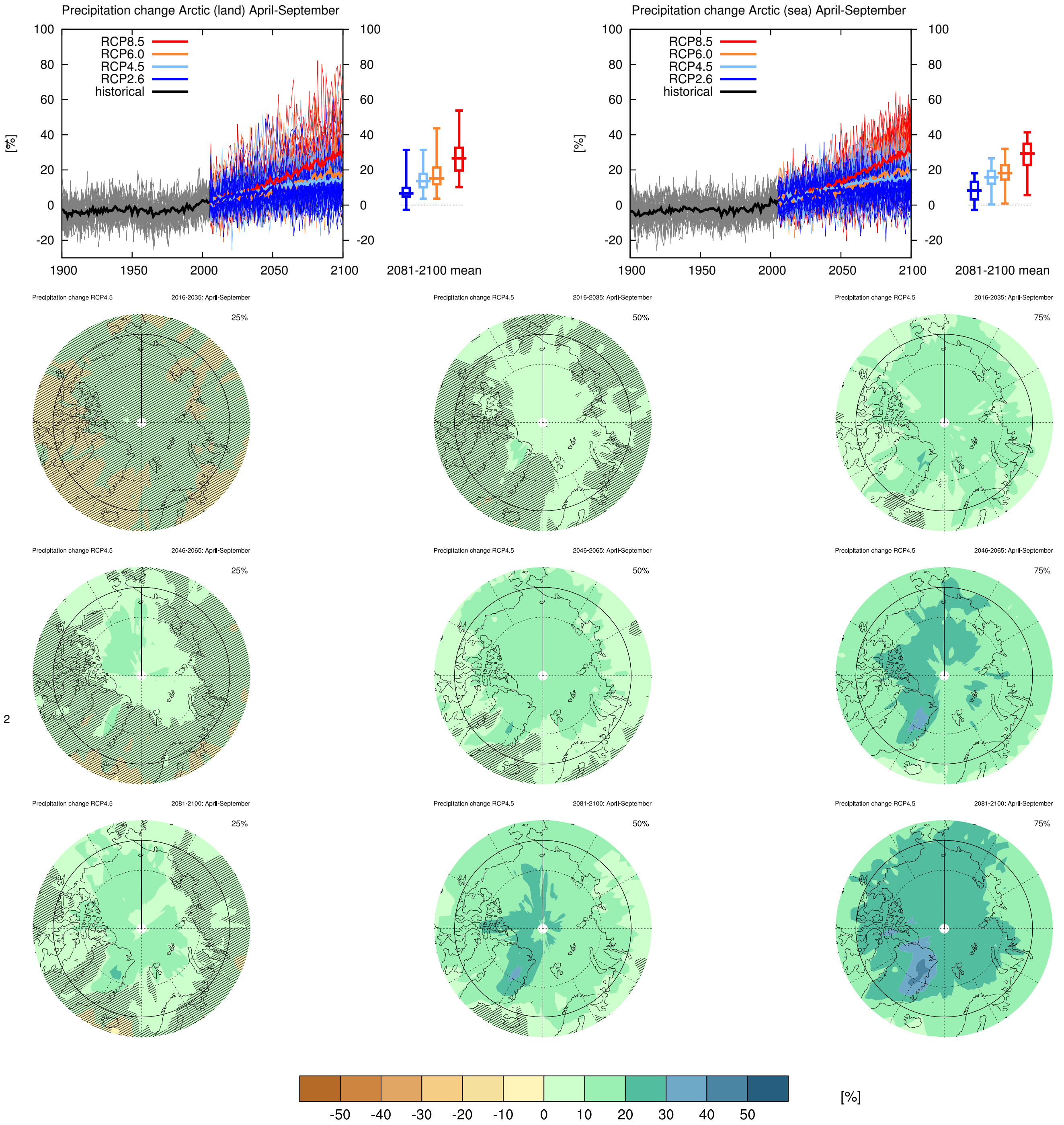

Figure AI.11: top left: time series of relative precipitation averaged over land grid points in the Arctic (67.5°–90°N) in April–September. Top right: same for sea grid points. Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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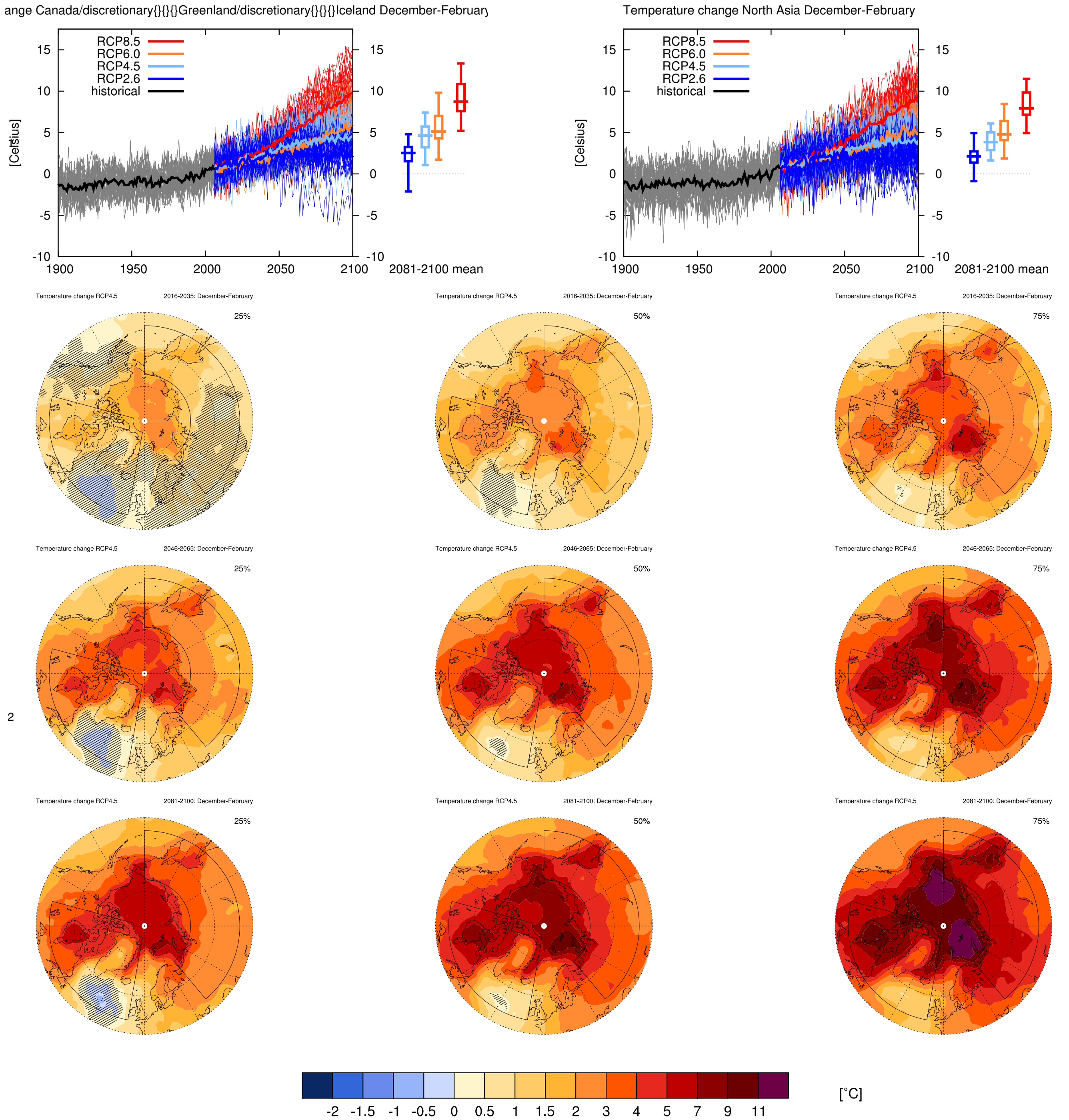

Figure AI.12: top left: time series of temperature averaged over land grid points in Canada/Greenland/Iceland (50°–85°N, 105°–10°W) in December–February. Top right: same for land grid points in North Asia (50°–70°N, 40°–180°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.1, Box 11.2, 12.4.3, 14.9.8 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

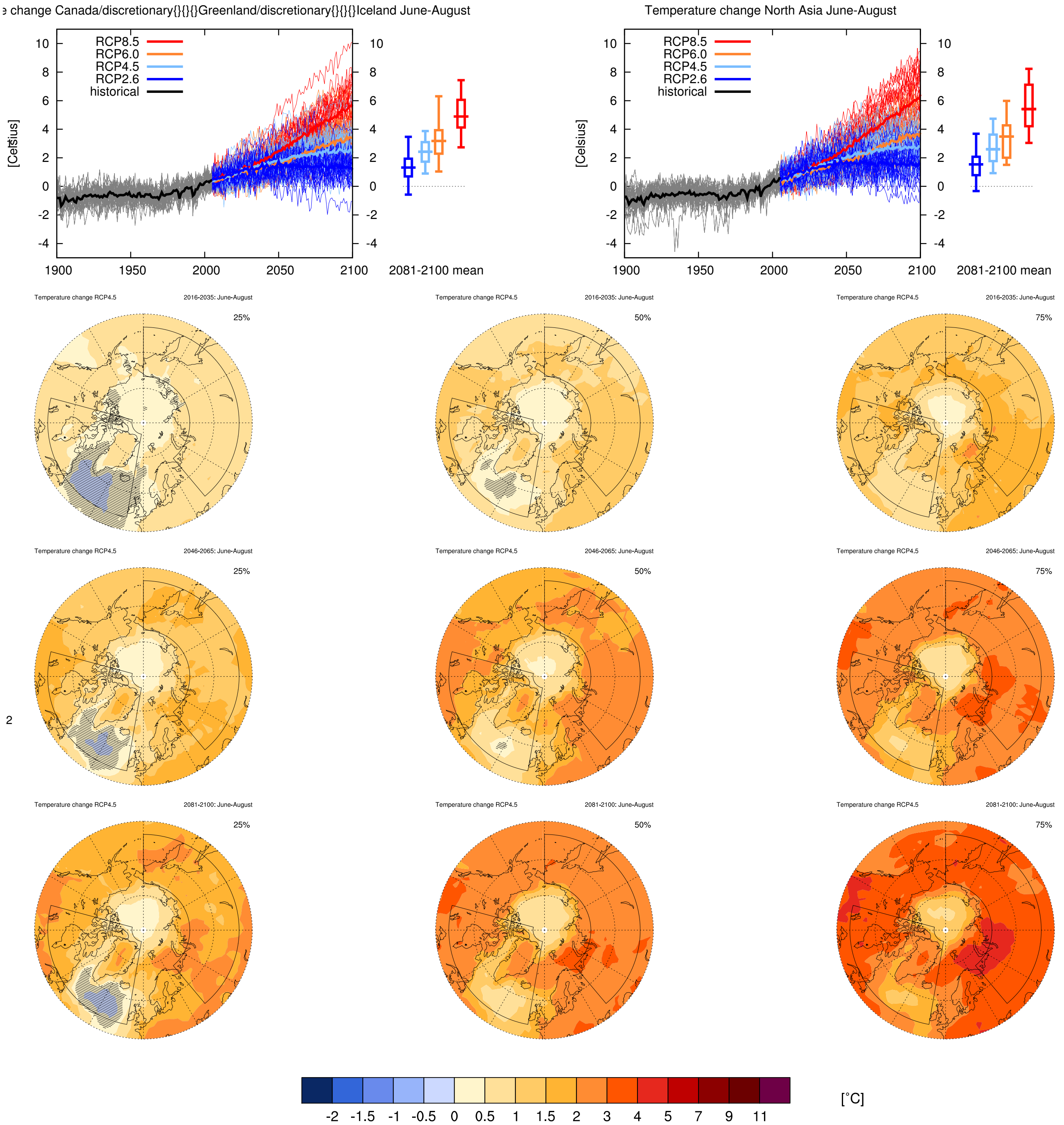

Figure AI.13: top left: time series of temperature averaged over land grid points in Canada/Greenland/Iceland (50°–85°N, 105°–10°W) in June–August. Top right: same for land grid points in North Asia (50°–70°N, 40°–180°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.1, Box 11.2, 12.4.3, 14.9.8 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

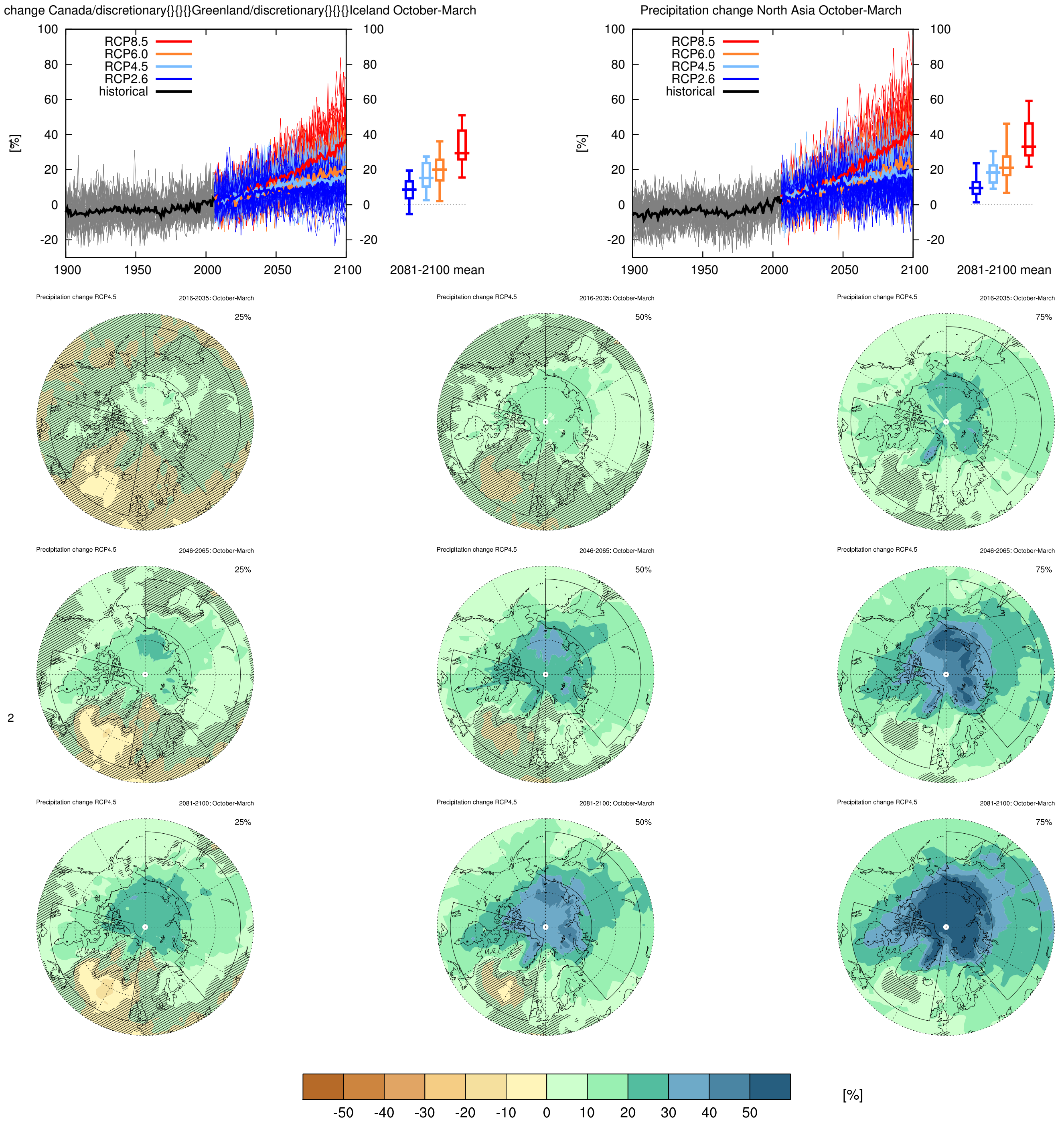

Figure AI.14: top left: time series of relative precipitation averaged over land grid points in Canada/Greenland/ Iceland (50°–85°N, 105°–10°W) in October–March. Top right: same for land grid points in North Asia (50°–70°N, 40°–180°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of relative precipitation changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.1, Box 11.2, 12.4.5, 14.9.8 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

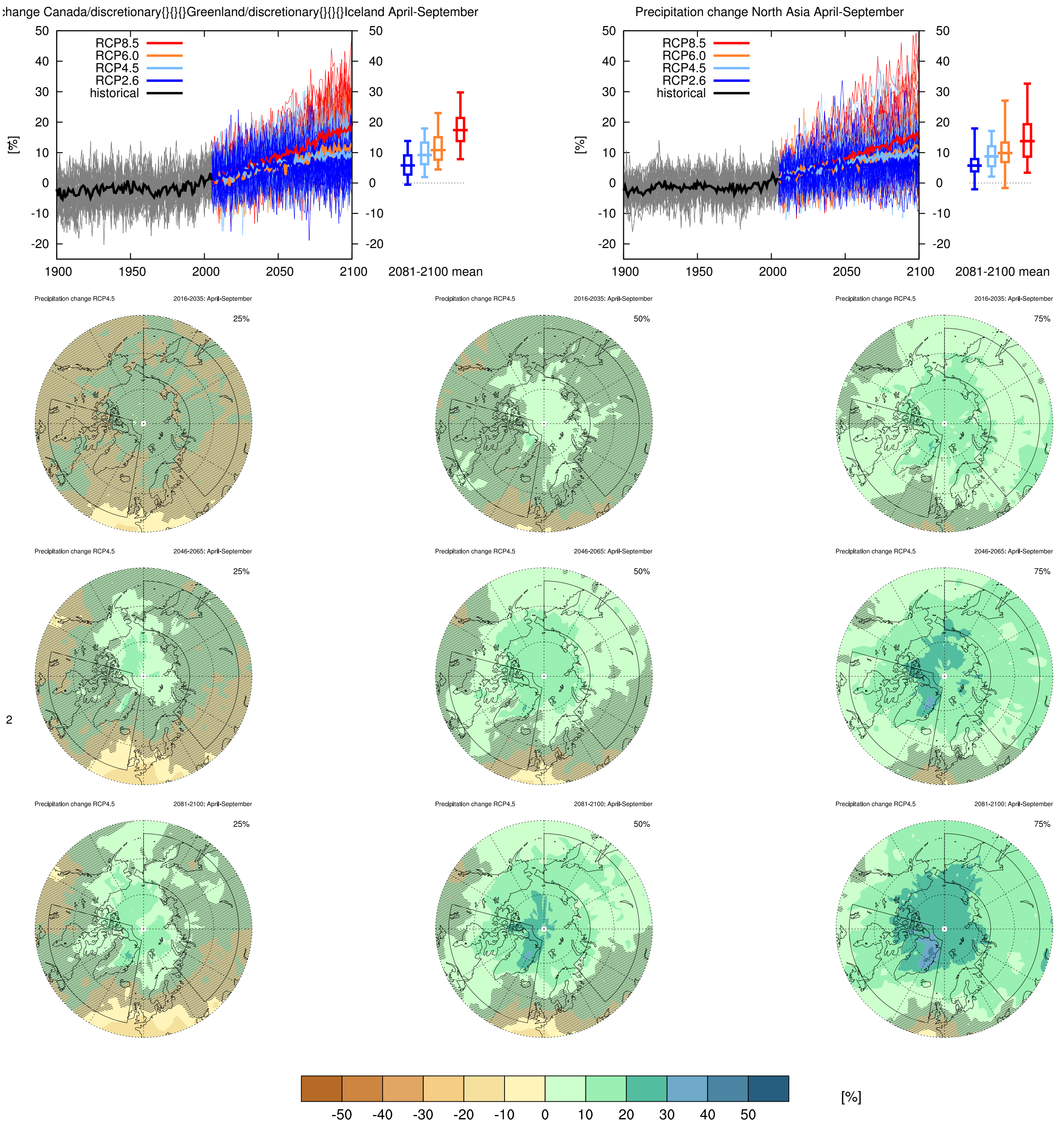

Figure AI.15: top left: time series of relative precipitation averaged over land grid points in Canada/Greenland/Iceland (50°–85°N, 105°–10°W) in April–September. Top right: same for land grid points in North Asia (50°–70°N, 40°–180°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of relative precipitation changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.1, Box 11.2, 12.4.5, 14.9.8 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

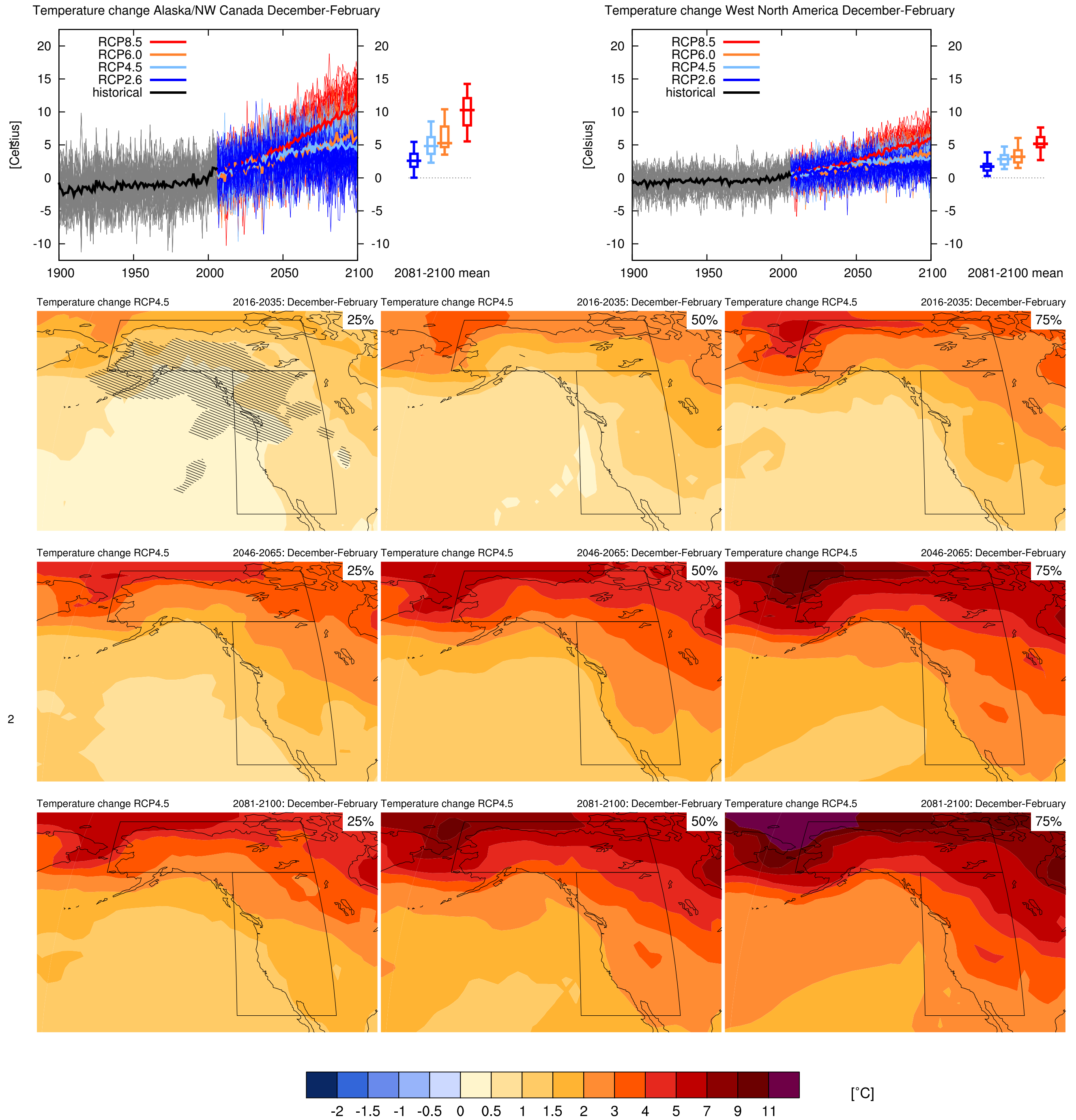

Figure AI.16: top left: time series of temperature averaged over land grid points in Alaska/NW Canada (60°–72.6°N, 168°–105°W) in December–February. Top right: same for land grid points in West North America (28.6°–60°N, 130°–105°W). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.1, Box 11.2, 12.4.3, 14.9.3 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

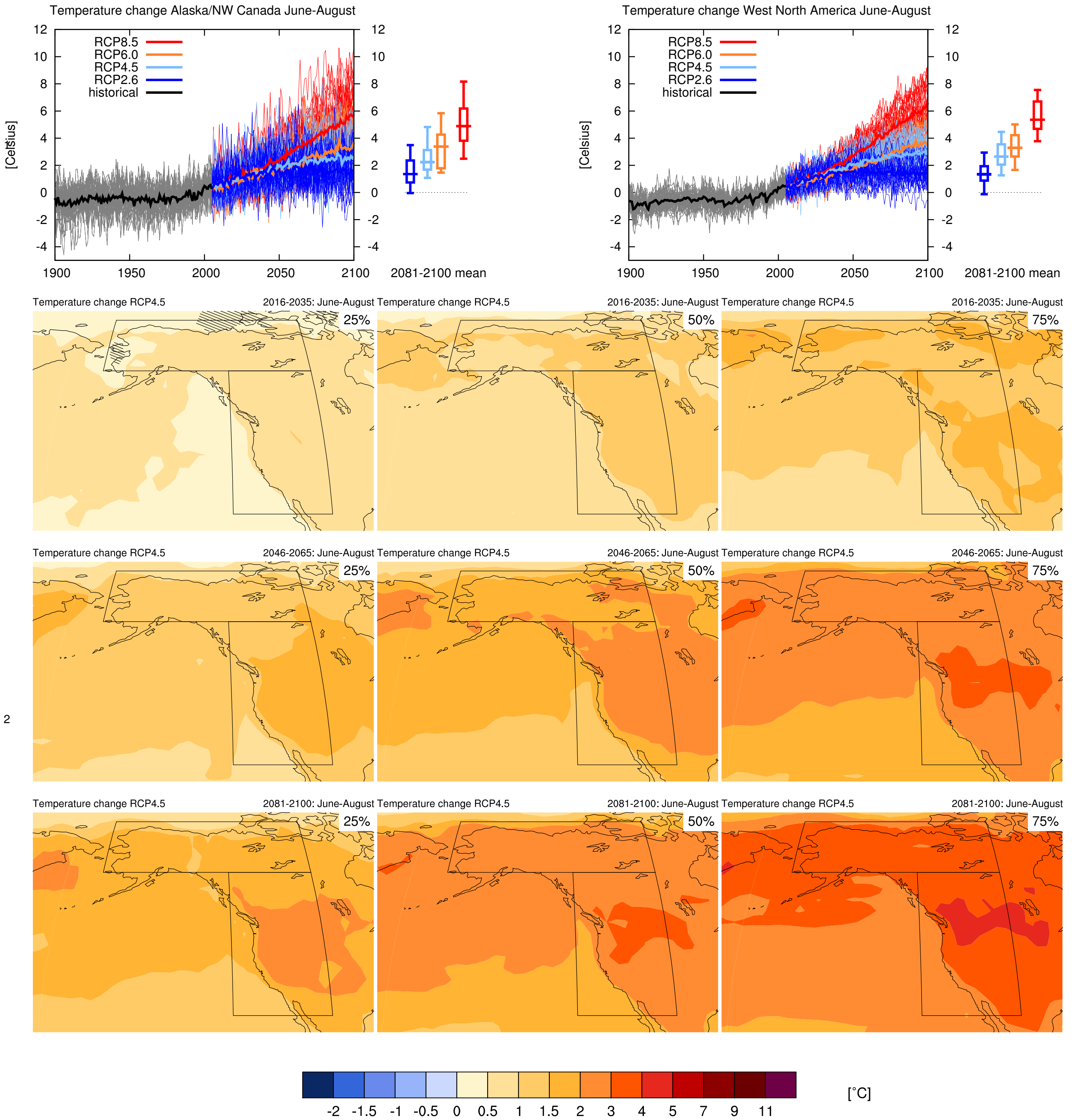

Figure AI.17: top left: time series of temperature averaged over land grid points in Alaska/NW Canada (60°–72.6°N, 168°–105°W) in June–August. Top right: same for land grid points in West North America (28.6°–60°N, 130°–105°W). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.1, Box 11.2, 12.4.3, 14.9.3 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

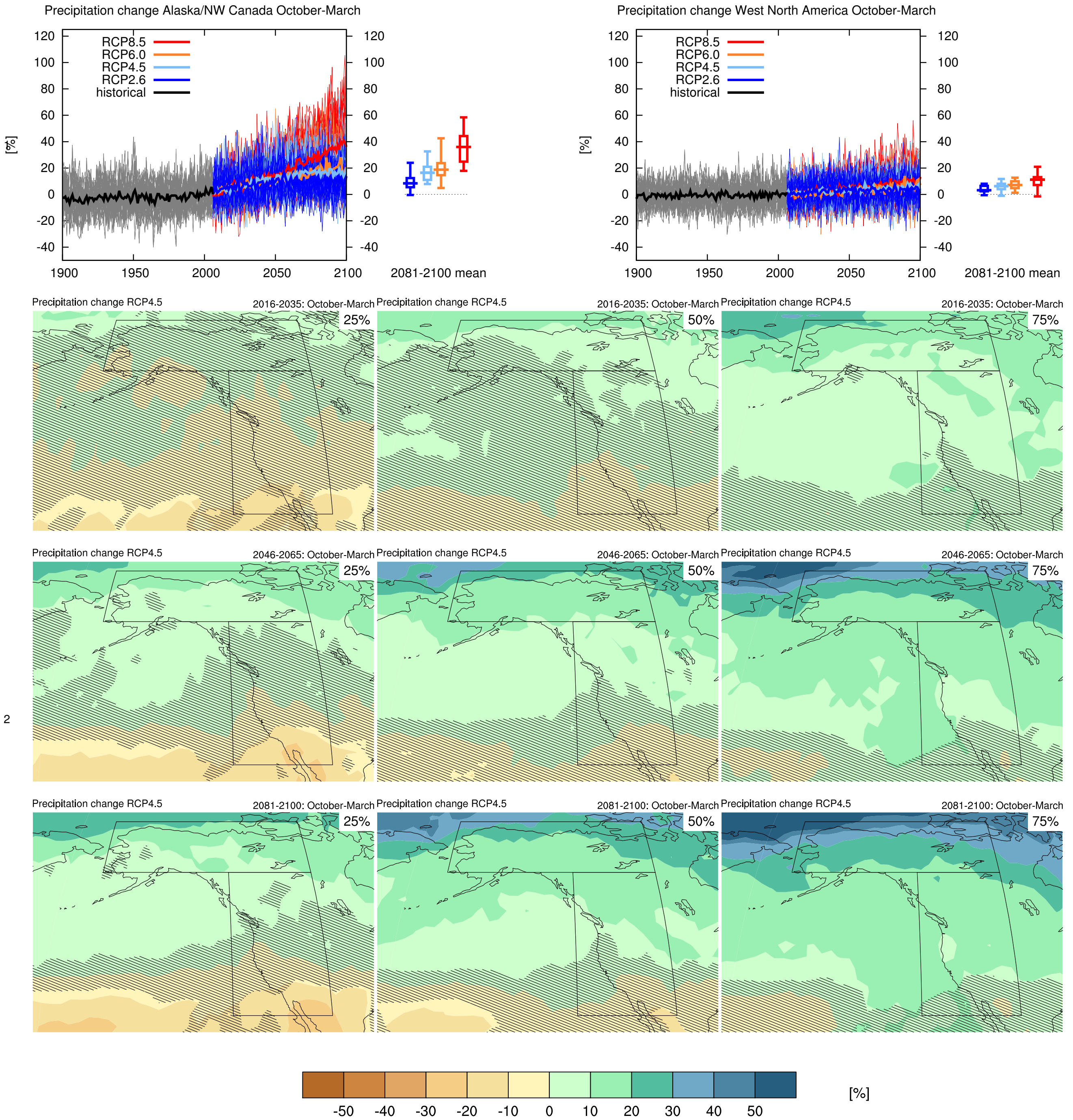

Figure AI.18: top left: time series of relative precipitation averaged over land grid points in Alaska/NW Canada (60°–72.6°N, 168°–105°W) in October–March. Top right: same for land grid points in West North America (28.6°–60°N, 130°–105°W). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of relative precipitation changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.1, Box 11.2, 12.4.5, 14.9.3 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

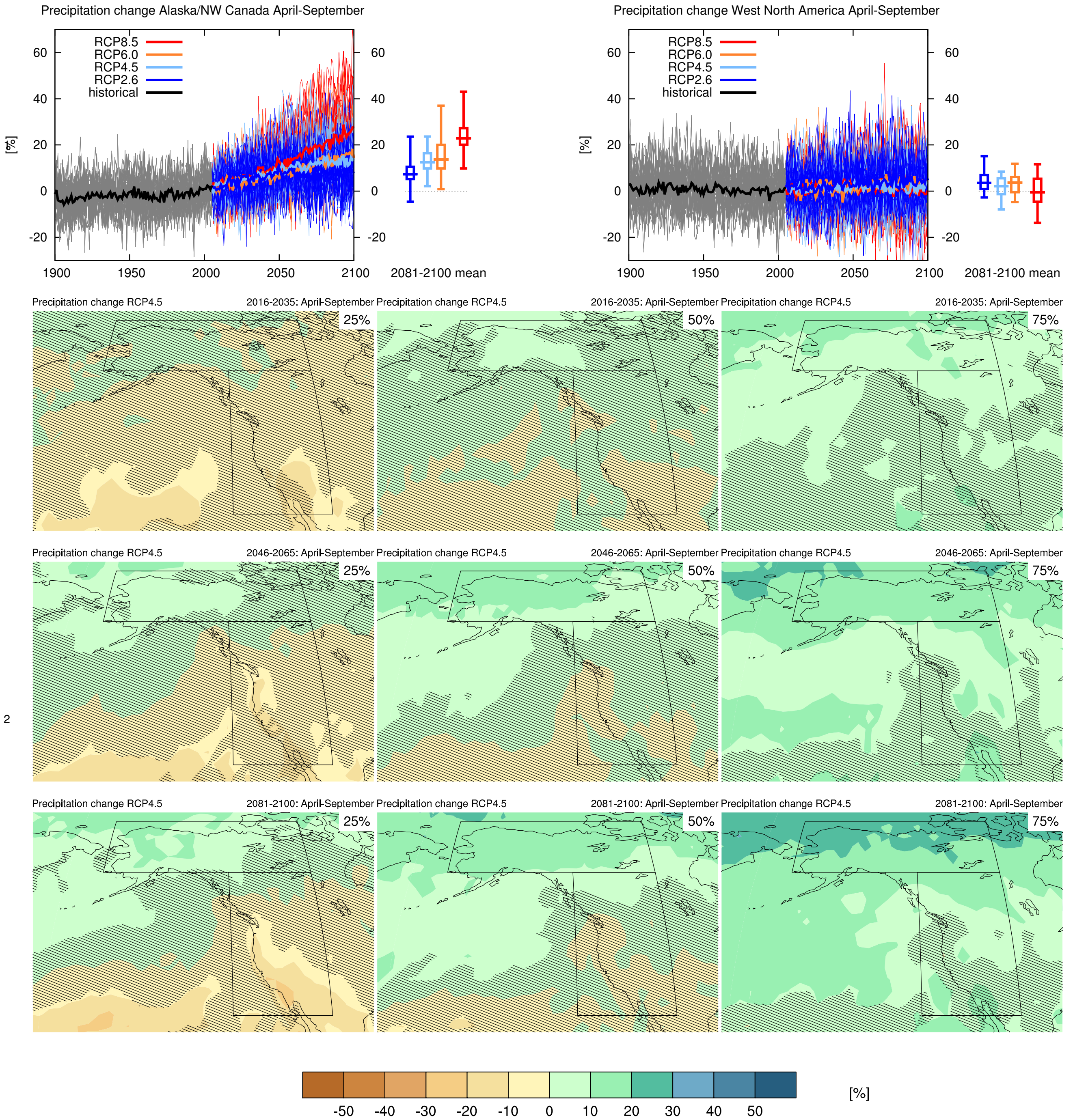

Figure AI.19: top left: time series of relative precipitation averaged over land grid points in Alaska/NW Canada (60°–72.6°N, 168°–105°W) in April–September. Top right: same for land grid points in West North America (28.6°–60°N, 130°–105°W). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of relative precipitation changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.1, Box 11.2, 12.4.5, 14.9.3 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

