Climate change as a phenomenon in the Republic of Moldova. Long-term national climate change projections

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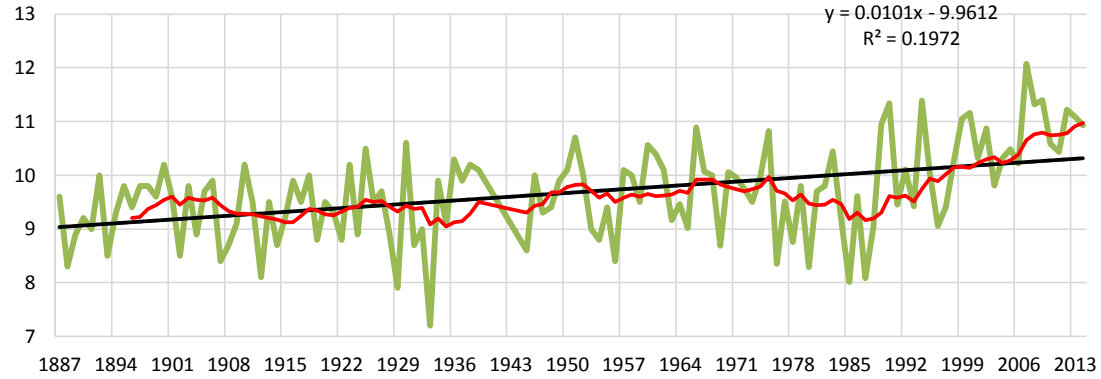
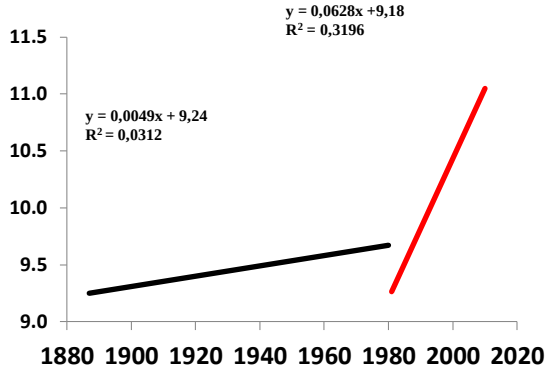
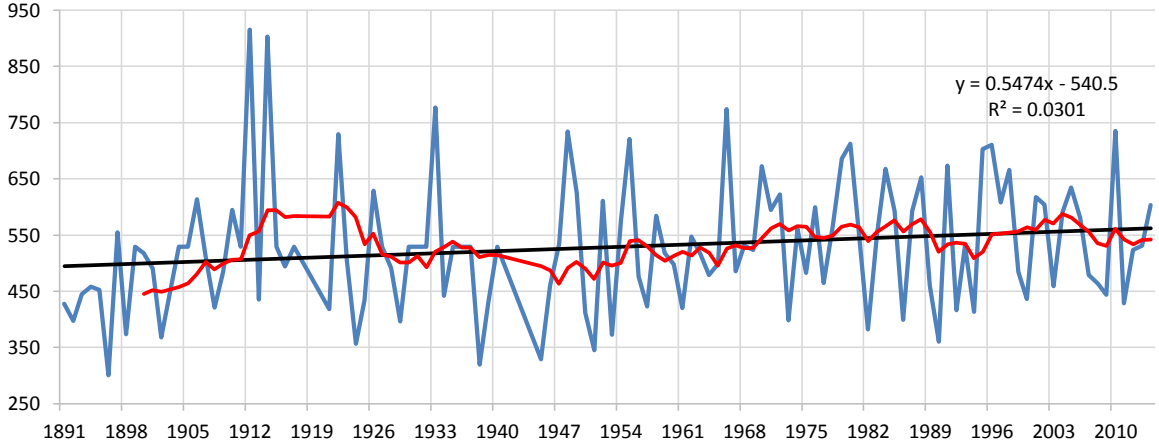
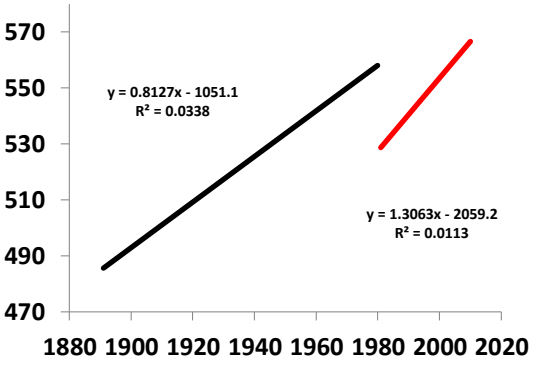
Seminar: Captarea și utilizarea durabilă a apelor pluviale prin intermediul reabilitării iazurilor/helețeilor existente și construcției altor noi. Program national, Chisinau , 05 09 2017

