UNDP Climate Change Country Profiles

Cuba

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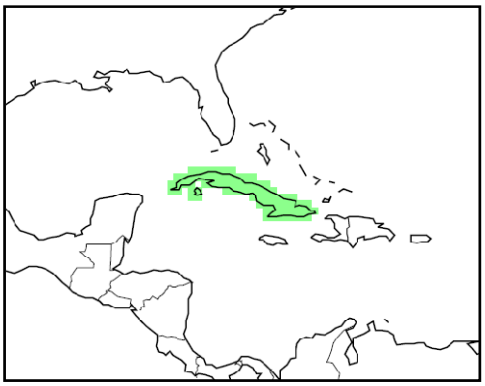
http://country-profiles.geog.ox.ac.uk



General Climate

Cuba sits at a latitude of 20-23˚N, on the boundary of the tropical and sub-tropical zones. The Island experiences the year-round warm, humid conditions associated with the Tropics, but with more distinct seasonal variations than the Southern Caribbean Islands.

Seasonal mean temperatures range from 22-24˚C in the cooler months of December to February, to 27-28˚C in the warmer months of July and August. The wet season occurs through May to October, during which the island receives around 100-150mm per month.

Inter-annual variability in Cuban climate is influenced strongly the El Nino Southern Oscillation (ENSO). El Niño episodes bring warmer and drier than average conditions between June and August and La Niña episodes bring colder and wetter conditions at this time. Cuba also lies in the heart of the Atlantic hurricane belt, where Hurricanes occur throughout August, September and October. Heavy rainfall associated with cyclones and hurricanes contributes significantly to wet season rainfall totals. The occurrence of hurricanes is strongly linked to ENSO, with more frequent hurricane activity associated with La Nina events, and less frequent events in El Nino years.

Recent Climate Trends

Temperature

- Mean annual temperature does not show a significant rate of increase since 1960, as Cuba experienced warmer than average temperatures in the early 1960s. Mean annual temperature has however, increased by around 0.1˚C per decade since 1970.
- The frequency of hot days[1] has only increased slightly since 1960, whilst the frequency of hot nights has increased more rapidly and significantly over this period.
    - The average number of 'hot' nights per year increased by 52 (an additional 14.1% of nights) between 1960 and 2003. The rate of increase is seen most strongly in JJA

[1] 'Hot' day or 'hot' night is defined by the temperature exceeded on 10% of days or nights in current climate of that region and season.

when the average number of hot JJA nights has increased by 6.9 days per month (an additional 22.4% of JJA nights) over this period.

- The frequency of cold days[2] and nights has decreased significantly since 1960 in almost all seasons.
    - The average number of 'cold 'days per year has decreased by 19 (5.3% of days) between 1960 and 2003. This rate of decrease is most rapid in MAM when the average number of cold MAM days has decreased by 2 days per month (6.4% of MAM days) over this period.
    - The average number of 'cold' nights per year has decreased by 29 (8.0% of days) between 1960 and 2003. This rate of decrease is most rapid in SON when the average number of cold SON nights has decreased by 2.9 nights per month (9.5% of SON nights) over this period.

Precipitation

- Mean rainfall over Cuba has decreased at an average rate of 7.4mm per month (7.1%) per decade since 1960. This decrease is mainly due to decreases in JJA and SON rainfall, of 13.9 and 8.8 mm per month (9.3% and 6.5%) per decade respectively.
- The magnitude of maximum-5day rainfalls has not shown a significant trend in observations since 1960.

GCM Projections of Future Climate

Temperature

- The mean annual temperature is projected to increase by 0.8 to 2.4˚C by the 2060s, and 1.2 to 3.8 degrees by the 2090s. The range of projections by the 2090s under any one emissions scenario is around 1-2˚C.
- The projected rate of warming is most rapid in summer (JJA).

- All projections indicate substantial increases in the frequency of days and nights that are considered 'hot' in current climate.
    - Annually, projections indicate that 'hot' days will to occur on 25-61% of days by the 2060s, and 26-86% of days by the 2090s. Days considered 'hot' by current climate standards for their season are projected to increase most rapidly in JJA, occurring on 51-99% of days of the season by the 2090s.
    - Nights that are considered 'hot' for the annual climate of 1970-99 are projected to occur on 31-59% of nights by the 2060s and 37-85% of nights by the 2090s. Nights that are hot for each season are projected to increase most rapidly in JJA, occurring occur on 68-99% of nights in every season by the 2090s.

[2] 'Cold' days or 'cold' nights are defined as the temperature below which 10% of days or nights are recorded in current climate of that region or season.

- All projections indicate decreases in the frequency of days and nights that are considered 'cold' in current climate. These events are expected to become exceedingly rare, occurring on 0-4% of days in the year, and potentially not at all under the higher emissions scenarios.

Precipitation

- Projections of mean annual rainfall from different models in the ensemble are broadly consistent in indicating decreases in rainfall for Cuba. Ensemble median changes for all seasons except SON are negative. Annual projections vary between -45% to +15% by the 2090s with ensemble median changes of -3 to -8%.
- Changes in projected rainfall show the strongest decreasing signal in MAM and JJA rainfall.

- The proportion of total rainfall that falls in heavy[3] events does not show a consistent direction of change, but tends towards negative changes in JJA and MAM.
- Maximum 1- and 5-day rainfalls in projections do not show a consistent direction of change.

[3] A 'Heavy' event is defined as a daily rainfall total which exceeds the threshold that is exceeded on 5% of rainy days in current the climate of that region and season.

Additional Regional Climate Change Information

- Tropical cyclones are poorly captured by GCMs and thus potential changes in intensity and tracks of tropical cyclones in the future are very uncertain. Whilst evidence indicates that tropical cyclones are likely to become, on the whole, more intense under a warmer climate as a result of higher sea-surface temperatures, there is great uncertainty in changes in frequency, and changes to storm tracks and their interactions with other features of climate variability (such as the El Niño Southern Oscillation) which introduces uncertainty at the regional scale (Christensen *et al*., 2007).
- Uncertainty in potential changes in tropical cyclone contributes to uncertainties in future wet-season rainfall. Potential increases in summer rainfall associated with tropical cyclone activity, which may not be captured in the GCM projections, may counteract the projected decreases in rainfall in the region (Christensen *et al*., 2007).
- Model simulations show wide disagreements in projected changes in the amplitude of future El Niño events, contributing to uncertainty in future climate variability in projections for this region.
- Cuba is vulnerable to sea-level rise. Sea-level in this region is projected by climate models to rise by the following levels[4] by the 2090s, relative to 1980-1999 sea-level:
    - 0.13 to 0.43m under SRES B1
    - 0.16 to 0.53m under SRES A1B
    - 0.18 to 0.56m under SRES A2

- For further information see Christensen *et al.* (2007) IPCC Working Group I Report: '*The Physical Science Basis'*, Chapter 11 *(Regional Climate projections*): Section 11.6 *(South and Central America*) and Section 11.9 (*Small Islands*).

[4] Taken from the IPCC Working group I (*The Physical Science Basis*): Chapter 10 (Global Climate Projections) (Meehl *et al*., 2007). Regional sea-level projections are estimated by applying regional adjustments (Fig 10.32, p813) to projected global mean sea-level rise from 14 AR4 models.

Data Summary

	Observed Mean 1970-99	Observed Trend 1960-2006		Projected changes by the 2030s			Projected changes by the 2060s			Projected changes by the 2090s		
				Min	Median	Max	Min	Median	Max	Min	Median	Max
Temperature												
	(˚C)	(change in ˚C per decade)		Change in ˚C			Change in ˚C			Change in ˚C		
			A2	0.6	**1.0**	1.2	1.4	**1.9**	2.2	2.5	**3.1**	3.8
Annual	25.7	-0.04	*A1B*	0.4	**1.1**	1.3	1.1	**1.9**	2.4	1.9	**2.6**	3.2
			B1	0.4	**0.8**	1.0	0.8	**1.4**	1.6	1.2	**1.6**	2.2
			A2	0.5	**0.9**	1.2	1.3	**1.8**	2.1	2.1	**2.9**	3.6
DJF	23.4	-0.04	*A1B*	0.2	**0.9**	1.5	1.2	**1.7**	2.2	1.6	**2.2**	3.2
			B1	0.4	**0.7**	1.1	0.7	**1.3**	1.8	1.1	**1.5**	2.2
			A2	0.5	**0.9**	1.3	1.3	**1.9**	2.1	2.4	**3.0**	3.6
MAM	25.2	-0.07	*A1B*	0.4	**1.1**	1.3	1.0	**1.9**	2.2	1.7	**2.7**	2.9
			B1	0.2	**0.8**	1.0	0.8	**1.3**	1.6	1.0	**1.7**	2.1
			A2	0.7	**1.0**	1.4	1.5	**2.0**	2.5	2.6	**3.3**	4.1
JJA	27.6	0.00	*A1B*	0.6	**1.1**	1.5	1.2	**2.0**	2.7	2.0	**2.6**	3.5
			B1	0.4	**0.9**	1.2	1.0	**1.4**	1.7	1.3	**1.7**	2.4
			A2	0.7	**1.1**	1.2	1.3	**2.0**	2.4	2.4	**3.2**	3.8
SON	26.4	0.00	*A1B*	0.5	**1.1**	1.4	1.2	**1.9**	2.6	1.9	**2.7**	3.3
			B1	0.5	**0.9**	1.1	0.8	**1.4**	1.7	1.2	**1.6**	2.3
Precipitation												
	(mm per month)	(change in mm per decade)		Change in mm per month			Change in mm per month			Change in mm per month		
			A2	-19	**-2**	9	-29	**-5**	4	-40	**-9**	6
Annual	104.7	-7.4*	*A1B*	-20	**-3**	3	-34	**-6**	8	-25	**-8**	5
			B1	-11	**-3**	11	-15	**-3**	8	-16	**-3**	9
			A2	-15	**-1**	5	-15	**-3**	15	-16	**-5**	19
DJF	41.7	-1.5	*A1B*	-12	**-4**	6	-20	**-4**	10	-15	**-2**	25
			B1	-8	**0**	18	-15	**-1**	5	-8	**-2**	19
			A2	-12	**-3**	18	-24	**-6**	7	-27	**-11**	0
MAM	93.9	-4.9	*A1B*	-16	**-3**	11	-21	**-4**	6	-22	**-10**	0
			B1	-13	**-3**	18	-15	**-5**	15	-15	**-4**	12
			A2	-34	**-10**	10	-49	**-21**	-4	-73	**-21**	-8
JJA	148.6	-13.9*	*A1B*	-29	**-10**	0	-53	**-15**	-4	-51	**-21**	-6
			B1	-17	**-9**	5	-27	**-10**	16	-26	**-16**	10
			A2	-15	**1**	22	-27	**3**	31	-48	**0**	30
SON	134.3	-8.8*	*A1B*	-22	**0**	27	-40	**2**	40	-28	**4**	22
			B1	-11	**2**	27	-16	**0**	24	-20	**0**	30
Precipitation (%)												
	(mm per month)	(change in % per decade)		% Change			% Change			% Change		
			A2	-21	**-3**	9	-32	**-5**	6	-45	**-8**	6
Annual	104.7	-7.1*	*A1B*	-22	**-5**	7	-38	**-5**	12	-32	**-8**	5
			B1	-12	**-2**	8	-26	**-3**	8	-26	**-3**	15
			A2	-26	**-1**	8	-27	**-5**	18	-24	**-10**	23
DJF	41.7	-3.5	*A1B*	-21	**-3**	8	-37	**-9**	11	-25	**-3**	34
			B1	-14	**-2**	22	-21	**-1**	8	-14	**-3**	25
			A2	-29	**-11**	24	-49	**-13**	14	-49	**-21**	-1
MAM	93.9	-5.2	*A1B*	-32	**-11**	15	-46	**-10**	25	-40	**-21**	0
			B1	-22	**-7**	26	-40	**-8**	32	-37	**-9**	23
			A2	-28	**-7**	17	-44	**-18**	-4	-60	**-26**	-6
JJA	148.6	-9.3*	*A1B*	-29	**-15**	0	-43	**-18**	-3	-53	**-21**	-7
			B1	-25	**-8**	5	-36	**-7**	10	-45	**-15**	17
			A2	-12	**0**	19	-22	**2**	35	-40	**0**	27
SON	134.3	-6.5*	*A1B*	-19	**0**	21	-33	**1**	34	-23	**3**	19
			B1	-9	**2**	18	-15	**0**	20	-21	**0**	26