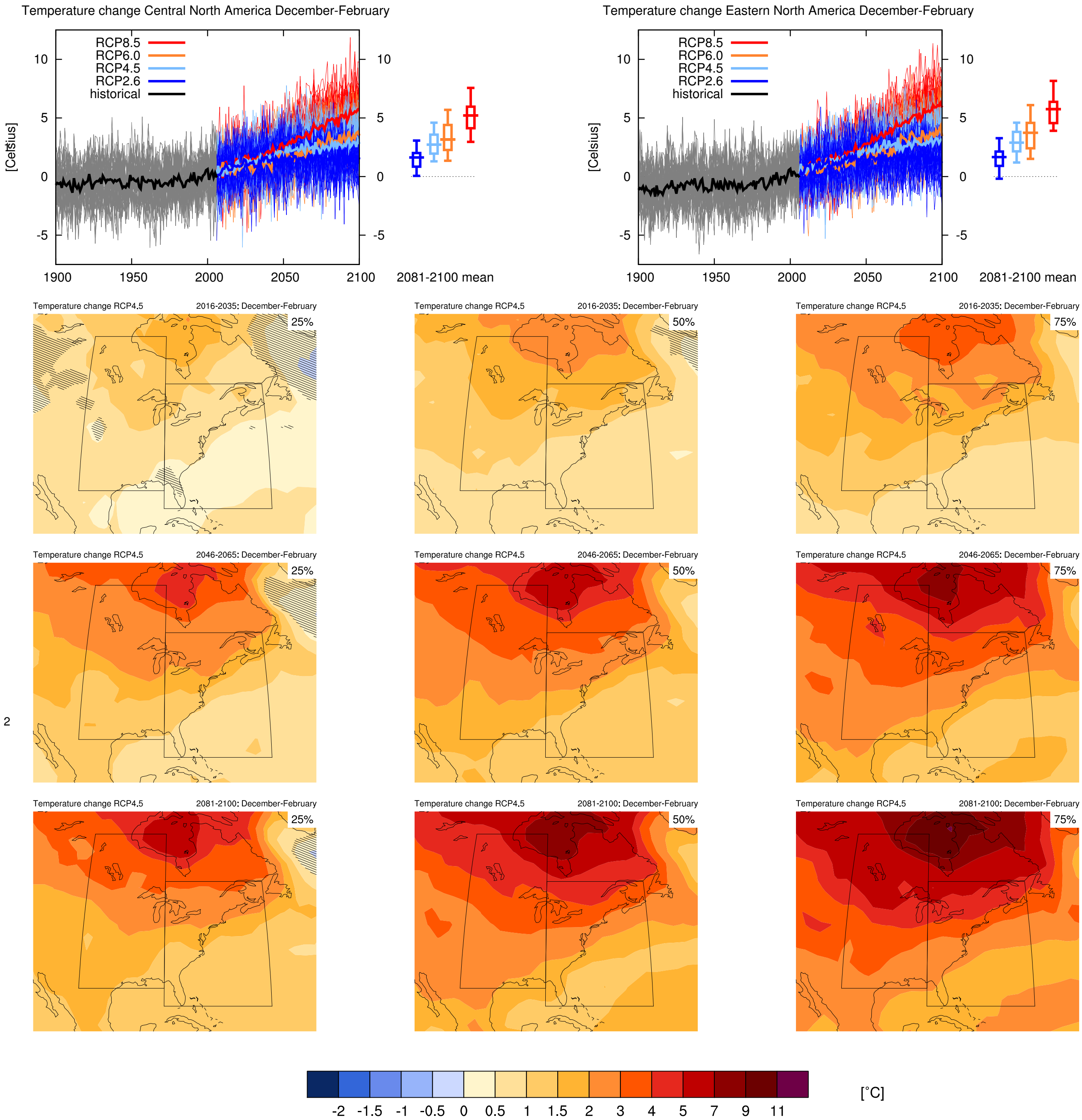

Figure AI.20: top left: time series of temperature averaged over land grid points in Central North America (28.6°–60°N, 105°–85°W) in December–February. Top right: same for land grid points in Eastern North America (25°–50°N, 85°–60°W). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.1, Box 11.2, 12.4.3, 14.9.3 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

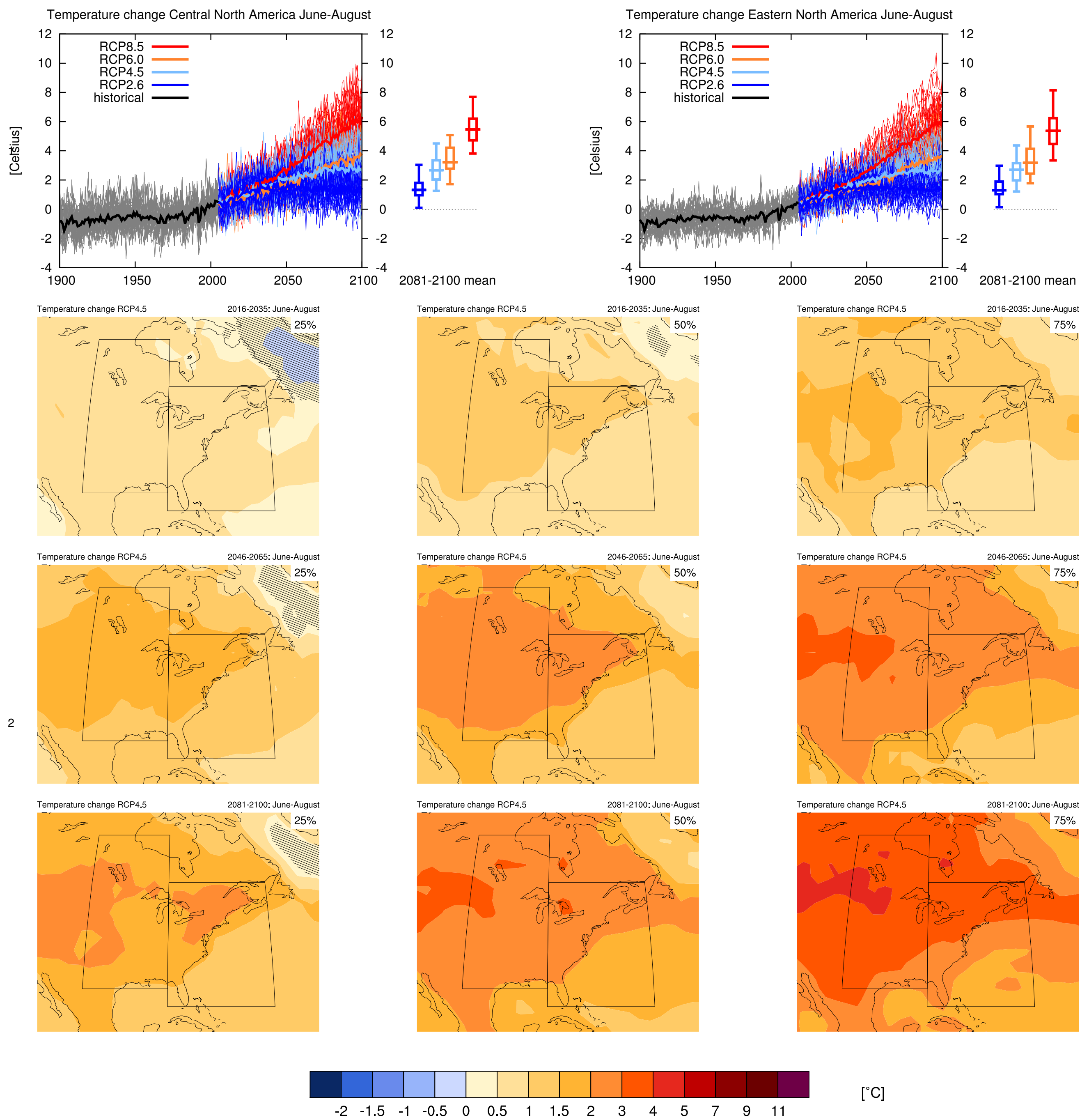

Figure AI.21: top left: time series of temperature averaged over land grid points in Central North America (28.6°–60°N, 105°–85°W) in June–August. Top right: same for land grid points in Eastern North America (25°–50°N, 85°–60°W). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.1, Box 11.2, 12.4.3, 14.9.3 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

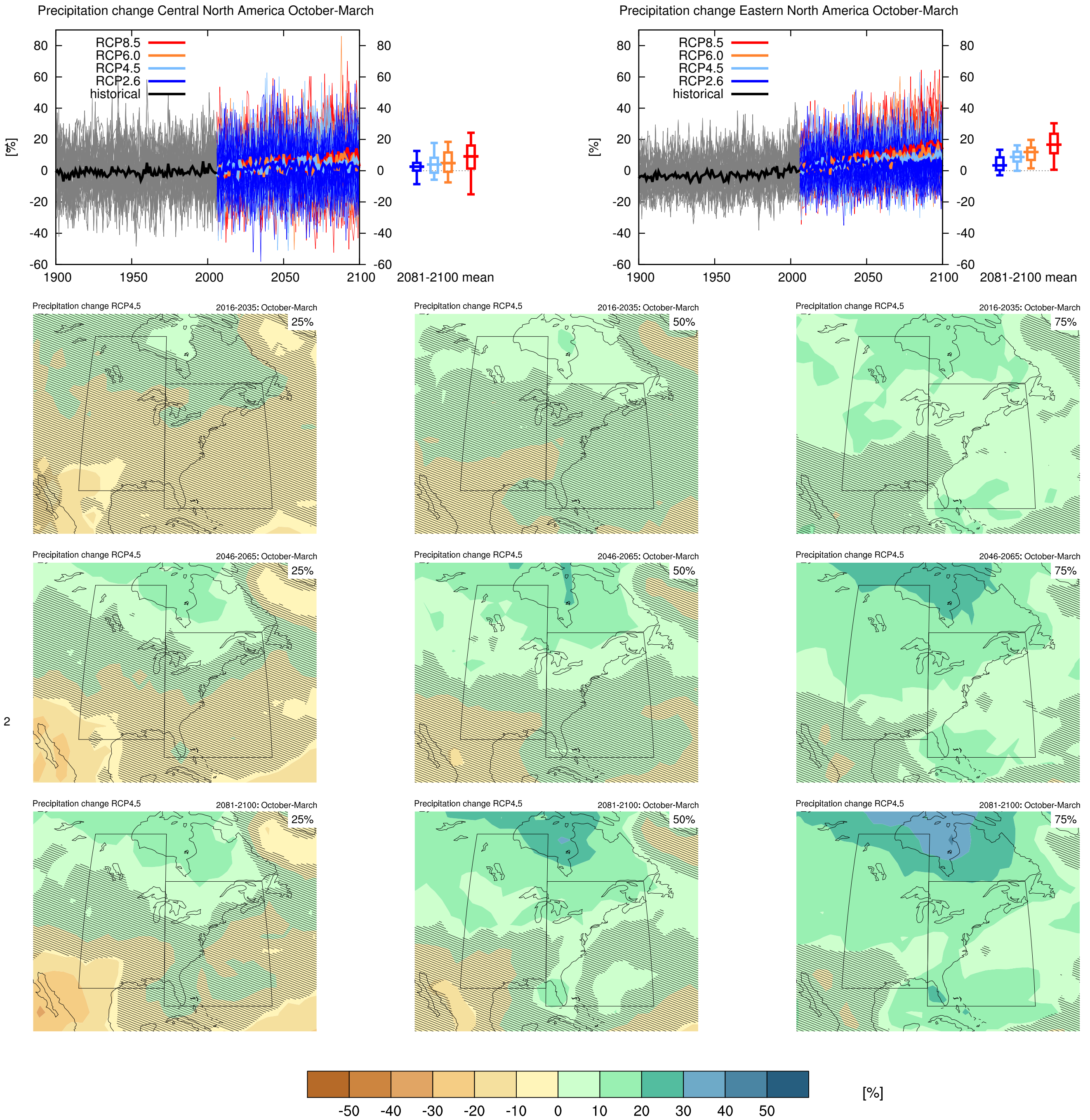

Figure AI.22: top left: time series of relative precipitation averaged over land grid points in Central North America (28.6°–60°N, 105°–85°W) in October–March. Top right: same for land grid points in Eastern North America (25°–50°N, 85°–60°W). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of relative precipitation changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.1, Box 11.2, 12.4.5, 14.9.3 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

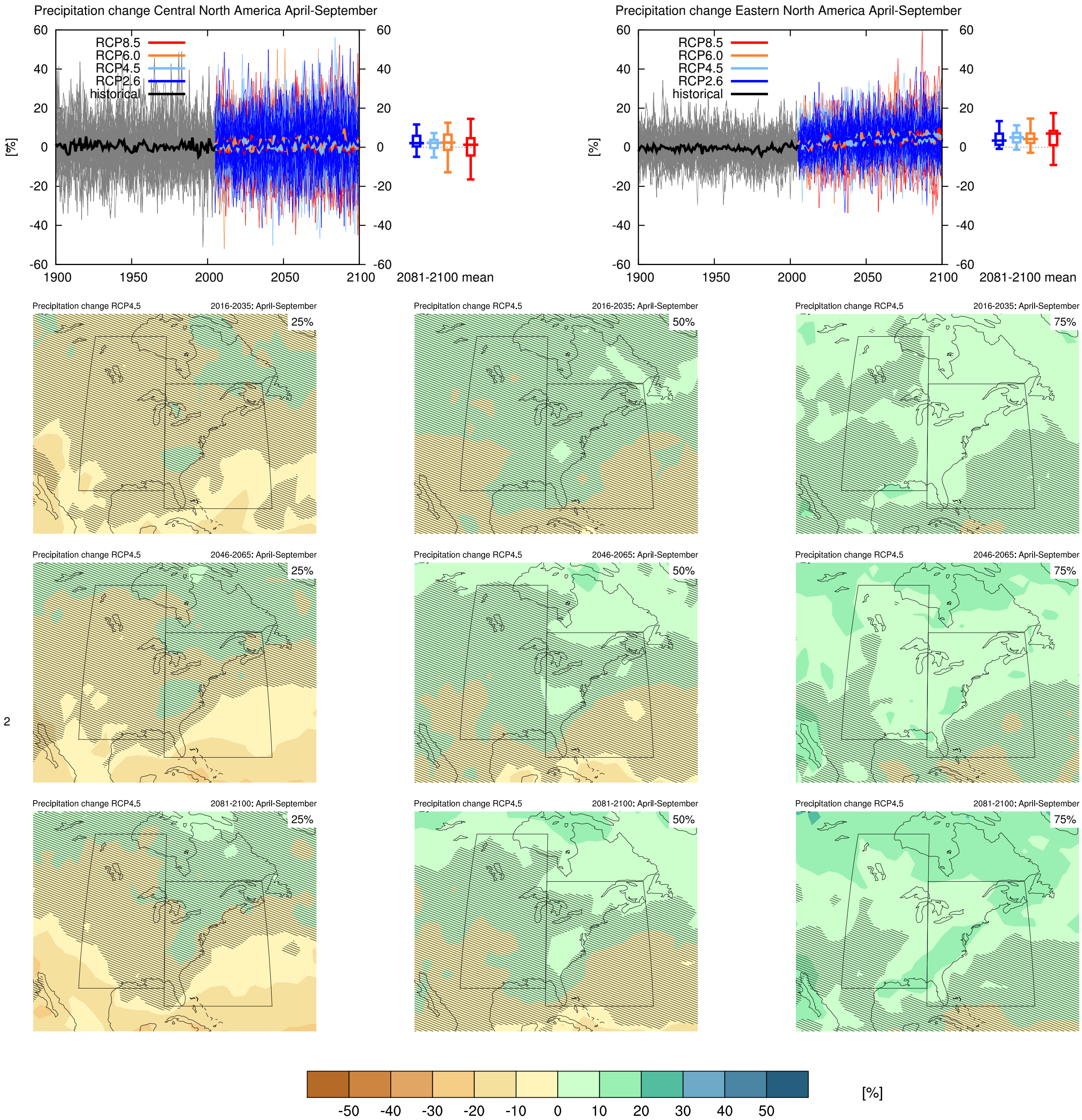

Figure AI.23: top left: time series of relative precipitation averaged over land grid points in Central North America (28.6°–60°N, 105°–85°W) in April–September. Top right: same for land grid points in Eastern North America (25°–50°N, 85°–60°W). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of relative precipitation changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.1, Box 11.2, 12.4.5, 14.9.3 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

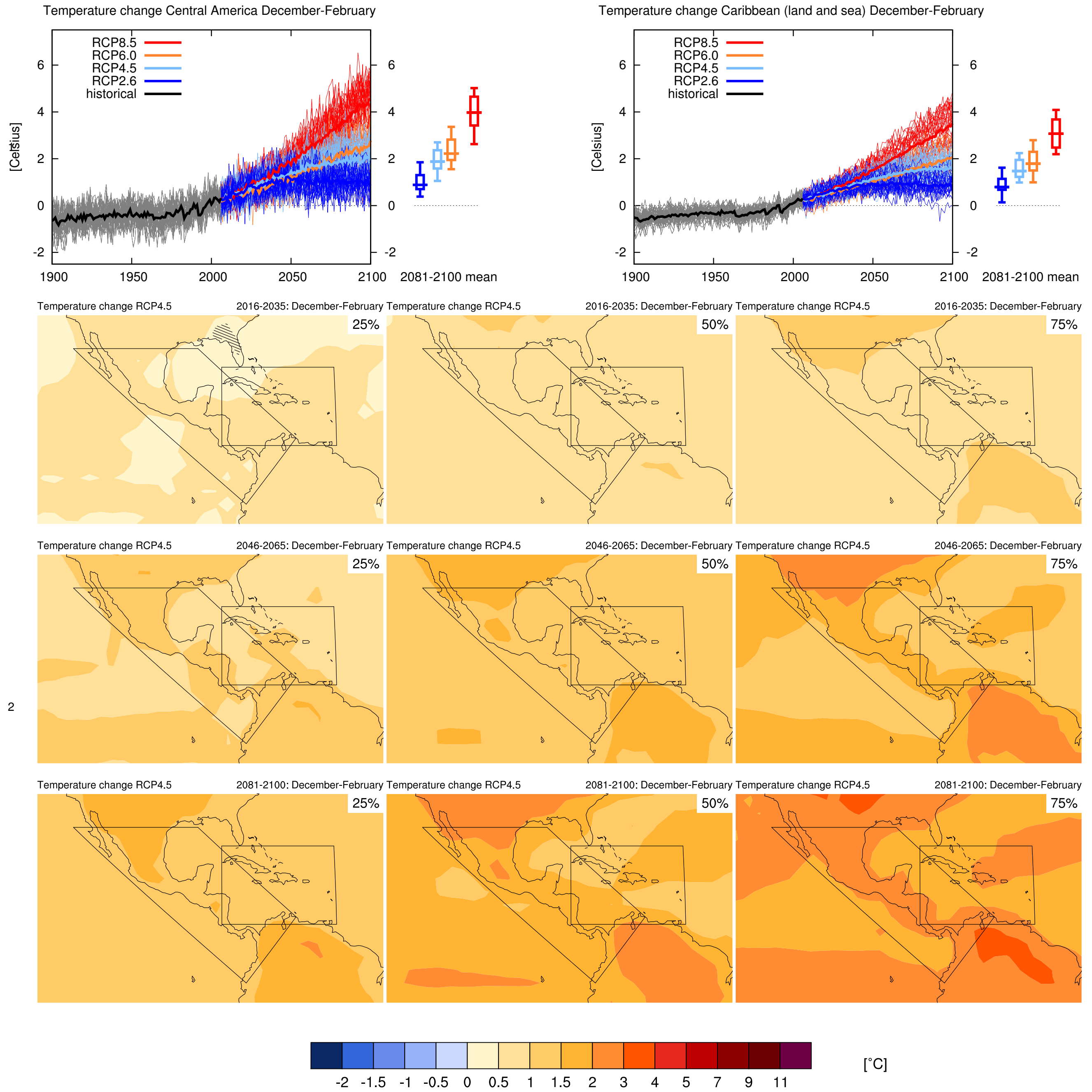

Figure AI.24: top left: time series of temperature averaged over land grid points in Central America (68.8°W, 11.4°N; 79.7°W, 1.2°S; 116.3°W,28.6°N; 90.3°W,28.6°N) in December–February. Top right: same for all grid points in Caribbean (land and sea) (10°–25°N, 85°–60°W). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.3, Box 11.2, 12.4.3, 14.9.4 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

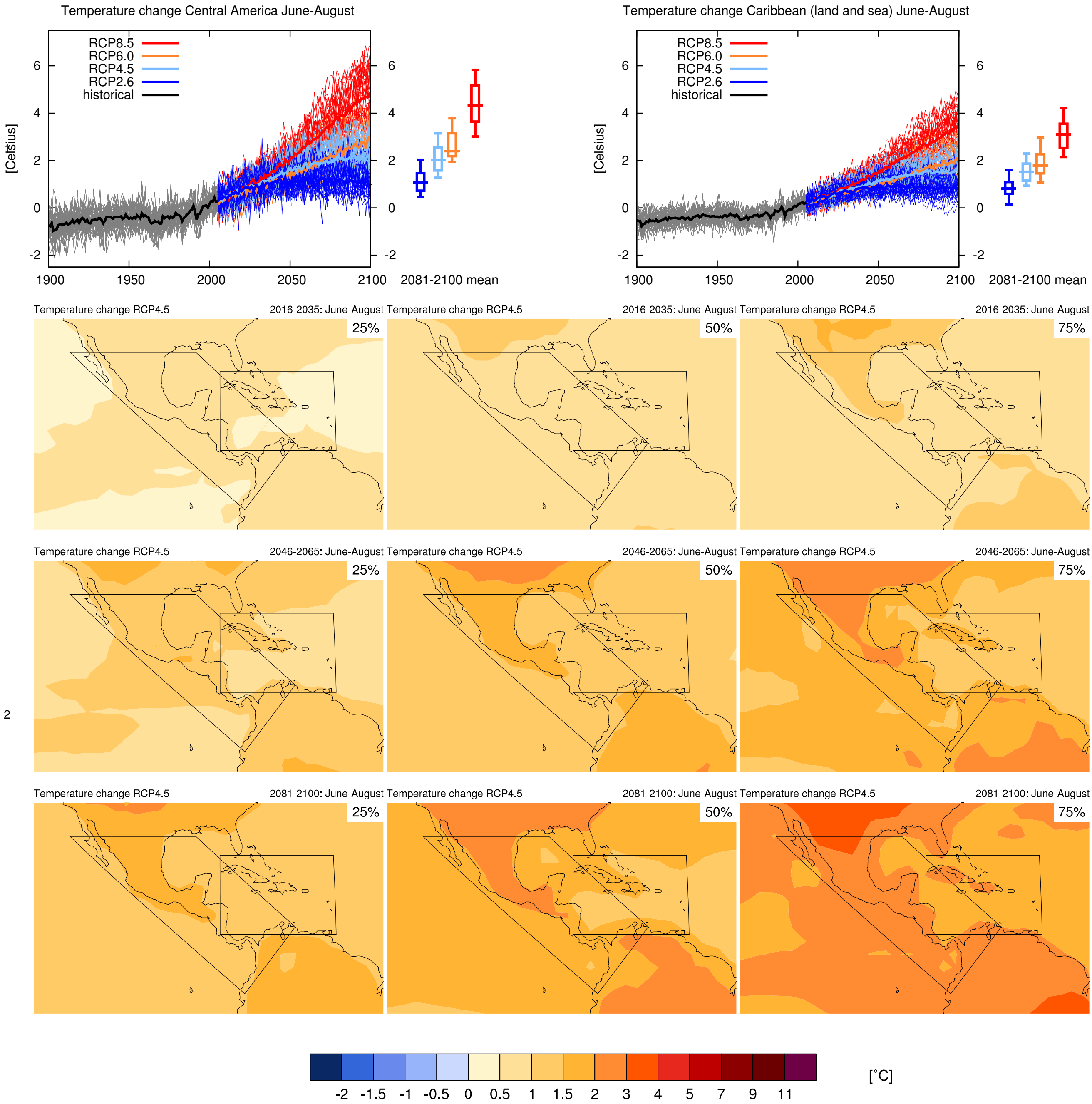

Figure AI.25: top left: time series of temperature averaged over land grid points in Central America (68.8°W, 11.4°N; 79.7°W, 1.2°S; 116.3°W,28.6°N; 90.3°W,28.6°N) in June–August. Top right: same for all grid points in Caribbean (land and sea) (10°–25°N, 85°–60°W). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.3, Box 11.2, 12.4.3, 14.9.4 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

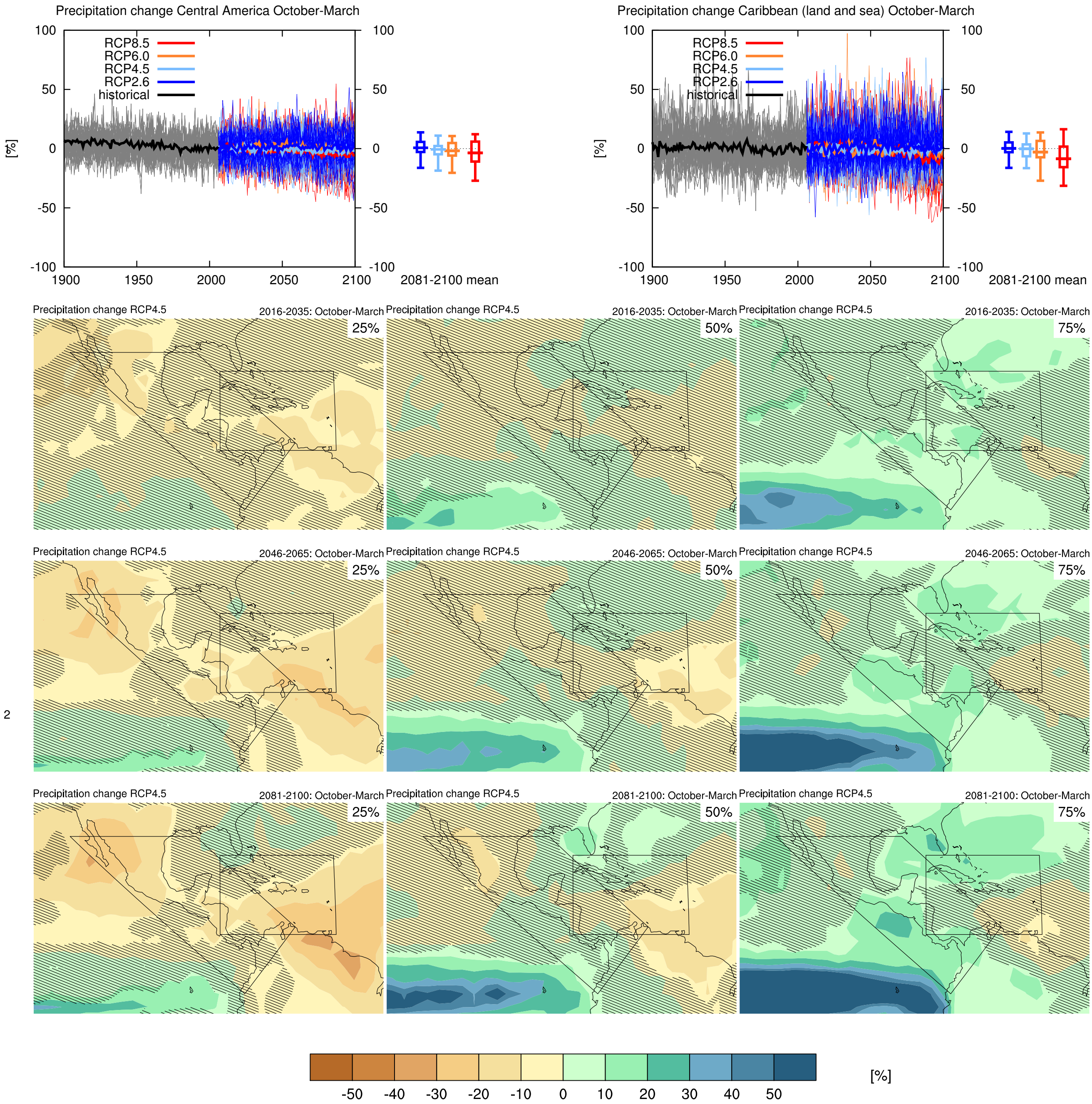

Figure AI.26: top left: time series of relative precipitation averaged over land grid points in Central America (68.8°W,11.4°N; 79.7°W, 1.2°S; 116.3°W,28.6°N; 90.3°W,28.6°N) in October–March. Top right: same for all grid points in Caribbean (land and sea) (10°–25°N, 85°–60°W). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of relative precipitation changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.3, Box 11.2, 12.4.5, 14.9.4 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

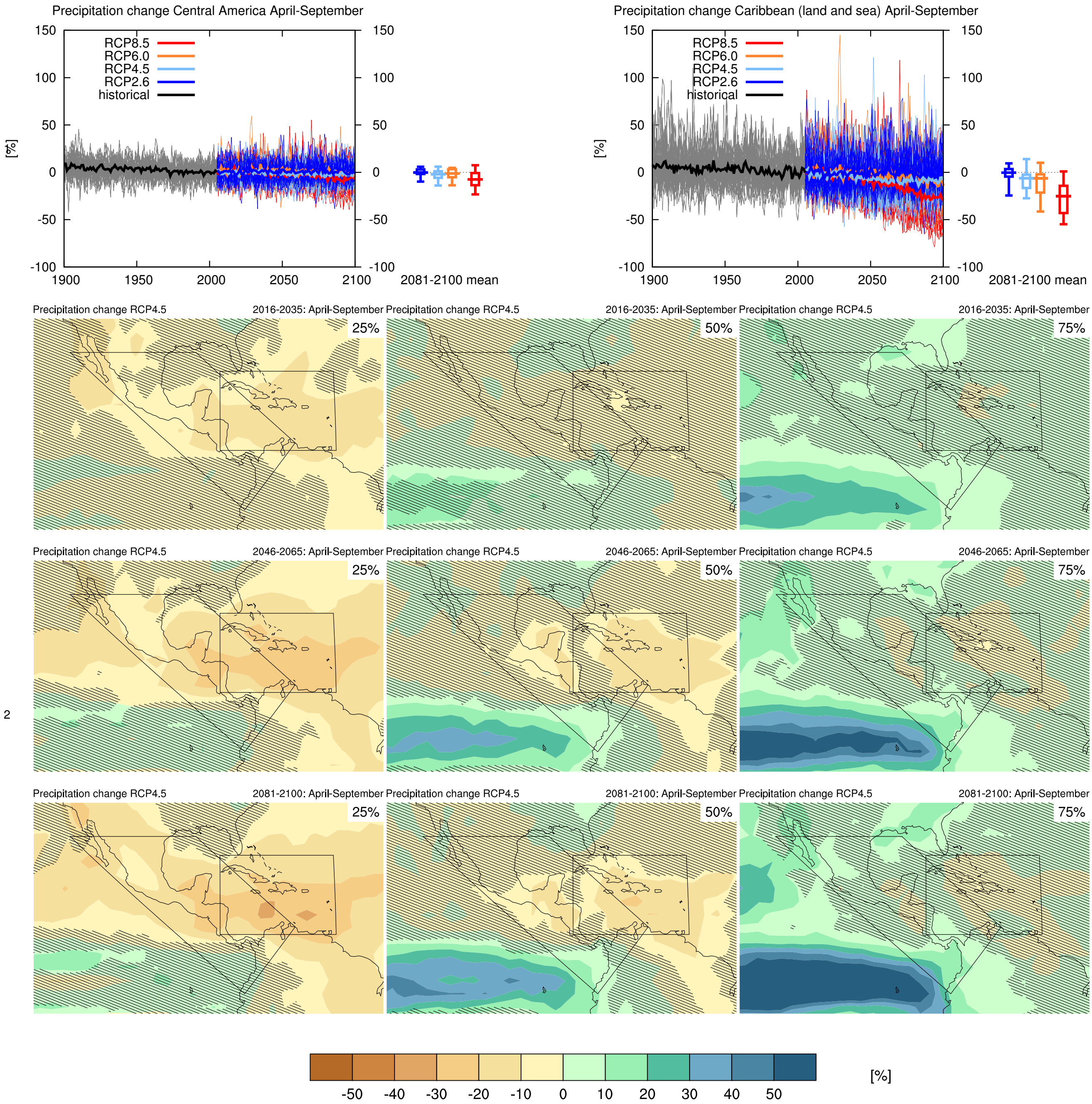

Figure AI.27: top left: time series of relative precipitation averaged over land grid points in Central America (68.8°W,11.4°N; 79.7°W, 1.2°S; 116.3°W,28.6°N; 90.3°W,28.6°N) in April–September. Top right: same for all grid points in Caribbean (land and sea) (10°–25°N, 85°–60°W). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of relative precipitation changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.3, Box 11.2, 12.4.5, 14.9.4 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