Observed Trends in Temperature and Precipitation



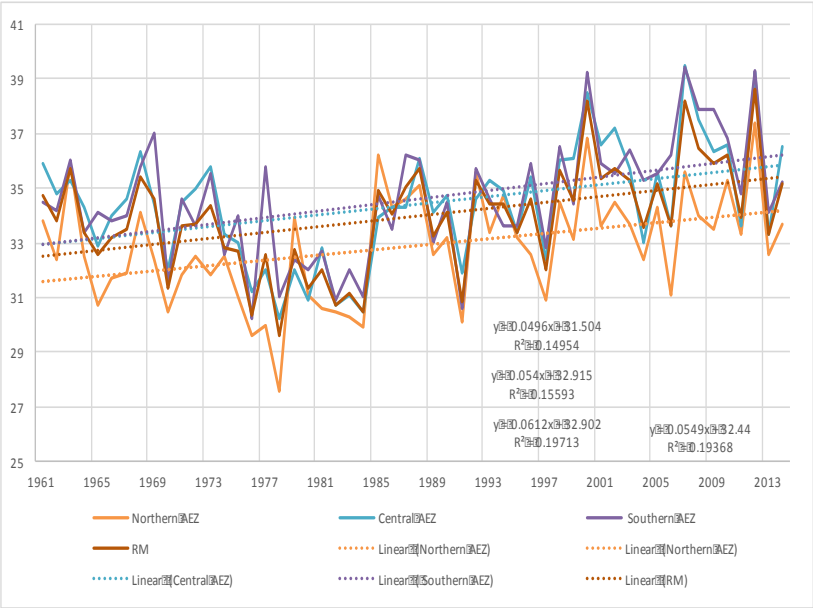




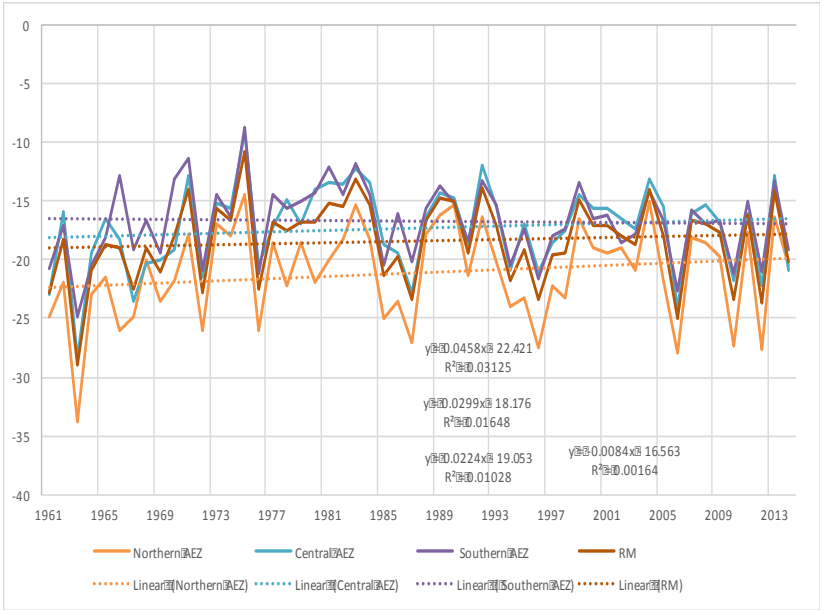


Trends in air temperature across the Republic of Moldova for 1961-2014

Maximum daily maximum temperature (TXx)



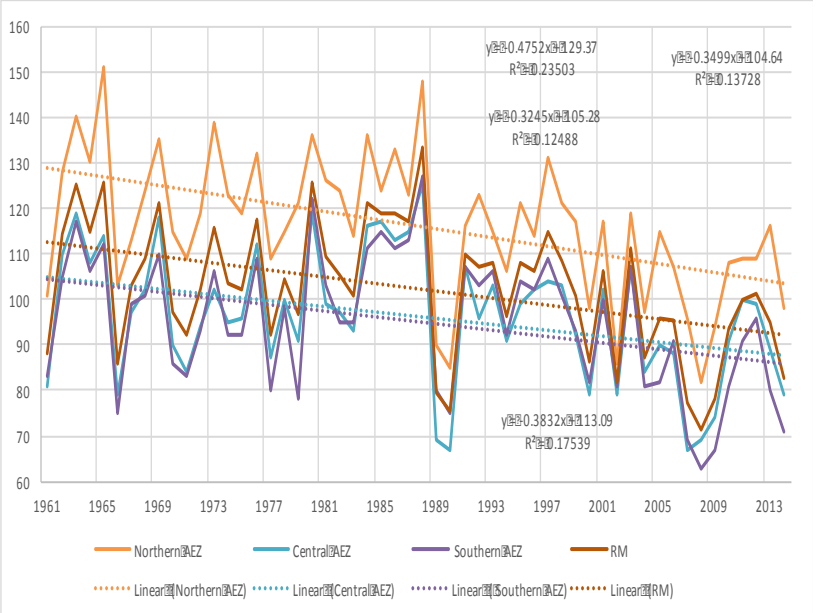
Minimum daily minimum temperature (TNn)