	Observed Mean 1970-99	Observed Trend 1960-2006		Projected changes by the 2030s			Projected changes by the 2060s			Projected changes by the 2090s		
				Min	Median	Max	Min	Median	Max	Min	Median	Max
	% Frequency	Change in frequency per decade					Future % frequency			Future % frequency		
Frequency of Hot Days (TX90p)												
TX90p												
			A2	****	****	****	28	**45**	61	41	**64**	86
Annual	8.9	0.65	*A1B*	****	****	****	31	**46**	57	36	**61**	81
			B1	****	****	****	25	**37**	46	26	**45**	57
			A2	****	****	****	41	**61**	79	68	**86**	98
DJF	10.4	0.94	*A1B*	****	****	****	46	**64**	84	55	**79**	94
			B1	****	****	****	33	**53**	78	41	**60**	87
			A2	****	****	****	31	**60**	86	55	**84**	98
MAM	8.5	0.26	*A1B*	****	****	****	37	**62**	88	52	**78**	98
			B1	****	****	****	26	**45**	81	29	**60**	92
			A2	****	****	****	59	**79**	92	81	**97**	99
JJA	8.9	1.09	*A1B*	****	****	****	62	**81**	91	71	**95**	99
			B1	****	****	****	52	**65**	77	51	**79**	92
			A2	****	****	****	28	**69**	92	50	**85**	98
SON	8.8	0.81	*A1B*	****	****	****	30	**65**	91	38	**84**	98
			B1	****	****	****	22	**50**	84	30	**64**	89
Frequency of Hot Nights (TN90p)												
			A2	****	****	****	39	**45**	59	58	**67**	85
Annual	11.8	3.29*	*A1B*	****	****	****	39	**49**	56	51	**61**	80
			B1	****	****	****	31	**39**	45	37	**48**	55
			A2	****	****	****	41	**59**	74	67	**81**	96
DJF	11.4	3.04*	*A1B*	****	****	****	47	**62**	78	60	**75**	91
			B1	****	****	****	31	**48**	72	43	**58**	81
			A2	****	****	****	44	**56**	85	75	**81**	98
MAM	11.1	2.64*	*A1B*	****	****	****	36	**59**	86	64	**76**	98
			B1	****	****	****	31	**47**	79	40	**59**	92
			A2	****	****	****	74	**82**	92	93	**99**	99
JJA	13.0	5.21*	*A1B*	****	****	****	71	**86**	91	87	**96**	99
			B1	****	****	****	55	**70**	77	68	**84**	93
			A2	****	****	****	58	**76**	91	81	**92**	98
SON	11.8	4.10*	*A1B*	****	****	****	57	**77**	89	71	**89**	97
			B1	****	****	****	43	**61**	79	53	**72**	86
Frequency of Cold Days (TX10p)												
			A2	****	****	****	0	**2**	5	0	**1**	1
Annual	8.0	-1.23*	*A1B*	****	****	****	0	**2**	3	0	**1**	2
			B1	****	****	****	0	**3**	5	0	**3**	4
			A2	****	****	****	0	**1**	5	0	**0**	1
DJF	7.8	-1.28*	*A1B*	****	****	****	0	**1**	3	0	**0**	2
			B1	****	****	****	0	**2**	5	0	**2**	3
			A2	****	****	****	0	**1**	4	0	**0**	2
MAM	8.0	-1.48*	*A1B*	****	****	****	0	**1**	4	0	**0**	1
			B1	****	****	****	0	**2**	5	0	**2**	3
			A2	****	****	****	0	**0**	2	0	**0**	0
JJA	7.9	-0.93	*A1B*	****	****	****	0	**0**	0	0	**0**	1
			B1	****	****	****	0	**0**	2	0	**0**	3
			A2	****	****	****	0	**1**	2	0	**0**	1
SON	8.2	-1.12*	*A1B*	****	****	****	0	**1**	2	0	**0**	1
			B1	****	****	****	0	**2**	5	0	**1**	3
Frequency of Cold Nights (TN10p)												
			A2	****	****	****	0	**2**	4	0	**0**	2
Annual	7.4	-1.86*	*A1B*	****	****	****	0	**2**	3	0	**1**	2
			B1	****	****	****	0	**3**	5	0	**3**	4
			A2	****	****	****	0	**2**	4	0	**0**	1
DJF	8.0	-1.54*	*A1B*	****	****	****	0	**1**	3	0	**0**	2
			B1	****	****	****	0	**2**	5	0	**2**	3
			A2	****	****	****	0	**2**	5	0	**0**	1
MAM	7.7	-2.05*	*A1B*	****	****	****	0	**1**	3	0	**0**	1
			B1	****	****	****	0	**2**	6	0	**2**	3
			A2	****	****	****	0	**0**	0	0	**0**	0
JJA	7.6	-1.58*	*A1B*	****	****	****	0	**0**	0	0	**0**	0
			B1	****	****	****	0	**0**	1	0	**0**	0
			A2	****	****	****	0	**1**	2	0	**0**	1
SON	7.0	-2.20*	*A1B*	****	****	****	0	**1**	3	0	**0**	1
			B1	****	****	****	0	**2**	4	0	**1**	3

	Observed Mean 1970-99	Observed Trend 1960-2006		Projected changes by the 2030s Min	Median	Max	Projected changes by the 2060s Min	Median	Max	Projected changes by the 2090s Min	Median	Max
% total rainfall falling in Heavy Events (R95pct)												
	%	*Change in % per decade*					*Change in %*			*Change in %*		
			A2	****	****	****	-8	**0**	5	-9	**0**	5
Annual	****	****	*A1B*	****	****	****	-8	**0**	4	-7	**-1**	5
			B1	****	****	****	-9	**0**	4	-5	**0**	7
			A2	****	****	****	-9	**-1**	12	-12	**-1**	13
DJF	****	****	*A1B*	****	****	****	-12	**0**	11	-7	**-1**	11
			B1	****	****	****	-9	**-2**	7	-12	**1**	7
			A2	****	****	****	-16	**-5**	0	-25	**-8**	-1
MAM	****	****	*A1B*	****	****	****	-26	**-6**	2	-16	**-8**	0
			B1	****	****	****	-13	**-2**	6	-17	**-3**	7
			A2	****	****	****	-13	**-2**	7	-14	**-5**	6
JJA	****	****	*A1B*	****	****	****	-9	**-3**	2	-13	**-3**	4
			B1	****	****	****	-10	**-2**	6	-11	**-3**	6
			A2	****	****	****	-8	**0**	6	-9	**0**	8
SON	****	****	*A1B*	****	****	****	-8	**1**	7	-7	**0**	7
			B1	****	****	****	-7	**0**	4	-9	**0**	6
Maximum 1-day rainfall (RX1day)												
	mm	*Change in mm per decade*					*Change in mm*			*Change in mm*		
			A2	****	****	****	-3	**0**	9	-5	**0**	10
Annual	****	****	*A1B*	****	****	****	-3	**0**	6	-8	**0**	9
			B1	****	****	****	-4	**0**	5	-6	**0**	7
			A2	****	****	****	-4	**-1**	7	-5	**0**	6
DJF	16.4	-2.2	*A1B*	****	****	****	-7	**0**	8	-2	**0**	10
			B1	****	****	****	-3	**-1**	4	-4	**0**	3
			A2	****	****	****	-5	**-1**	2	-7	**-2**	1
MAM	27.4	2.51	*A1B*	****	****	****	-5	**-1**	2	-9	**-1**	0
			B1	****	****	****	-7	**-1**	3	-7	**-1**	2
			A2	****	****	****	-5	**-1**	4	-6	**-2**	7
JJA	****	****	*A1B*	****	****	****	-4	**-1**	3	-5	**-1**	2
			B1	****	****	****	-3	**0**	5	-8	**0**	5
			A2	****	****	****	-3	**0**	10	-5	**1**	10
SON	****	****	*A1B*	****	****	****	-3	**2**	8	-7	**0**	6
			B1	****	****	****	-2	**0**	4	-2	**0**	3
Maximum 5-day Rainfall (RX5day)												
	mm	*Change in mm per decade*					*Change in mm*			*Change in mm*		
			A2	****	****	****	-10	**0**	15	-17	**0**	24
Annual	****	****	*A1B*	****	****	****	-13	**2**	14	-13	**-2**	24
			B1	****	****	****	-10	**0**	14	-16	**0**	20
			A2	****	****	****	-7	**-2**	6	-11	**-1**	14
DJF	28.2	-0.49	*A1B*	****	****	****	-13	**0**	13	-9	**-1**	16
			B1	****	****	****	-7	**-2**	6	-9	**0**	7
			A2	****	****	****	-13	**-4**	6	-17	**-8**	0
MAM	54.0	1.03	*A1B*	****	****	****	-11	**-4**	8	-15	**-5**	0
			B1	****	****	****	-17	**-3**	8	-11	**-2**	9
			A2	****	****	****	-11	**-4**	16	-16	**-11**	14
JJA	30.7	1.82	*A1B*	****	****	****	-10	**-6**	1	-18	**-5**	3
			B1	****	****	****	-11	**-4**	19	-25	**-4**	13
			A2	****	****	****	-8	**0**	15	-21	**3**	22
SON	59.7	6.03	*A1B*	****	****	****	-13	**2**	22	-16	**0**	18
			B1	****	****	****	-7	**-1**	18	-8	**0**	19

* indicates trend is statistically significant at 95% confidence

**** indicates data are not available

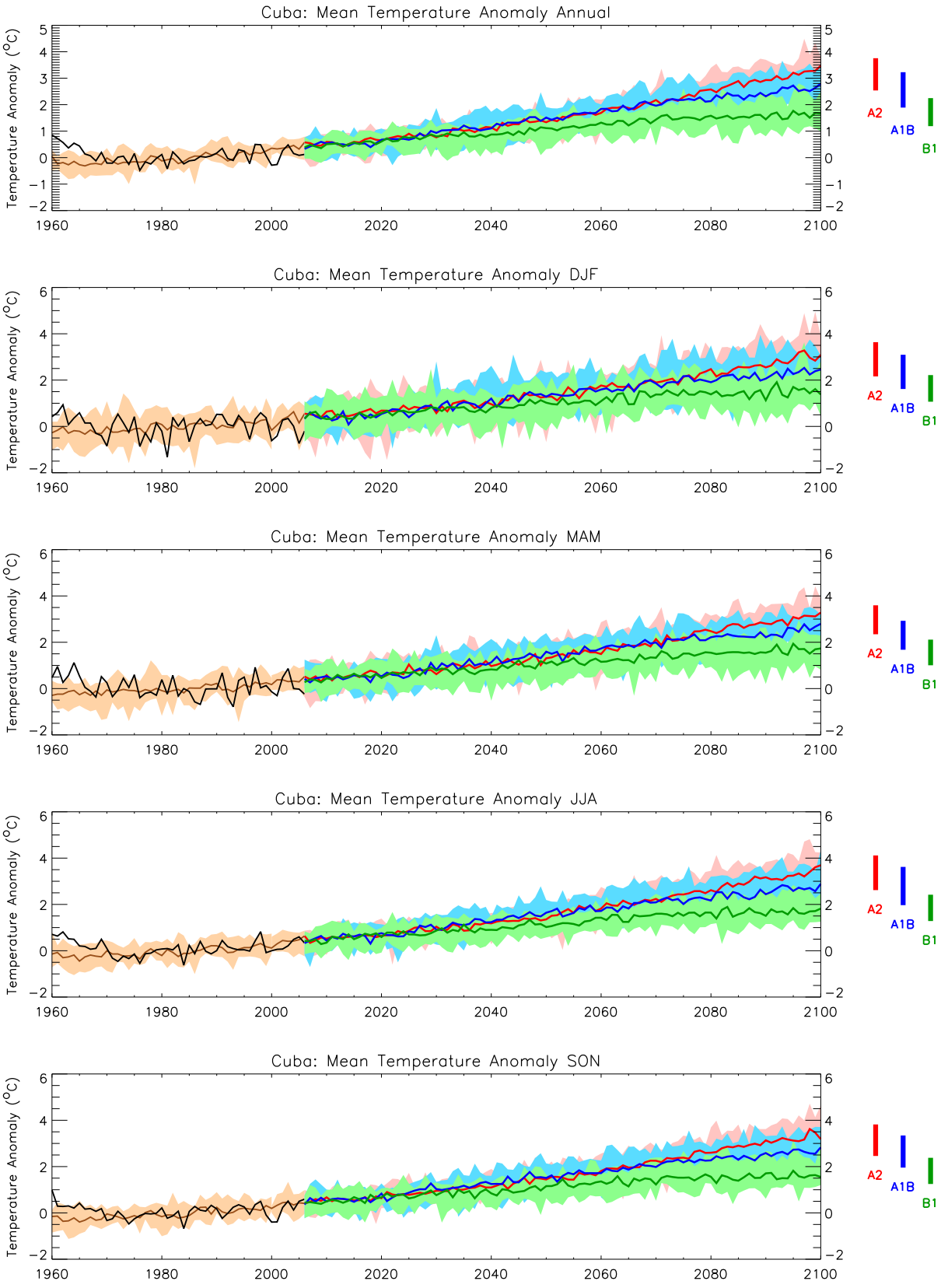


Figure 1: Trends in annual and seasonal mean temperature for the recent past and projected future. All values shown are anomalies, relative to the 1970-1999 mean climate. Black curves show the mean of observed data from 1960 to 2006, Brown curves show the median (solid line) and range (shading) of model simulations of recent climate across an ensemble of 15 models. Coloured lines from 2006 onwards show the median (solid line) and range (shading) of the ensemble projections of climate under three emissions scenarios. Coloured bars on the right-hand side of the projections summarise the range of mean 2090-2100 climates simulated by the 15 models for each emissions scenario.