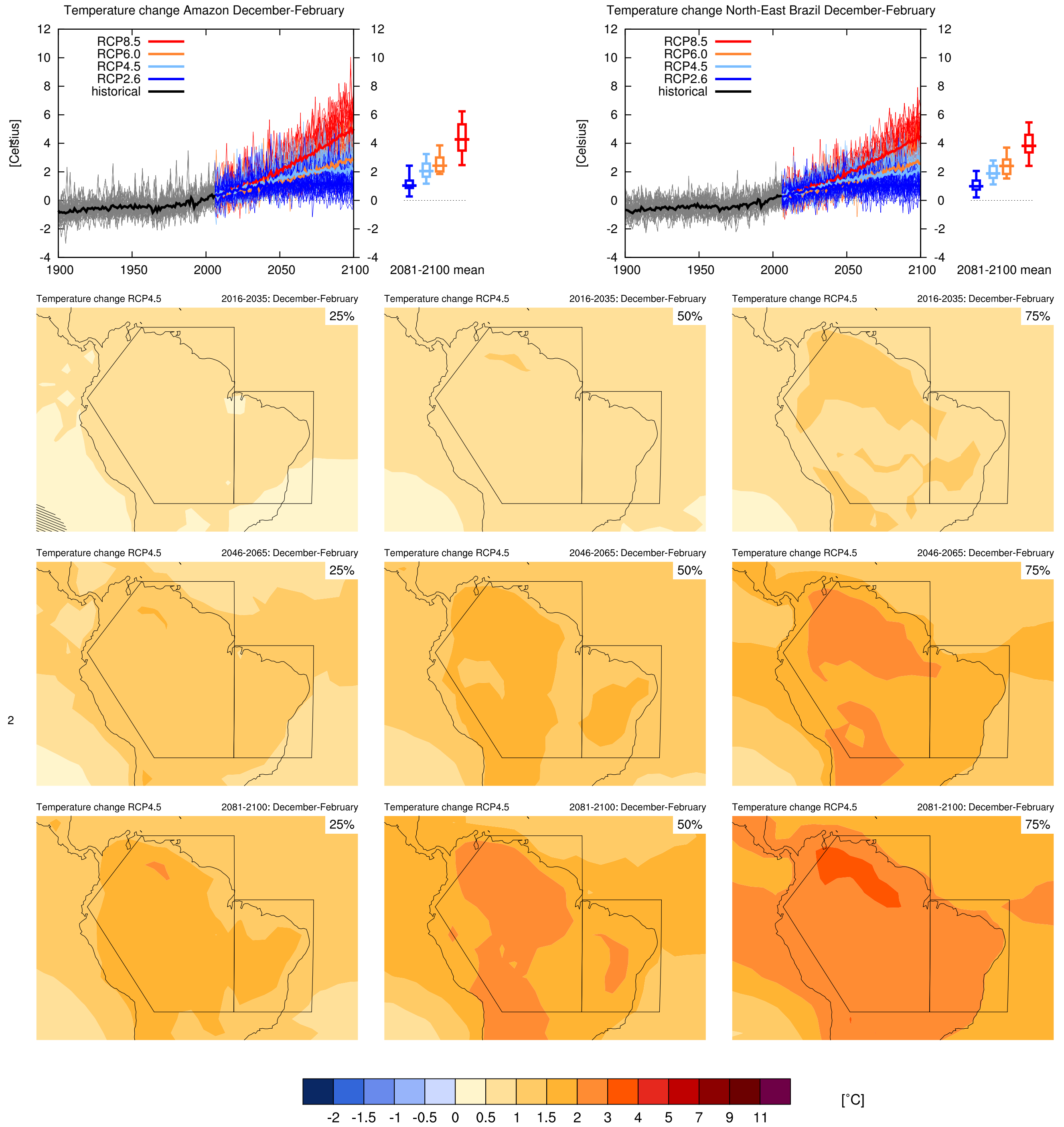

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Figure AI.28: top left: time series of temperature averaged over land grid points in the Amazon (20°S–10°N, 82.5°–60°W) in December–February. Top right: same for land grid points in North-East Brazil (20°S–EQ, 50°–34°W). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.3, Box 11.2, 12.4.3, 14.9.5 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

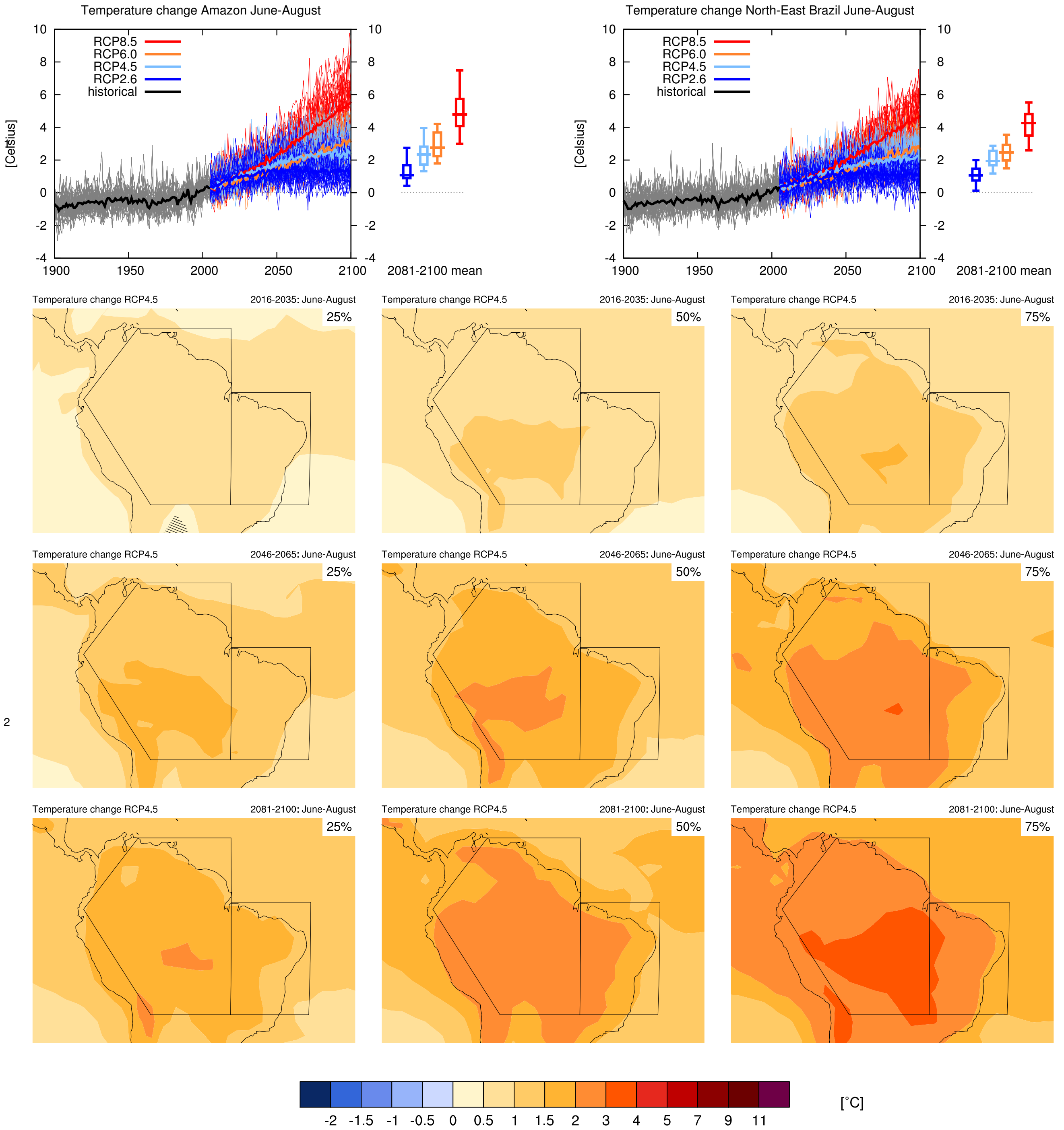

Figure AI.29: top left: time series of temperature averaged over land grid points in the Amazon (20°S–10°N, 82.5°–60°W) in June–August. Top right: same for land grid points in North-East Brazil (20°S–EQ, 50°–34°W). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.3, Box 11.2, 12.4.3, 14.9.5 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

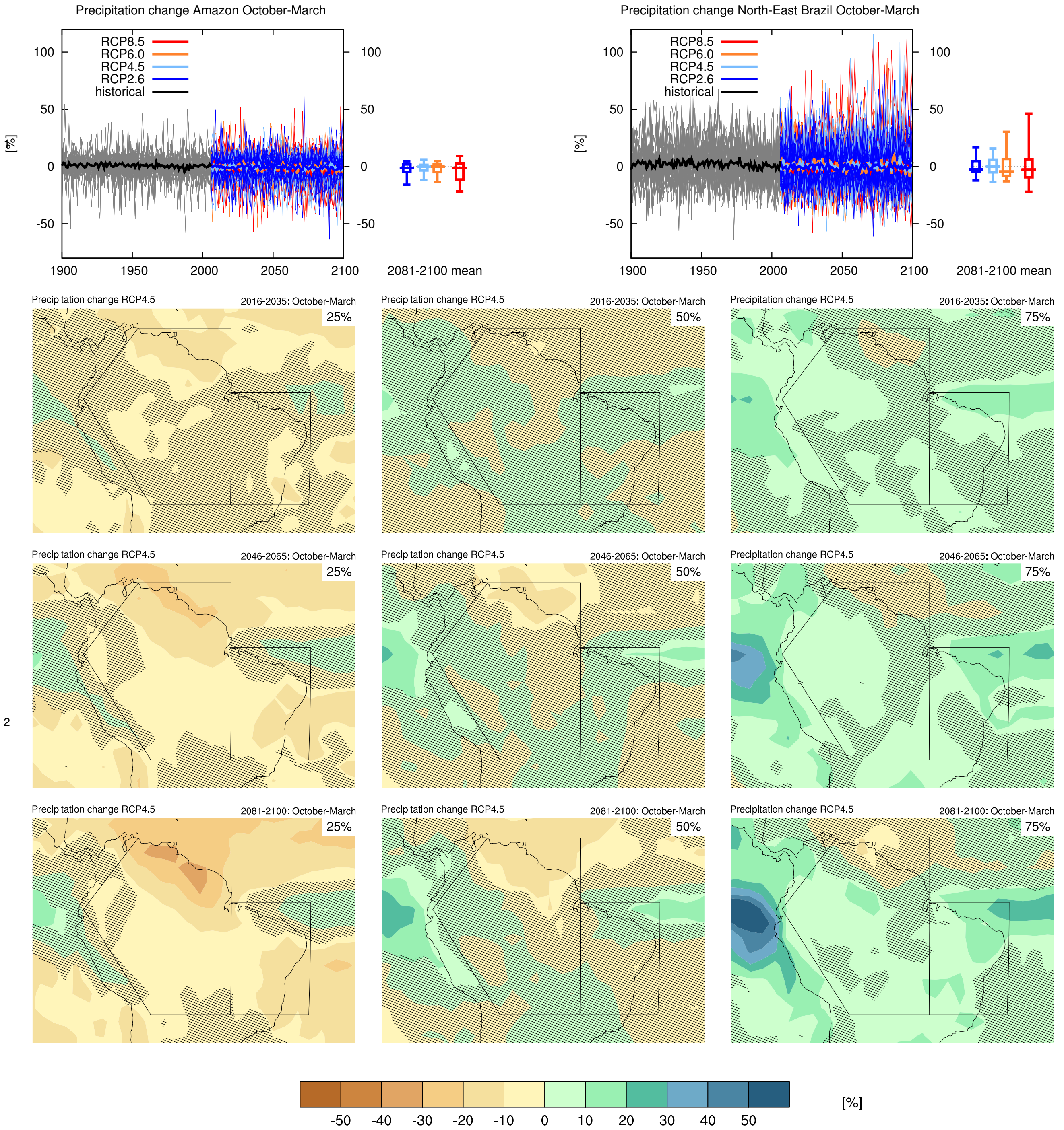

Figure AI.30: top left: time series of relative precipitation averaged over land grid points in the Amazon (20°S–10°N, 82.5°–60°W) in October–March. Top right: same for land grid points in North-East Brazil (20°S–EQ, 50°–34°W). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of relative precipitation changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.3, Box 11.2, 12.4.5, 14.9.5 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

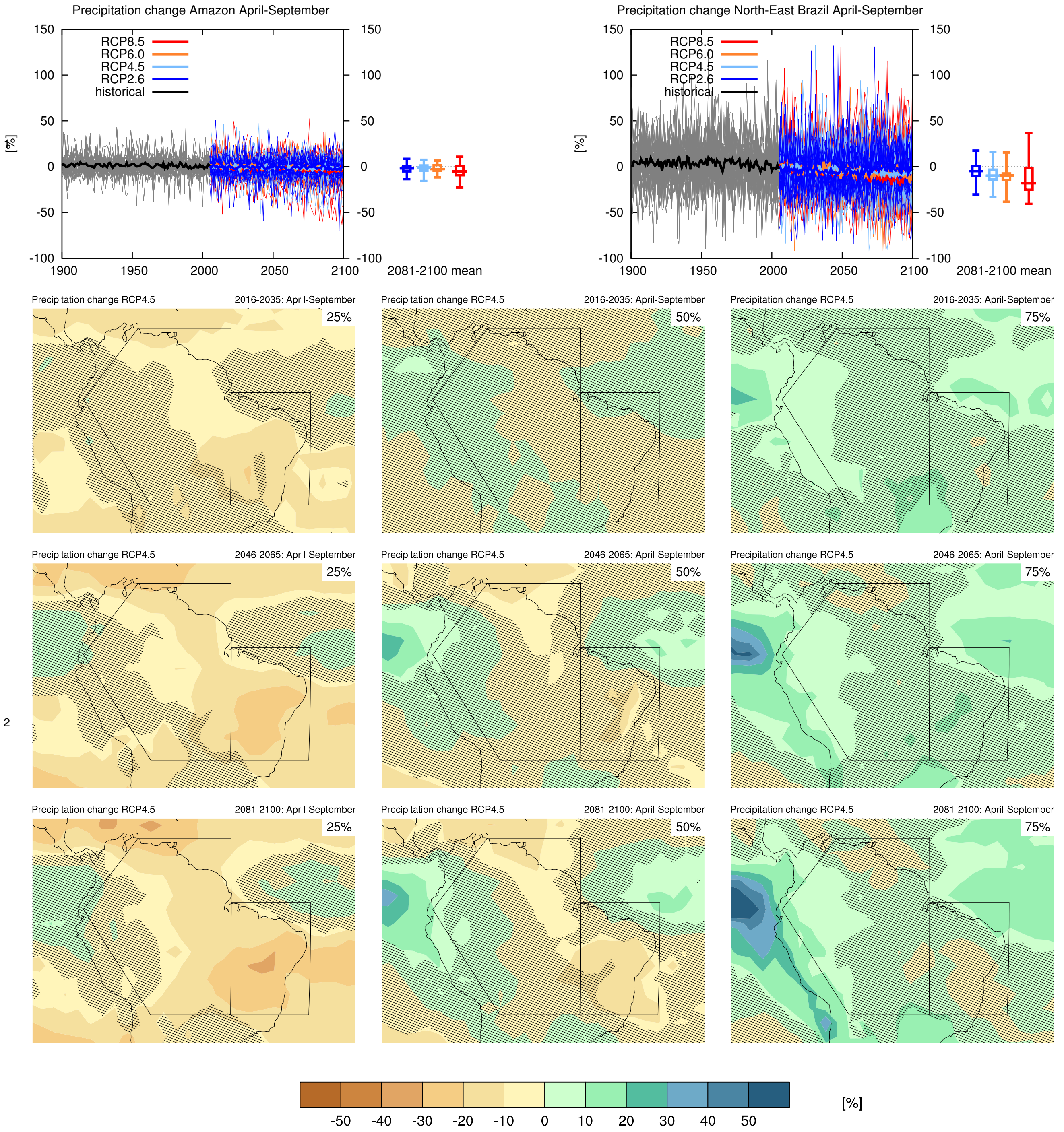

Figure AI.31: top left: time series of relative precipitation averaged over land grid points in the Amazon (20°S–10°N, 82.5°–60°W) in April–September. Top right: same for land grid points in North-East Brazil (20°S–EQ, 50°–34°W). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of relative precipitation changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.3, Box 11.2, 12.4.5, 14.9.5 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

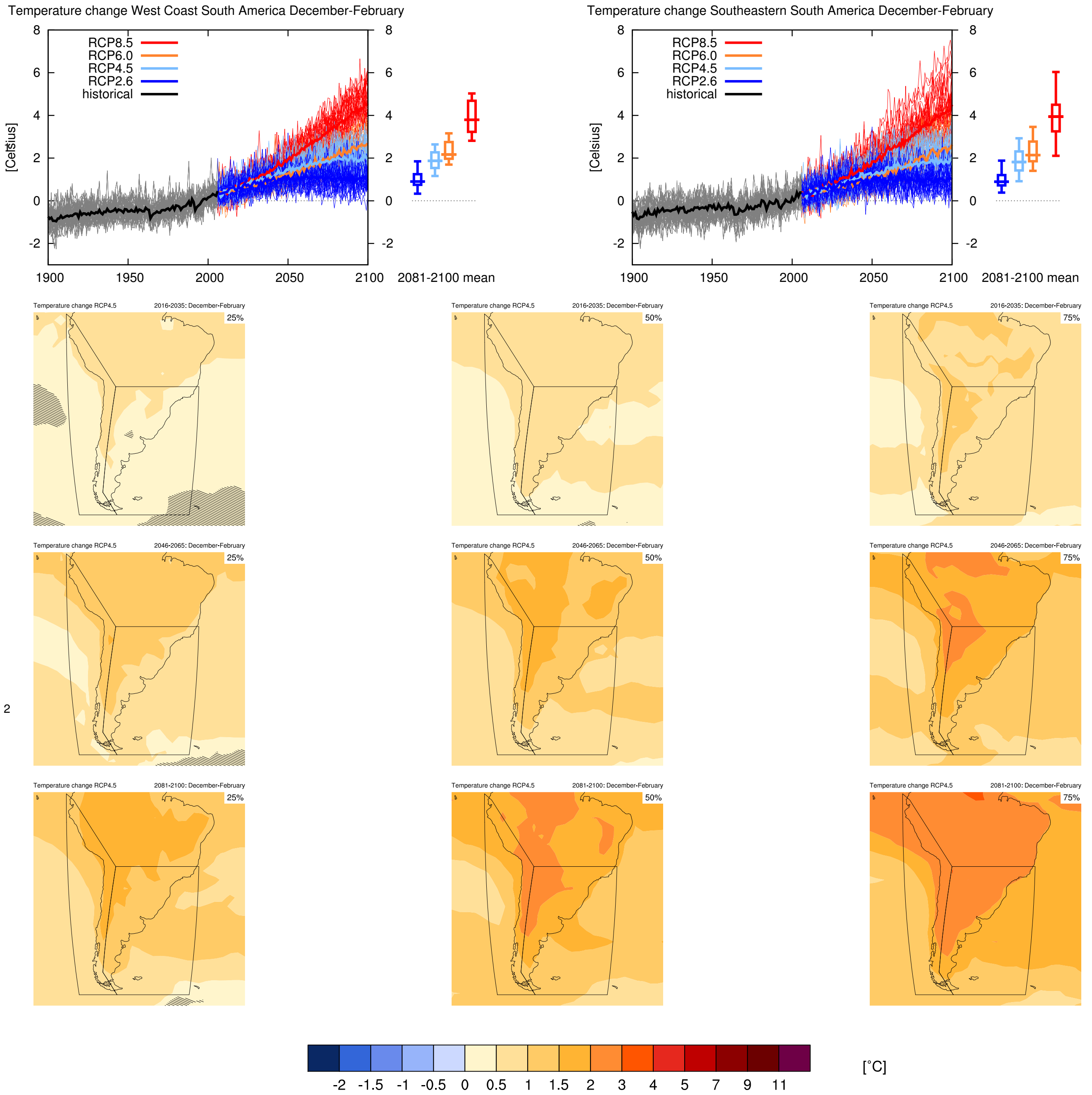

Figure AI.32: top left: time series of temperature averaged over land grid points in the West Coast of South America (79.7°W,1.2°S; 66.4°W,20°S; 72.1°W,50°S; 67.3°W56.7°S; 82.0°W 56.7°S; 82.2°W,0.5°N) in December–February. Top right: same for land grid points in Southeastern South America (39.4°W,20°S; 39.4°W,56.6°S; 67.3°W,56.7°S; 72.1°W,50°S; 66°W,20°S). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.2, Box 11.2, 12.4.3, 14.9.5 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

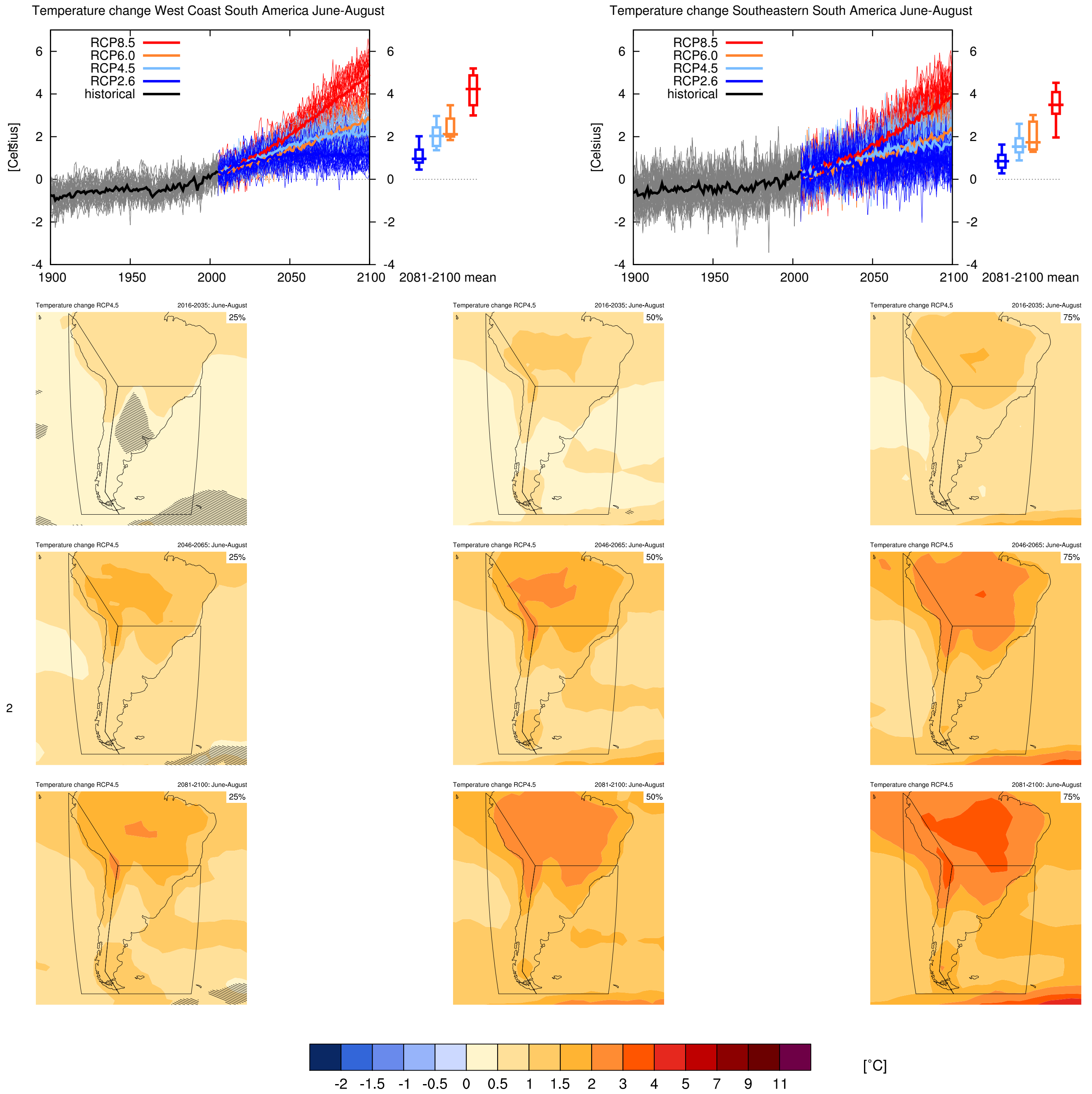

Figure AI.33: top left: time series of temperature averaged over land grid points in the West Coast of South America (79.7°W,1.2°S; 66.4°W,20°S; 72.1°W,50°S; 67.3°W56.7°S; 82.0°W 56.7°S; 82.2°W,0.5°N) in June–August. Top right: same for land grid points in Southeastern South America (39.4°W,20°S; 39.4°W,56.6°S; 67.3°W,56.7°S; 72.1°W,50°S; 66°W,20°S). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.2, Box 11.2, 12.4.3, 14.9.5 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

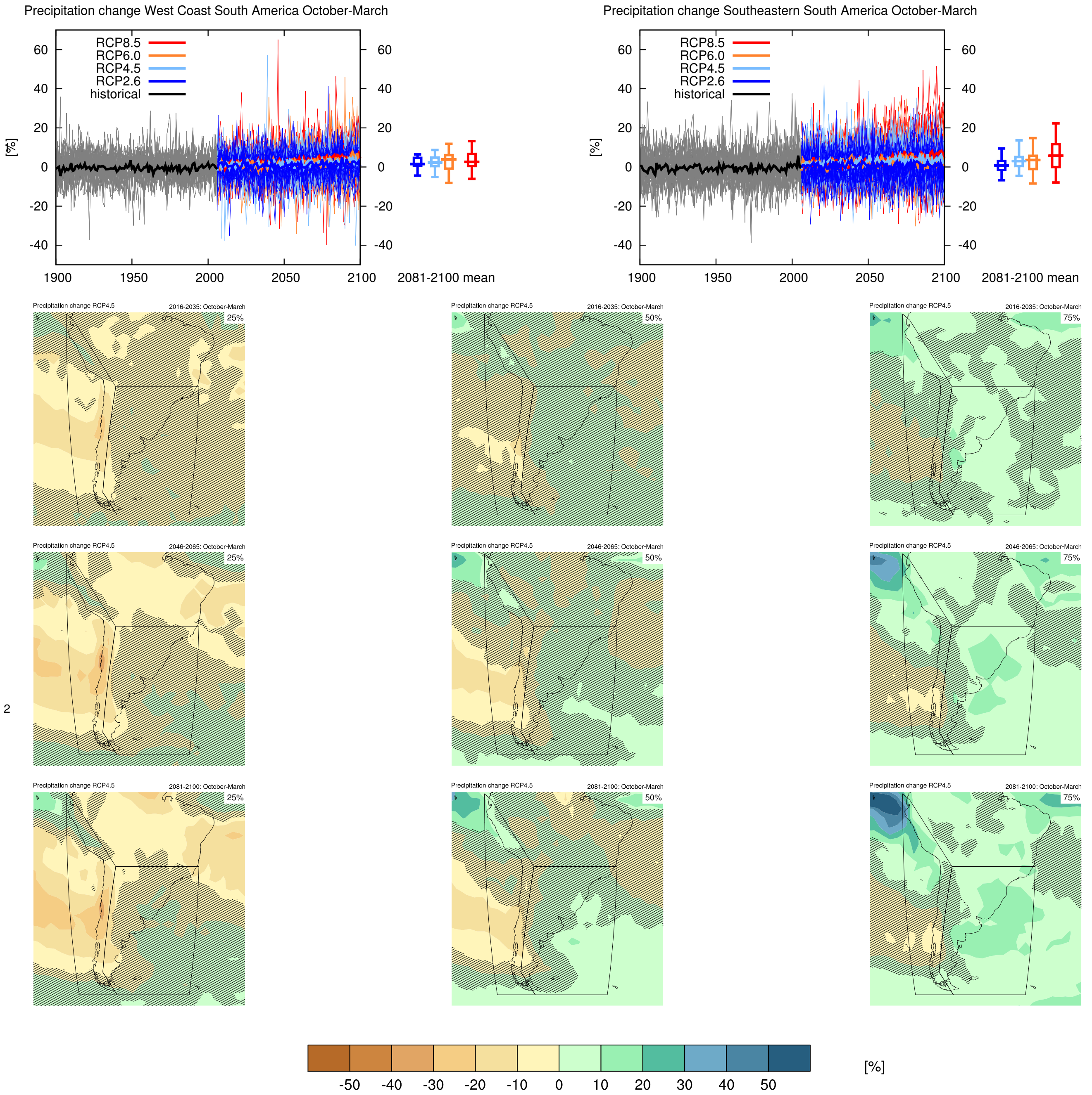

Figure AI.34: top left: time series of relative precipitation averaged over land grid points in the West Coast of South America (79.7°W,1.2°S; 66.4°W,20°S; 72.1°W,50°S; 67.3°W56.7°S; 82.0°W 56.7°S; 82.2°W,0.5°N) in October–March. Top right: same for land grid points in Southeastern South America (39.4°W,20°S; 39.4°W, 56.6°S; 67.3°W,56.7°S; 72.1°W,50°S; 66°W,20°S). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of relative precipitation changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.2, Box 11.2, 12.4.5, 14.9.5 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

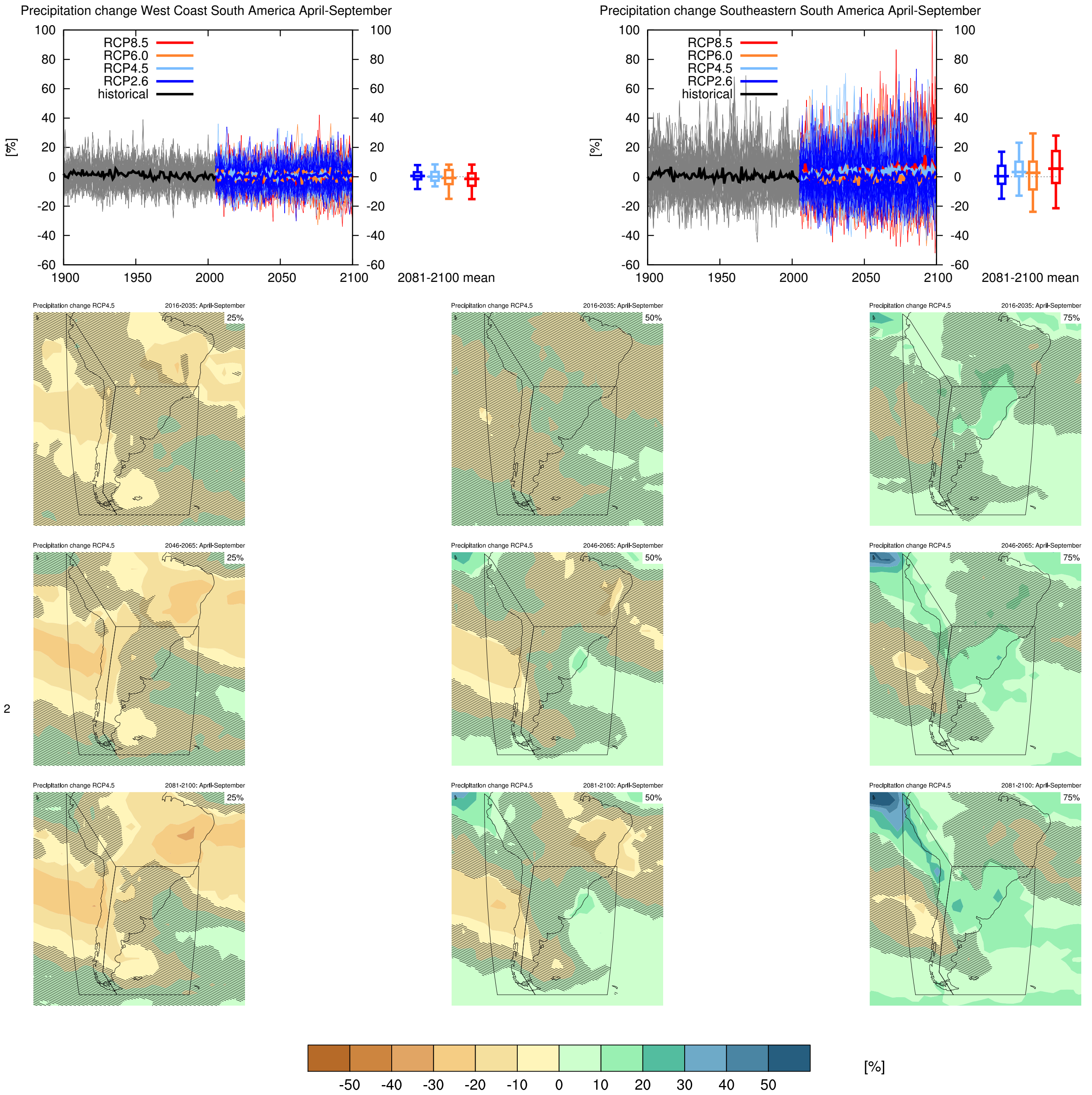

Figure AI.35: top left: time series of relative precipitation averaged over land grid points in the West Coast of South America (79.7°W,1.2°S; 66.4°W,20°S; 72.1°W,50°S; 67.3°W56.7°S; 82.0°W 56.7°S; 82.2°W,0.5°N) in April–September. Top right: same for land grid points in Southeastern South America (39.4°W,20°S; 39.4°W, 56.6°S; 67.3°W,56.7°S; 72.1°W,50°S; 66°W,20°S). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of relative precipitation changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.2, Box 11.2, 12.4.5, 14.9.5 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

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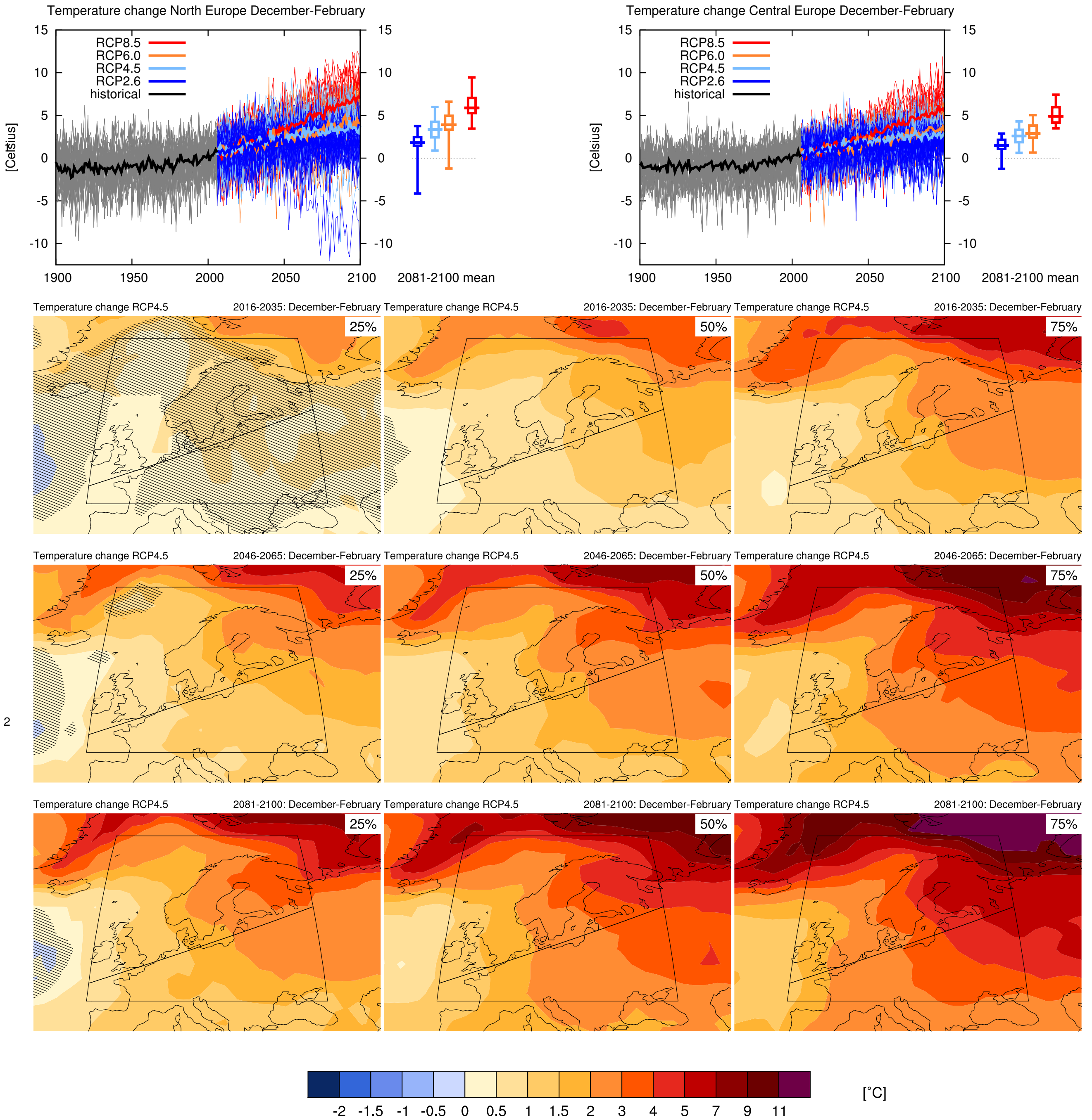