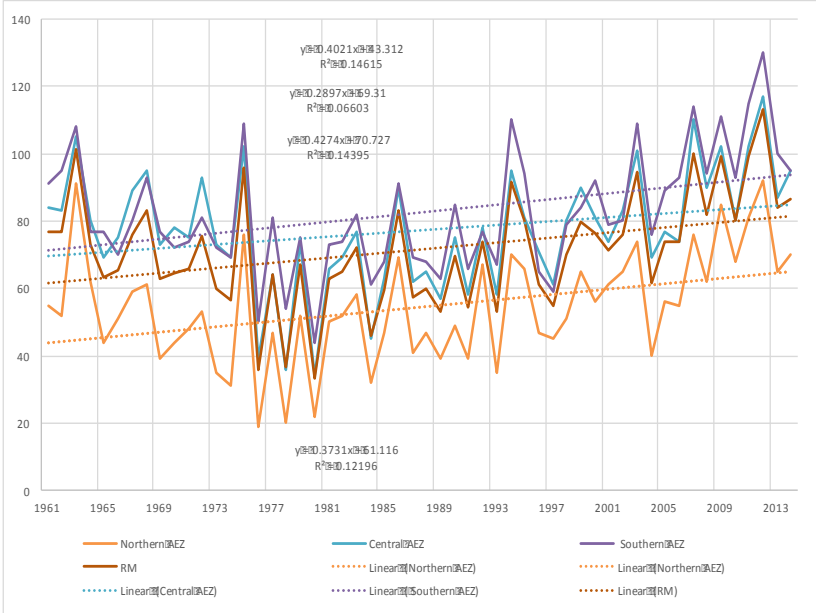
Extreme Indices	Northern AEZ				Central AEZ				Southern AEZ			
	Mean	Trend	R^2	p	Mean	Trend	R^2	p	Mean	Trend	R^2	p
TNn	-21.2	+0.5	3	0.2010	-17.4	+0.3	2	0.3548	-16.8	+0.2	0.1	0.7713
TXx	32.9	+0.5	15	0.0039	34.4	+0.5	16	0.0031	34.6	+0.6	20	0.0008

Trends in frost days and summer days across the Republic of Moldova for 1961-2014

Frost days (FD)