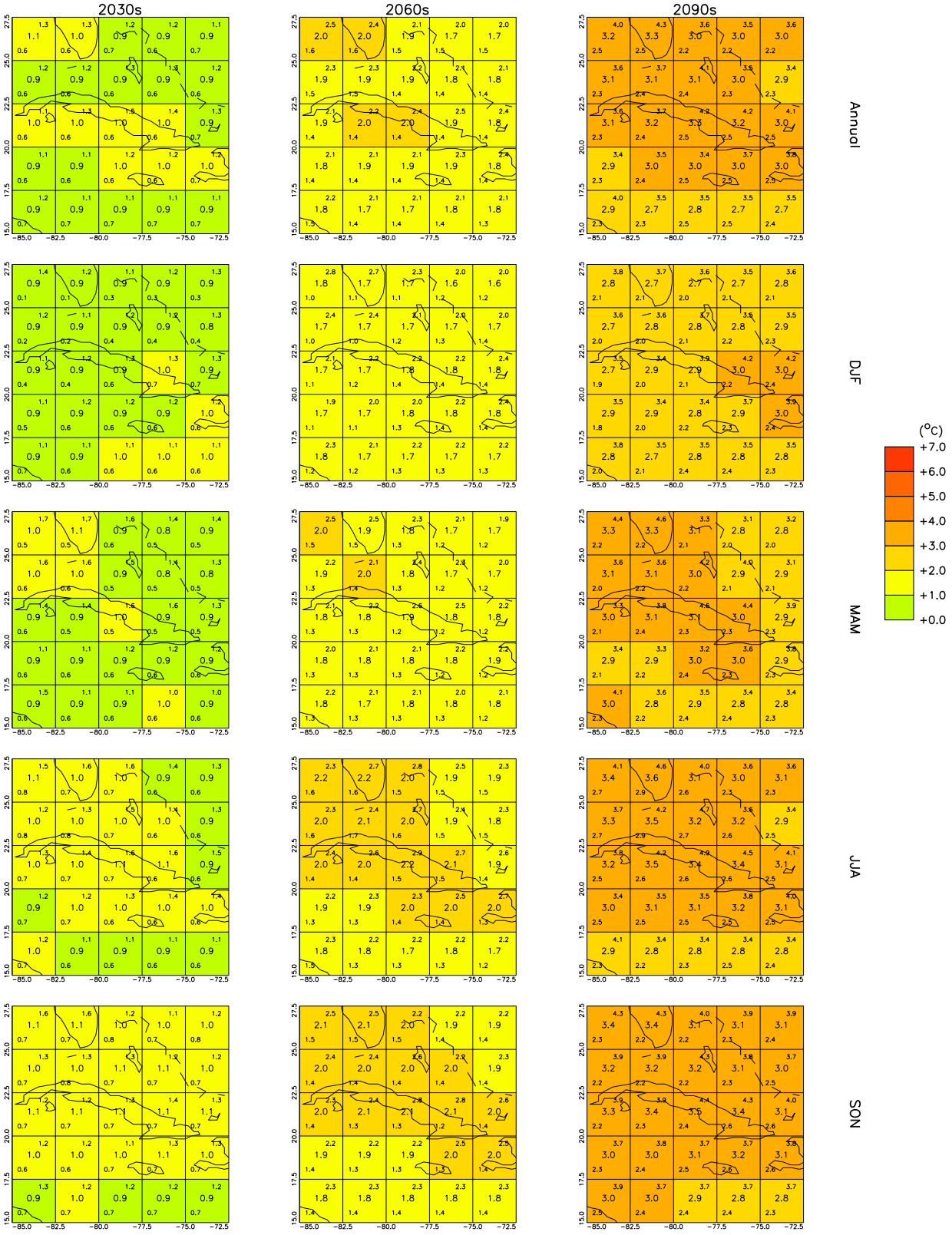


Figure 2: Spatial patterns of projected change in mean annual and seasonal temperature for 10-year periods in the future under the SRES A2 scenario. All values are anomalies relative to the mean climate of 1970-1999. In each grid box, the central value gives the ensemble median and the values in the upper and lower corners give the ensemble maximum and minimum.

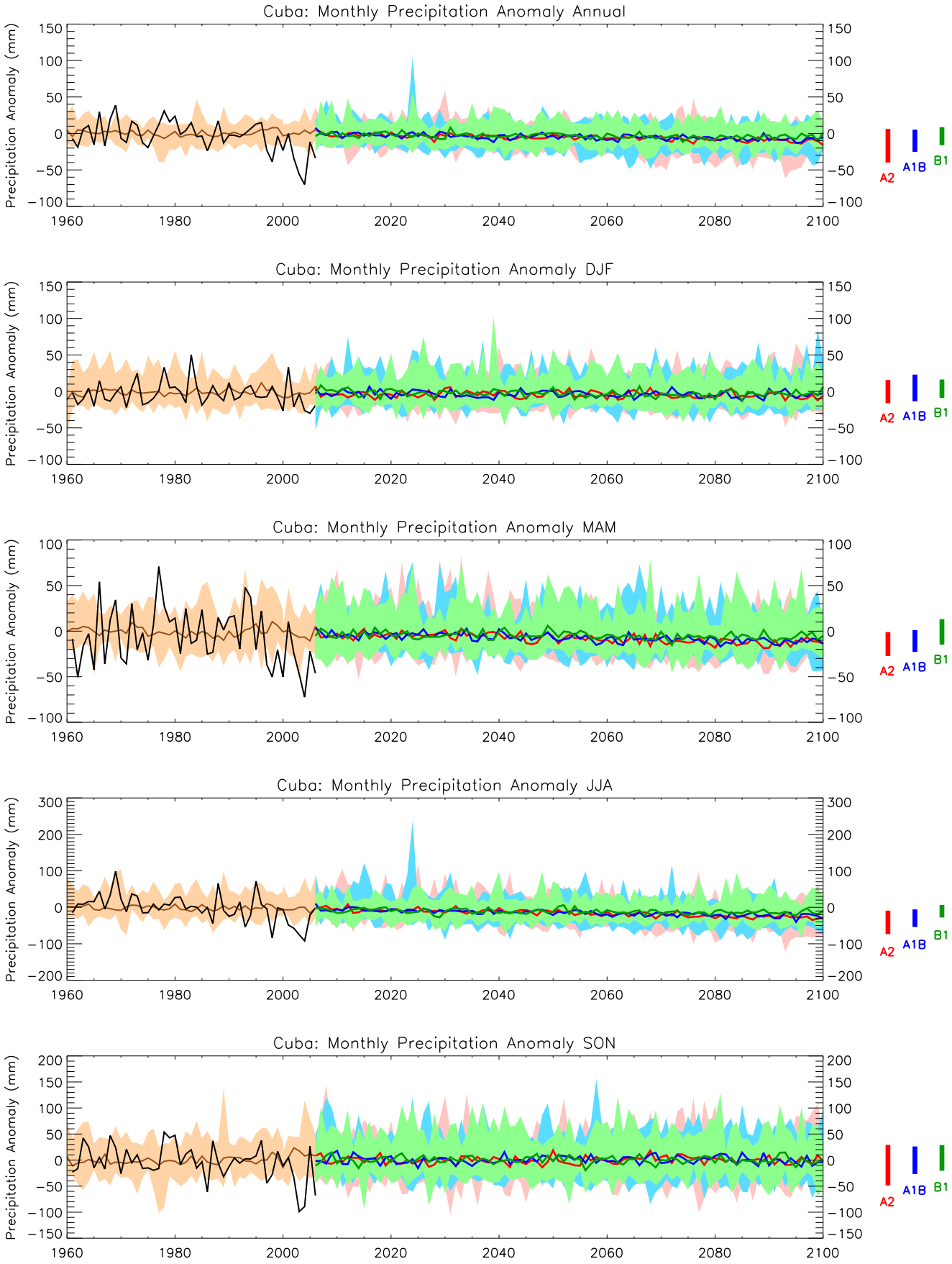


Figure 3: Trends in monthly precipitation for the recent past and projected future. All values shown are anomalies, relative to the 1970-1999 mean climate. See Figure 1 for details.

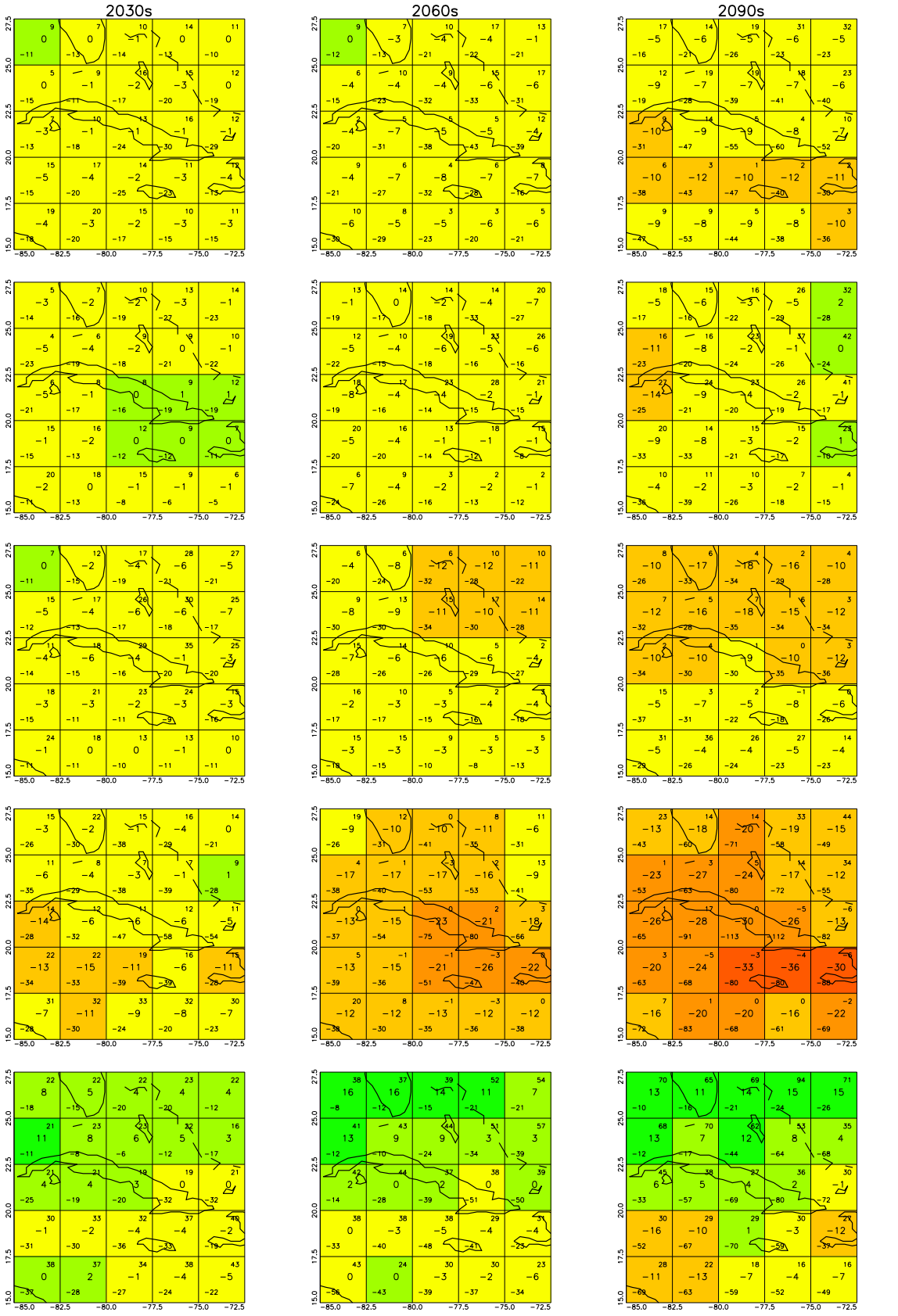


Figure 4: Spatial patterns of projected change in monthly precipitation for 10-year periods in the future under the SRES A2 scenario. All values are anomalies relative to the mean climate of 1970-1999.See Figure 2 for details.