3 **Figure AI.36:** top left: time series of temperature averaged over land grid points in North Europe (10°W,48°N; 10°W,75°N; 40°E,75°N; 40°E,61.3°N) in December–February. Top right: same for land grid points in Central Europe (10°W, 45°N; 10°W,48°N; 40°E, 61.3°N; 40°E,45°N). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 10.3, 11.3.2.4.1, Box 11.2, 12.4.3, 14.9.6 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

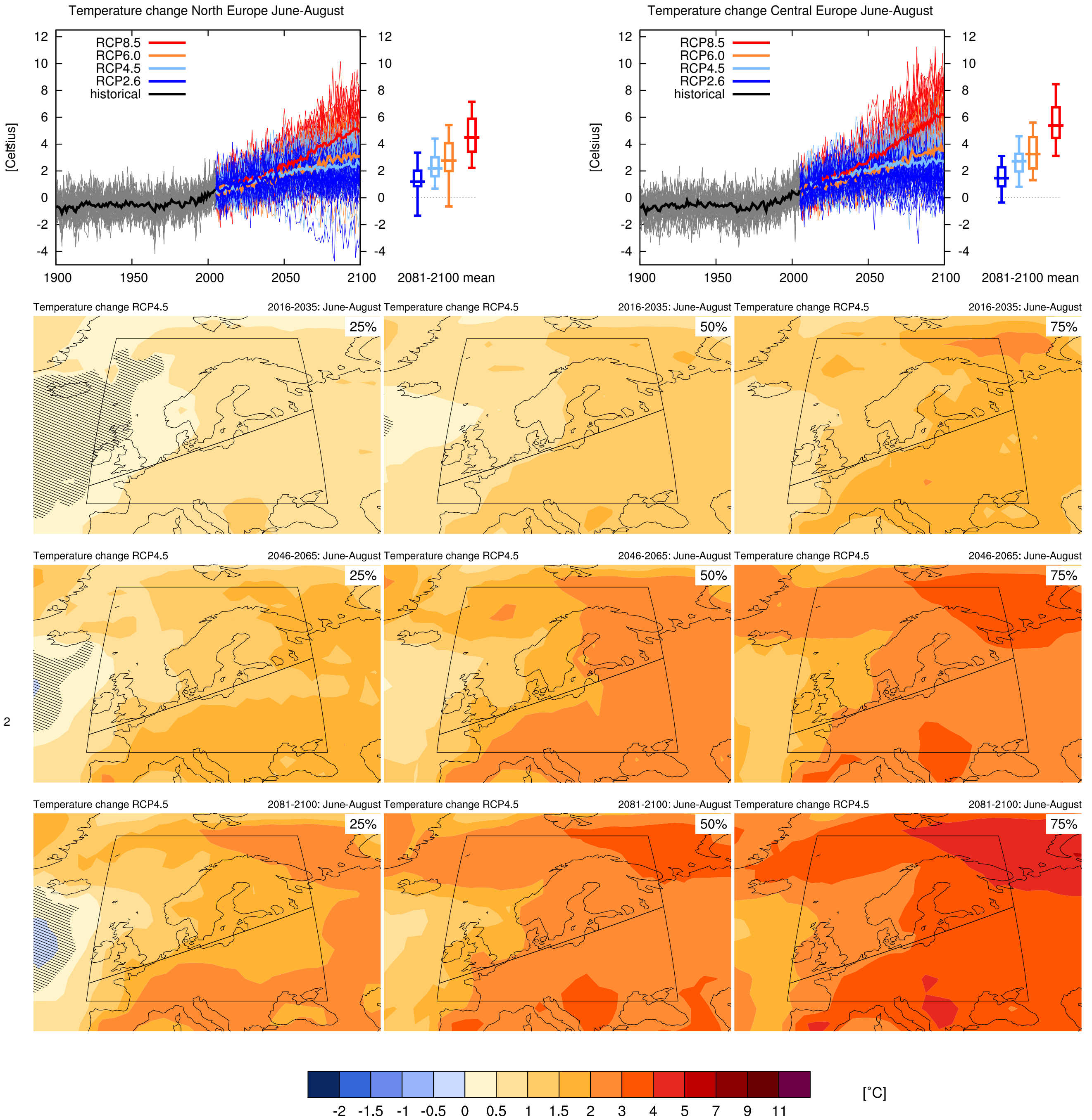

Figure AI.37: top left: time series of temperature averaged over land grid points in North Europe (10°W,48°N; 10°W,75°N; 40°E,75°N; 40°E,61.3°N) in June–August. Top right: same for land grid points in Central Europe (10°W, 45°N; 10°W,48°N; 40°E, 61.3°N; 40°E,45°N). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 10.3, 11.3.2.4.1, Box 11.2, 12.4.3, 14.9.6 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

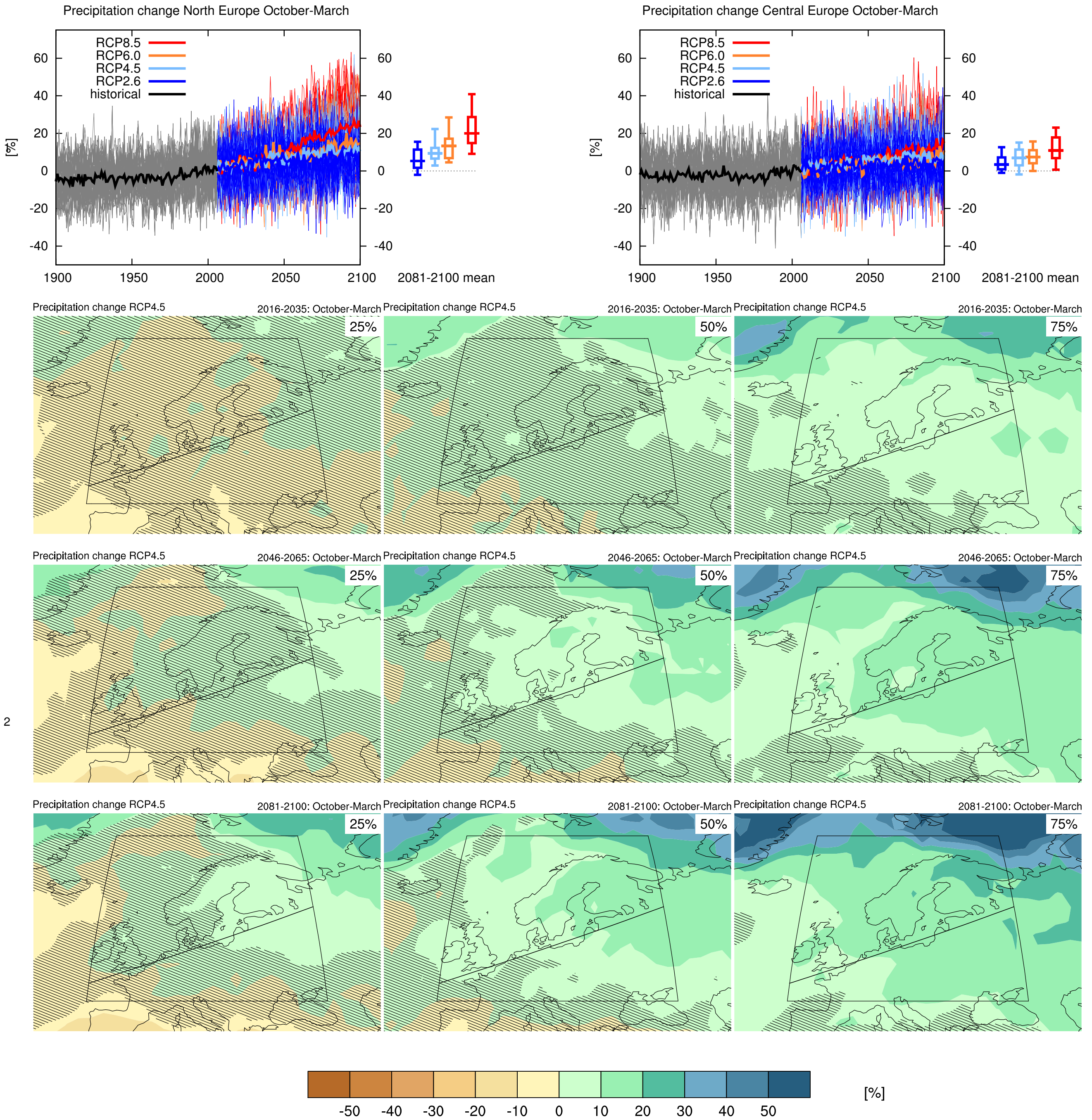

Figure AI.38: top left: time series of relative precipitation averaged over land grid points in North Europe (10°W,48°N; 10°W,75°N; 40°E,75°N; 40°E,61.3°N) in October–March. Top right: same for land grid points in Central Europe (10°W, 45°N; 10°W,48°N; 40°E, 61.3°N; 40°E,45°N). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of relative precipitation changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.1, Box 11.2, 12.4.5, 14.9.6 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

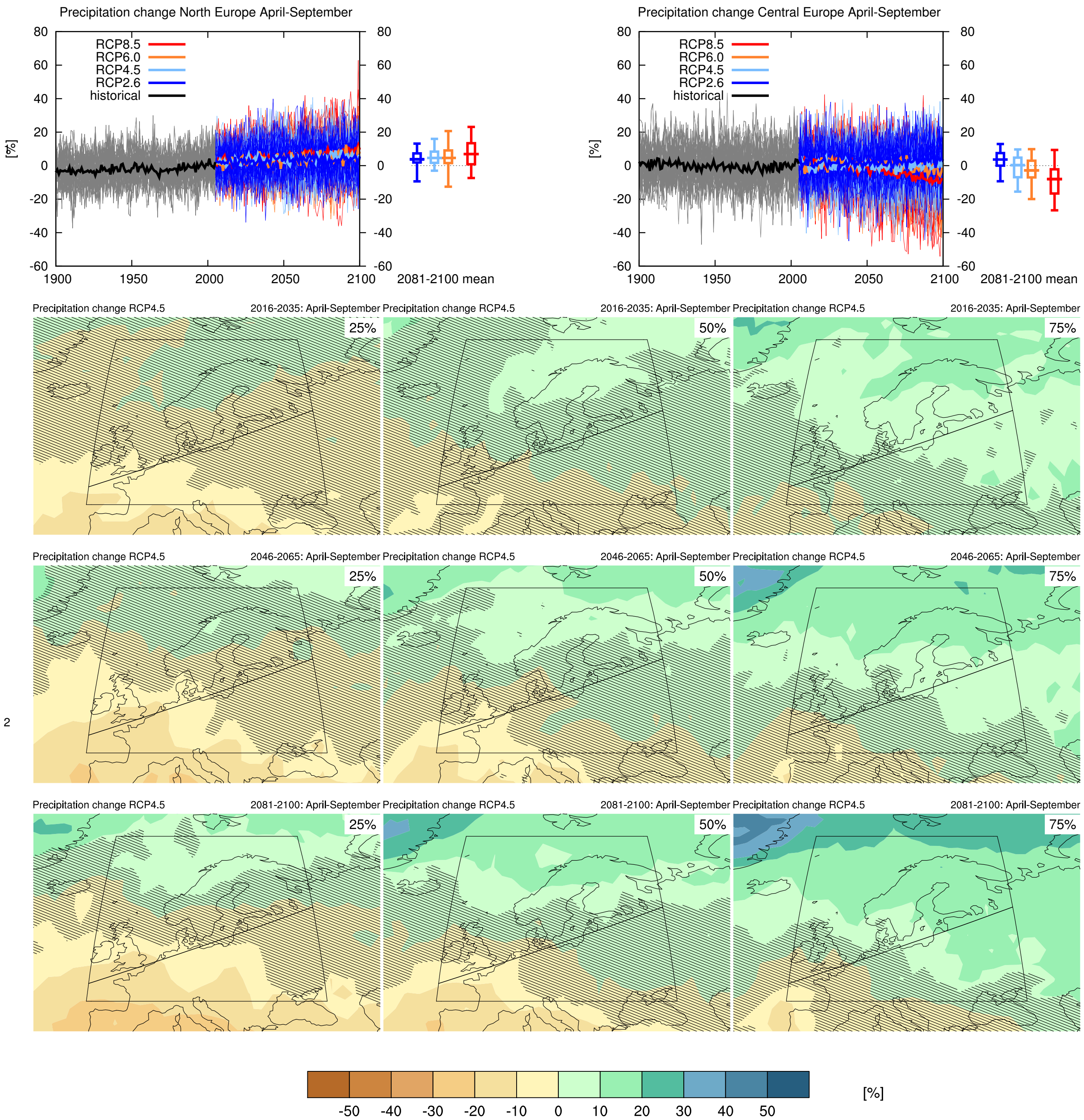

Figure AI.39: top left: time series of relative precipitation averaged over land grid points in North Europe (10°W,48°N; 10°W,75°N; 40°E,75°N; 40°E,61.3°N) in April–September. Top right: same for land grid points in Central Europe (10°W, 45°N; 10°W,48°N; 40°E, 61.3°N; 40°E,45°N). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of relative precipitation changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.1, Box 11.2, 12.4.5, 14.9.6 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

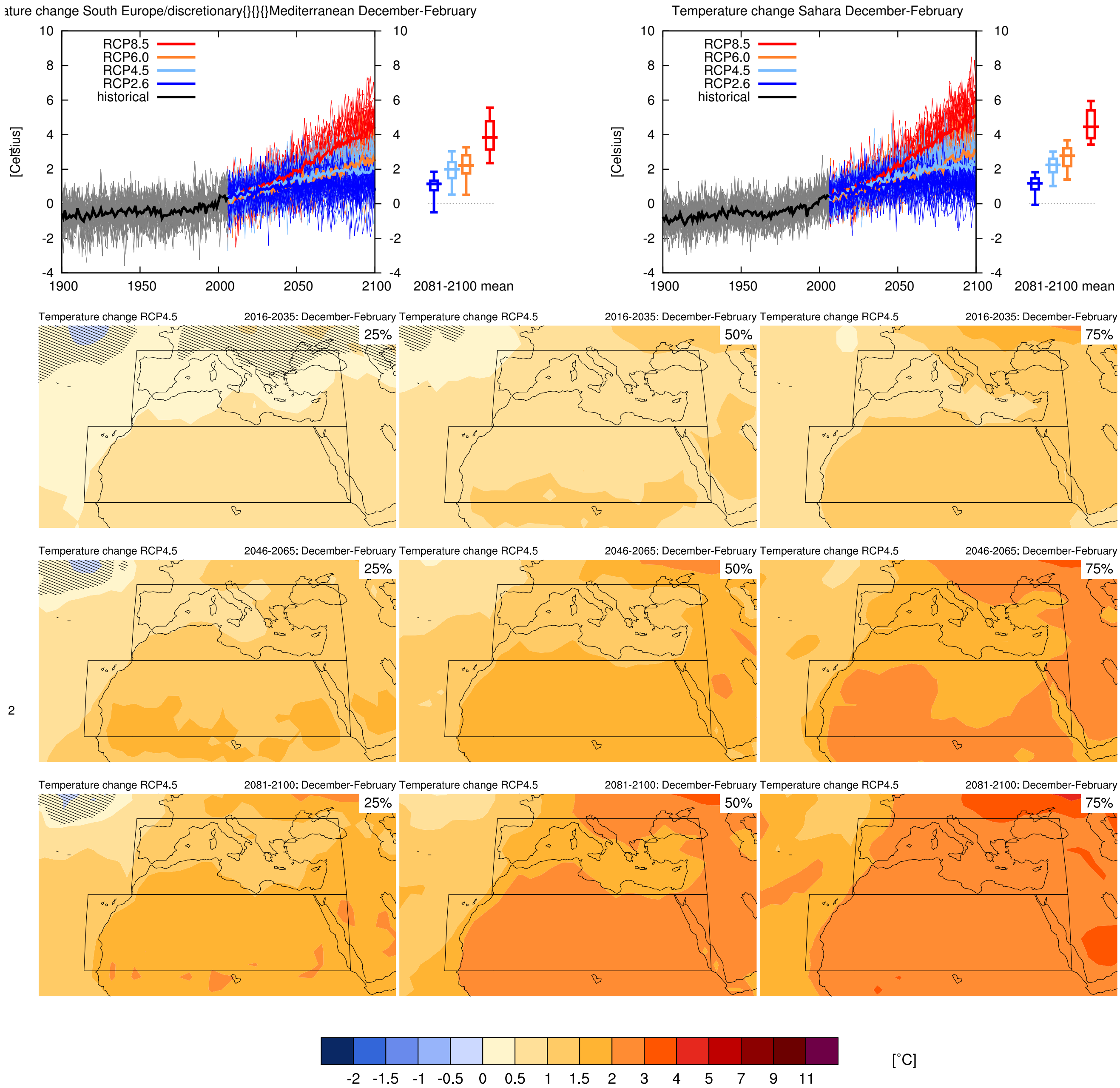

Figure AI.40: top left: time series of temperature averaged over land grid points in the region South Europe/ Mediterranean (30°–45°N, 10°W–40°E) in December–February. Top right: same for land grid points in the Sahara (15°–30°N, 20°W–40°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

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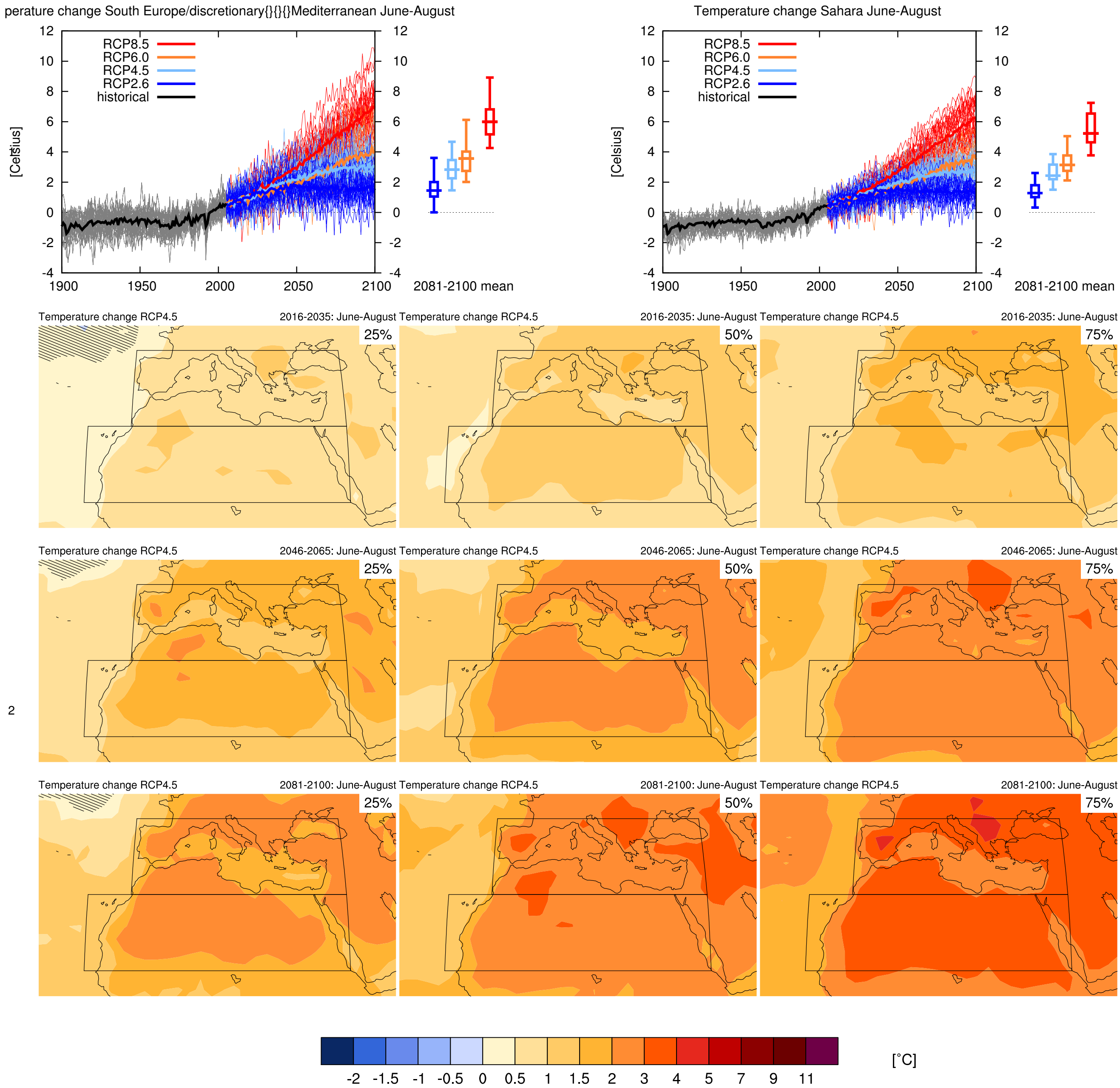

Figure AI.41: top left: time series of temperature averaged over land grid points in the region South Europe/ Mediterranean (30°–45°N, 10°W–40°E) in June–August. Top right: same for land grid points in the Sahara (15°–30°N, 20°W–40°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

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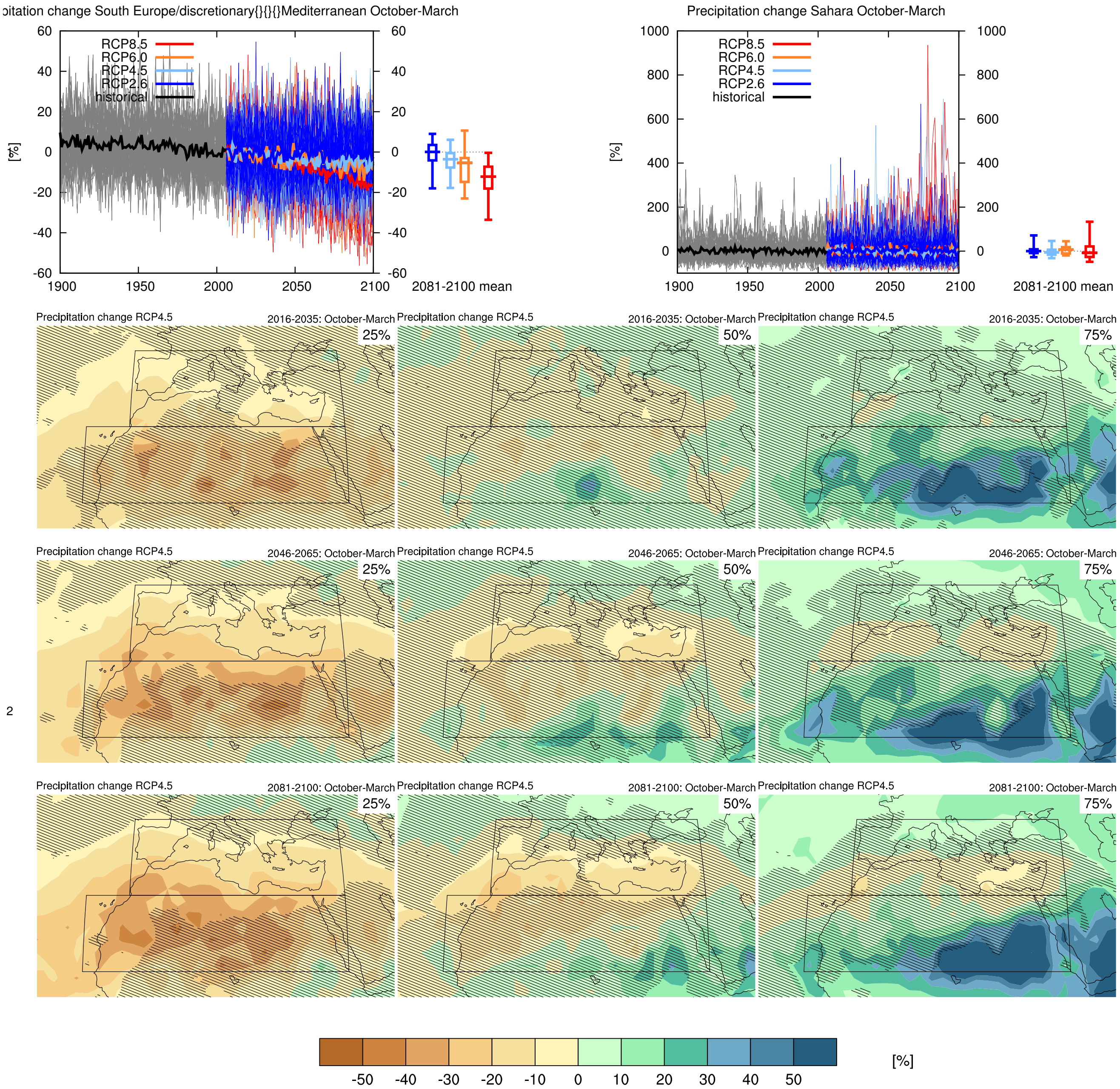

Figure AI.42: top left: time series of relative precipitation averaged over land grid points in the region South Europe/Mediterranean (30°–45°N, 10°W–40°E) in October–March. Top right: same for land grid points in the Sahara (15°–30°N, 20°W–40°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of relative precipitation changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

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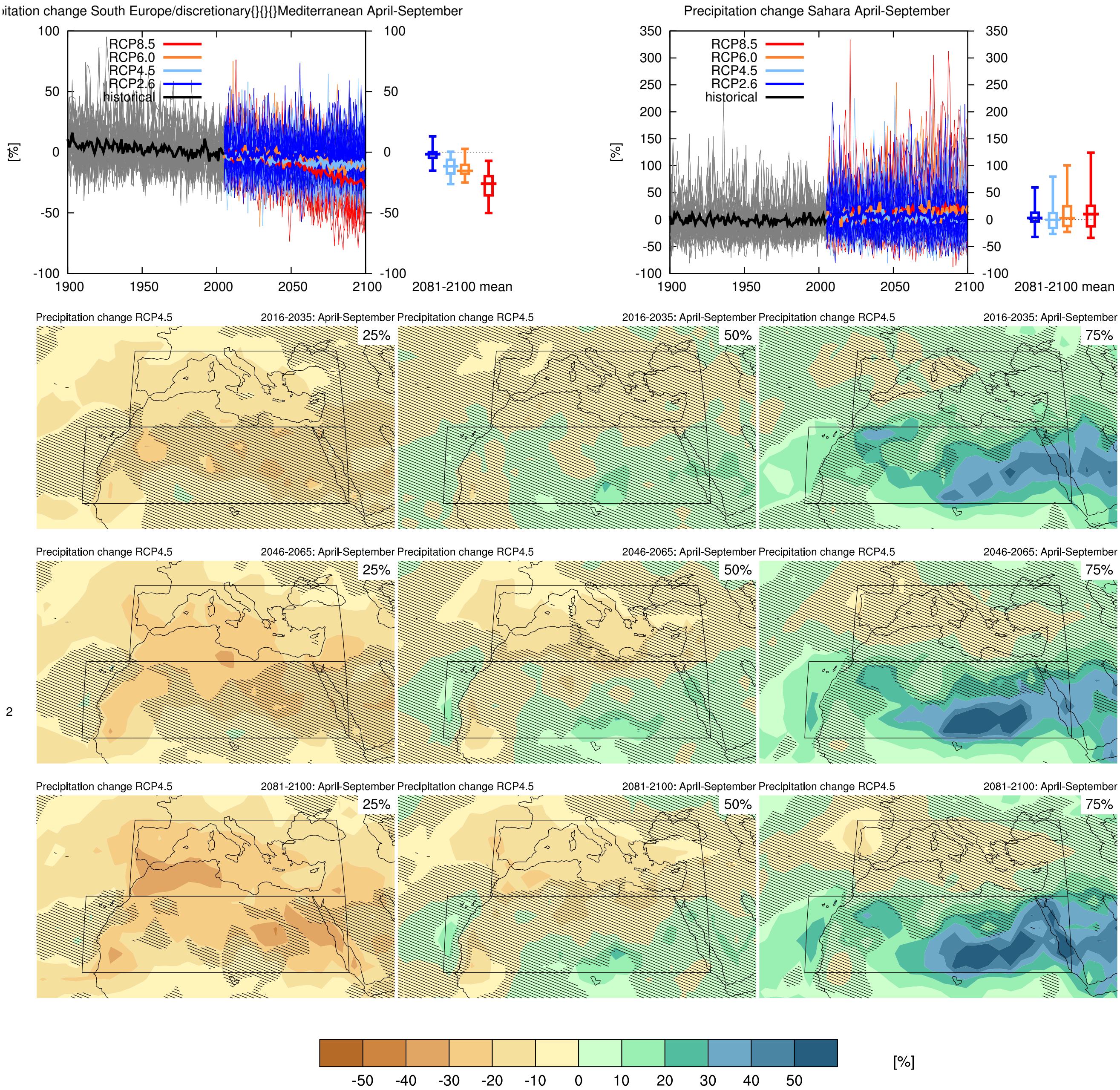

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Figure AI.43: top left: time series of relative precipitation averaged over land grid points in the region South Europe/Mediterranean (30°–45°N, 10°W–40°E) in April–September. Top right: same for land grid points in the Sahara (15°–30°N, 20°W–40°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of relative precipitation changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

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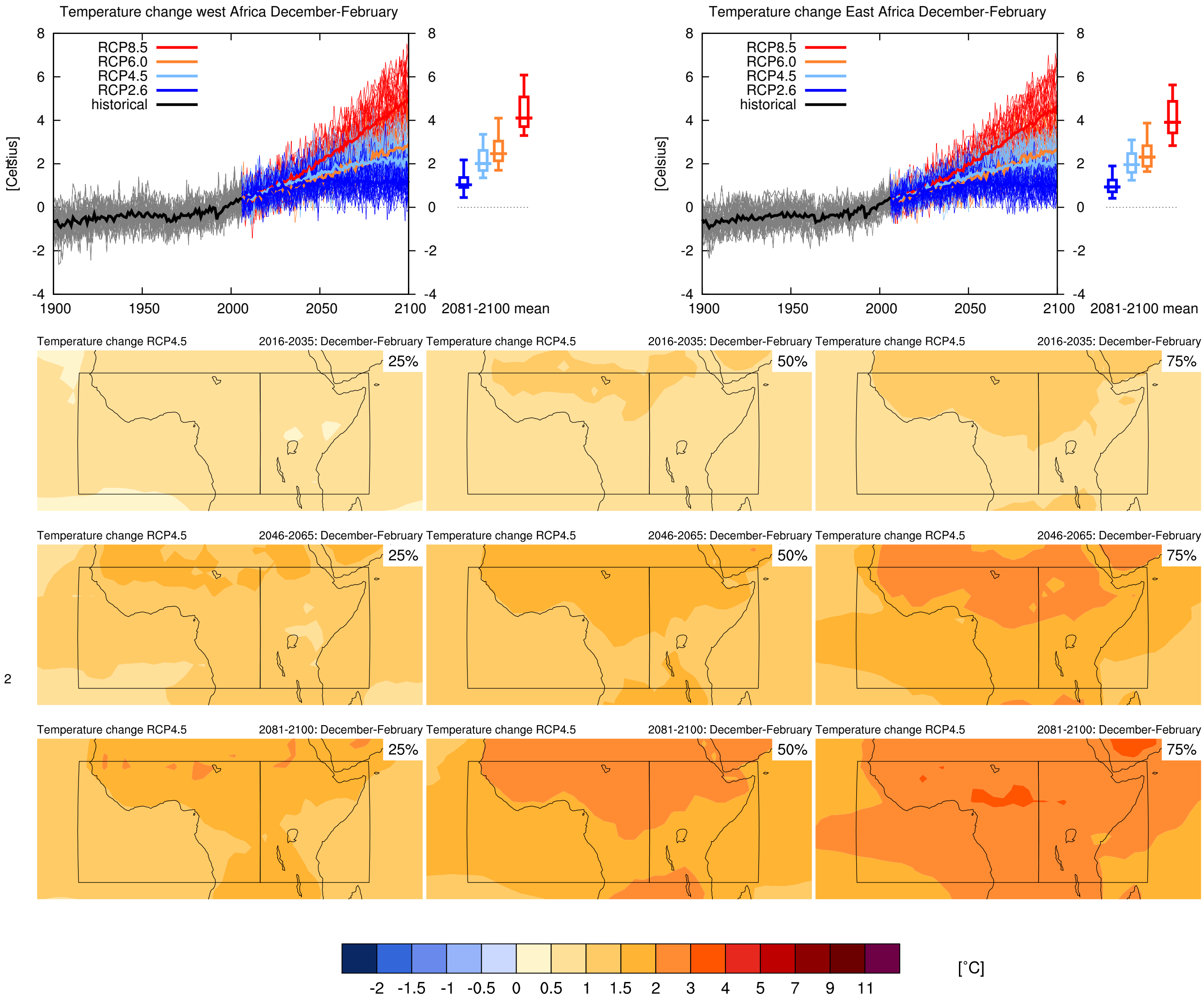

Figure AI.44: top left: time series of temperature averaged over land grid points in west Africa (11.4°S–15°N, 20°W–25°E) in December–February. Top right: same for land grid points in East Africa (11.3°S–15°N, 25°–52°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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Sections 9.6.1, 11.3.2.4.3, Box 11.2, 12.4.3, 14.9.7 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