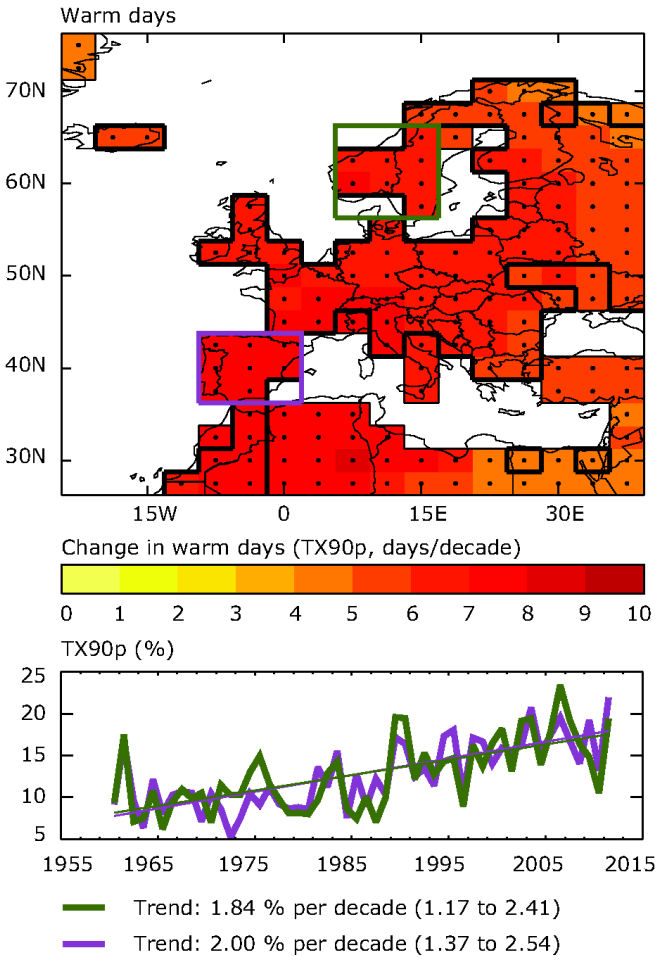


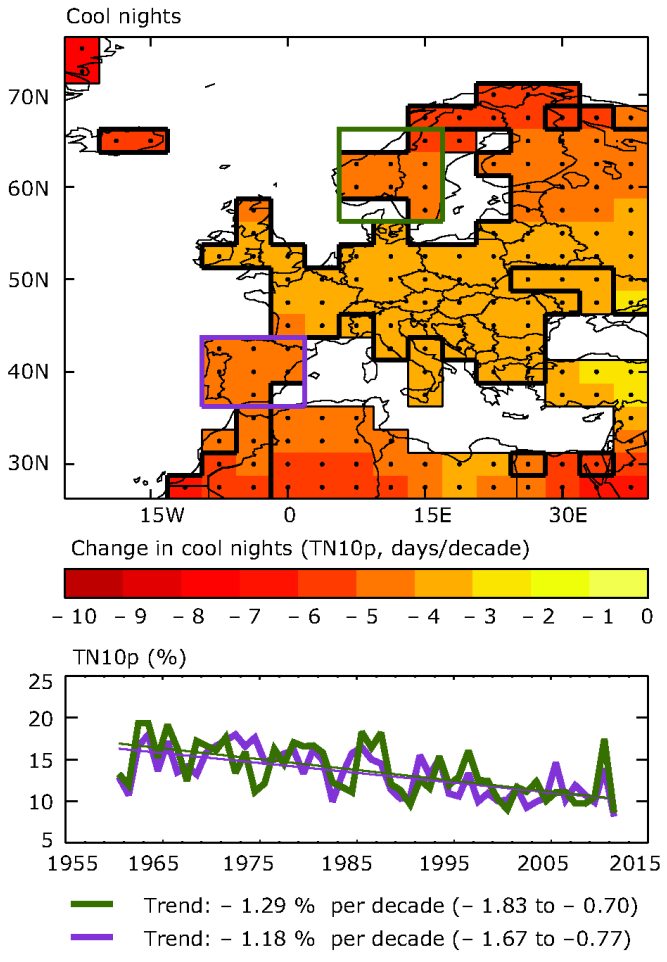
Summer days (SD)



Extreme Indices	Northern AEZ				Central AEZ				Southern AEZ			
	Mean	Trend	R^2	p	Mean	Trend	R^2	p	Mean	Trend	R^2	p
FD	116	-4.7	24	0.0002	96	-3.2	12	0.0087	95	-3.5	14	0.0058
SU	54	+4.0	15	0.0043	77	+2.9	7	0.0607	82	+4.3	14	0.0046

Trends in warm days and cool nights across Europe

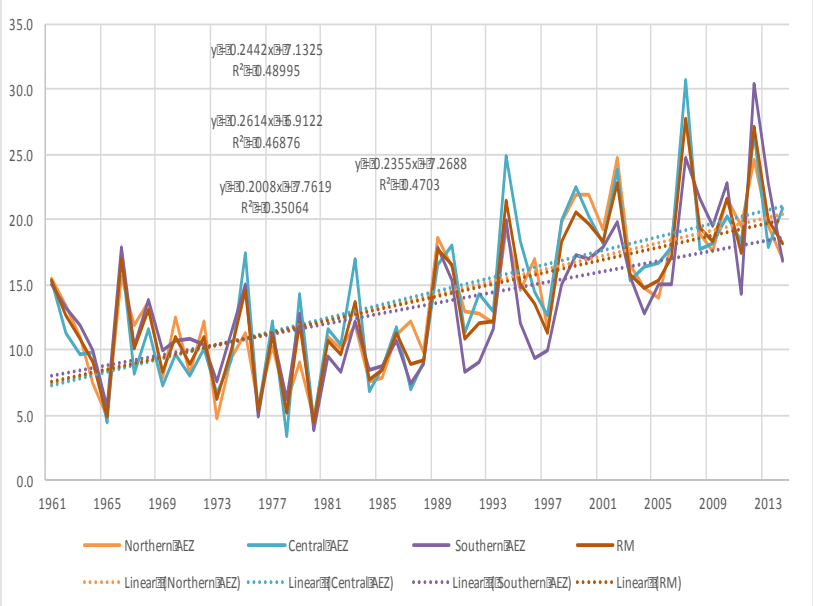




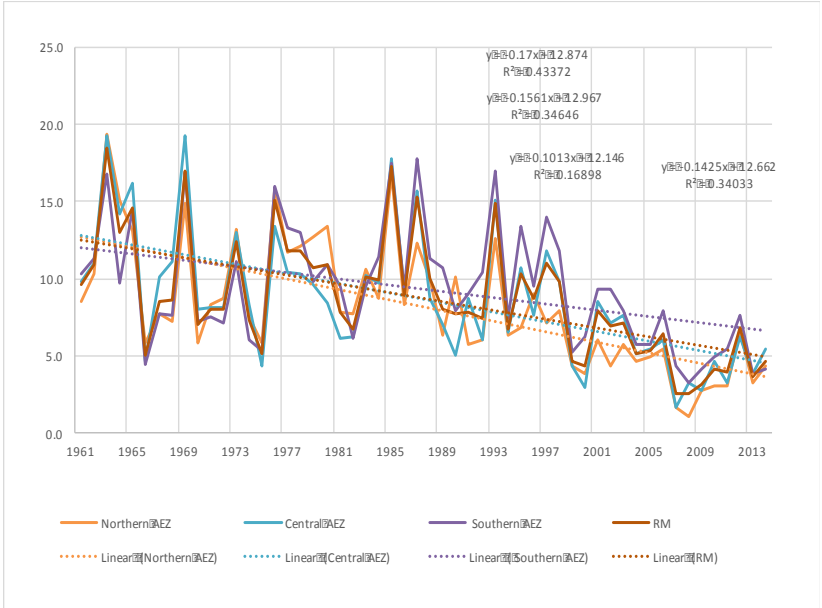
Source: EEA, 2012: Climate change impacts and vulnerability in Europe. An indicator – based report. No 2/2012. 304p.