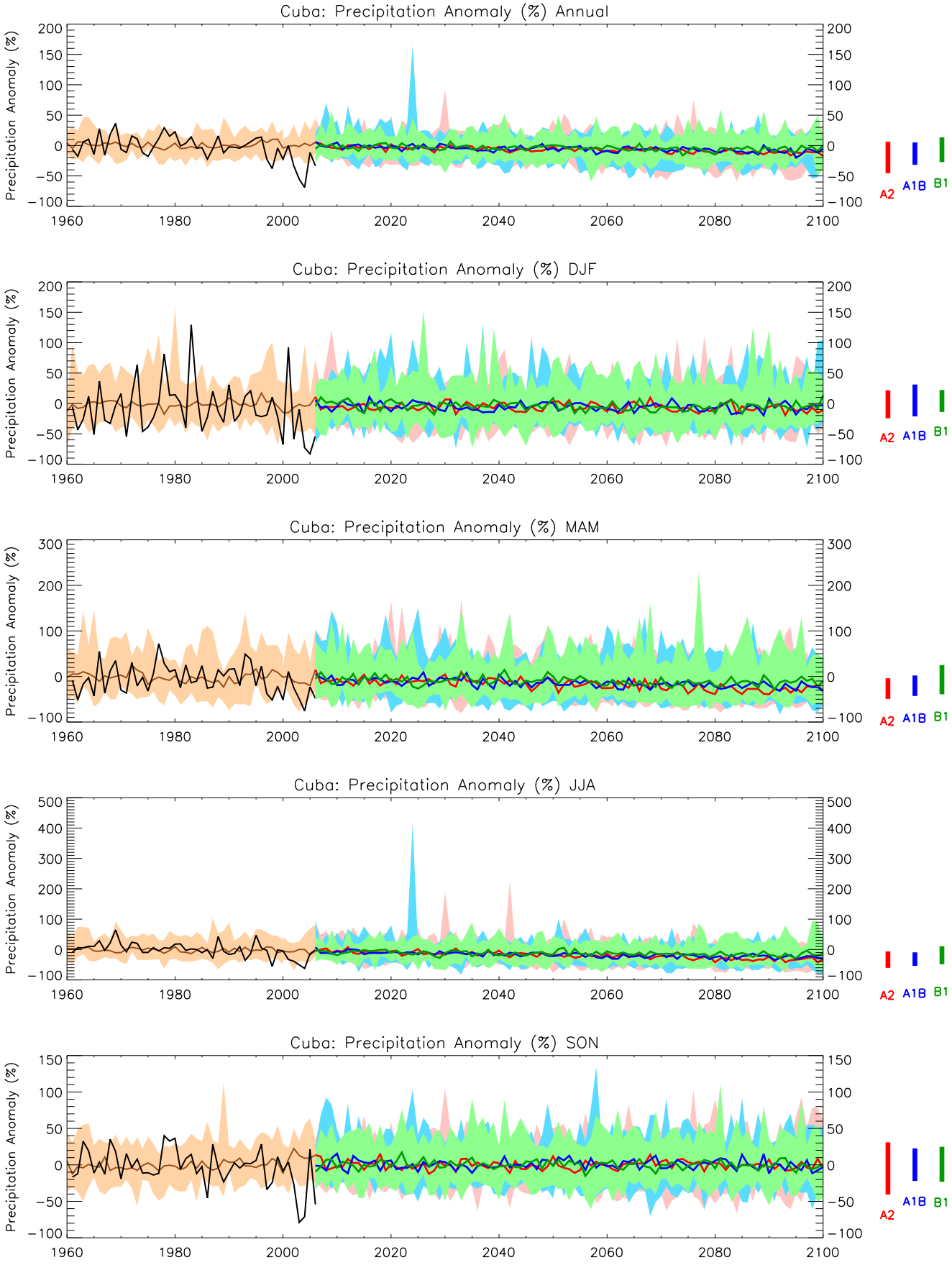


Figure 5: Trends in monthly precipitation for the recent past and projected future. All values shown are percentage anomalies, relative to the 1970-1999 mean climate. See Figure 1 for details.

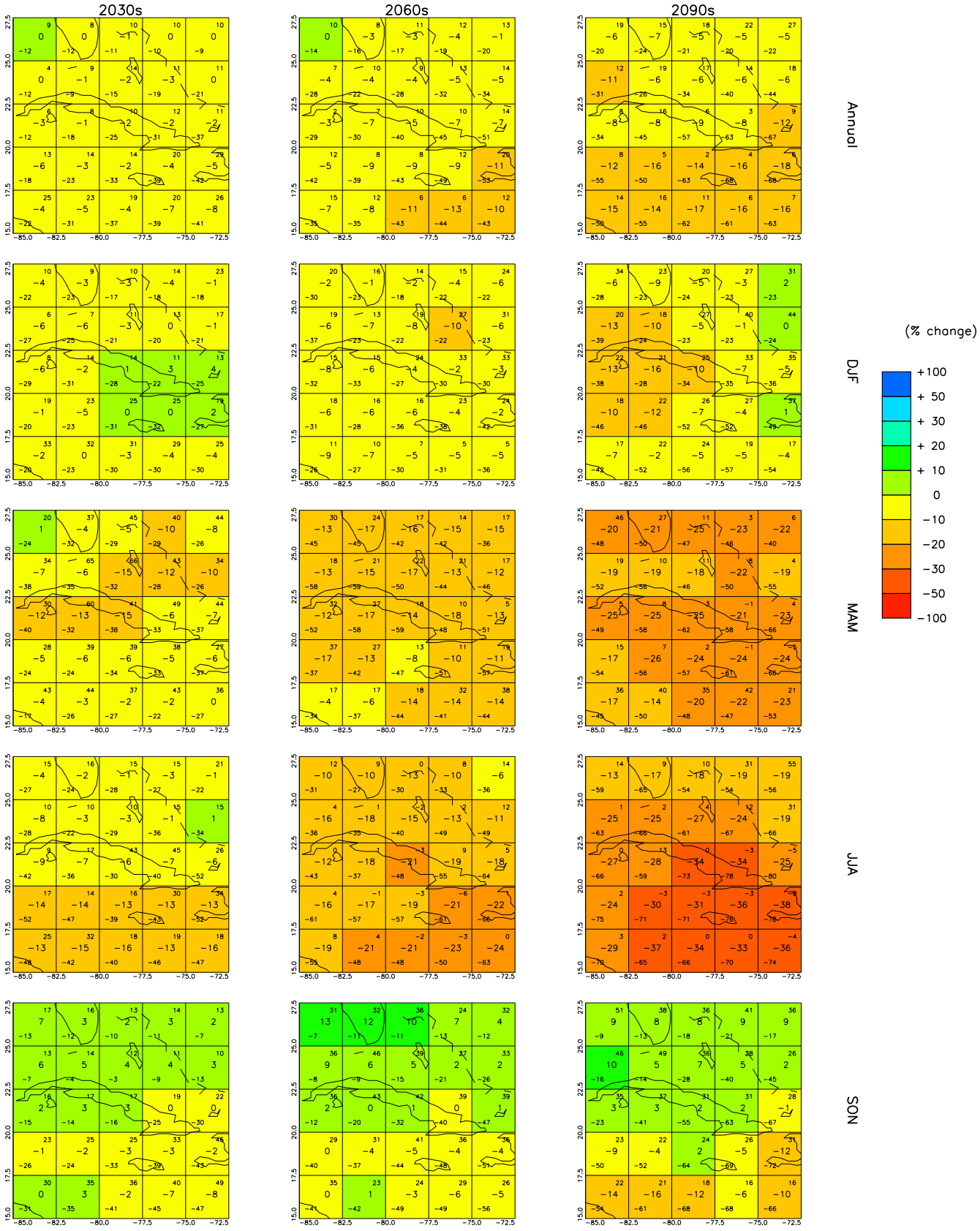


Figure 6: Spatial patterns of projected change in monthly precipitation for 10-year periods in the future under the SRES A2 scenario. All values are percentage anomalies relative to the mean climate of 1970-1999.See Figure 2 for details.

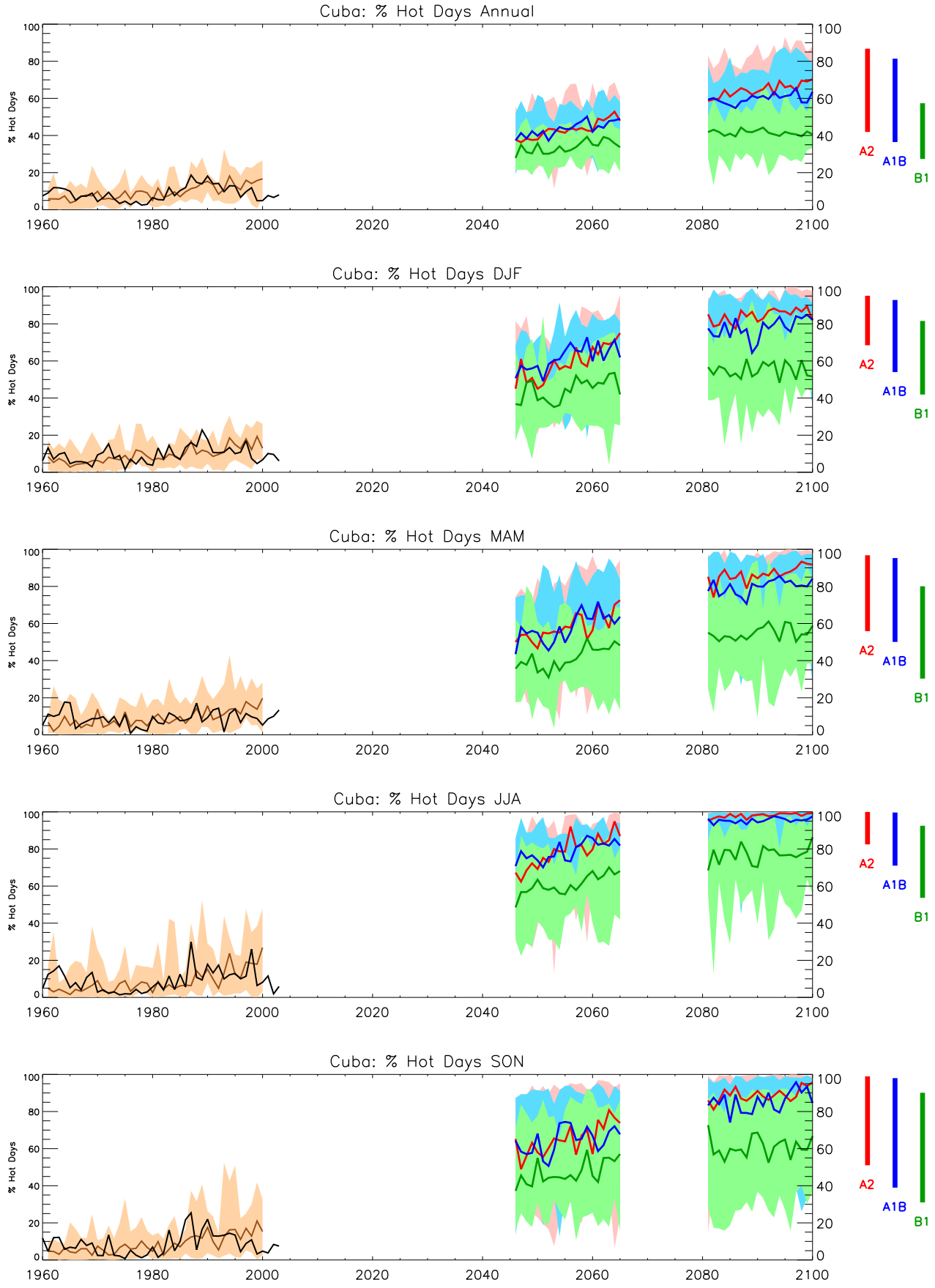


Figure 7: Trends in Hot-day frequency for the recent past and projected future. See Figure 1 for details.