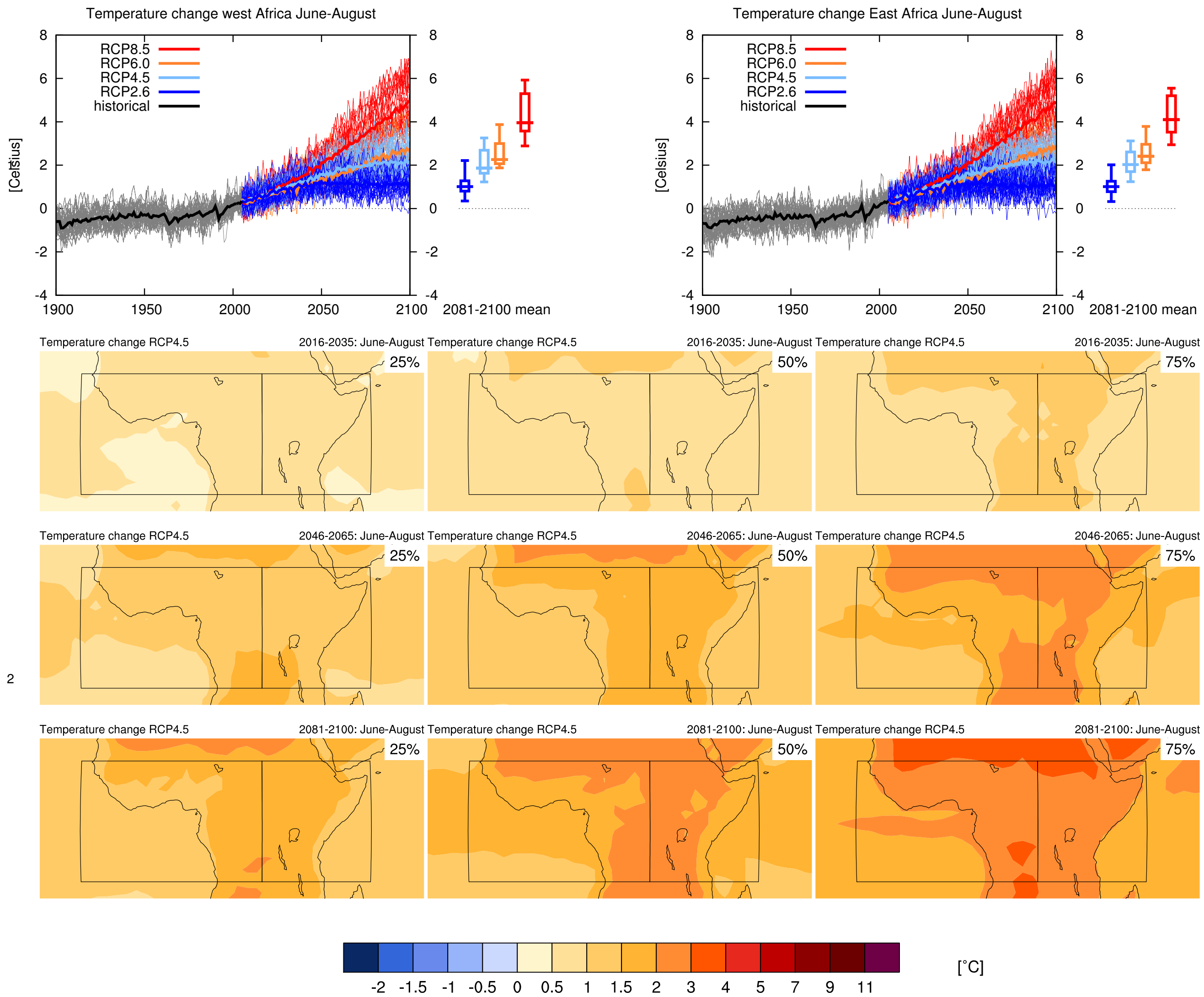

Figure AI.45: top left: time series of temperature averaged over land grid points in west Africa (11.4°S–15°N, 20°W–25°E) in June–August. Top right: same for land grid points in East Africa (11.3°S–15°N, 25°–52°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

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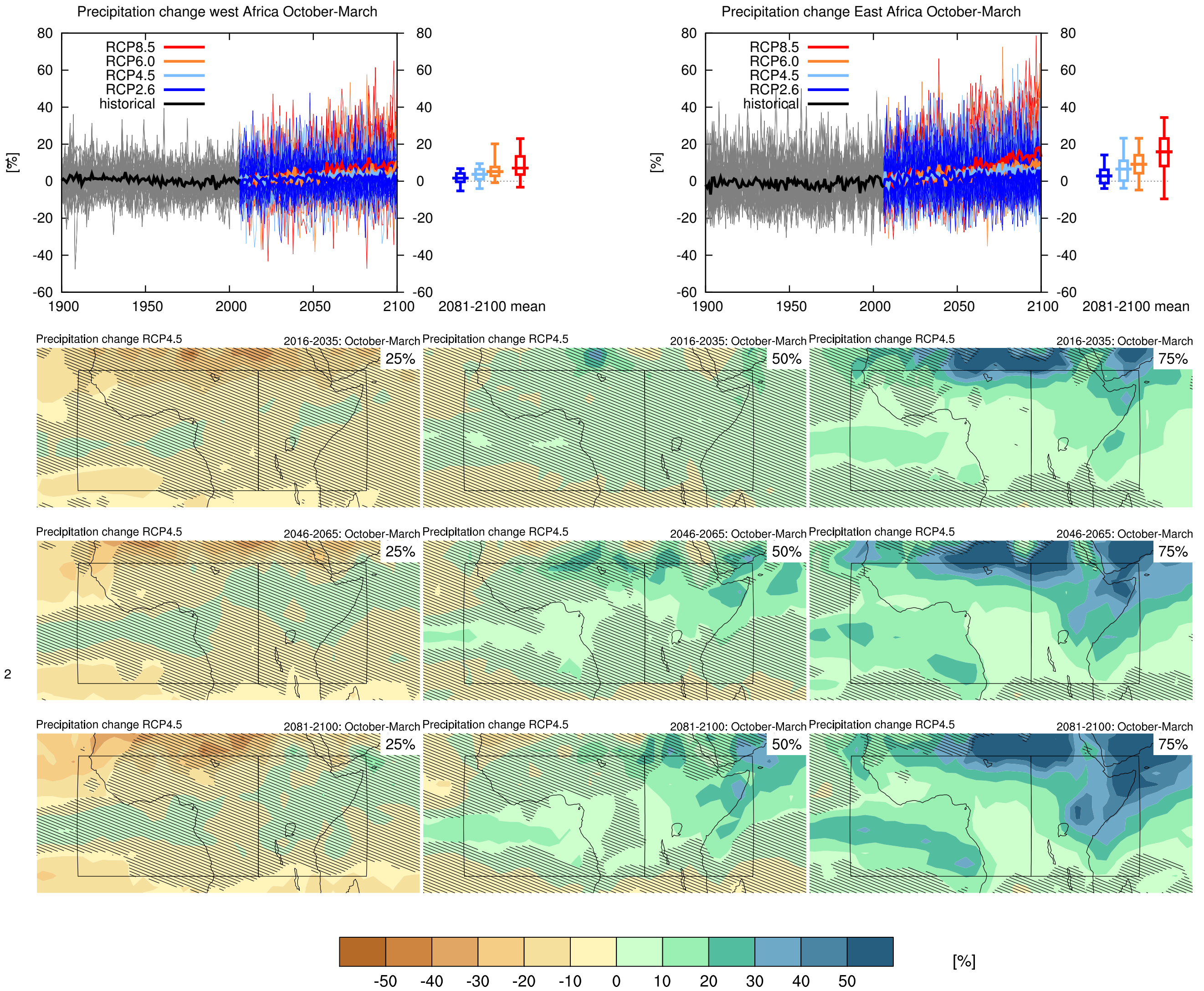

Figure AI.46: top left: time series of relative precipitation averaged over land grid points in west Africa (11.4°S–15°N, 20°W–25°E) in October–March. Top right: same for land grid points in East Africa (11.3°S–15°N, 25°–52°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of relative precipitation changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

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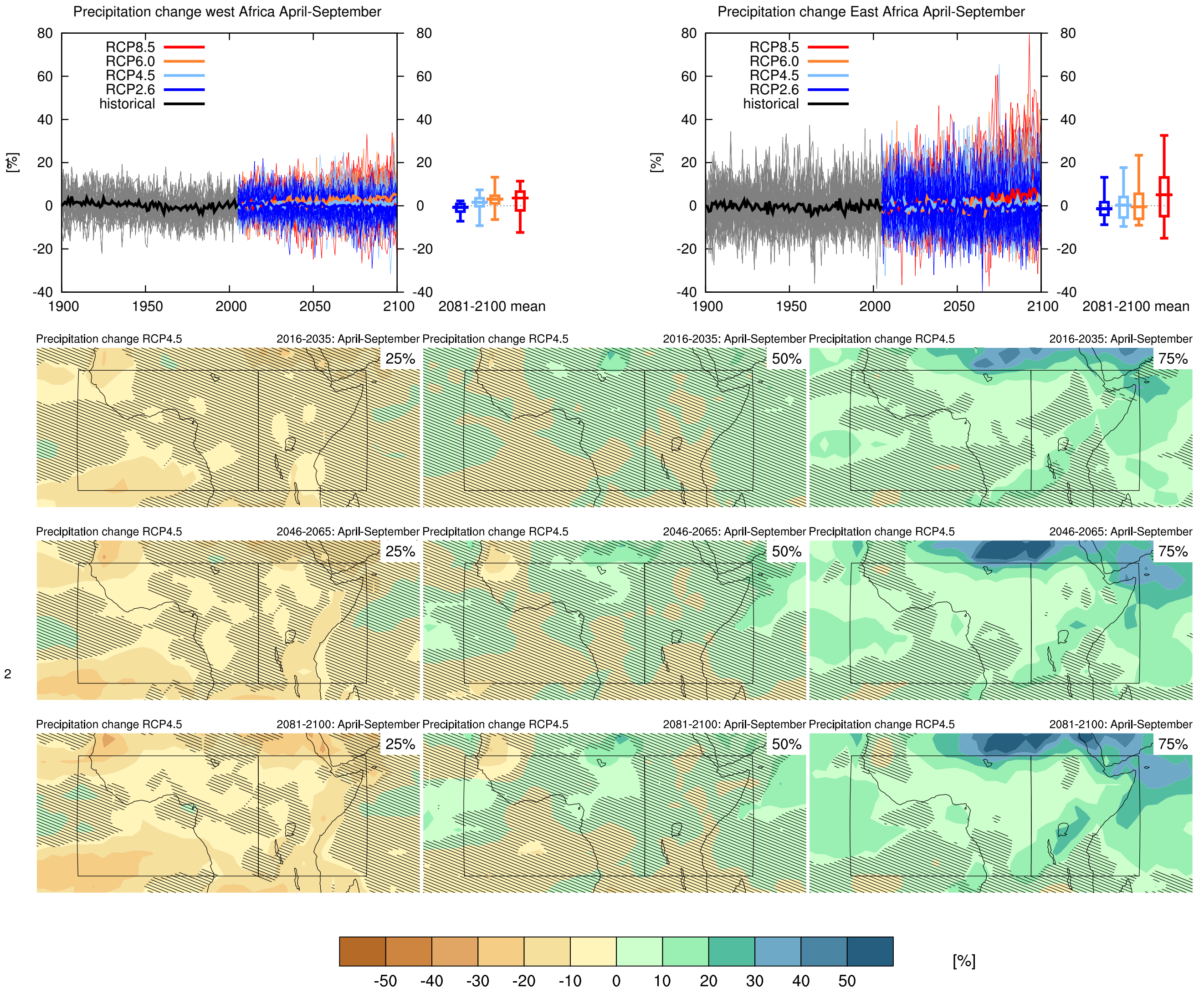

Figure AI.47: top left: time series of relative precipitation averaged over land grid points in west Africa (11.4°S–15°N, 20°W–25°E) in April–September. Top right: same for land grid points in East Africa (11.3°S–15°N, 25°–52°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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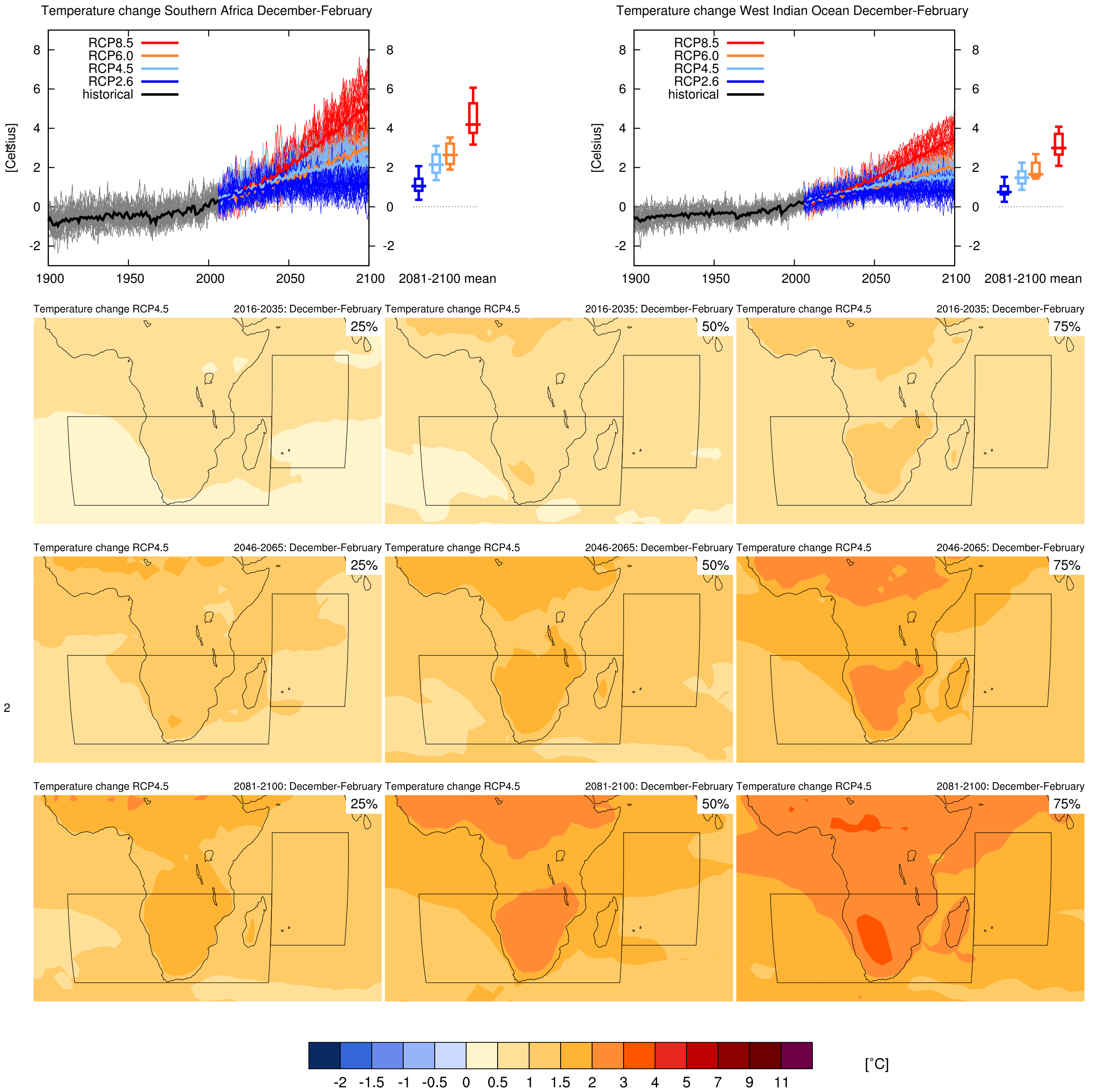

Figure AI.48: top left: time series of temperature averaged over land grid points in Southern Africa (35°–11.4°S, 10°W–52°E) in December–February. Top right: same for sea grid points in the West Indian Ocean (25°S–5°N, 52°–75°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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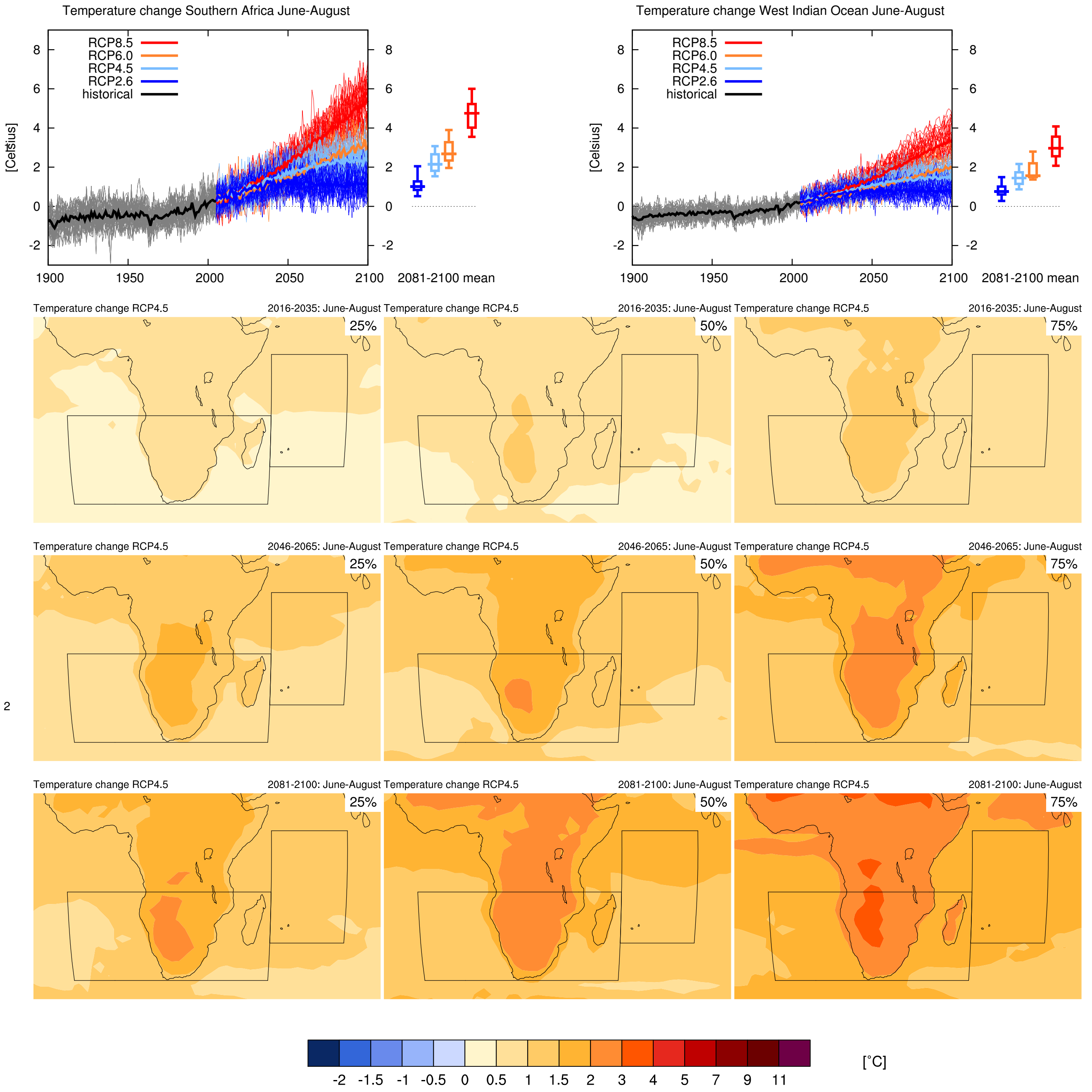

Figure AI.49: top left: time series of temperature averaged over land grid points in Southern Africa (35°–11.4°S, 10°W–52°E) in June–August. Top right: same for sea grid points in the West Indian Ocean (25°S–5°N, 52°–75°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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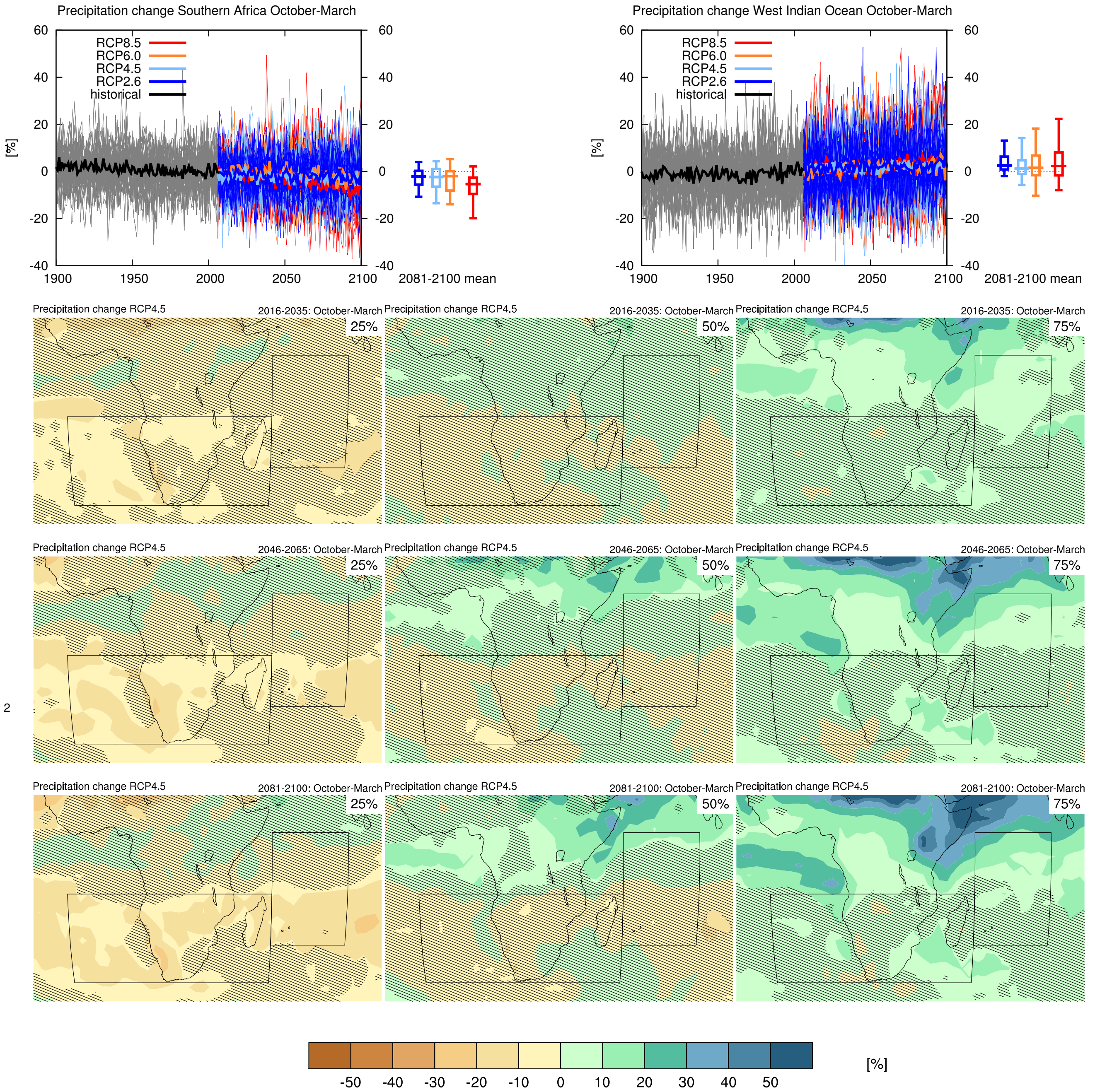

Figure AI.50: top left: time series of relative precipitation averaged over land grid points in Southern Africa (35°–11.4°S, 10°W–52°E) in October–March. Top right: same for sea grid points in the West Indian Ocean (25°S–5°N, 52°–75°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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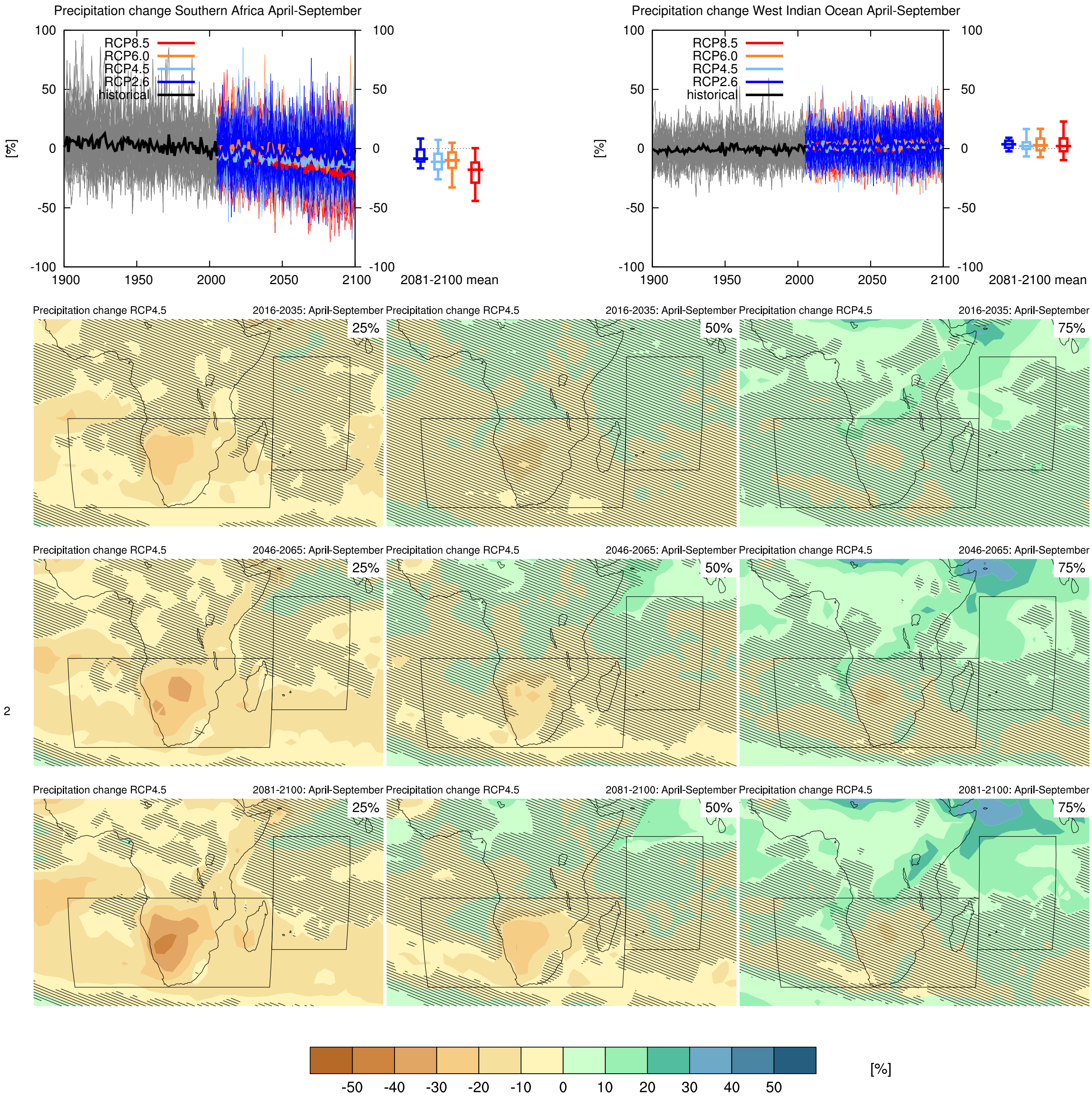

Figure AI.51: top left: time series of relative precipitation averaged over land grid points in Southern Africa (35°–11.4°S, 10°W–52°E) in April–September. Top right: same for sea grid points in the West Indian Ocean (25°S–5°N, 52°–75°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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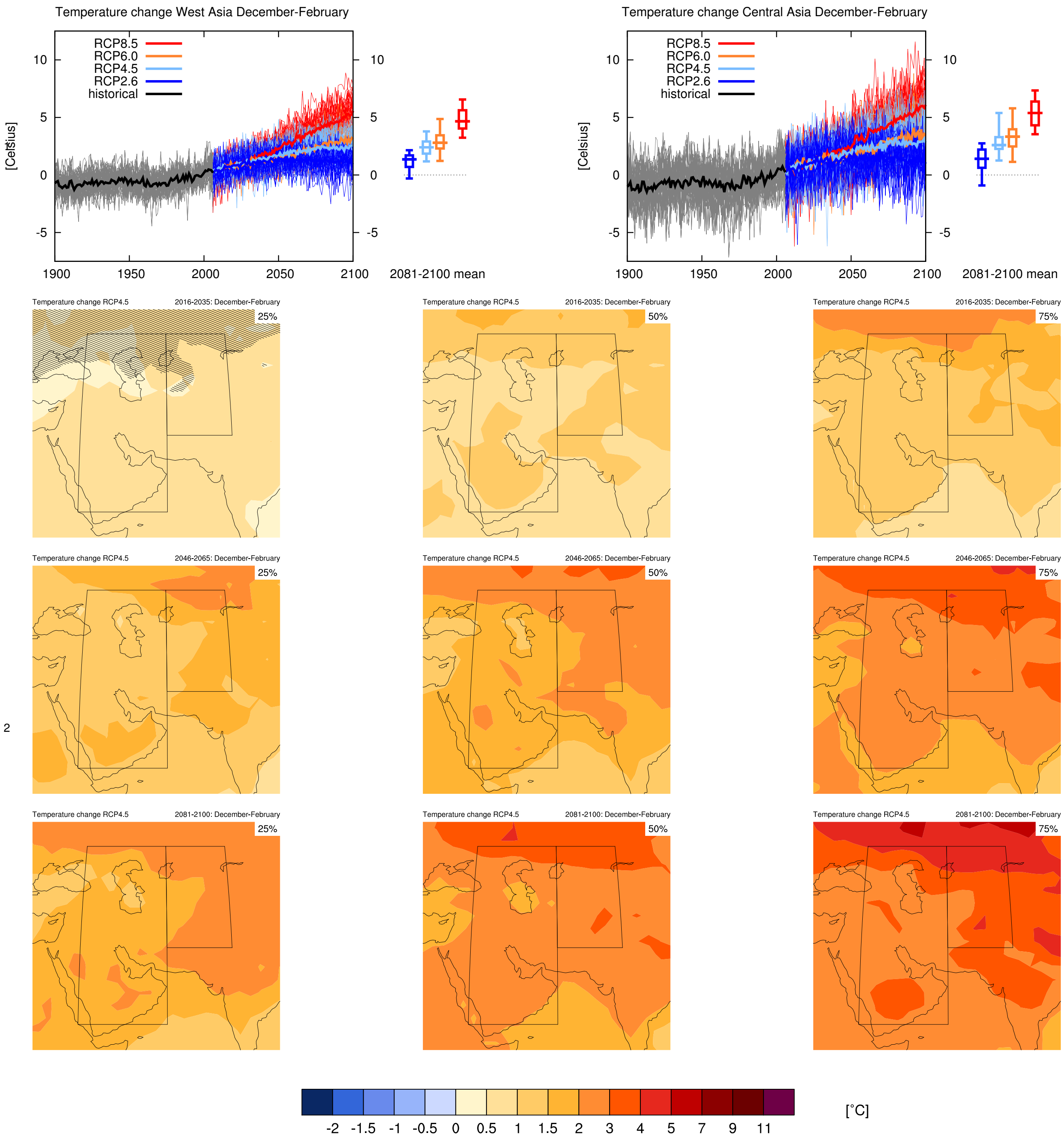

Figure AI.52: top left: time series of temperature averaged over land grid points in West Asia (15°–50°N, 40°–60°E) in December–February. Top right: same for land grid points in Central Asia (30°–50°N, 60°–75°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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Sections 9.6.1, 11.3.2.4.1, Box 11.2, 12.4.3, 14.9.8 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

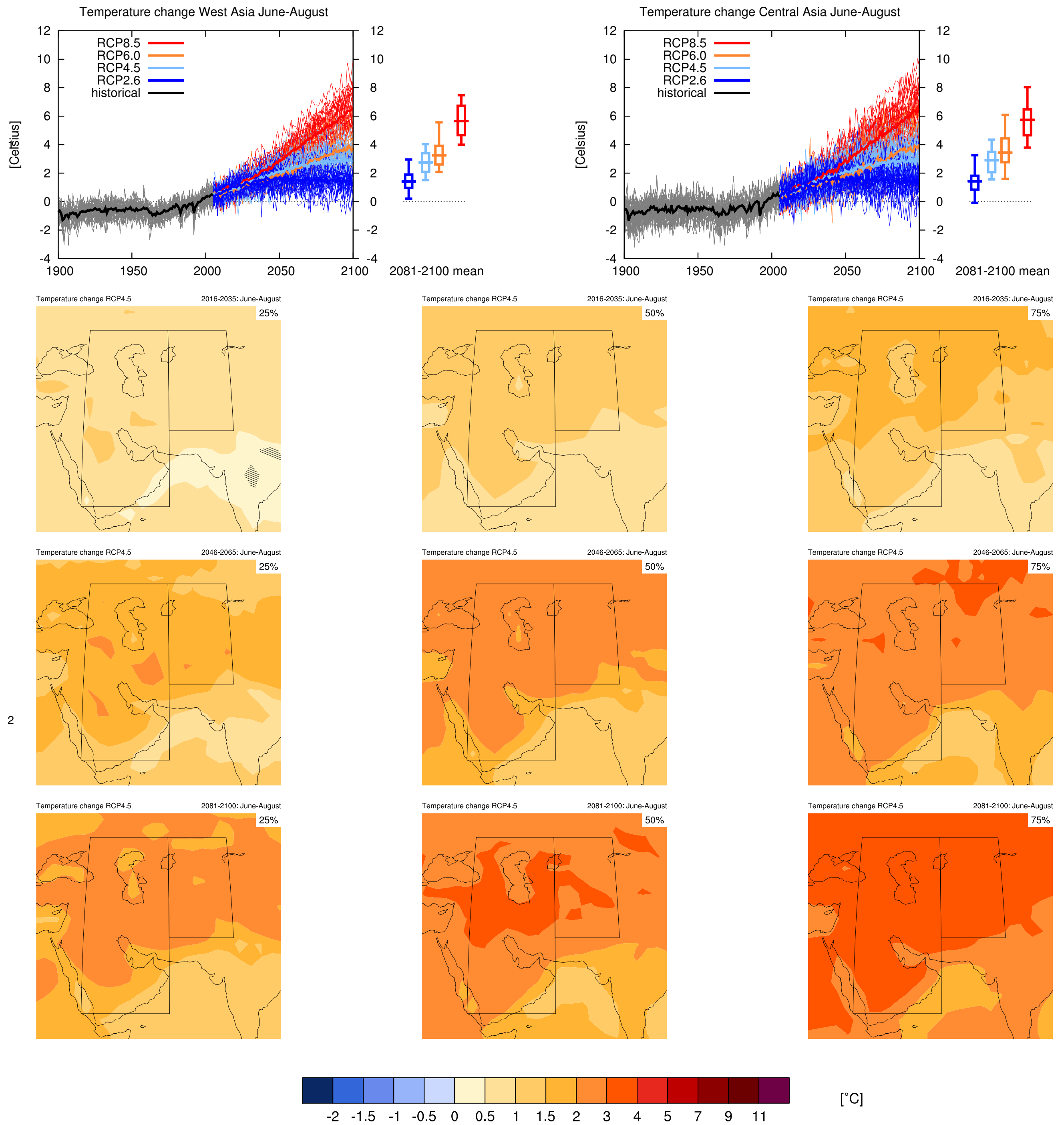

Figure AI.53: top left: time series of temperature averaged over land grid points in West Asia (15°–50°N, 40°–60°E) in June–August. Top right: same for land grid points in Central Asia (30°–50°N, 60°–75°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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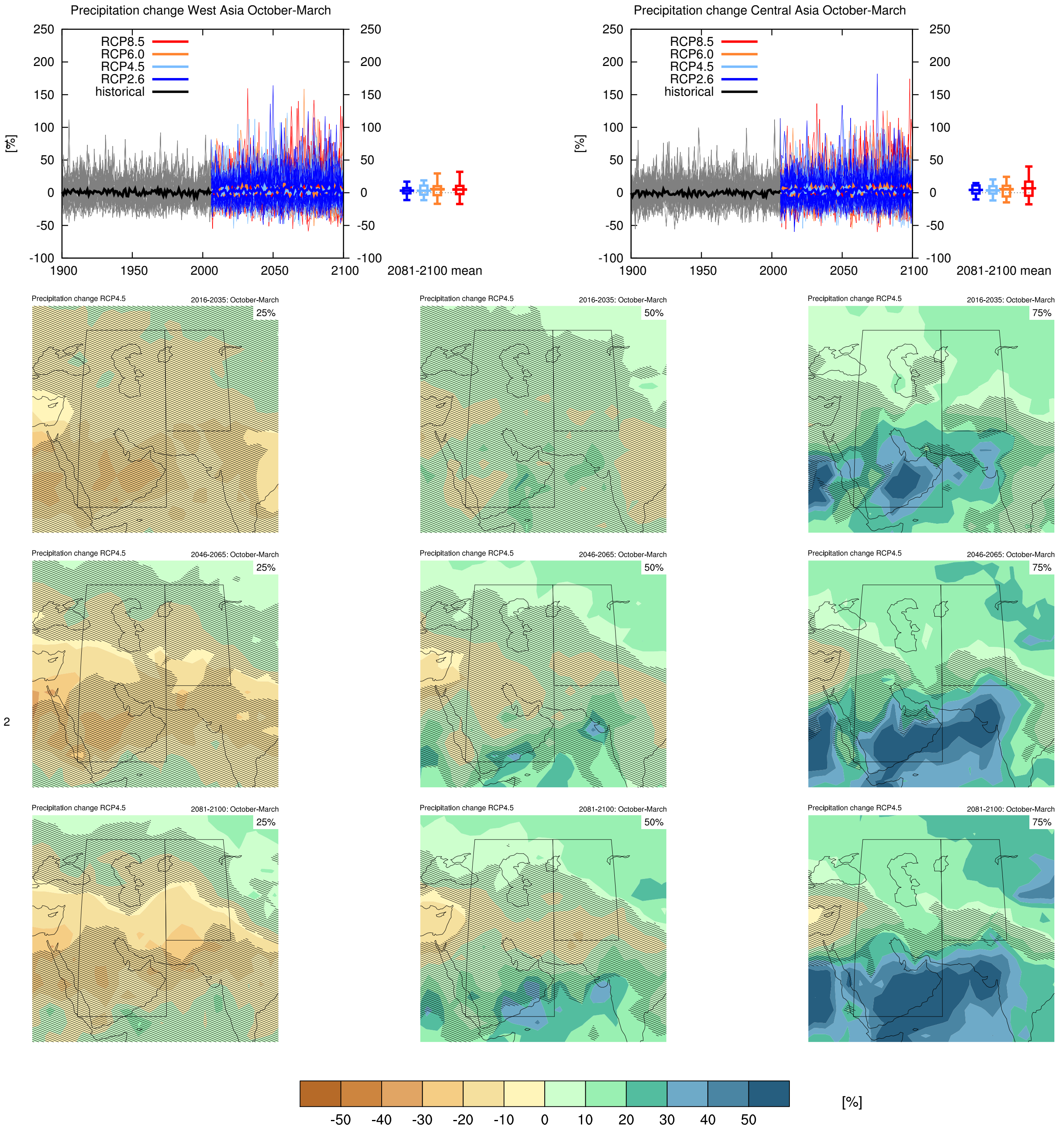