Trends in warm days and cool nights across Moldova for 1961-2014

Warm days (TX90p)

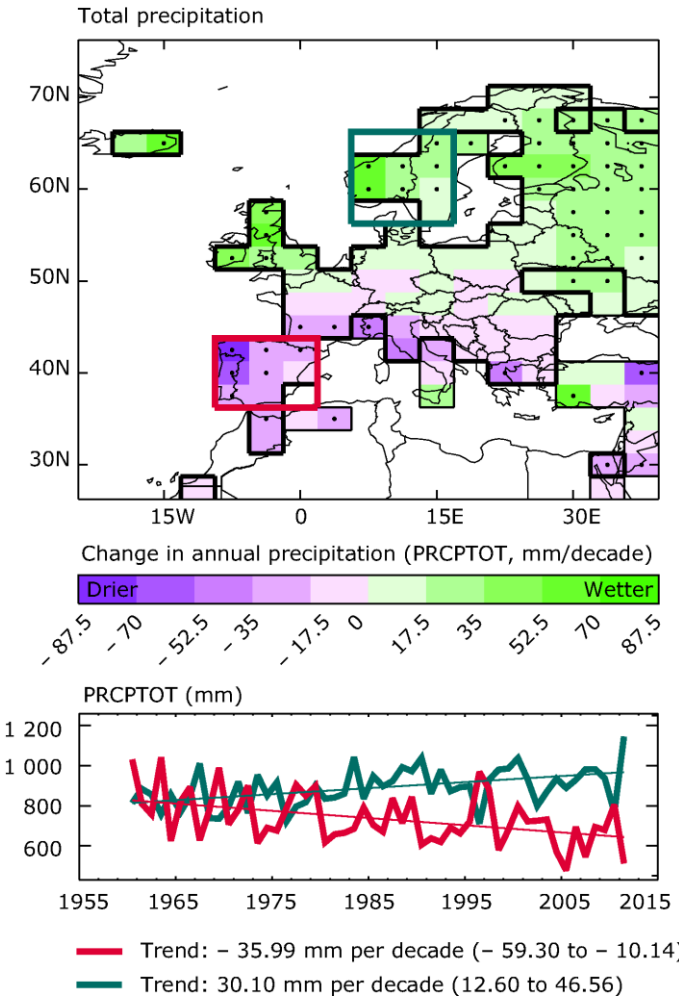


Cold nights (TN10p)

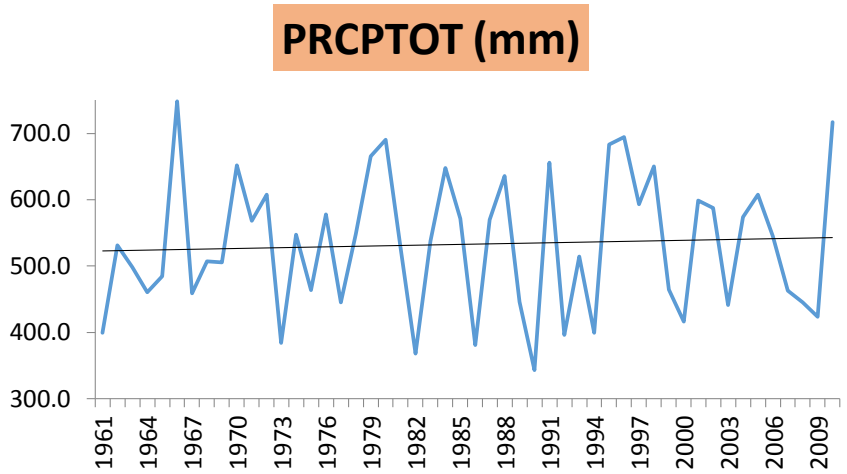


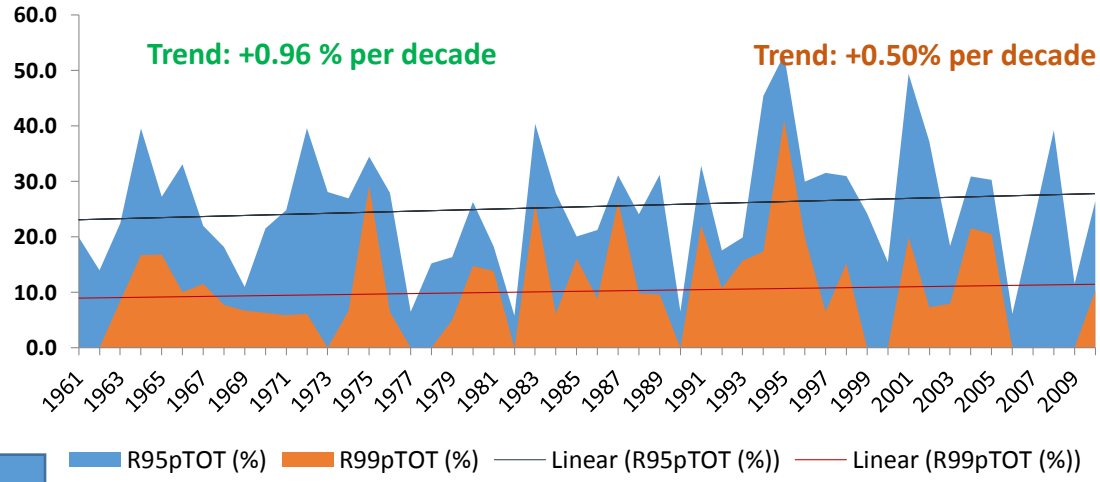
Extreme Indices	Northern AEZ				Central AEZ				Southern AEZ			
	Mean	Trend	R^2	p	Mean	Trend	R^2	p	Mean	Trend	R^2	p
TN90p	13.8	+2.4	49	0.0000	14.1	+2.6	47	0.0000	13.3	+2.0	35	0.0000
TX90p	12.6	+1.6	22	0.0004	12.4	+1.0	9	0.0251	12.9	+1.6	20	0.0008