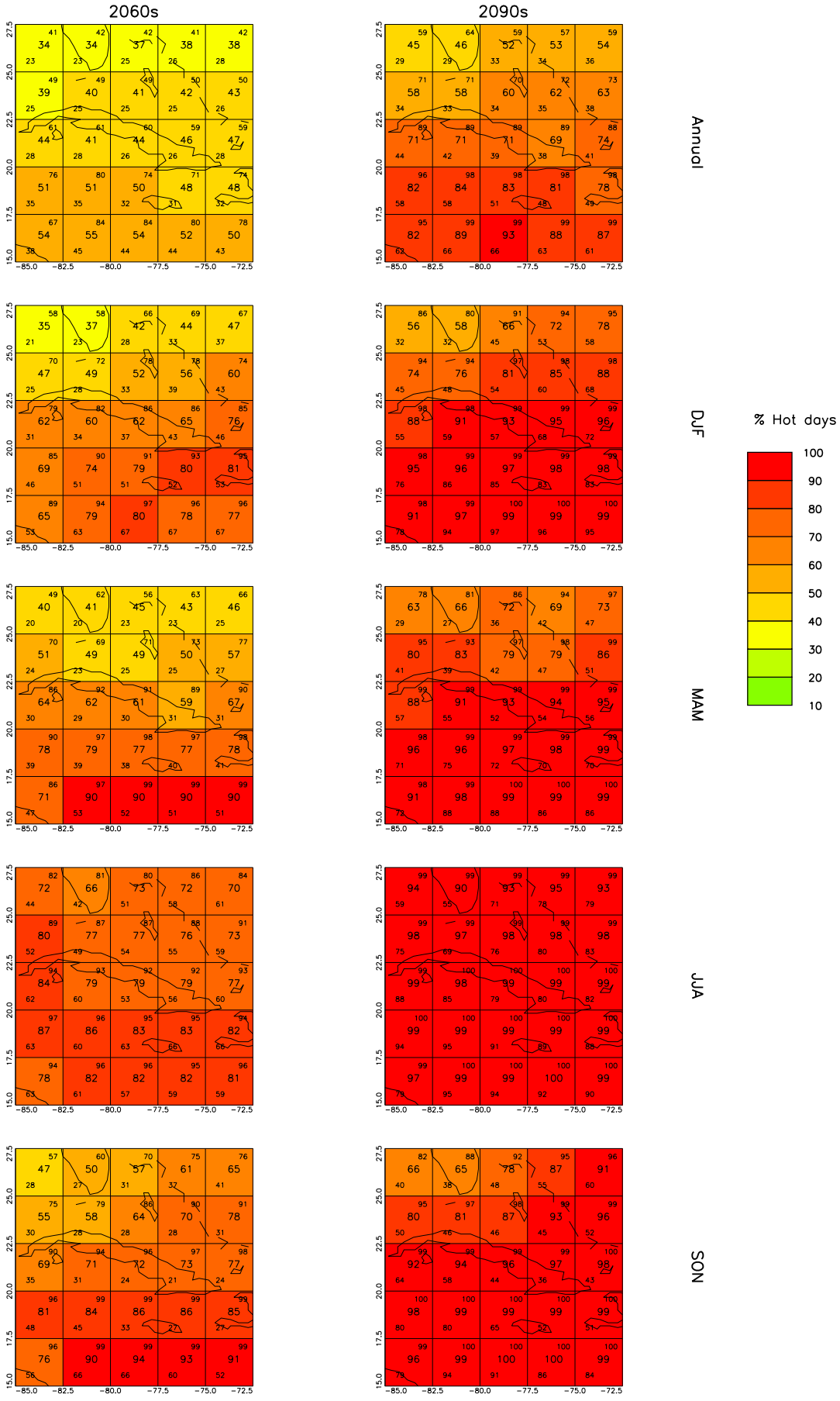


Figure 8: Spatial patterns of projected change in Hot-day frequency for 10-year periods in the future under the SRES A2 scenario. See Figure 2 for details.

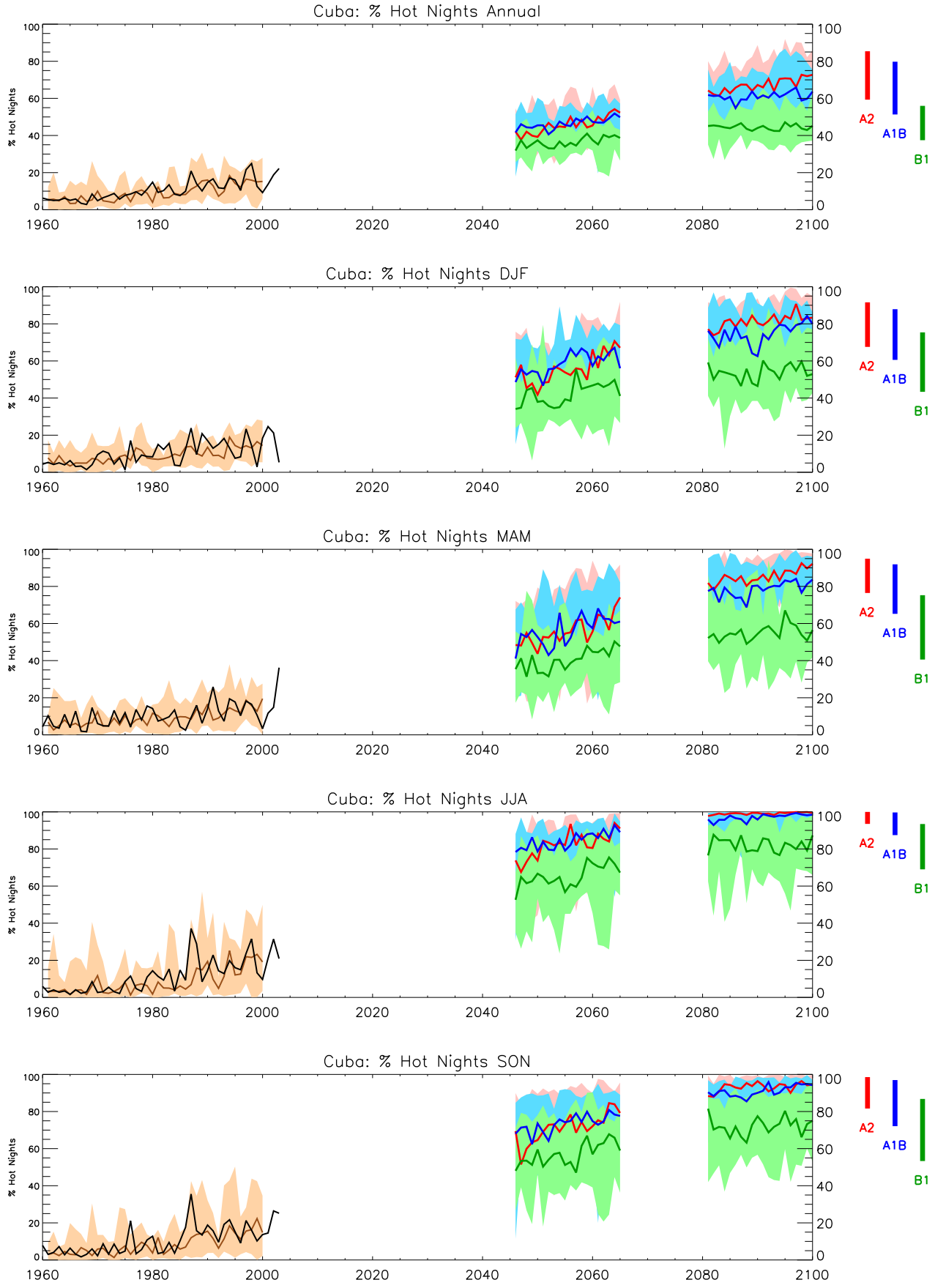


Figure 9: Trends in hot-night frequency for the recent past and projected future. See Figure 1 for details.

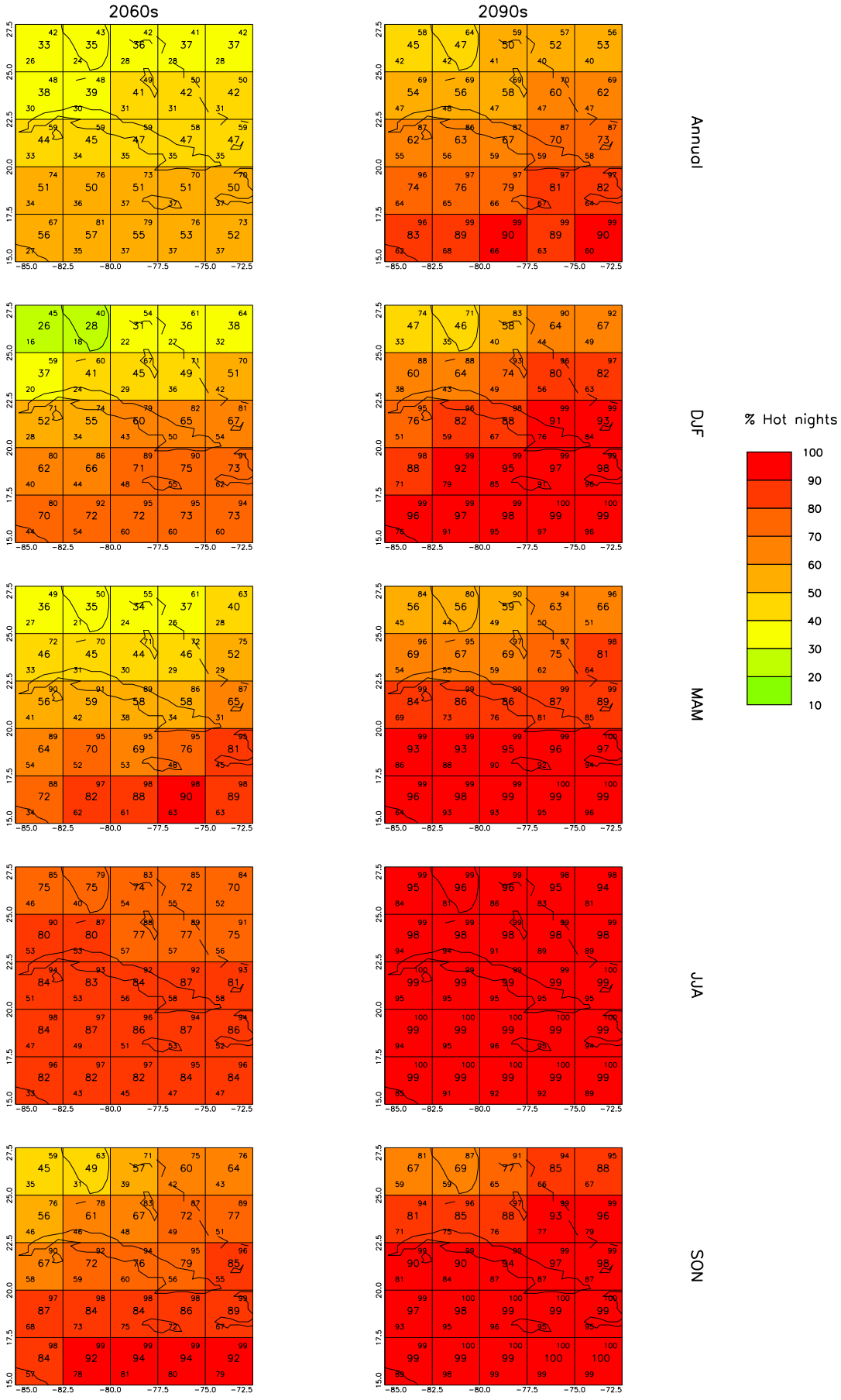


Figure 10: Spatial patterns of projected change in hot-night frequency for 10-year periods in the future under the SRES A2 scenario. See Figure 2 for details.