Figure AI.54: top left: time series of relative precipitation averaged over land grid points in West Asia (15°–50°N, 40°–60°E) in October–March. Top right: same for land grid points in Central Asia (30°–50°N, 60°–75°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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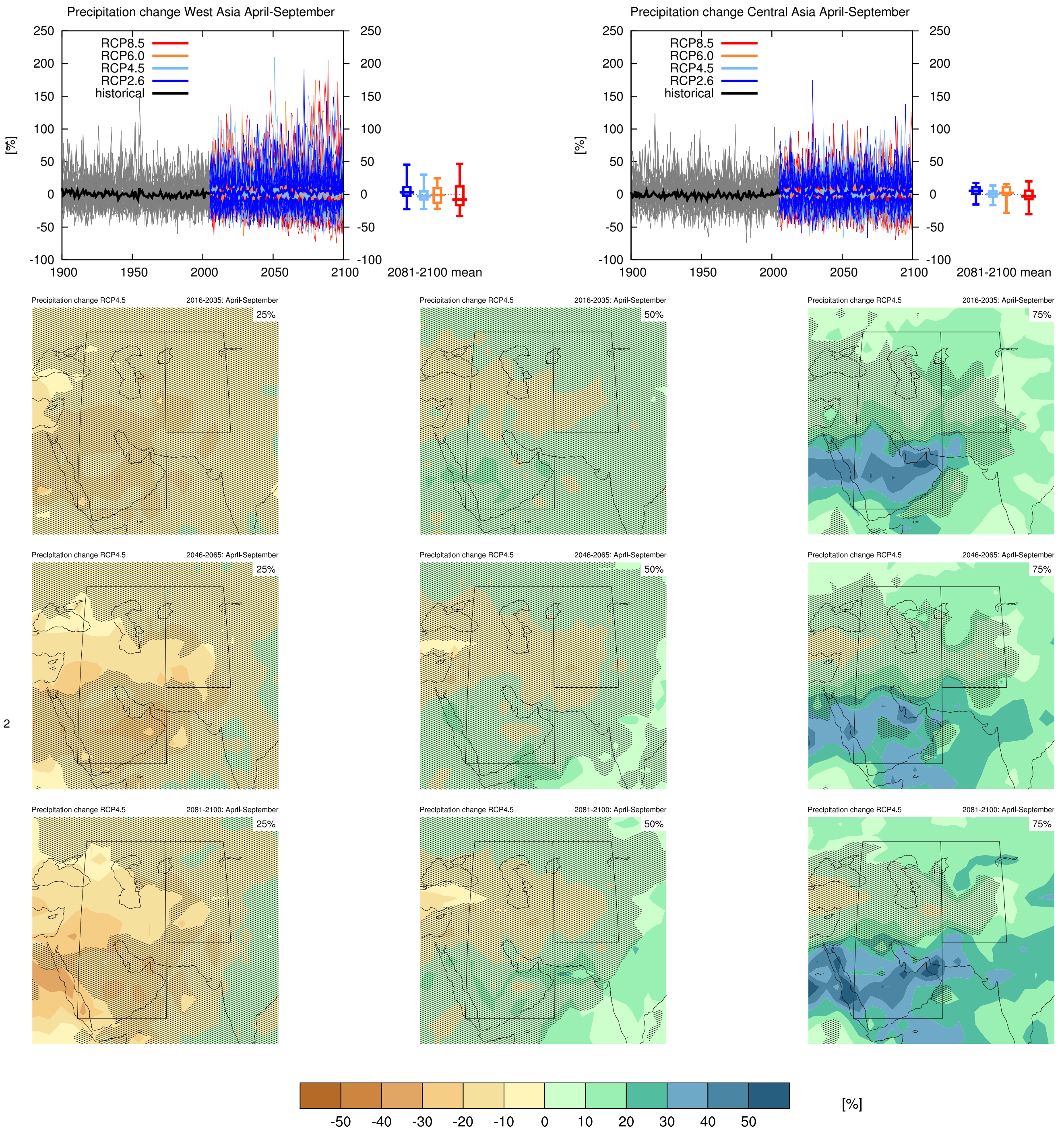

Figure AI.55: top left: time series of relative precipitation averaged over land grid points in West Asia (15°–50°N, 40°–60°E) in April–September. Top right: same for land grid points in Central Asia (30°–50°N, 60°–75°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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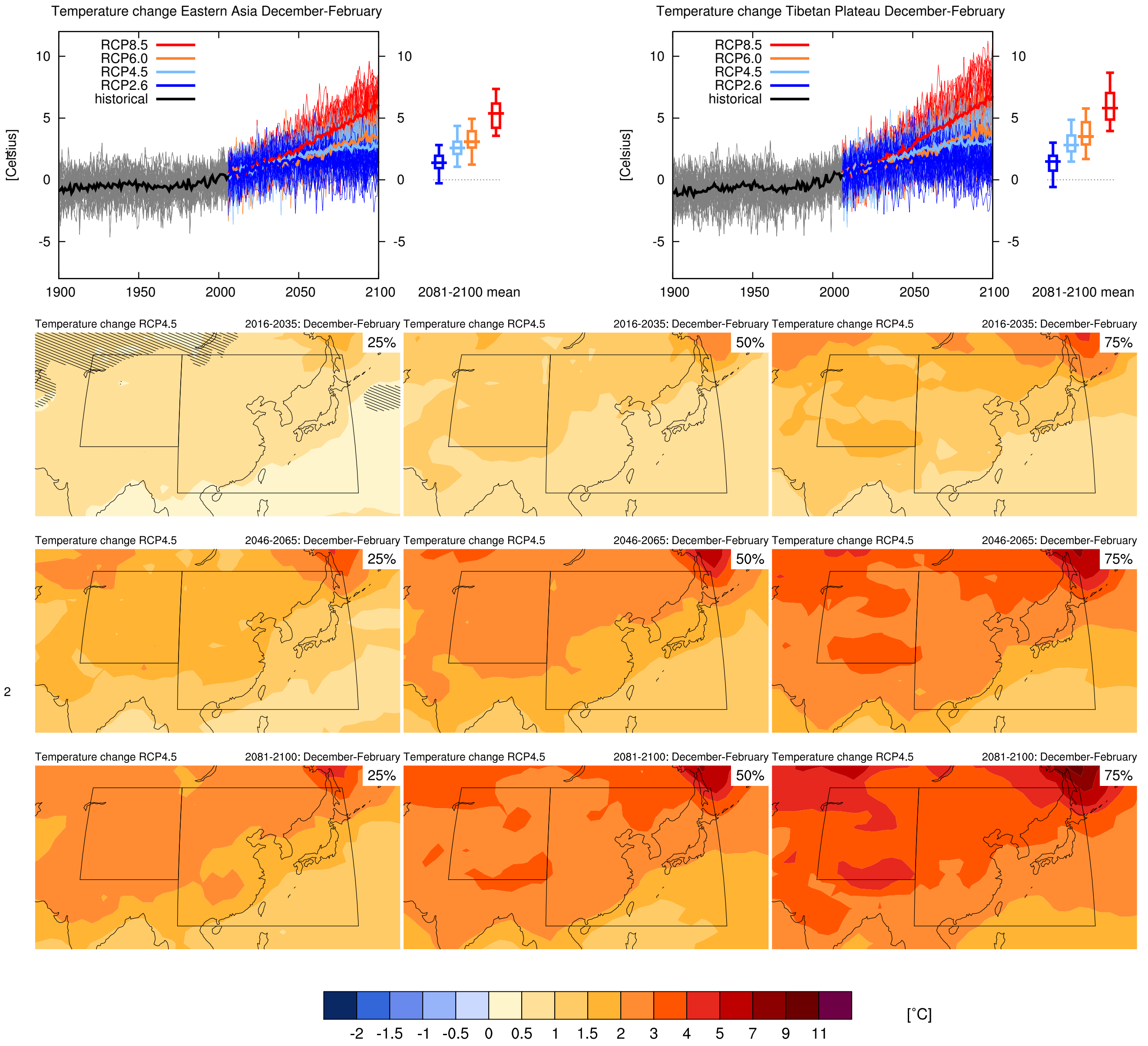

Figure AI.56: top left: time series of temperature averaged over land grid points in Eastern Asia (20°–50°N, 100°–145°E) in December–February. Top right: same for land grid points on the Tibetan Plateau (30°–50°N, 75°–100°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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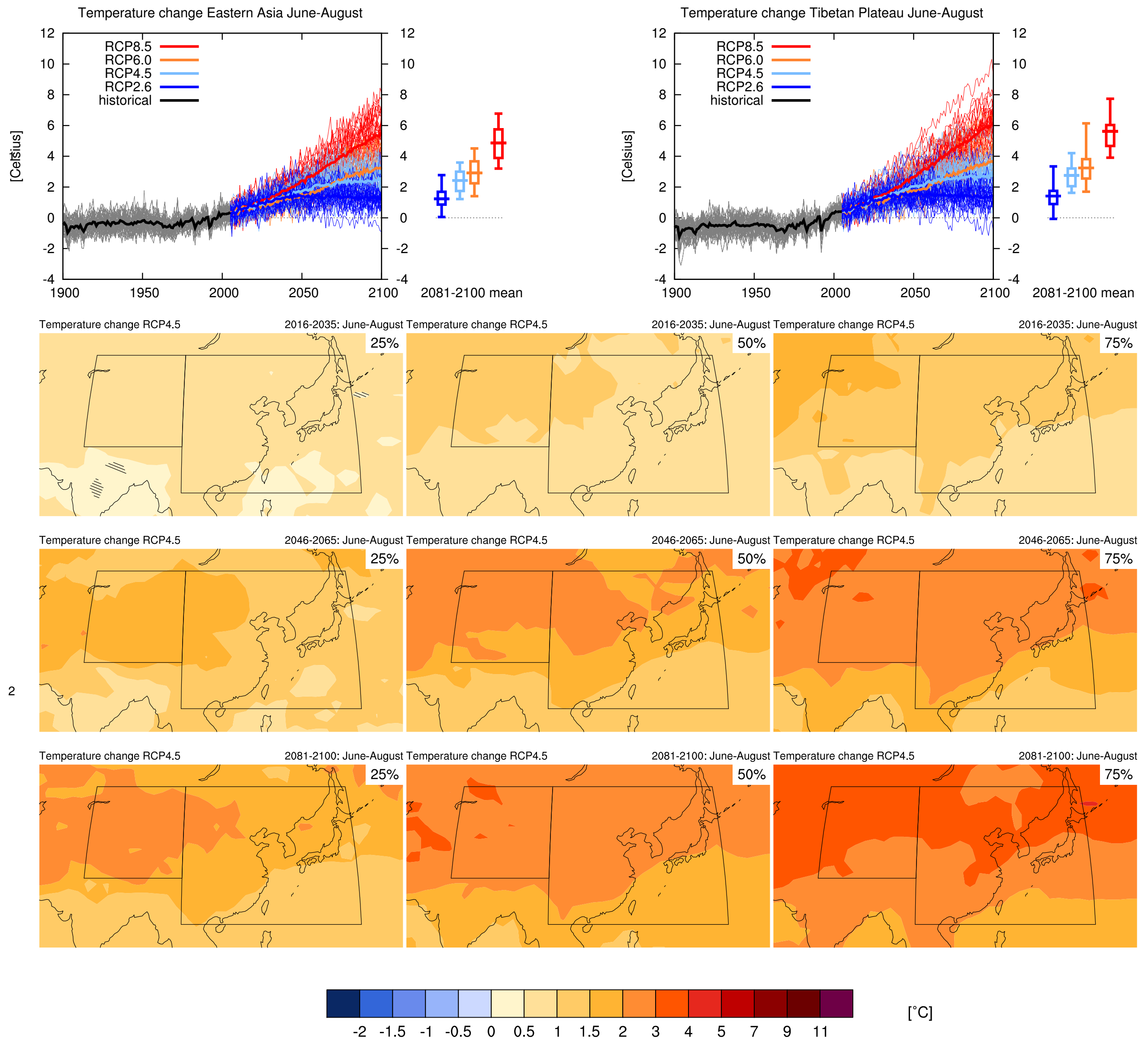

Figure AI.57: top left: time series of temperature averaged over land grid points in Eastern Asia (20°–50°N, 100°–145°E) in June–August. Top right: same for land grid points on the Tibetan Plateau (30°–50°N, 75°–100°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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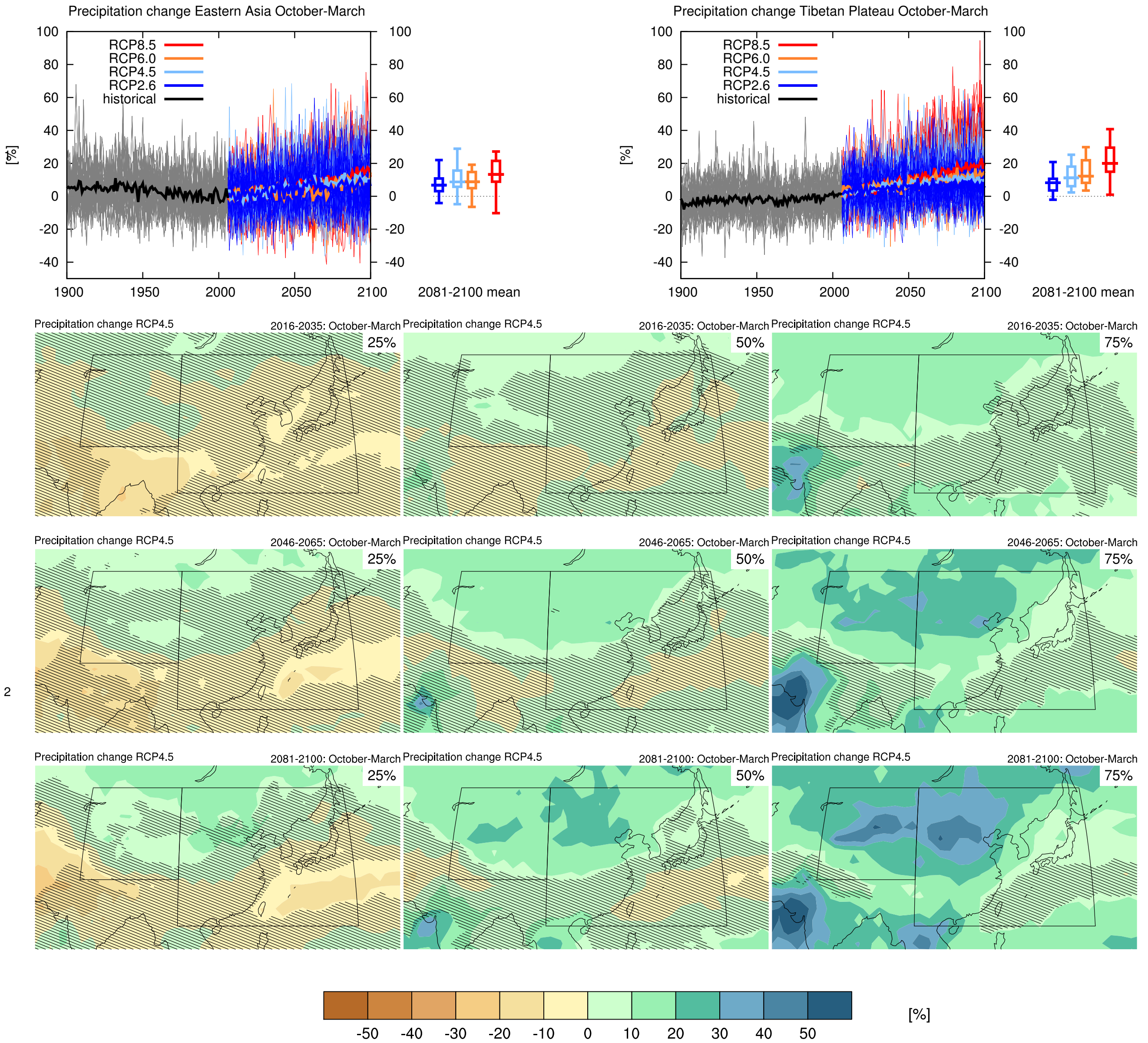

Figure AI.58: top left: time series of relative precipitation averaged over land grid points in Eastern Asia (20°–50°N, 100°–145°E) in October–March. Top right: same for land grid points on the Tibetan Plateau (30°–50°N, 75°–100°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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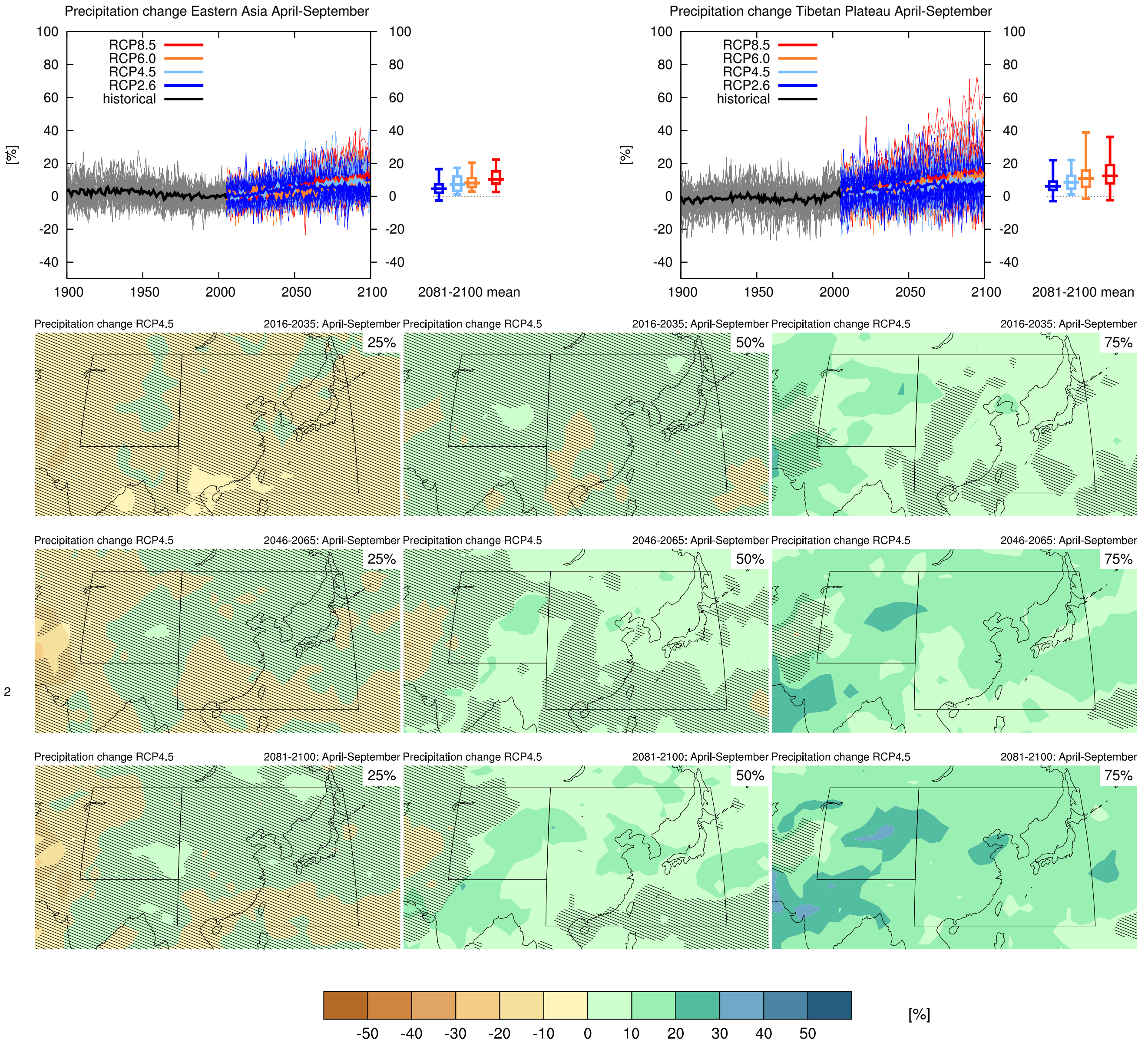
2 

3 **Figure AI.59:** top left: time series of relative precipitation averaged over land grid points in Eastern Asia (20°–50°N, 100°–145°E) in April–September. Top right: same for land grid points on the Tibetan Plateau (30°–50°N, 75°–100°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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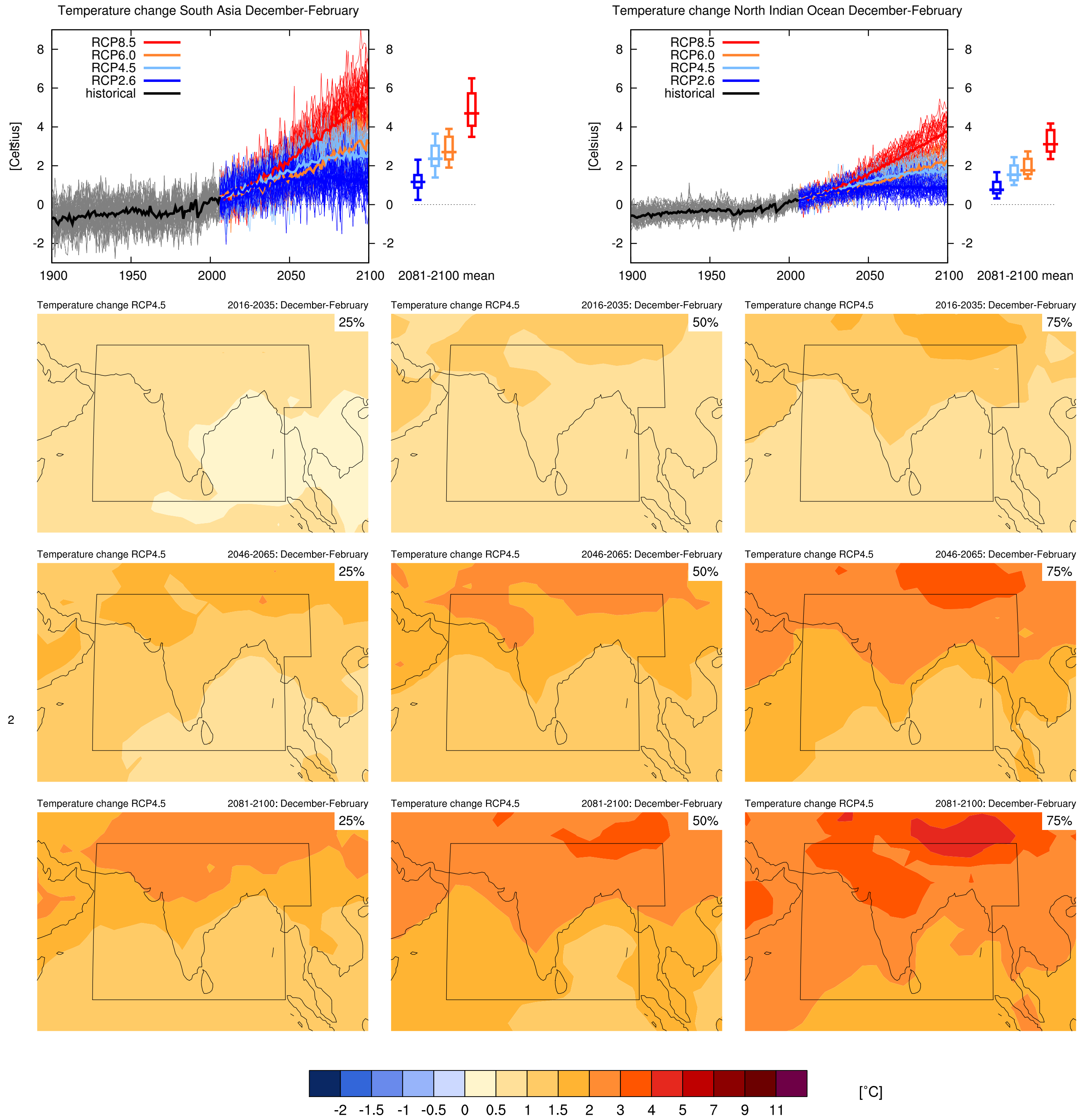

Figure AI.60: top left: time series of temperature averaged over land grid points in South Asia (60°E,5°N; 60°E,30°N; 100°E,30°N; 100°E,20°E; 95°E,20°N; 95°E,5°N) in December–February. Top right: same for sea grid points in the North Indian Ocean (5°–30°N, 60°–95°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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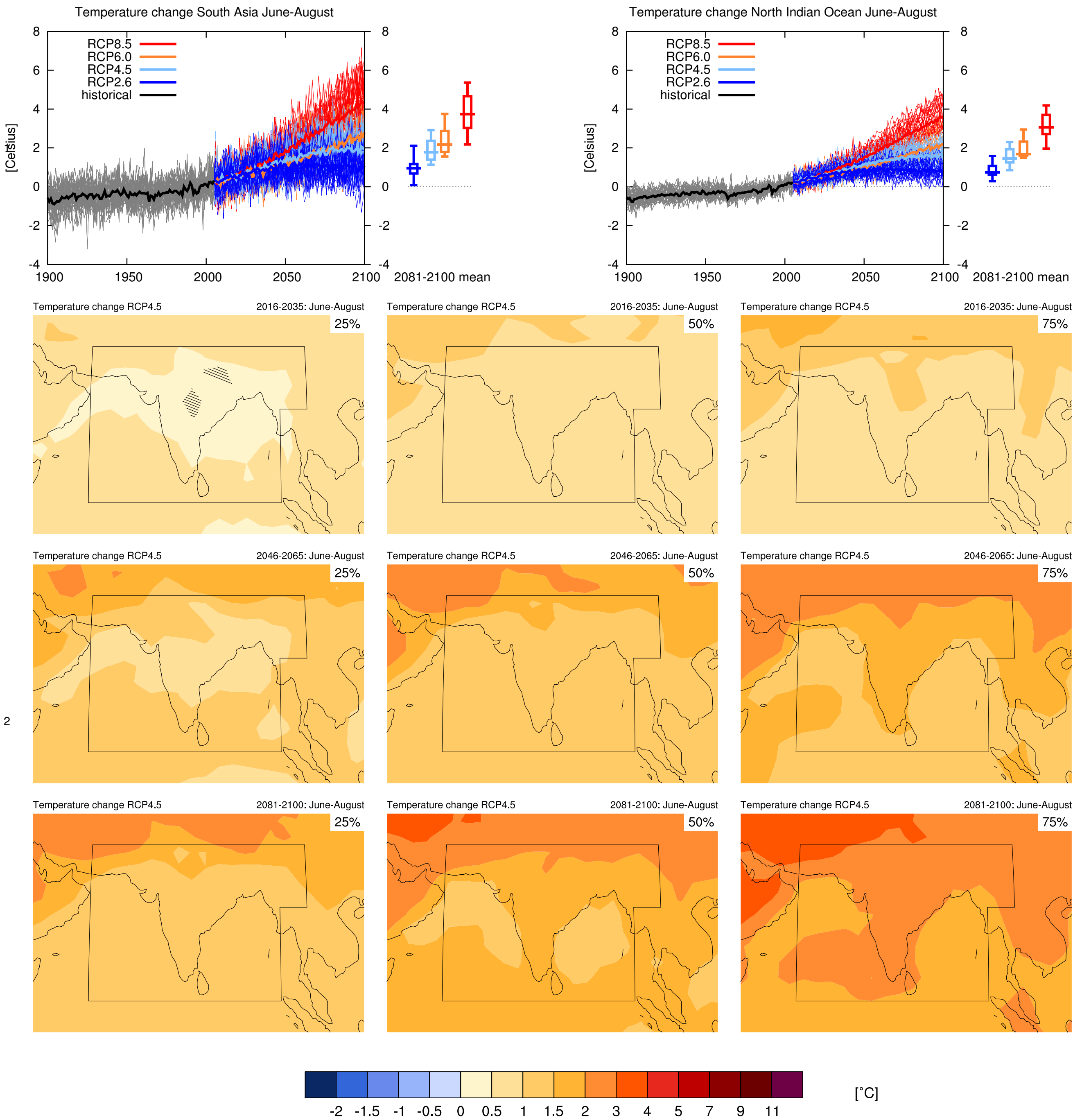

Figure AI.61: top left: time series of temperature averaged over land grid points in South Asia (60°E,5°N; 60°E,30°N; 100°E,30°N; 100°E,20°E; 95°E,20°N; 95°E,5°N) in June–August. Top right: same for sea grid points in the North Indian Ocean (5°–30°N, 60°–95°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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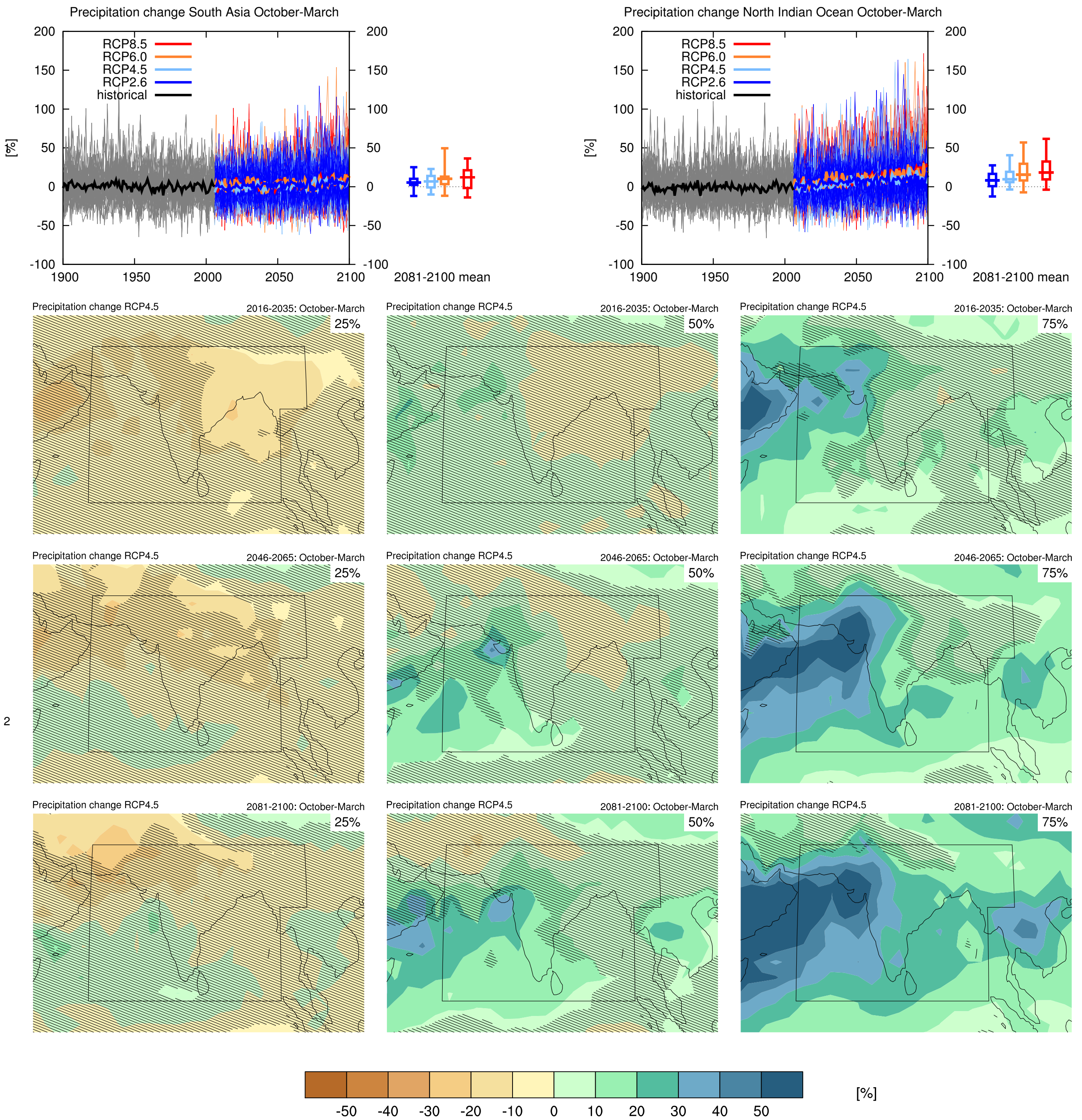