Trends in precipitation extreme indices



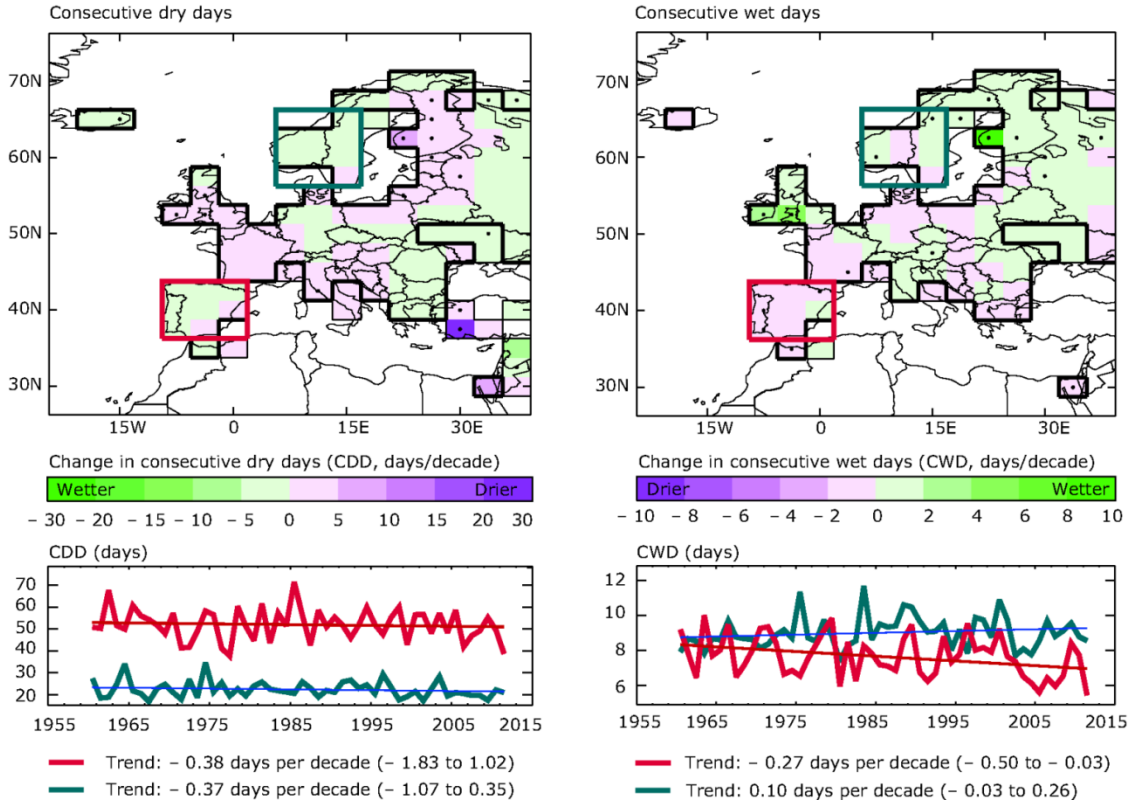
Trend: +3.98 mm per decade

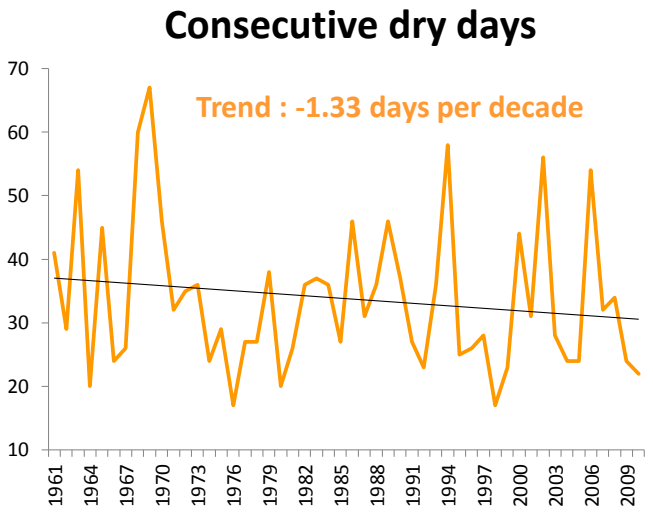


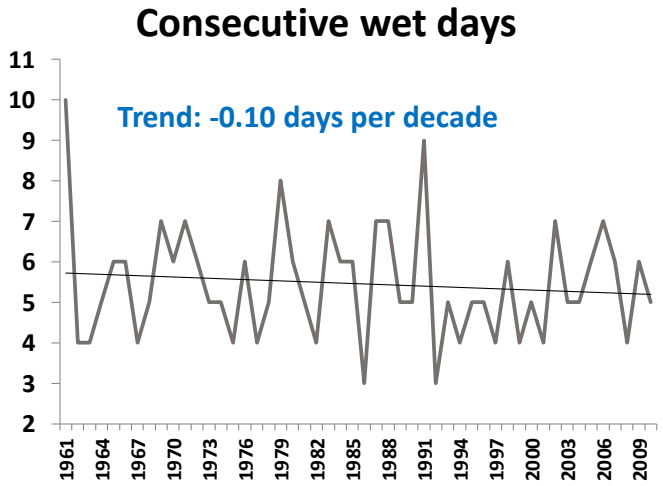


Source: EEA, 2012: Climate change impacts and vulnerability in Europe. An indicator – based report. No 2/2012. 304p.

Trends in consecutive dry days and consecutive wet days