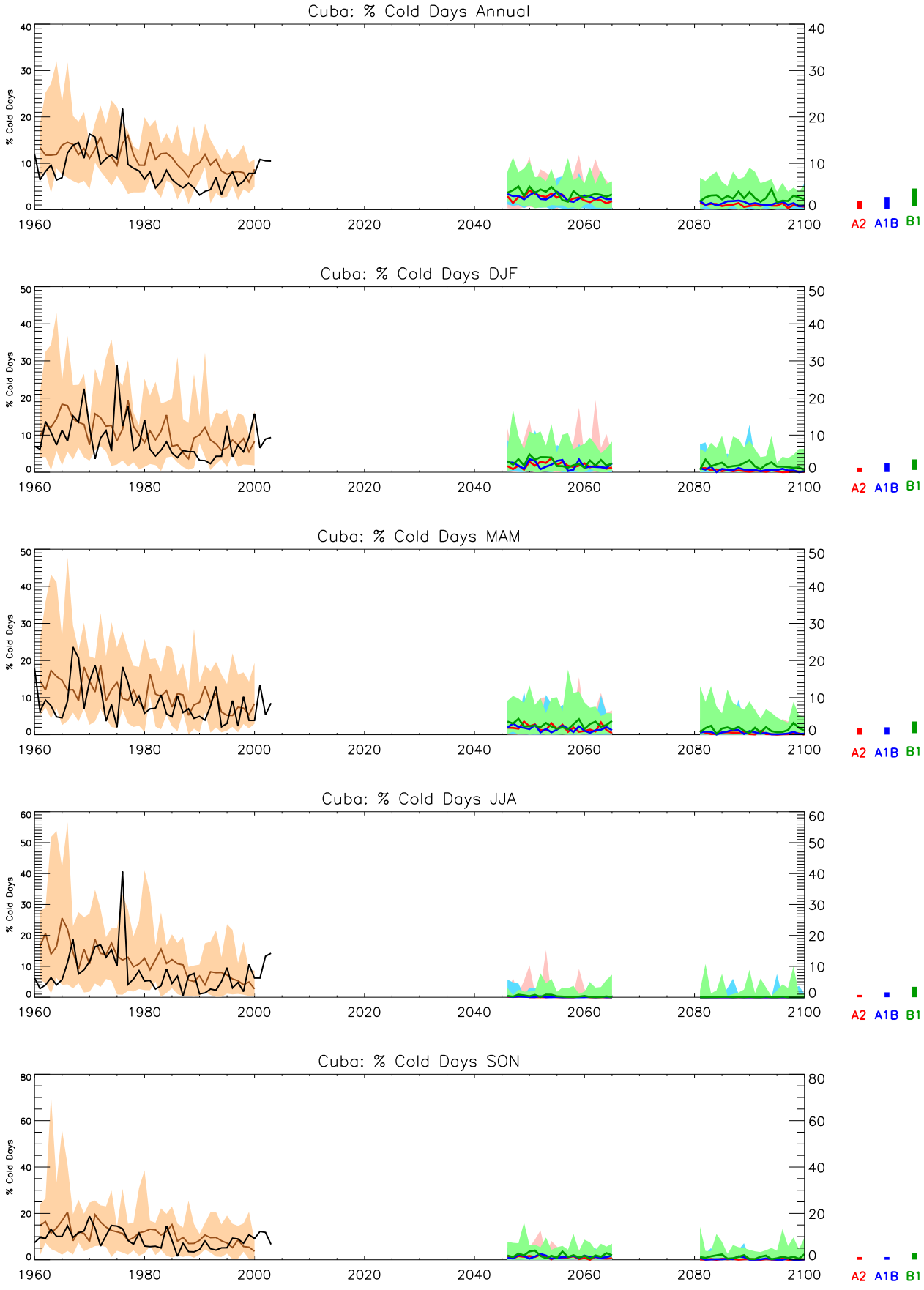


Figure 11: Trends in cold-day frequency for the recent past and projected future. See Figure 1 for details.

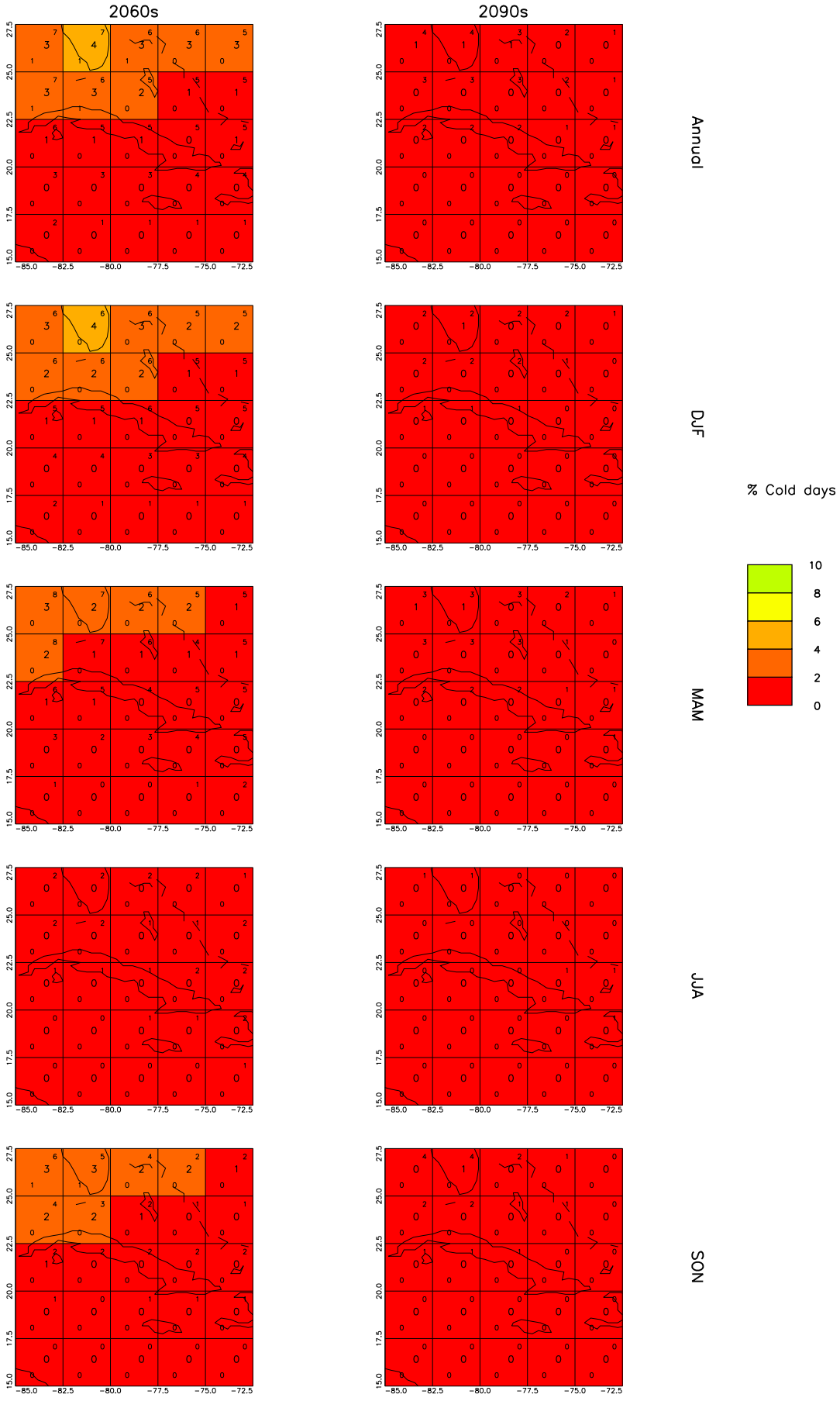


Figure 12: Spatial patterns of projected change in cold-day frequency for 10-year periods in the future under the SRES A2 scenario. See Figure 2 for details.

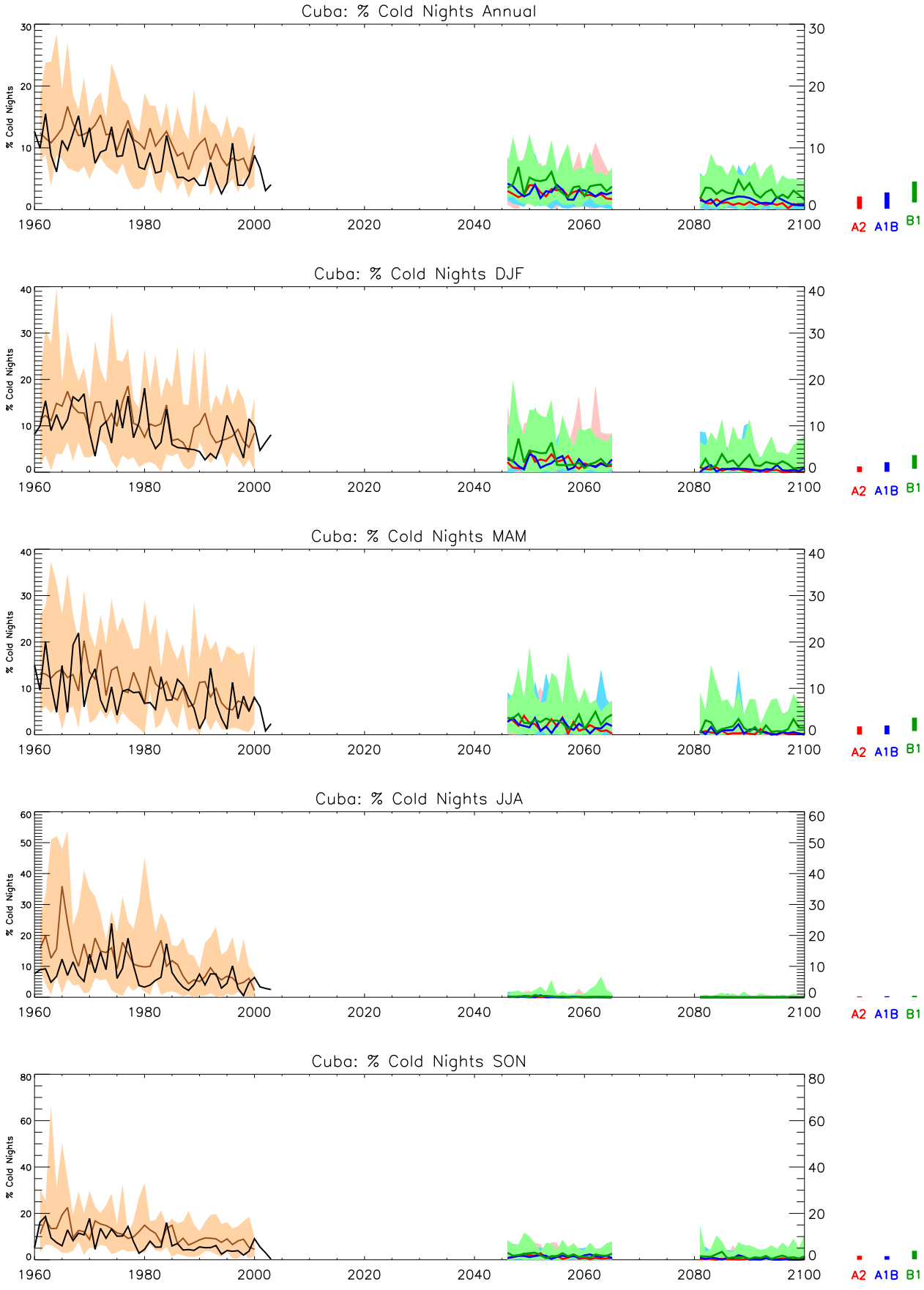


Figure 13: Trends in cold-night frequency for the recent past and projected future. See Figure 1 for details.

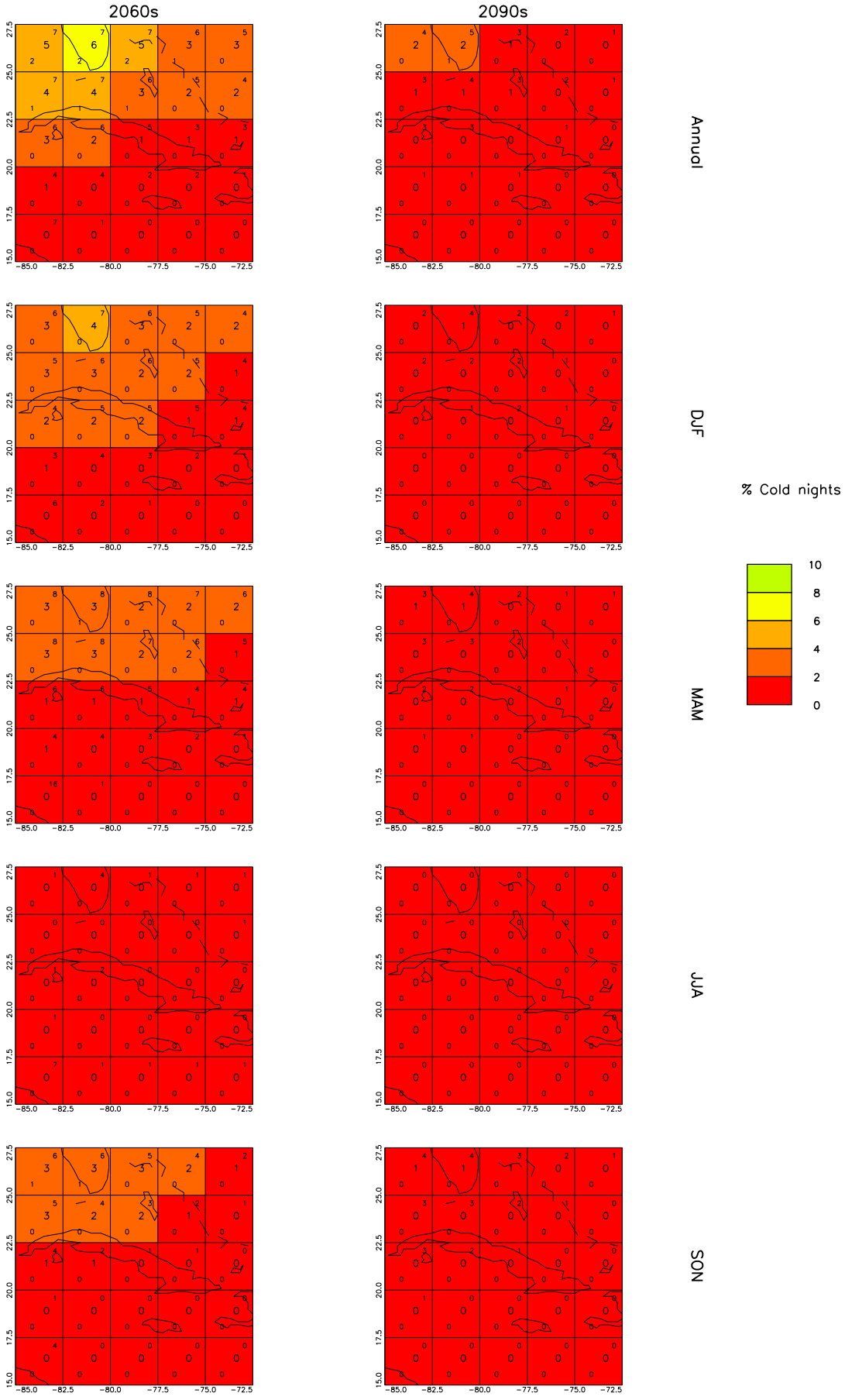


Figure 14: Spatial patterns of projected change in cold-night frequency for 10-year periods in the future under the SRES A2 scenario. See Figure 2 for details.