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Figure AI.62: top left: time series of relative precipitation averaged over land grid points in South Asia (60°E,5°N; 60°E,30°N; 100°E,30°N; 100°E,20°E; 95°E,20°N; 95°E,5°N) in October–March. Top right: same for sea grid points in the North Indian Ocean (5°–30°N, 60°–95°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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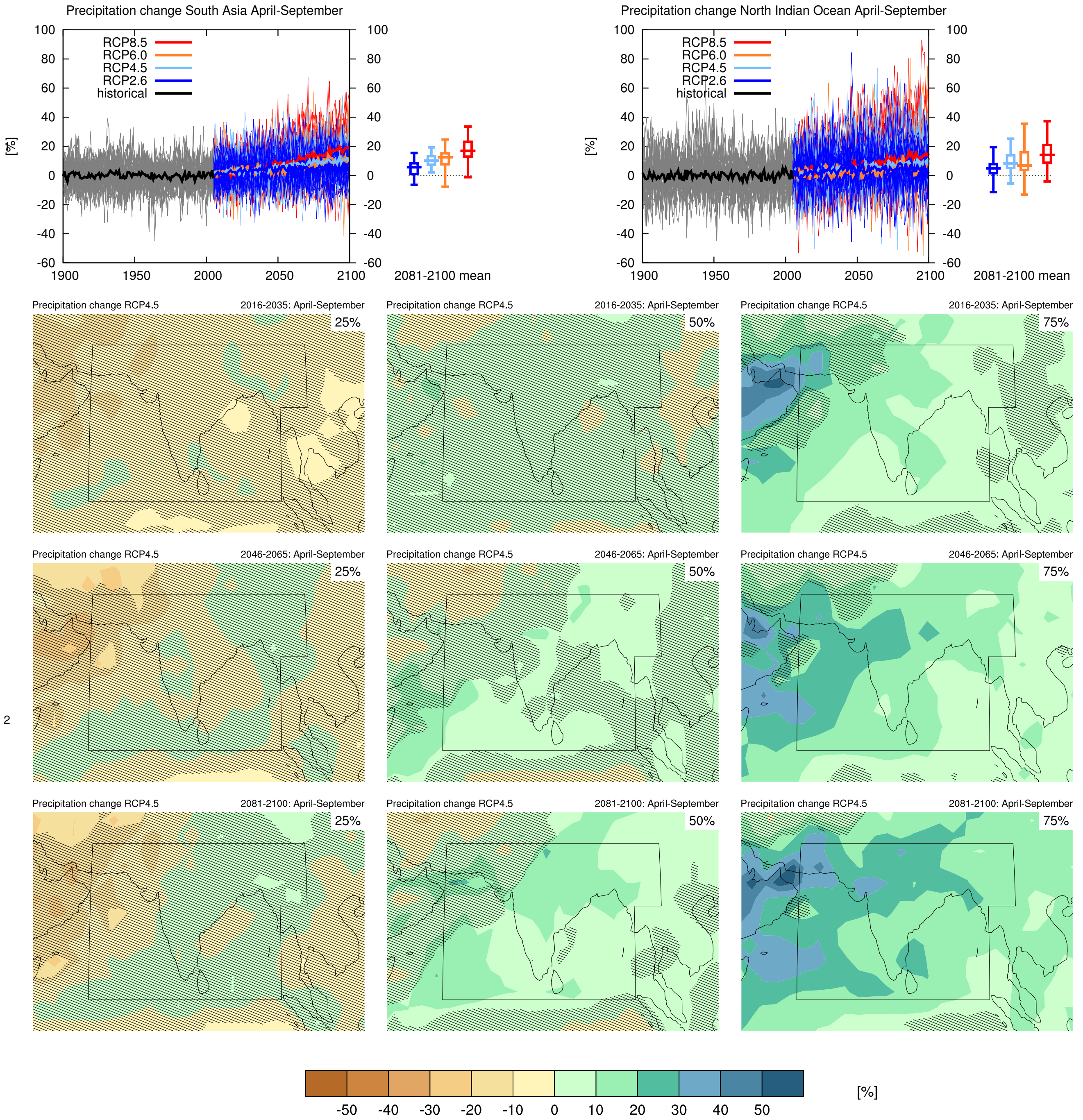

Figure AI.63: top left: time series of relative precipitation averaged over land grid points in South Asia (60°E,5°N; 60°E,30°N; 100°E,30°N; 100°E,20°E; 95°E,20°N; 95°E,5°N) in April–September. Top right: same for sea grid points in the North Indian Ocean (5°–30°N, 60°–95°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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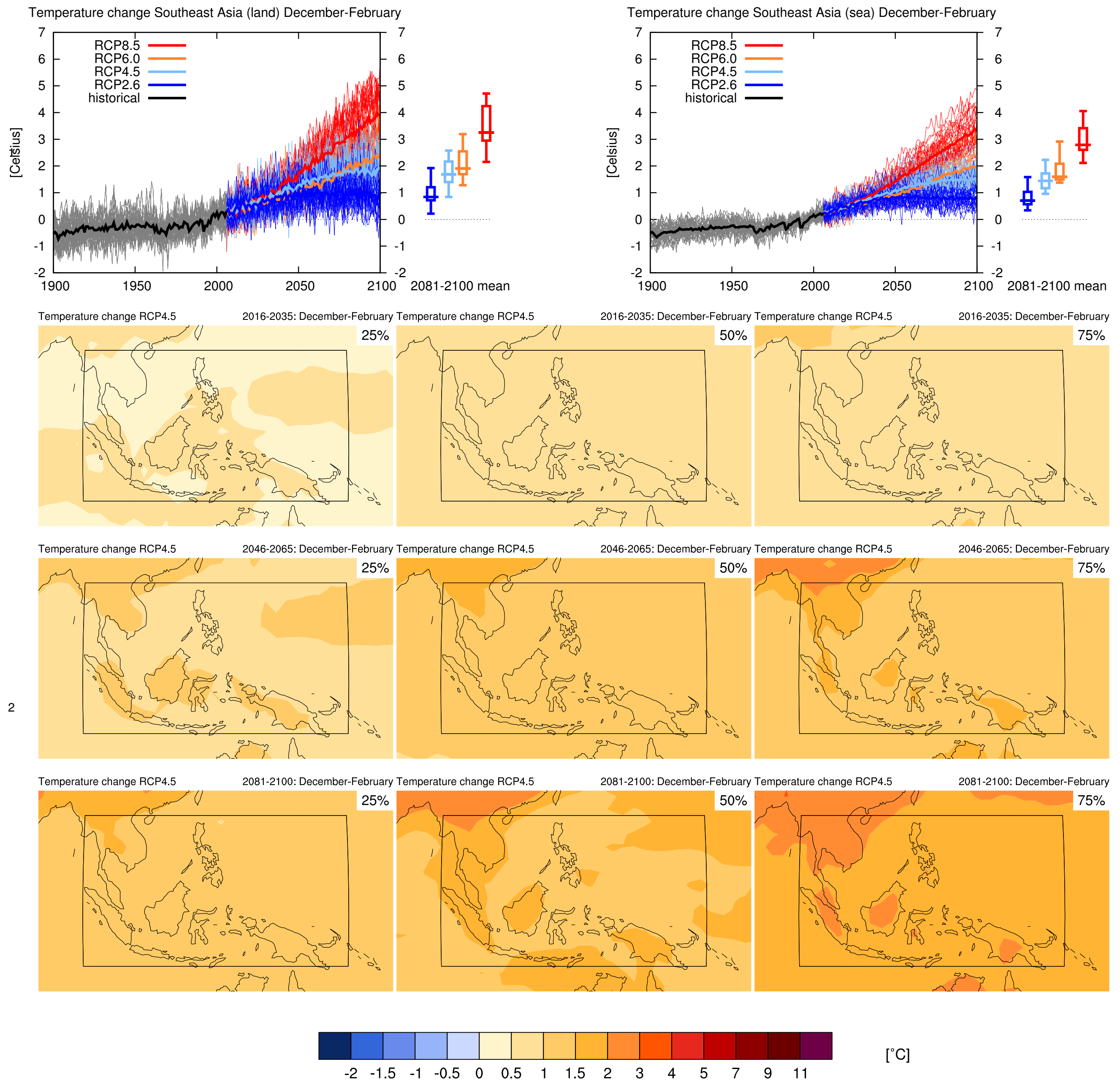

Figure AI.64: top left: time series of temperature averaged over land grid points in Southeast Asia (10°S–20°N, 95°–155°E) in December–February. Top right: same for sea grid points. Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.3, Box 11.2, 12.4.3, 14.9.11 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

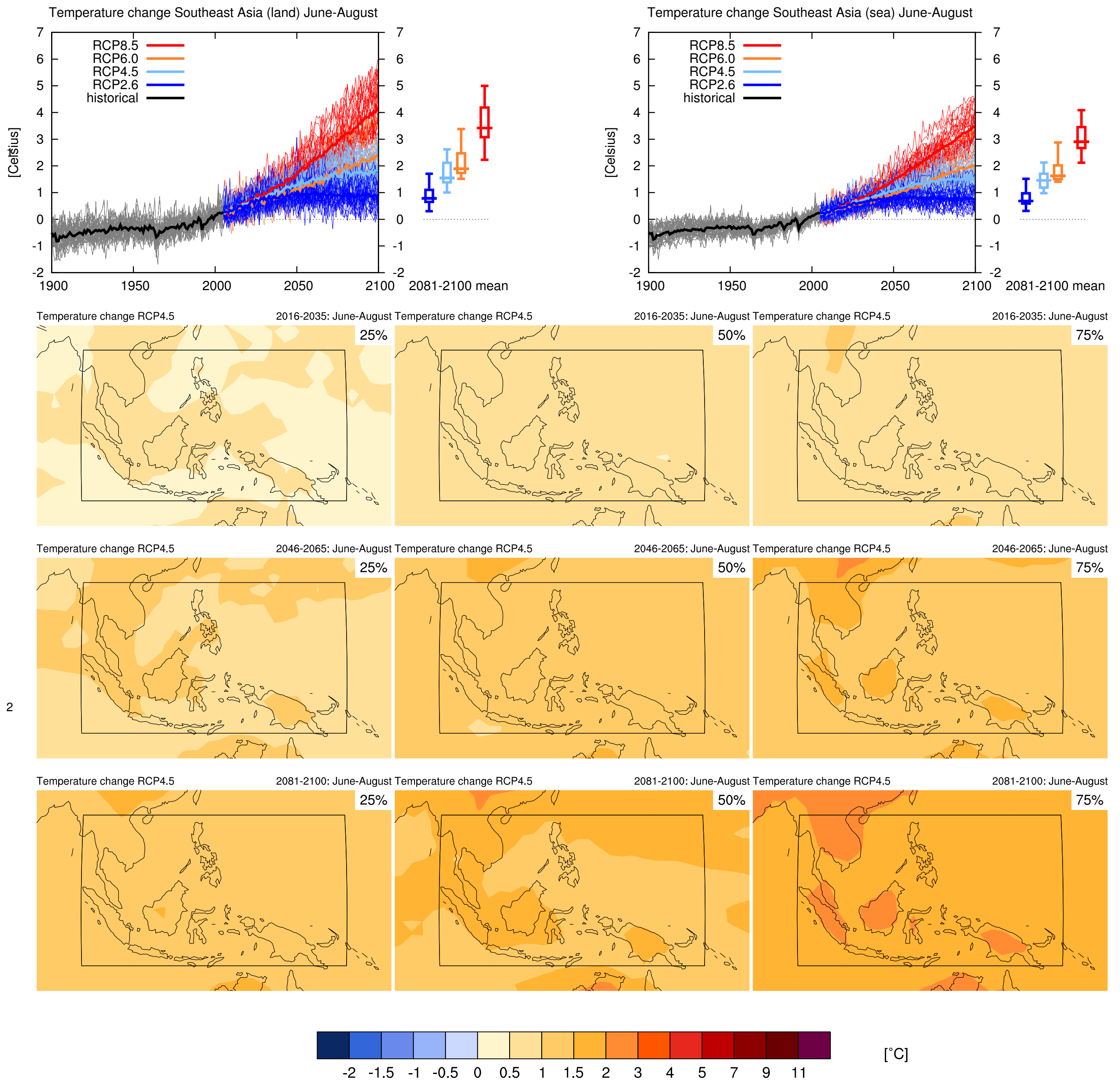

Figure AI.65: top left: time series of temperature averaged over land grid points in Southeast Asia (10°S–20°N, 95°–155°E) in June–August. Top right: same for sea grid points. Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.3, Box 11.2, 12.4.3, 14.9.11 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

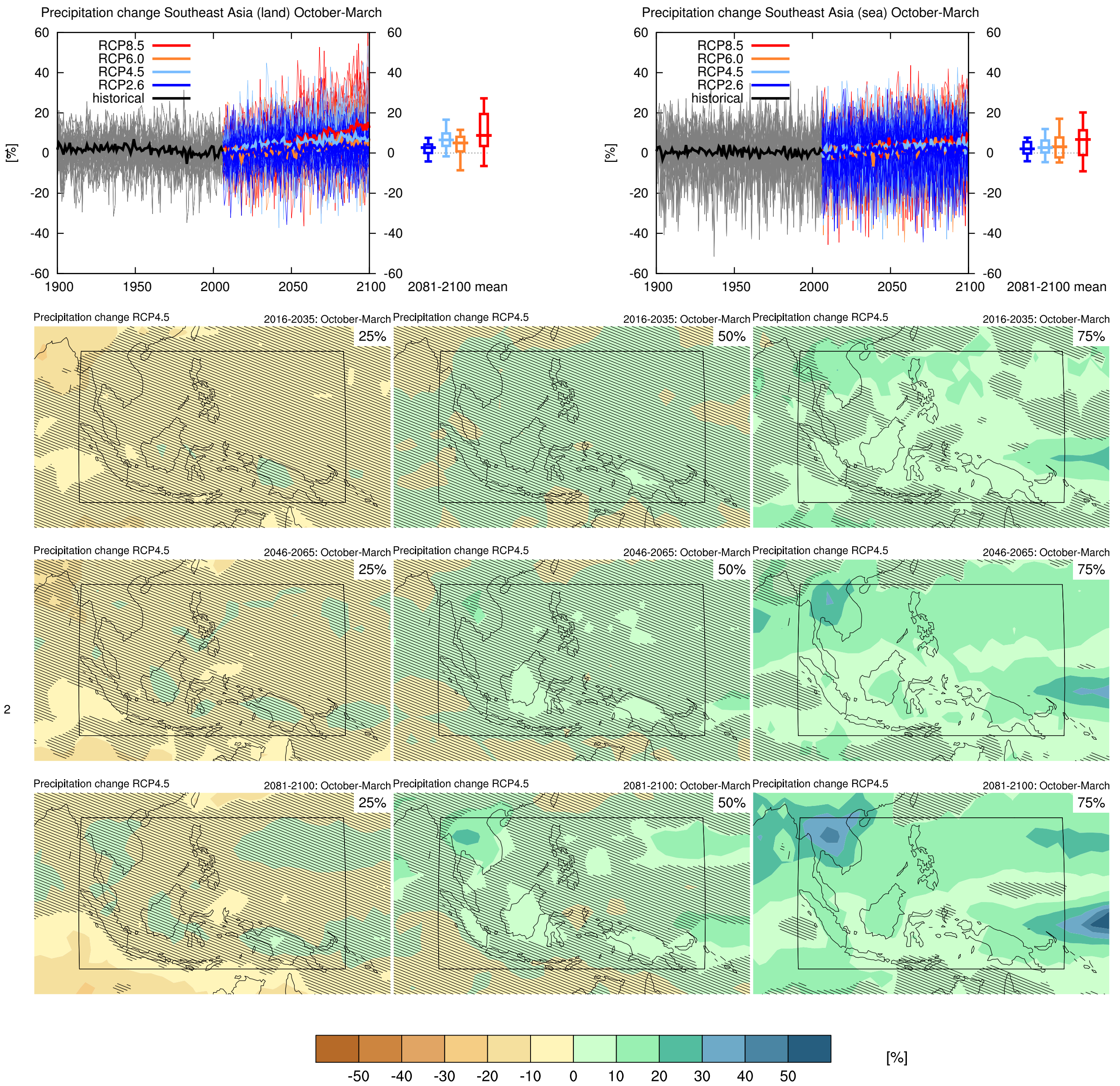

Figure AI.66: top left: time series of relative precipitation averaged over land grid points in Southeast Asia (10°S–20°N, 95°–155°E) in October–March. Top right: same for sea grid points. Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of relative precipitation changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.3, Box 11.2, 12.4.5, 14.9.11 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

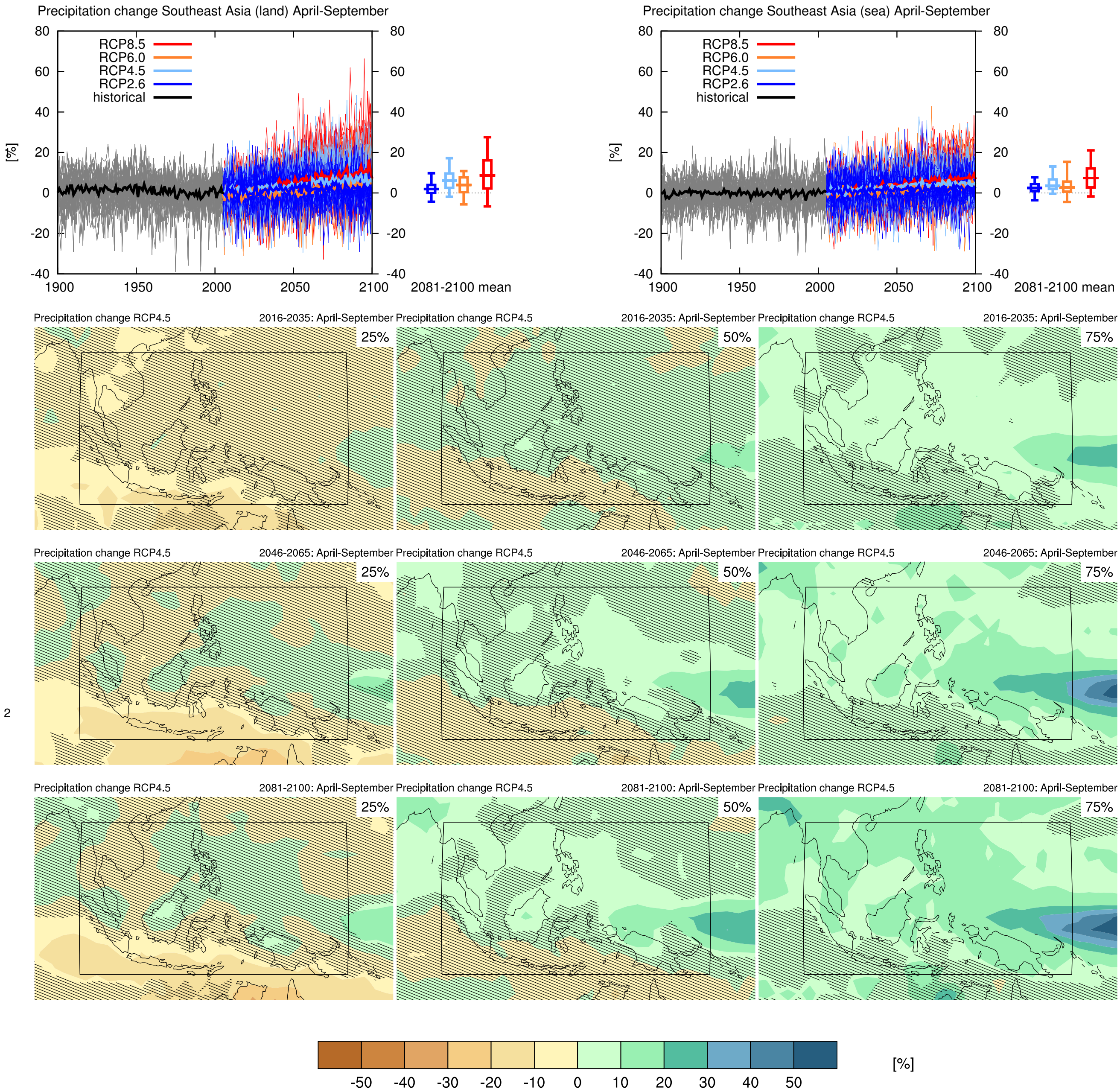

Figure AI.67: top left: time series of relative precipitation averaged over land grid points in Southeast Asia (10°S–20°N, 95°–155°E) in April–September. Top right: same for sea grid points. Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of relative precipitation changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.3, Box 11.2, 12.4.5, 14.9.11 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

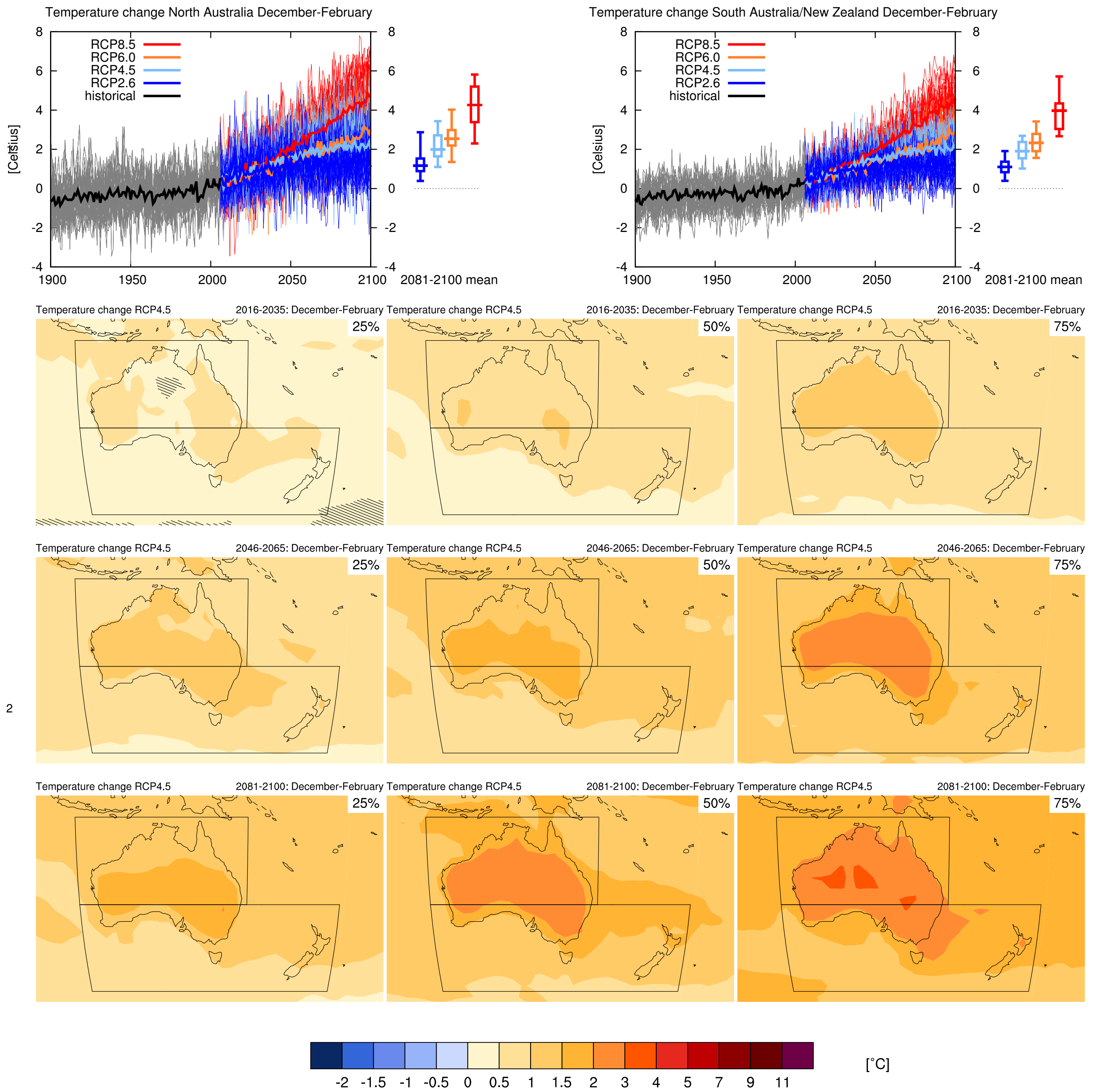

Figure AI.68: top left: time series of temperature averaged over land grid points in North Australia (30°–10°S, 110°–155°E) in December–February. Top right: same for land grid points in South Australia/New Zealand (50°–30°S, 110°–180°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.2, Box 11.2, 12.4.3, 14.9.12 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

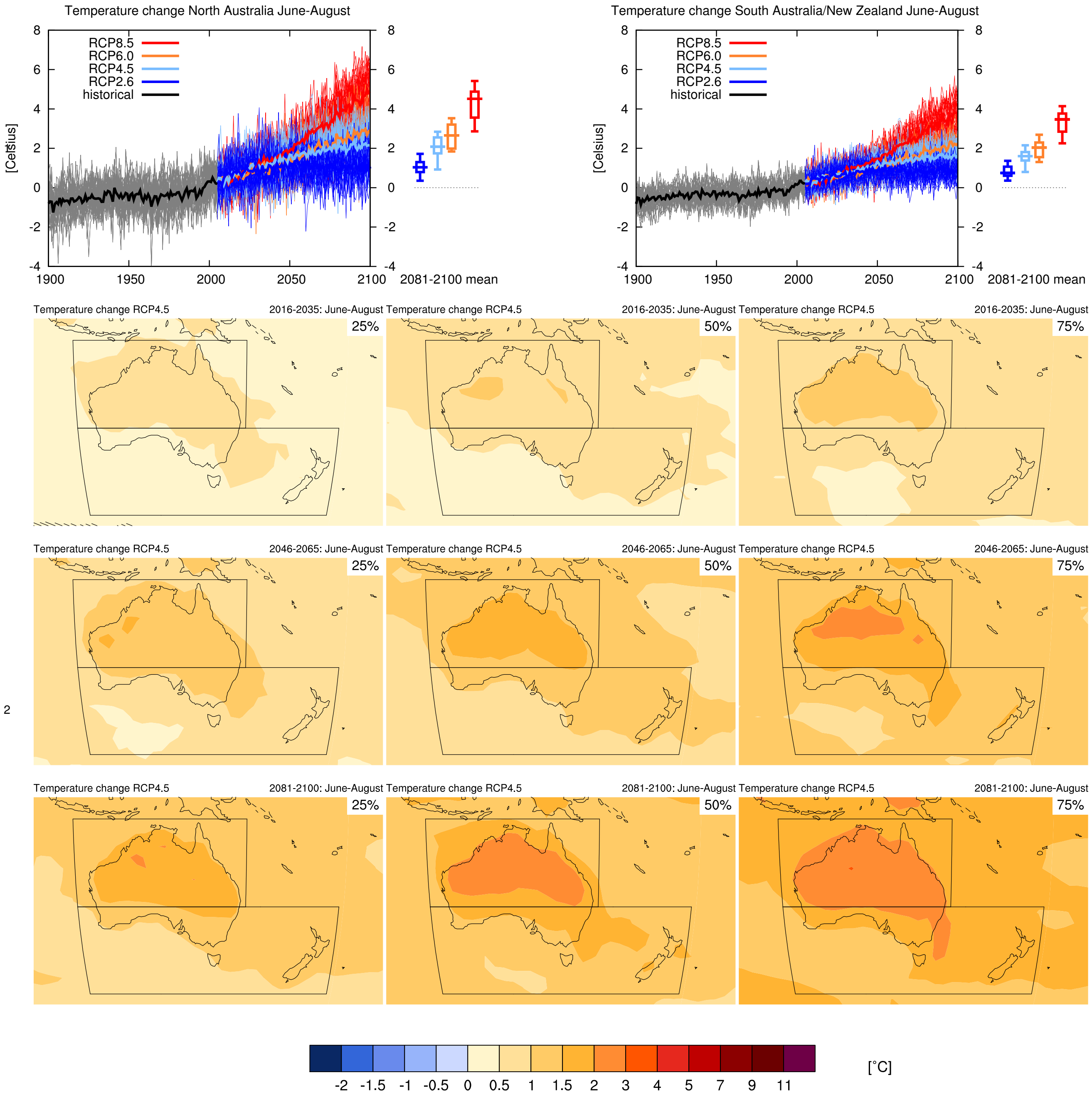

Figure AI.69: top left: time series of temperature averaged over land grid points in North Australia (30°–10°S, 110°–155°E) in June–August. Top right: same for land grid points in South Australia/New Zealand (50°–30°S, 110°–180°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.2, Box 11.2, 12.4.3, 14.9.12 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

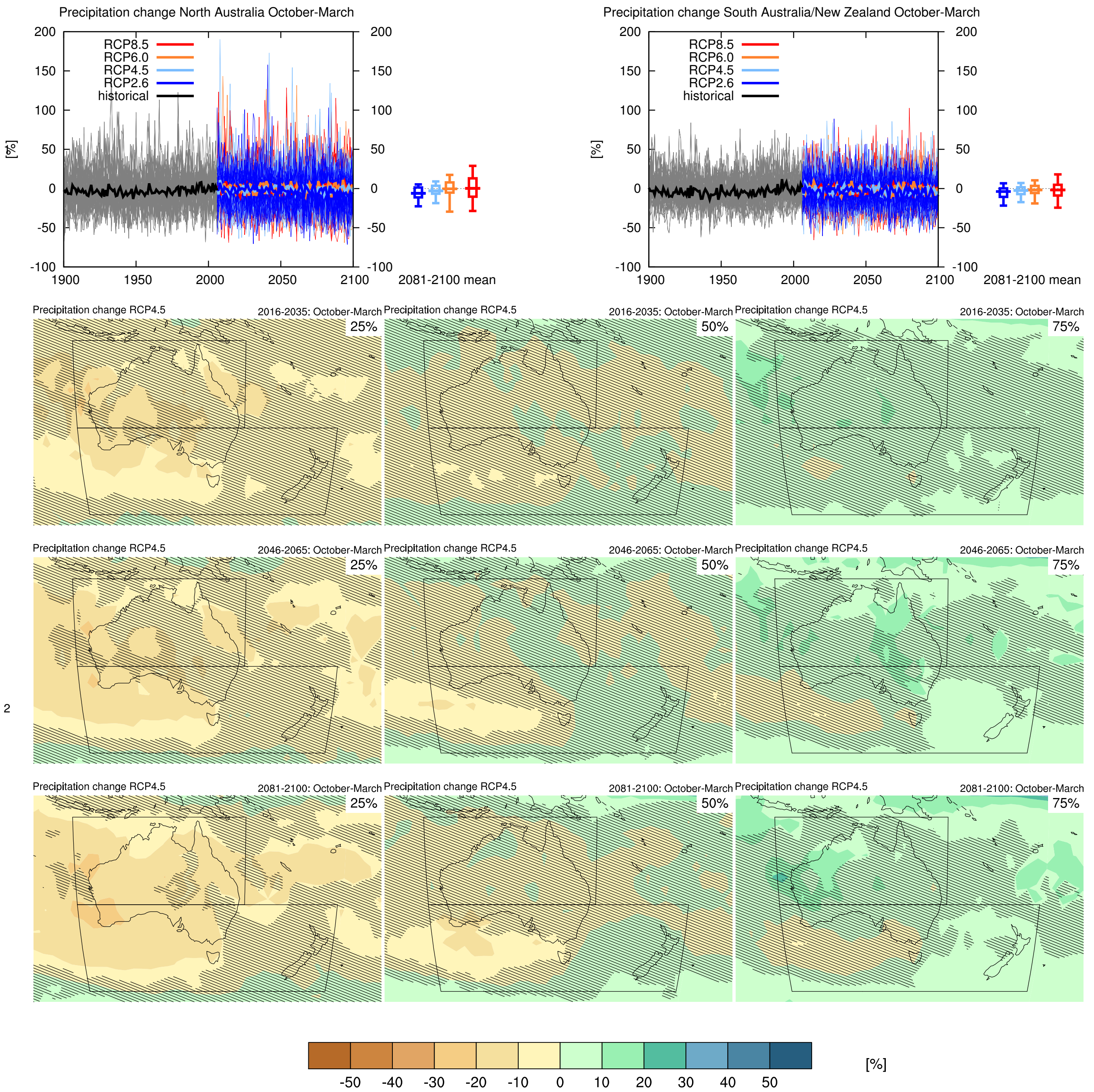

Figure AI.70: top left: time series of relative precipitation averaged over land grid points in North Australia (30°–10°S, 110°–155°E) in October–March. Top right: same for land grid points in South Australia/New Zealand (50°–30°S, 110°–180°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of relative precipitation changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.2, Box 11.2, 12.4.5, 14.9.12 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