Source: EEA, 2012: Climate change impacts and vulnerability in Europe. An indicator – based report. No 2/2012. 304p.

Top 10 Natural Disasters in Moldova for the period 1900 to 2013

Economic damage costs:

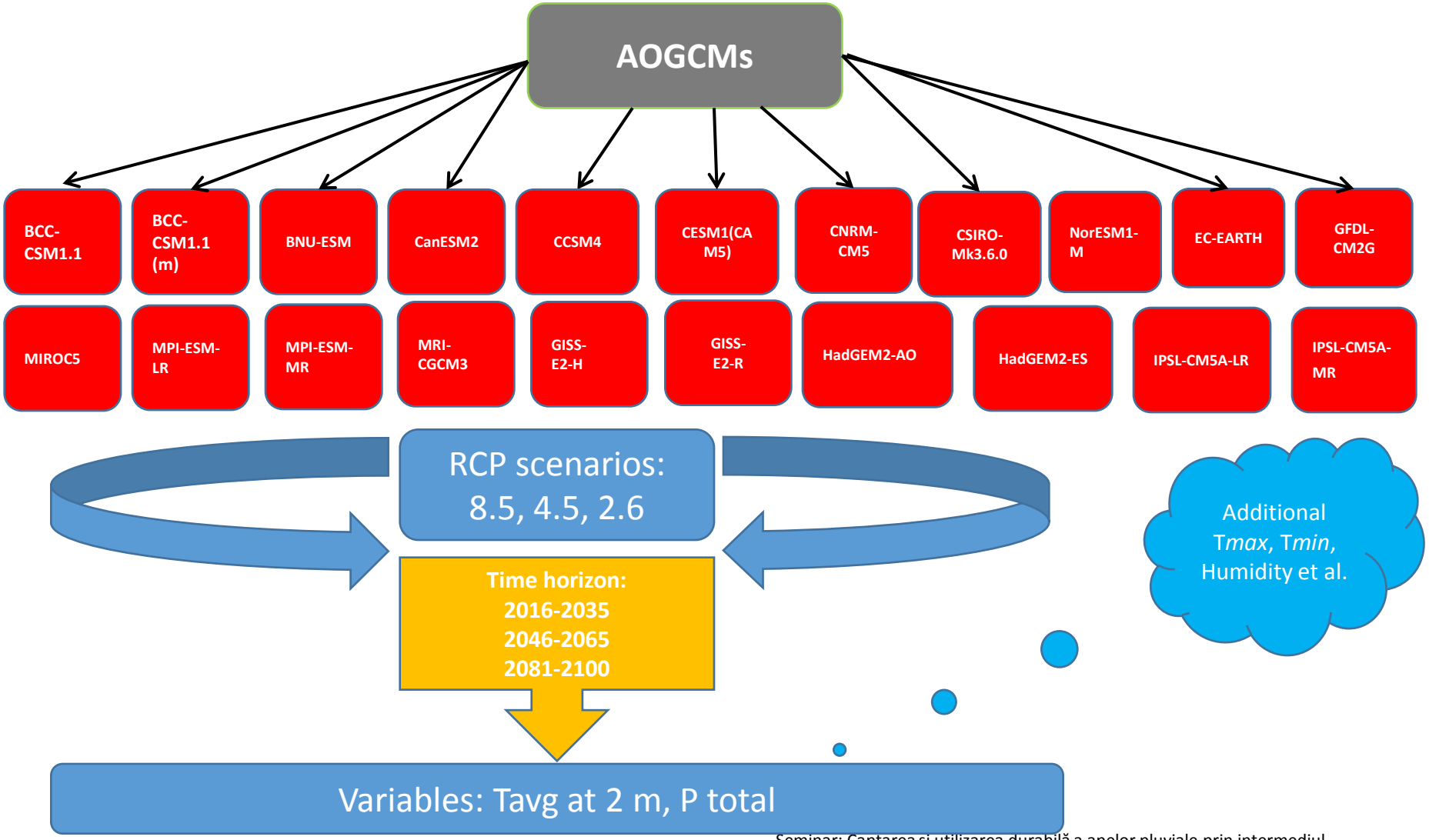
Disaster	Date	Damage (000 US$)
Drought	2007	406,000
Flood	24-Aug-1994	300,000
Flood	6-Jul-1997	50,000
Storm	26-Nov-2000	31,600
Flood	18-Aug-2005	7,752
Flood	15-Mar-1999	4,000
Flood	Jun-2002	832