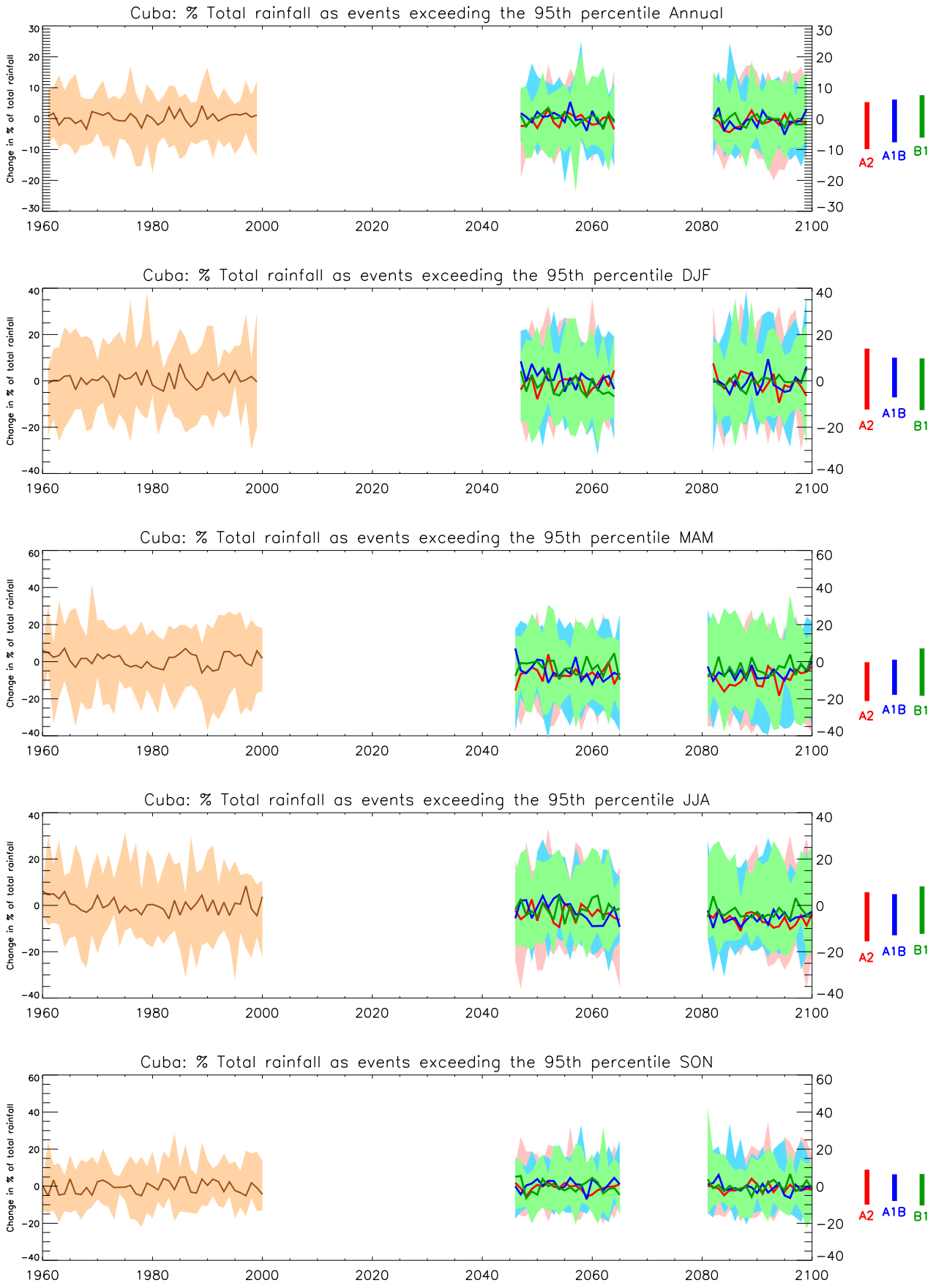


Figure 15: Trends in the proportion of precipitation falling in 'heavy' events for the recent past and projected future. All values shown are anomalies, relative to the 1970-1999 mean climate. See Figure 1 for details.

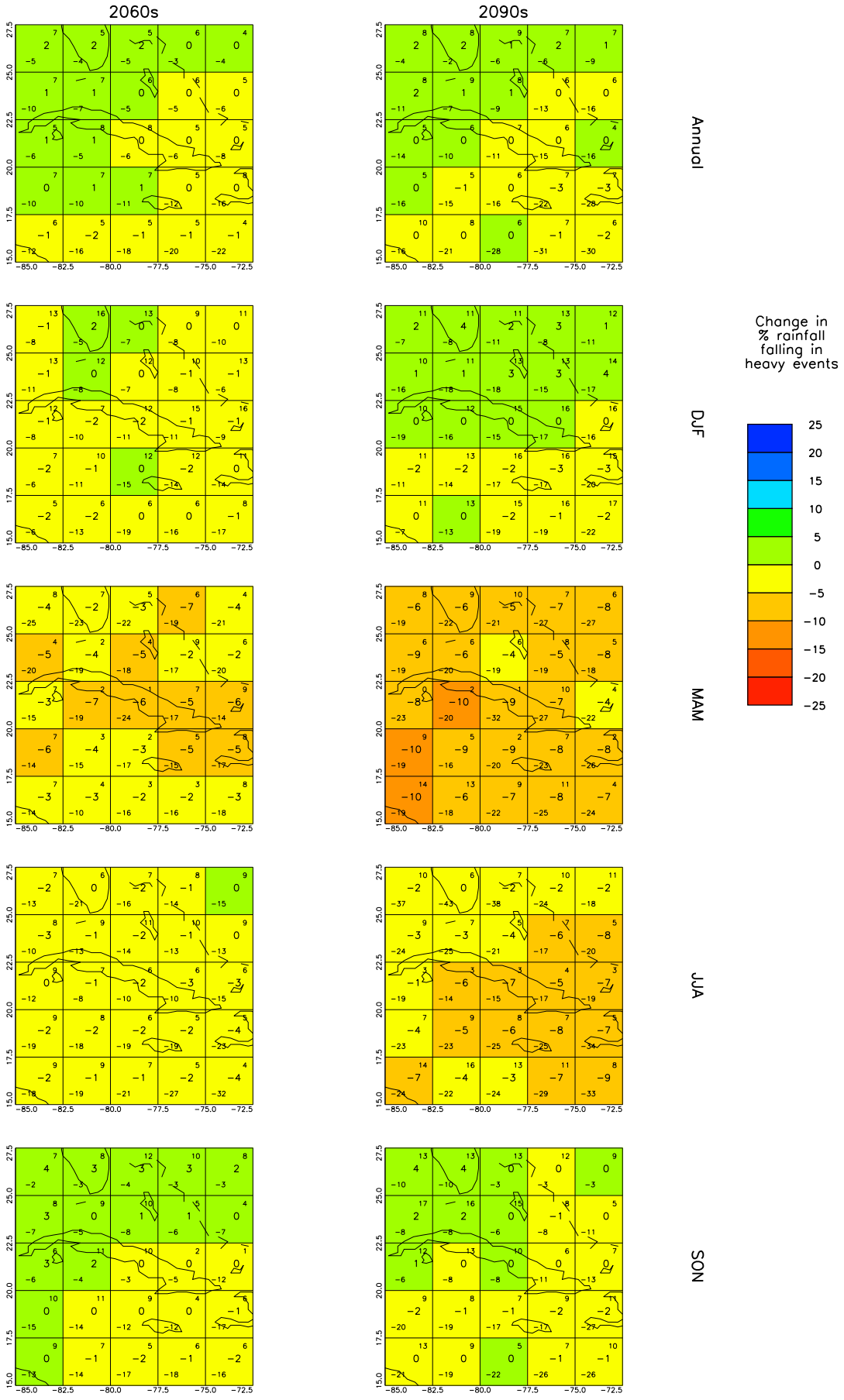


Figure 16: Spatial patterns of projected change in the proportion of precipitation falling in 'heavy' events for 10-year periods in the future under the SRES A2 scenario. All values are anomalies relative to the mean climate of 1970-1999. See Figure 2 for details.

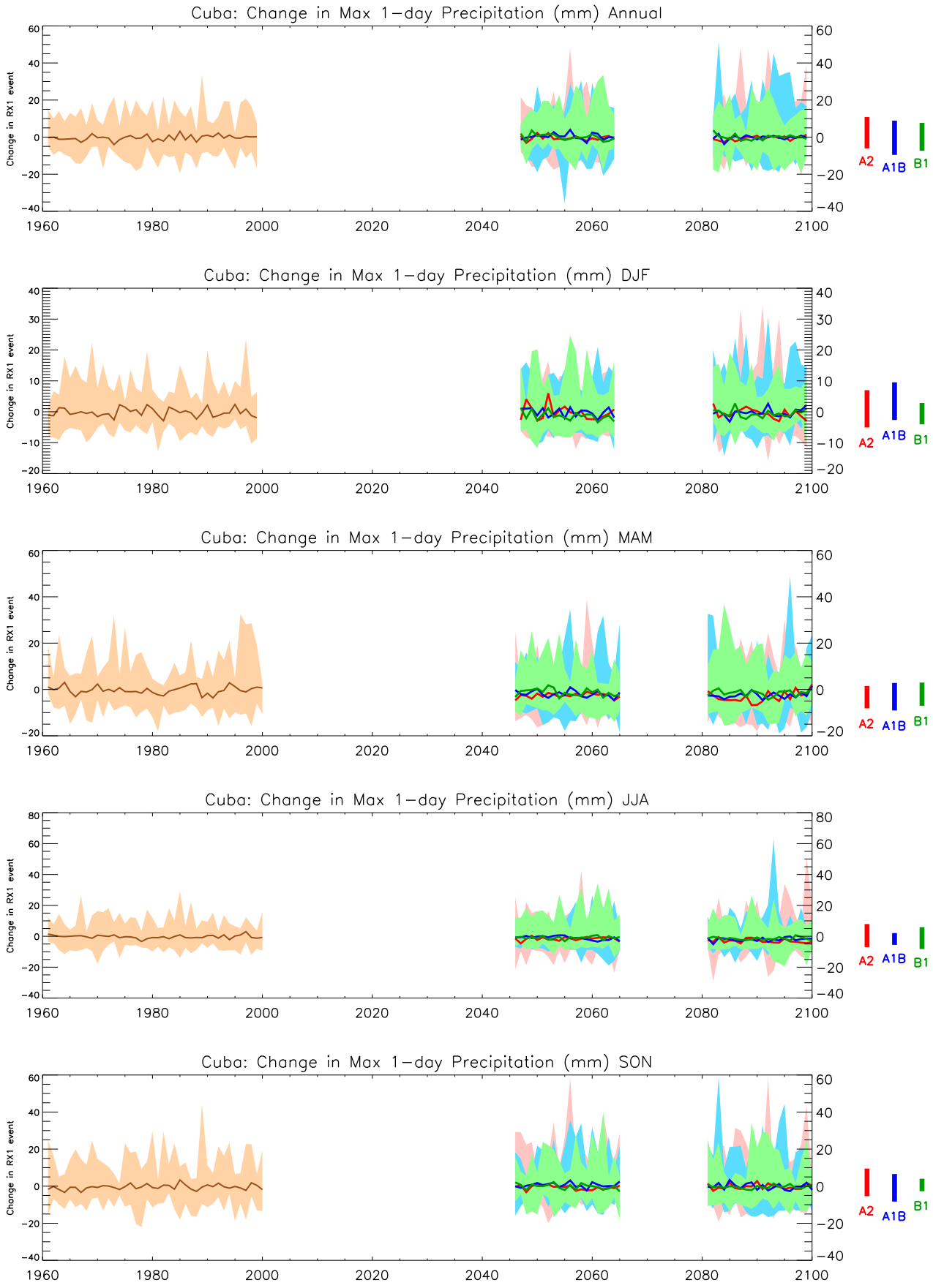


Figure 17: Trends in maximum 1-day rainfall for the recent past and projected future. All values shown are anomalies, relative to the 1970-1999 mean climate. See Figure 1 for details.