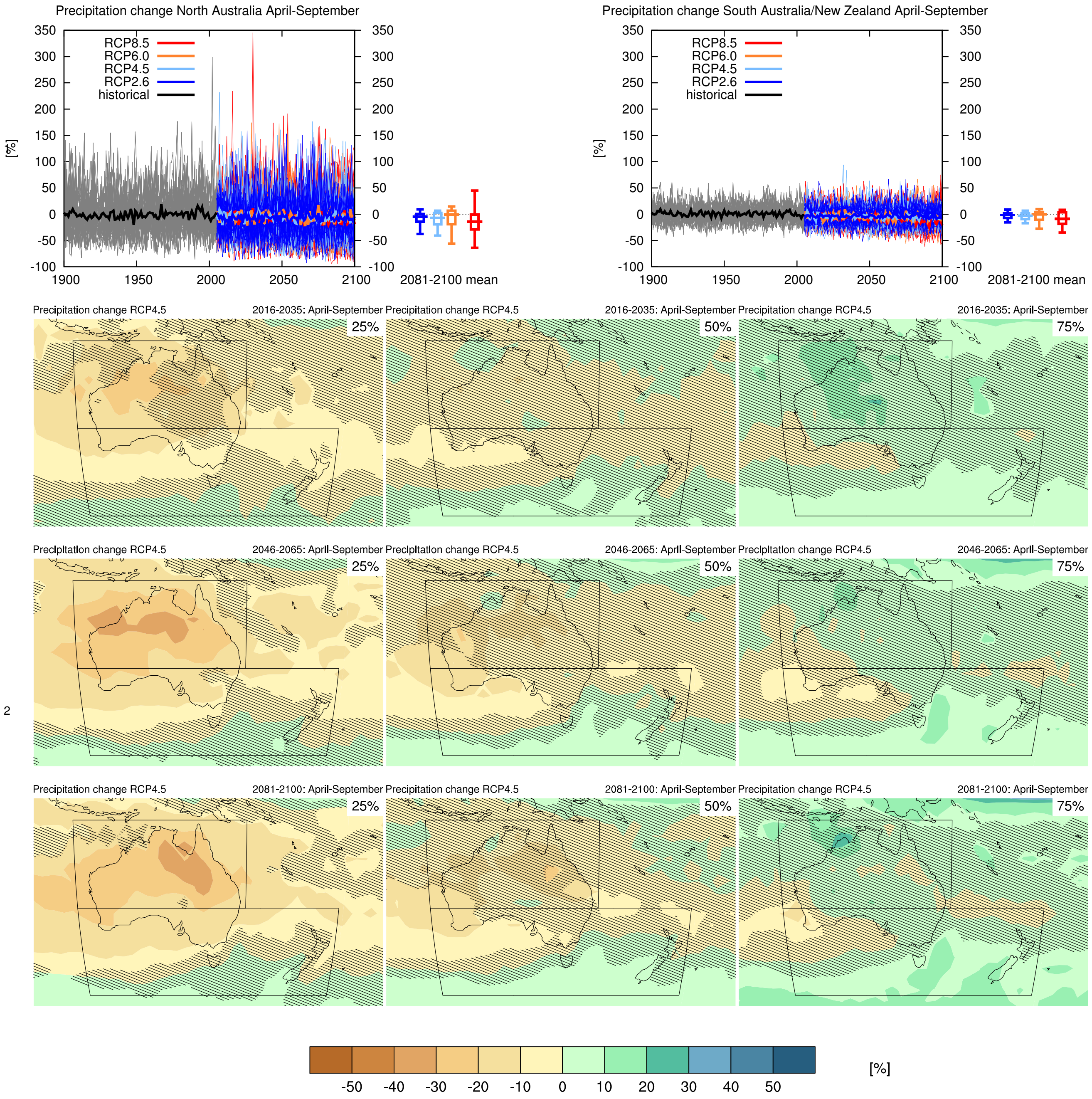

Figure AI.71: top left: time series of relative precipitation averaged over land grid points in North Australia (30°–10°S, 110°–155°E) in April–September. Top right: same for land grid points in South Australia/New Zealand (50°–30°S, 110°–180°E). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of relative precipitation changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

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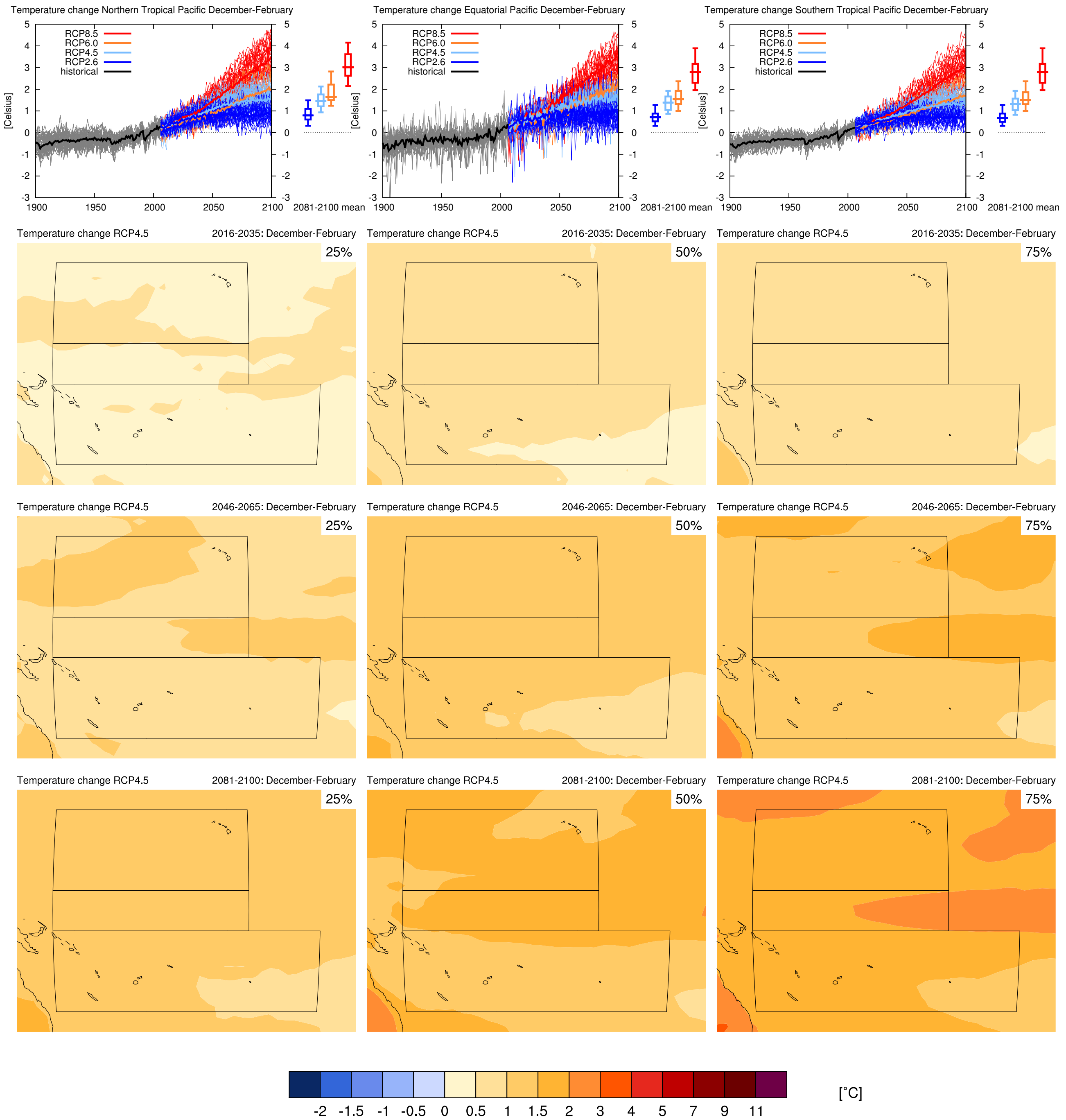

Figure AI.72: top left: time series of temperature averaged over all grid points in the Northern Tropical Pacific (5°–25°N, 155°E–150°W) in December–February. Top middle: same for all grid points in the Equatorial Pacific (5°S–5°N, 155°E–150°W). Top right: same for all grid points in the Southern Tropical Pacific (5°S–5°N, 155°E–150°W). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.3, Box 11.2, 12.4.3, 14.9.13 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

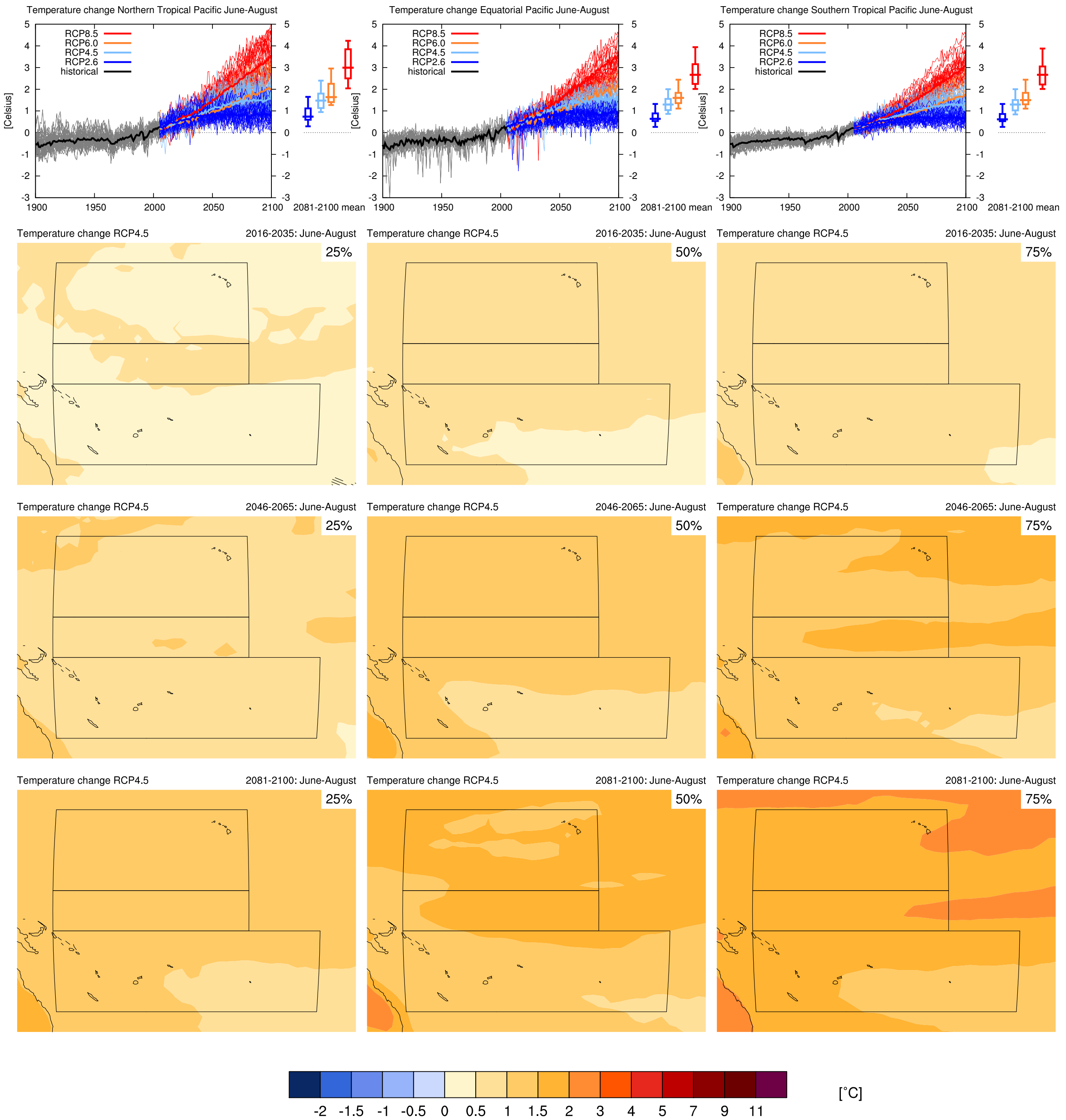

Figure AI.73: top left: time series of temperature averaged over all grid points in the Northern Tropical Pacific (5°–25°N, 155°E–150°W) in June–August. Top middle: same for all grid points in the Equatorial Pacific (5°S–5°N, 155°E–150°W). Top right: same for all grid points in the Southern Tropical Pacific (5°S–5°N, 155°E–150°W). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of temperature changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.3, Box 11.2, 12.4.3, 14.9.13 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

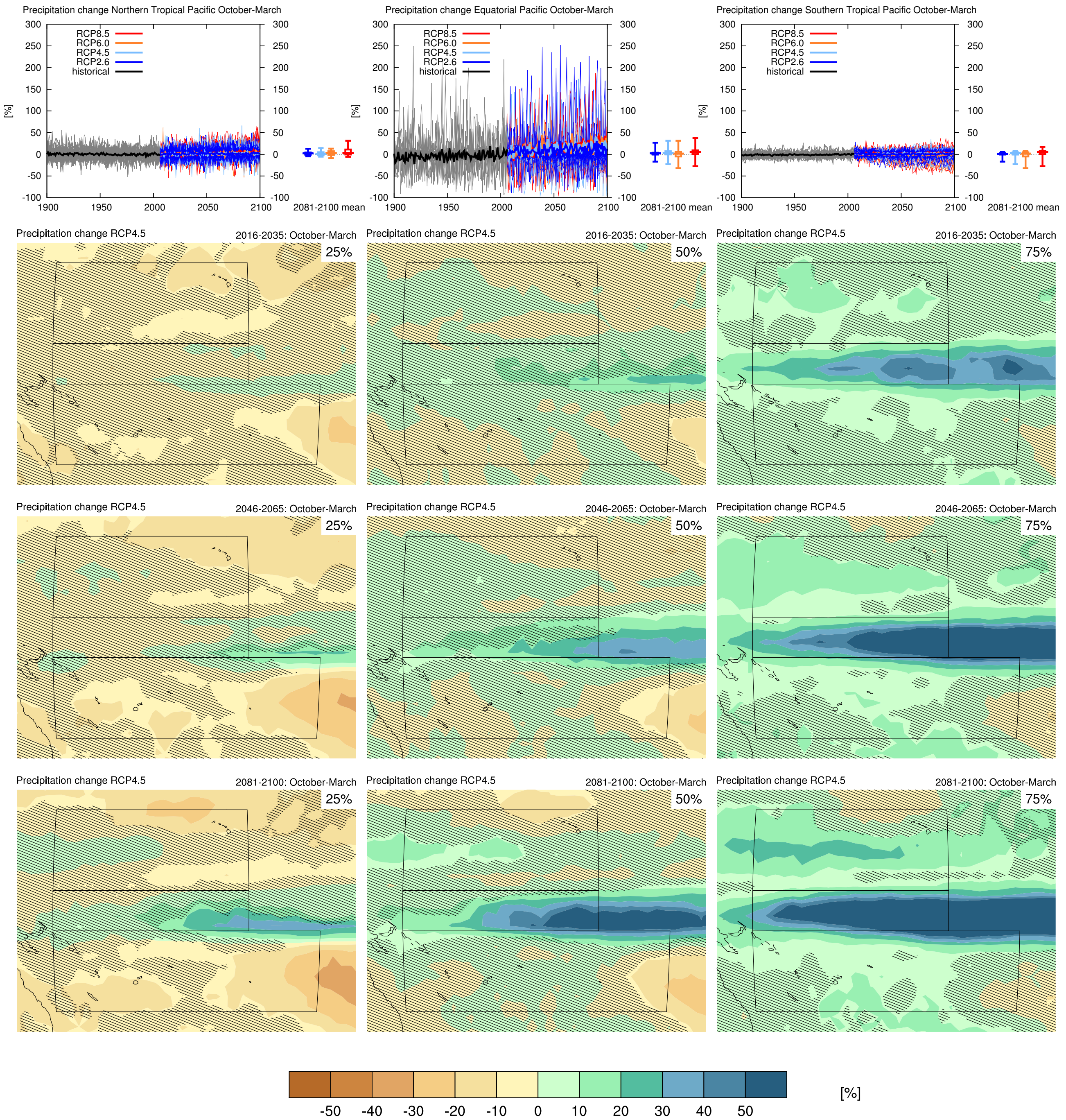

Figure AI.74: top left: time series of relative precipitation averaged over all grid points in the Northern Tropical Pacific (5°–25°N, 155°E–150°W) in October–March. Top middle: same for all grid points in the Equatorial Pacific (5°S–5°N, 155°E–150°W). Top right: same for all grid points in the Southern Tropical Pacific (5°S–5°N, 155°E–150°W). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

Below: maps of relative precipitation changes in 2016–2035, 2046–2065 and 2081–2100 with respect to 1986–2005 in the RCP4.5 scenario. For each point, the 25th, 50th and 75th percentile of the distribution of the CMIP5 ensemble are shown, this includes both natural variability and inter-model spread. Hatching denotes areas where the 20-yr mean differences of the percentiles are less than the standard deviation of model-estimated present-day natural variability of 20-yr mean differences.

Sections 9.6.1, 11.3.2.4.3, Box 11.2, 12.4.5, 14.9.13 contain relevant information regarding the evaluation of models in this region, the model spread in the context of other methods of projecting changes and the role of modes of variability and other climate phenomena.

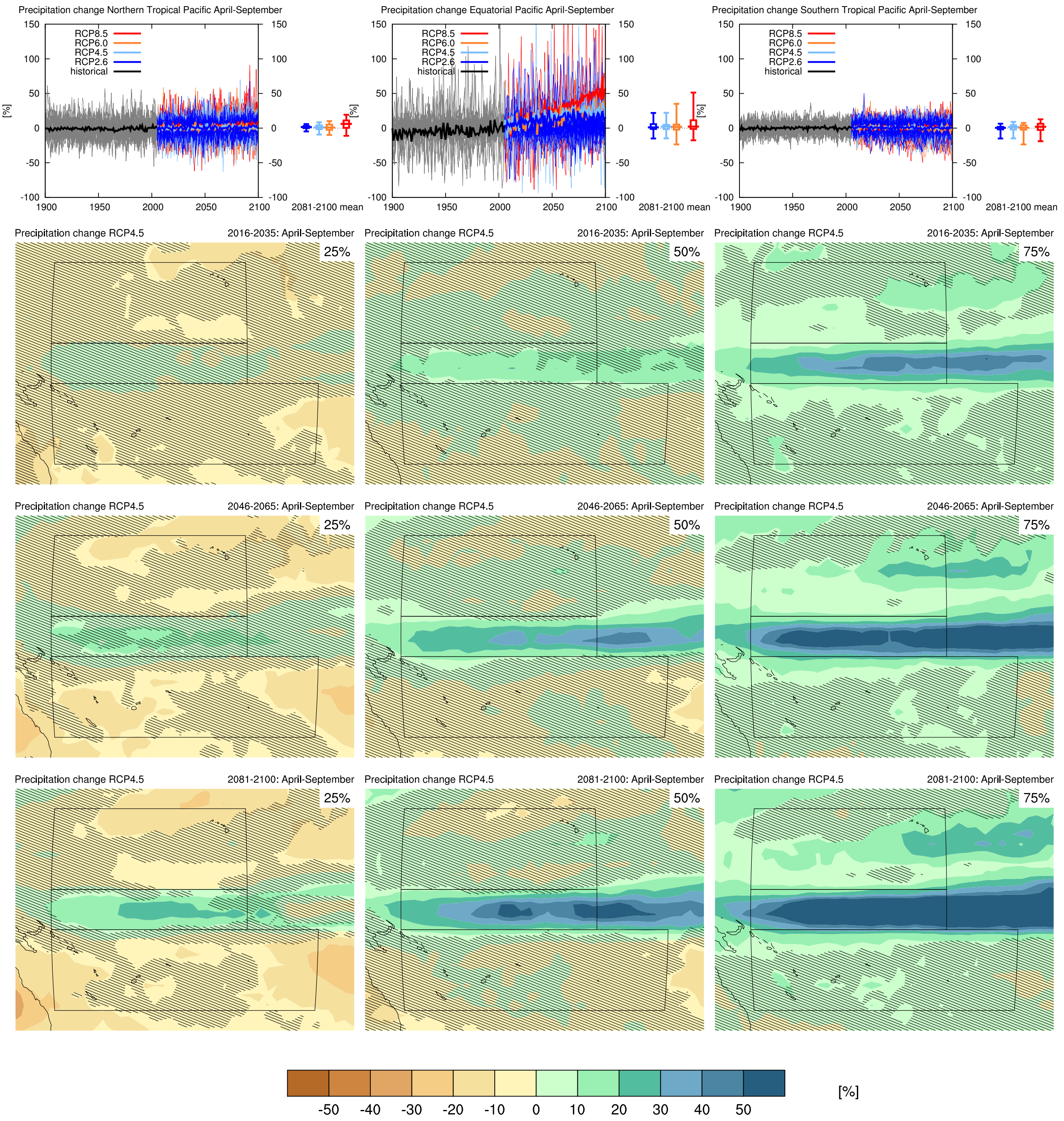

Figure AI.75: top left: time series of relative precipitation averaged over all grid points in the Northern Tropical Pacific (5°–25°N, 155°E–150°W) in April–September. Top middle: same for all grid points in the Equatorial Pacific (5°S–5°N, 155°E–150°W). Top right: same for all grid points in the Southern Tropical Pacific (5°S–5°N, 155°E–150°W). Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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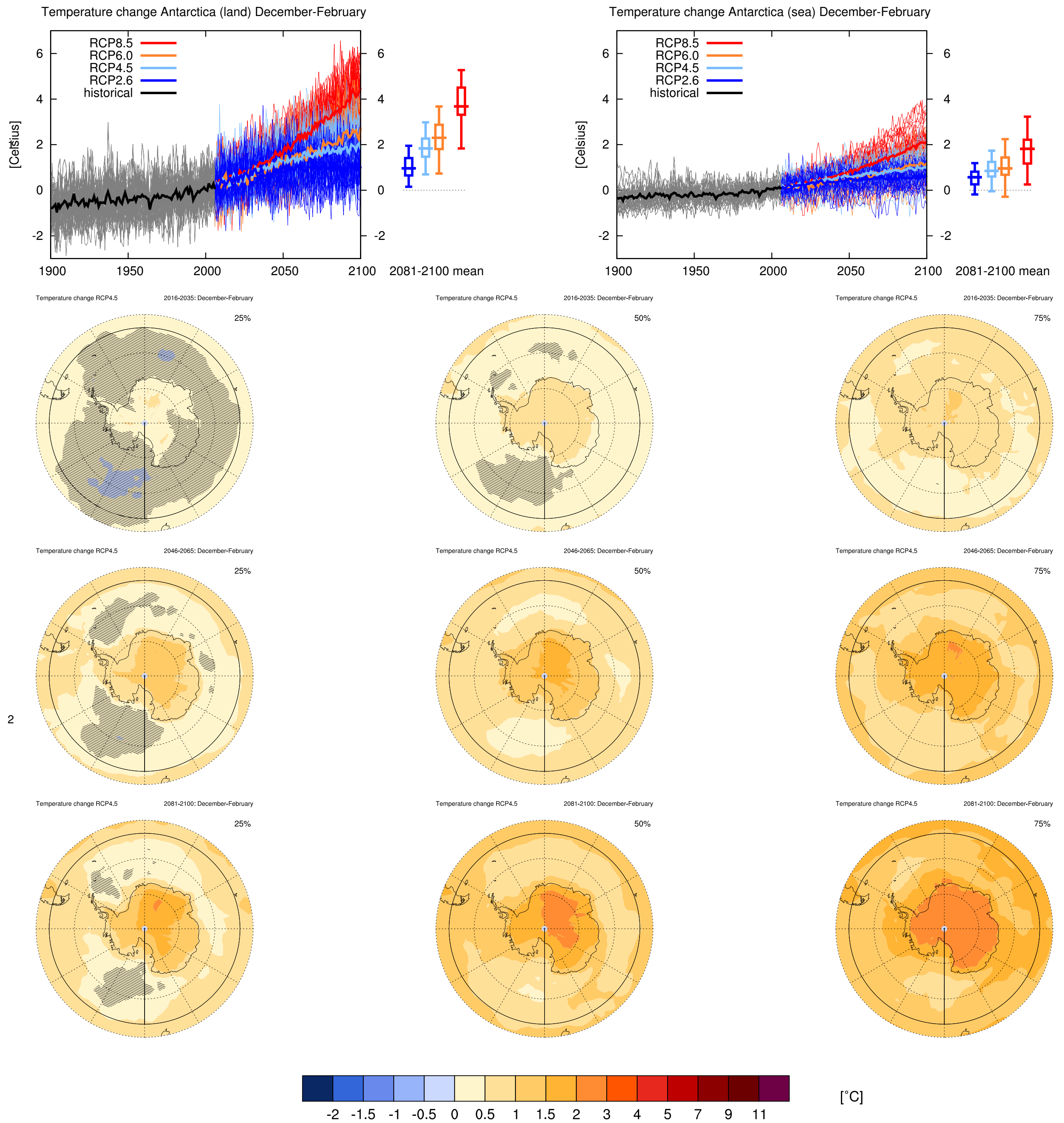

Figure AI.76: top left: time series of temperature averaged over land grid points in Antarctica (90°–50°S) in December–February. Top right: same for sea grid points. Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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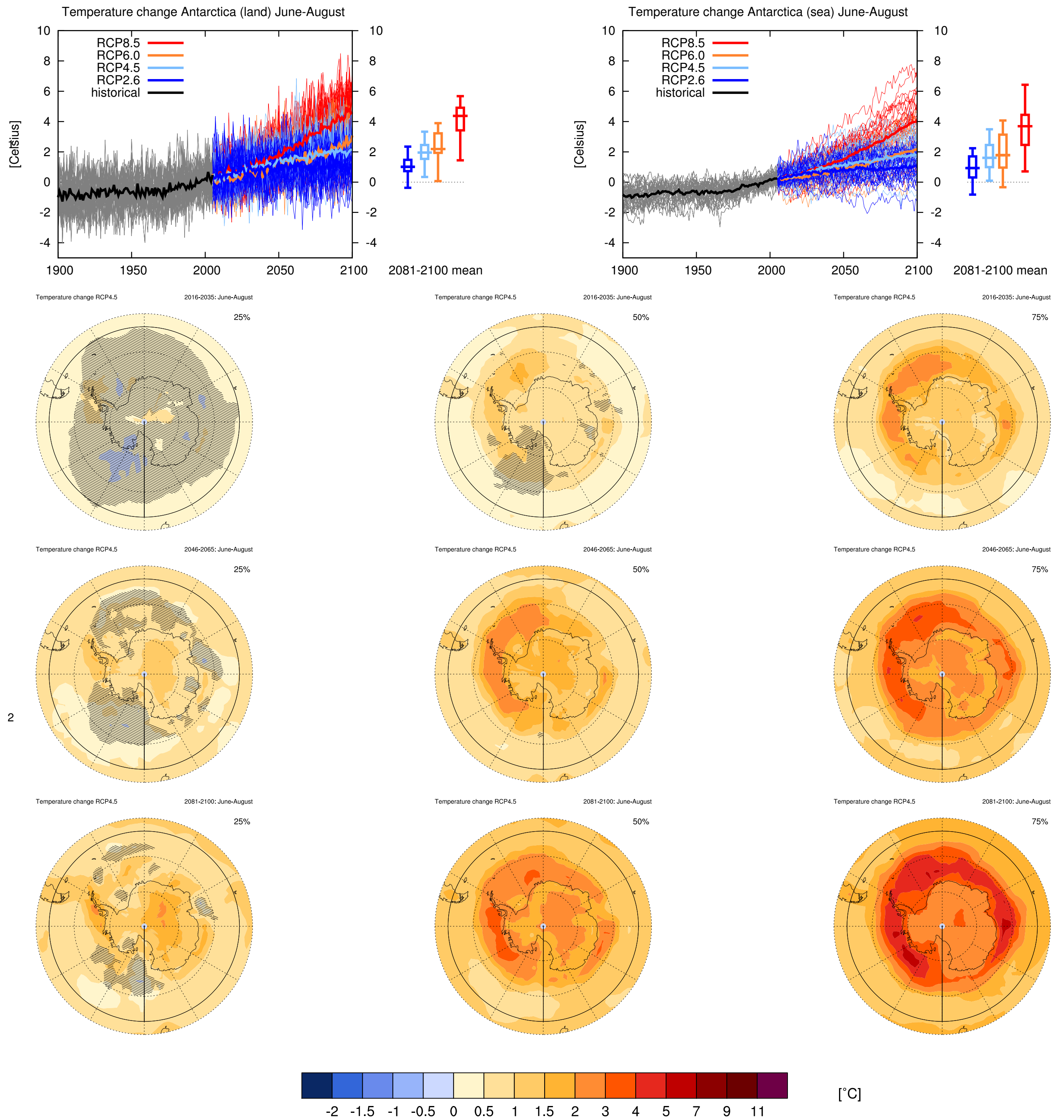

Figure AI.77: top left: time series of temperature averaged over land grid points in Antarctica (90°–50°S) in June–August. Top right: same for sea grid points. Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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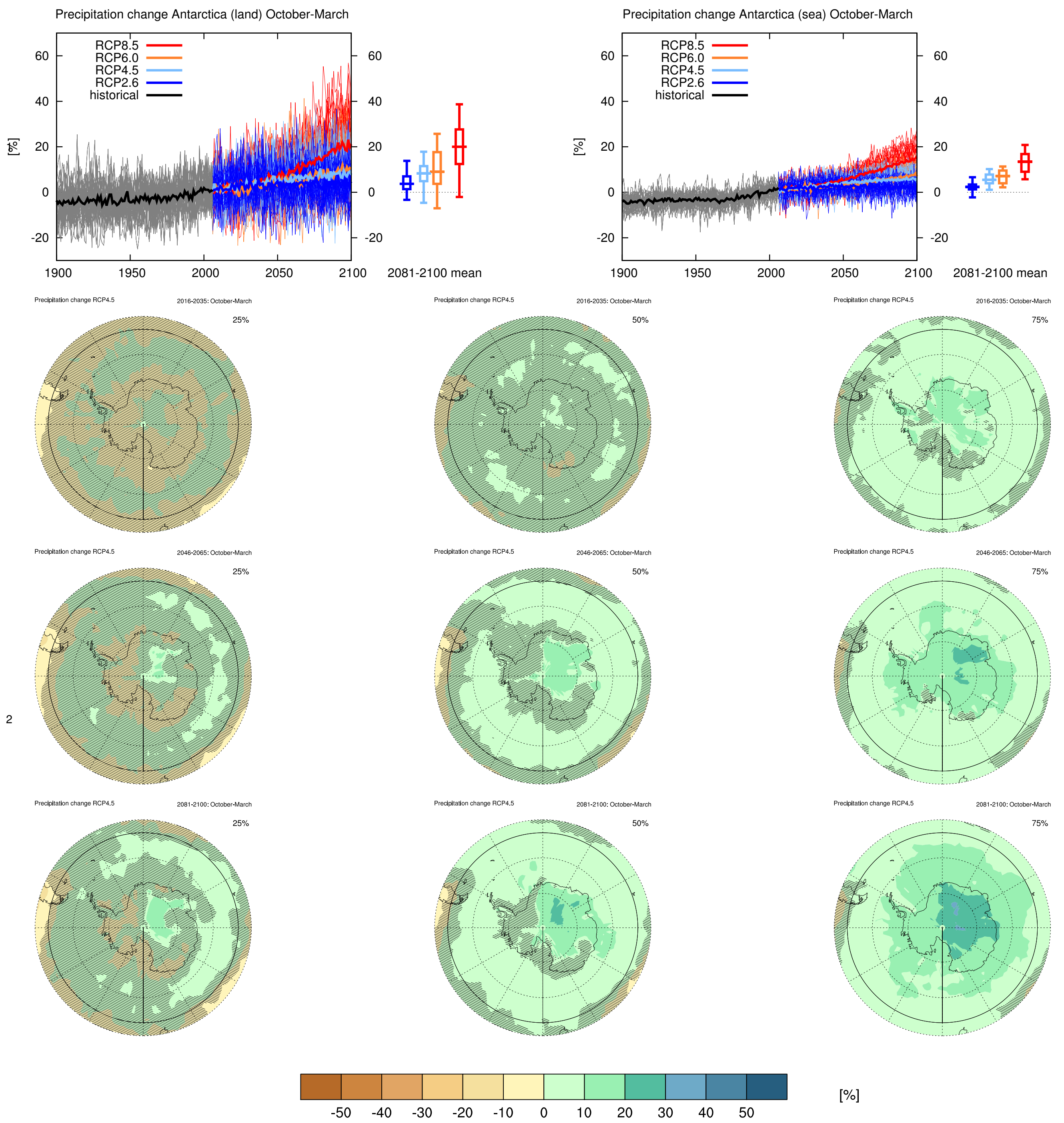

Figure AI.78: top left: time series of relative precipitation averaged over land grid points in Antarctica (90°–50°S) in October–March. Top right: same for sea grid points. Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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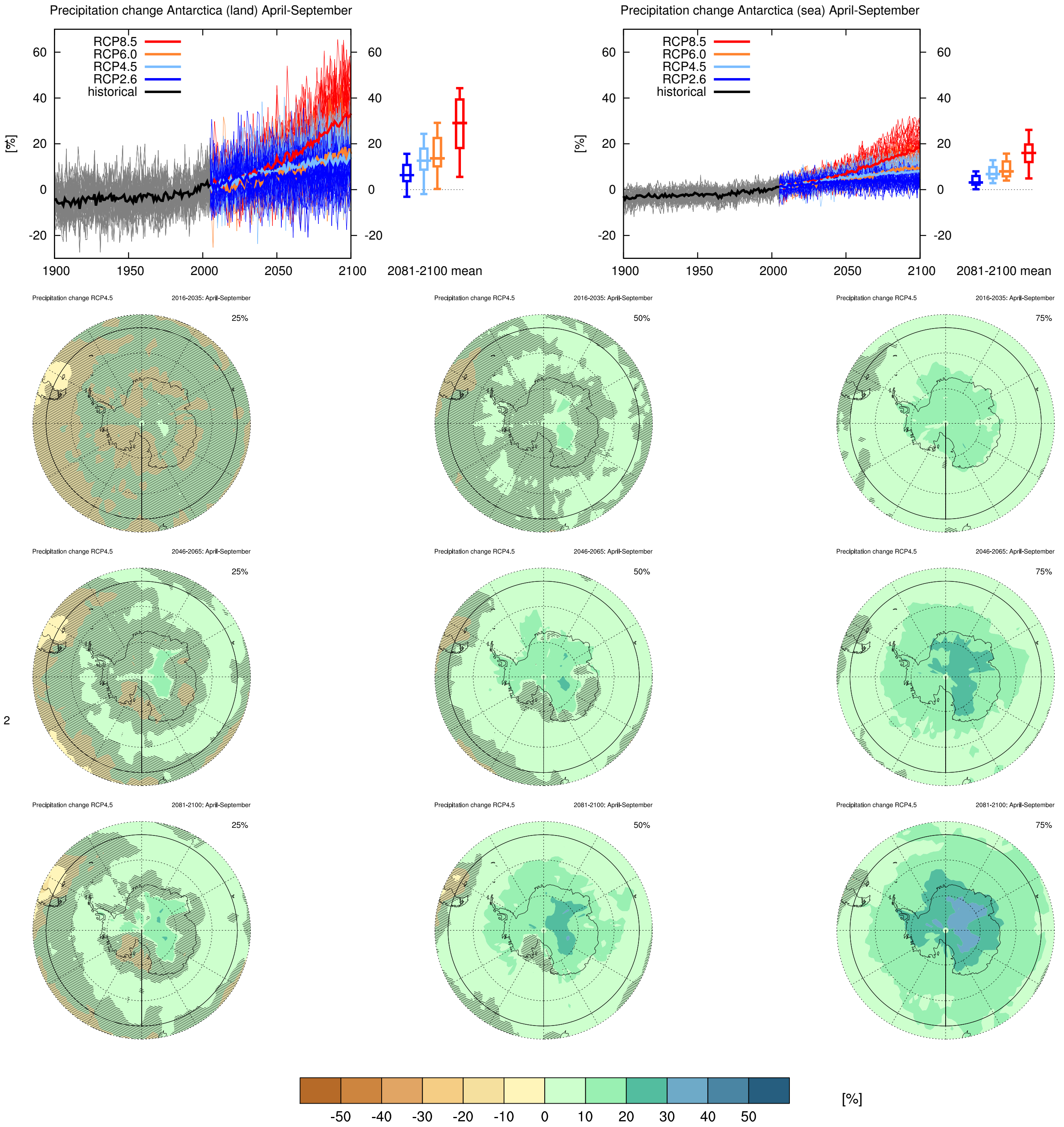

Figure AI.79: top left: time series of relative precipitation averaged over land grid points in Antarctica (90°–50°S) in April–September. Top right: same for sea grid points. Thin lines denote one ensemble member per model, thick lines the CMIP5 multi-model mean. On the right-hand side the 5th, 25th, 50th (median), 75th and 95th percentiles of the distribution of 20-yr mean changes are given for the period 2081–2100 (relative to 1986–2005) for the four RCP scenarios.

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