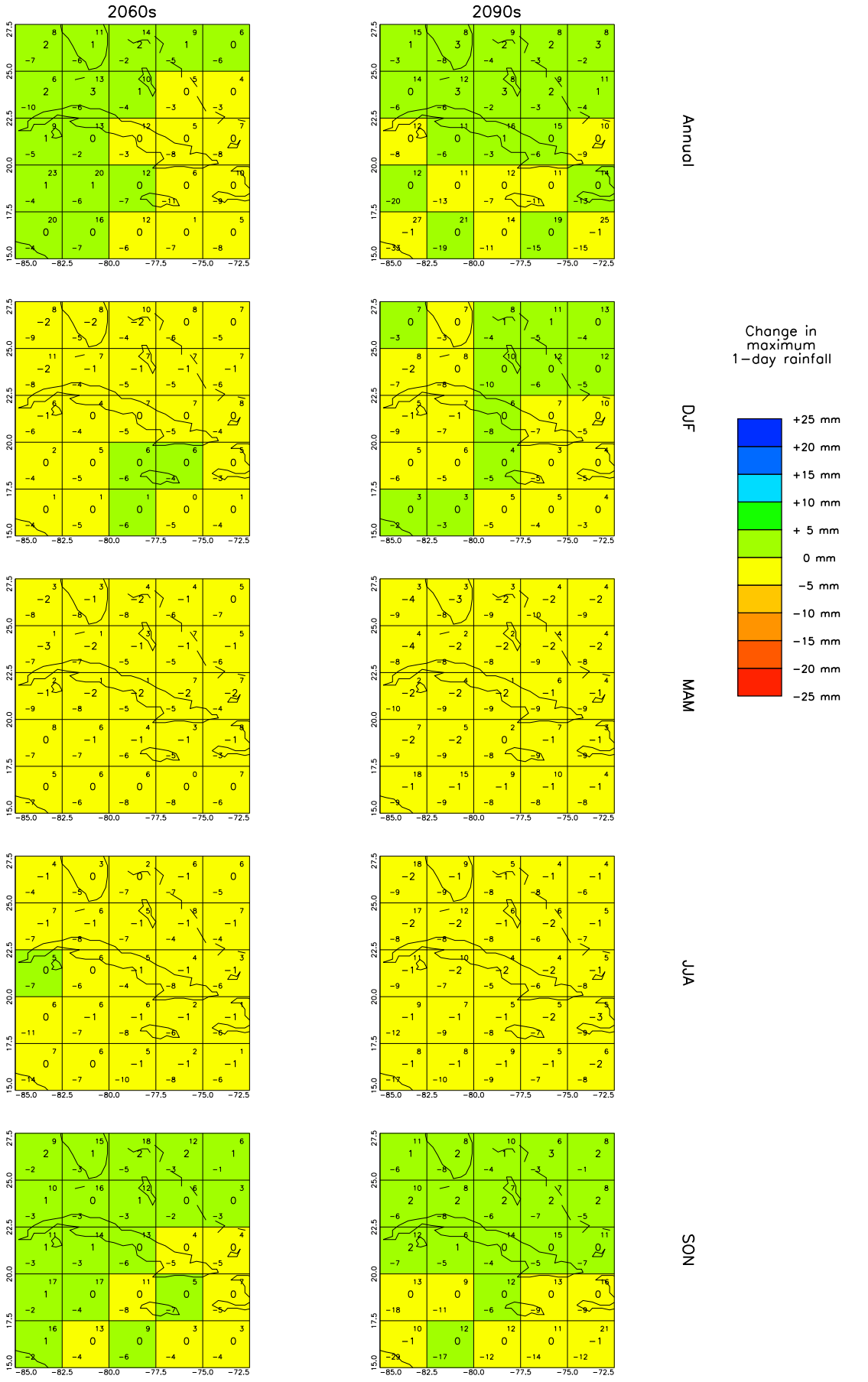


Figure 18: Spatial patterns of maximum 1-day rainfall for 10-year periods in the future under the SRES A2 scenario. All values are anomalies relative to the mean climate of 1970-1999. See Figure 2 for details.

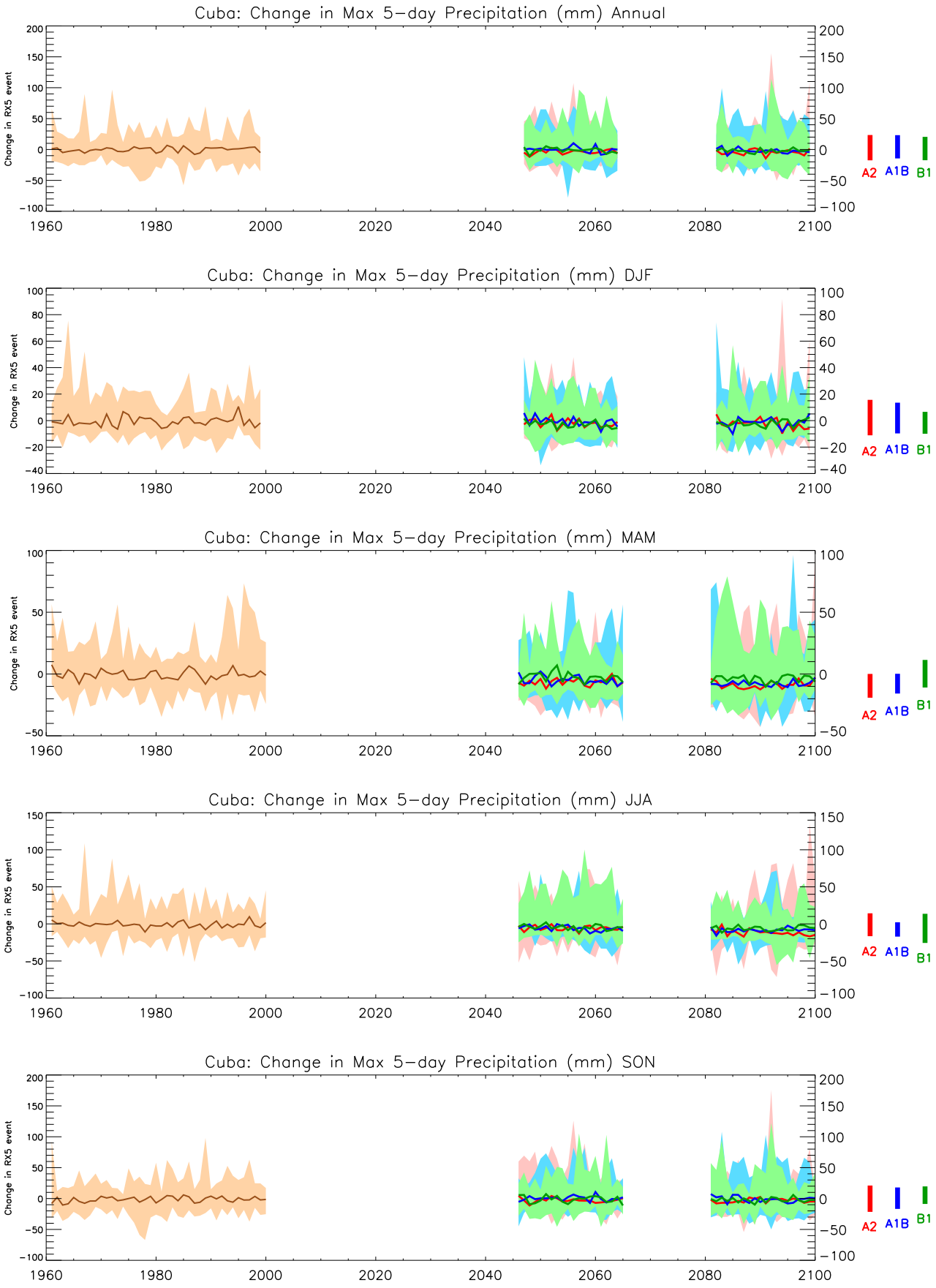


Figure 19: Trends in maximum 5-day rainfall for the recent past and projected future. All values shown are anomalies, relative to the 1970-1999 mean climate. See Figure 1 for details.

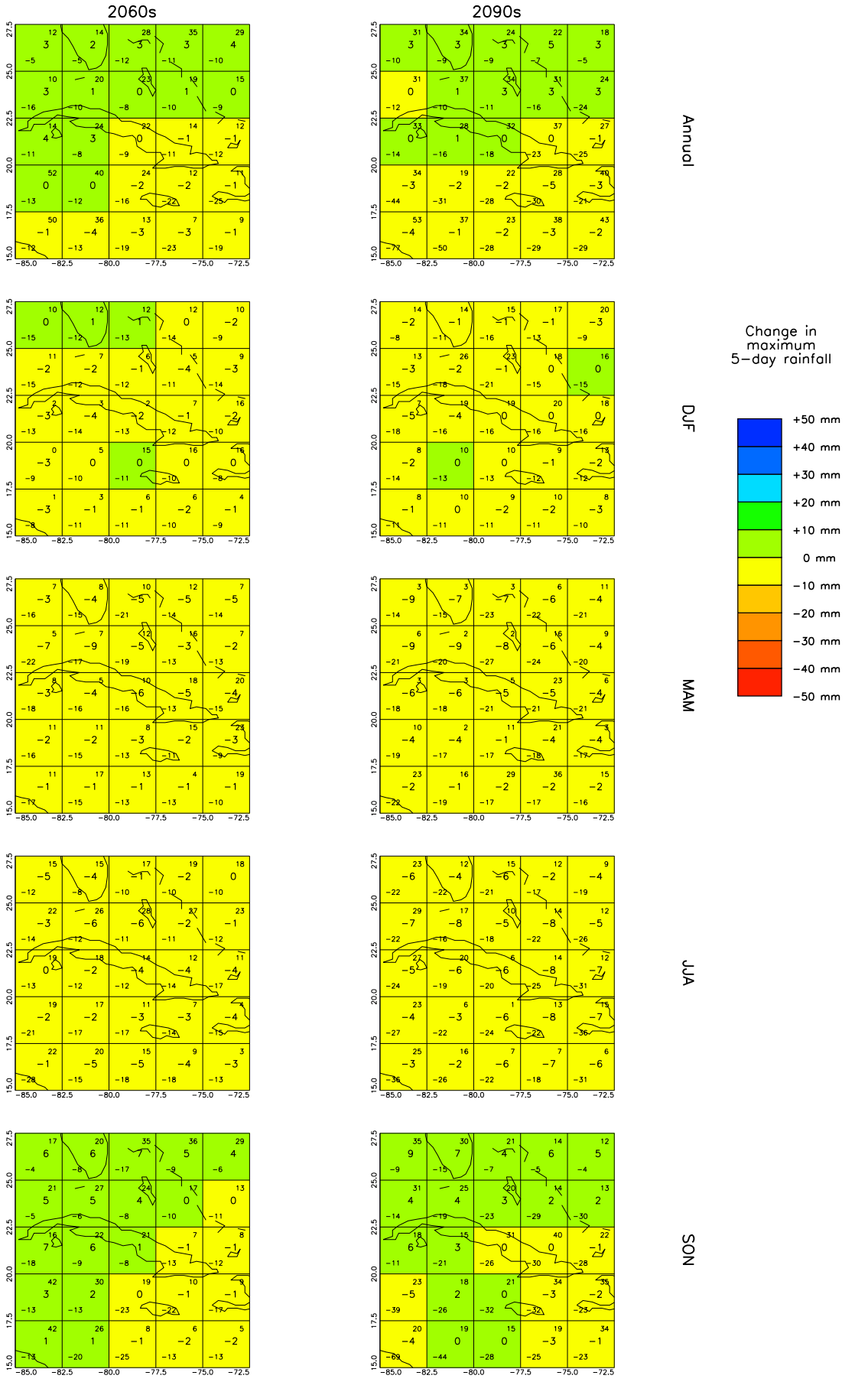


Figure 20: Spatial patterns of projected change in maximum 5-day rainfall for 10-year periods in the future under the SRES A2 scenario. All values are anomalies relative to the mean climate of 1970-1999. See Figure 2 for details.