Source:"EM-DAT: The OFDA/CRED International Disaster Database, www.emdat.be - Université catholique de Louvain - Brussels - Belgium"

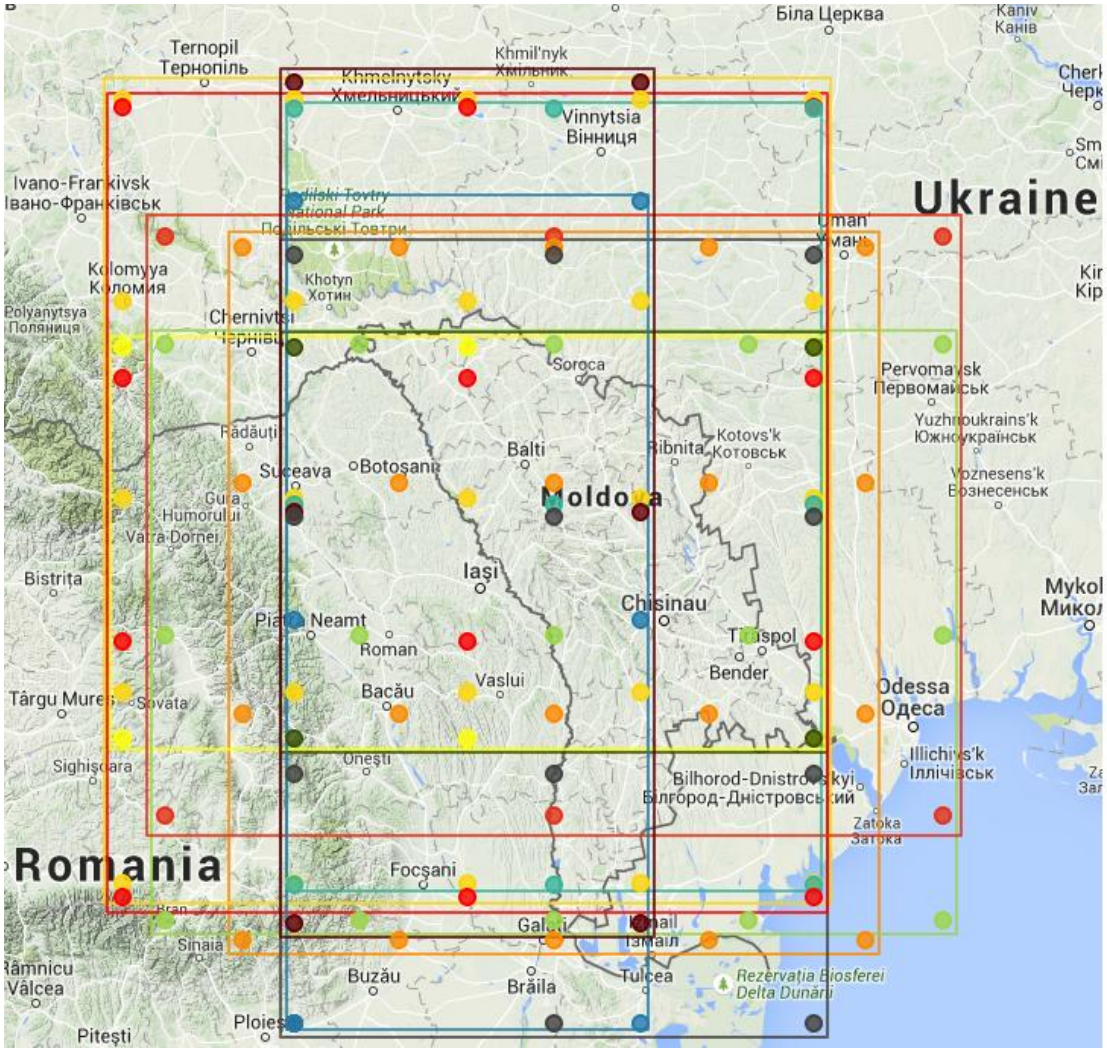
Numbers of total affected people

Disaster	Date	No Total Affected
Storm	26-Nov-2000	2,600,000
Drought	2007	210,394
Storm	11-Nov-1994	25,580
Flood	24-Aug-1994	25,000
Flood	5-Jul-2010	12,000
Extreme temperature	30-Jan-2012	7,374
Flood	18-Aug-2005	6,500
Drought	Nov-2012	5,800
Flood	26-Jul-2008	4,000
Flood	6-Jul-1997	2,244

21 GCMS experiments made kindly available by the WCRP Coupled Model Intercomparison Project – Phase 5 (CMIP5)



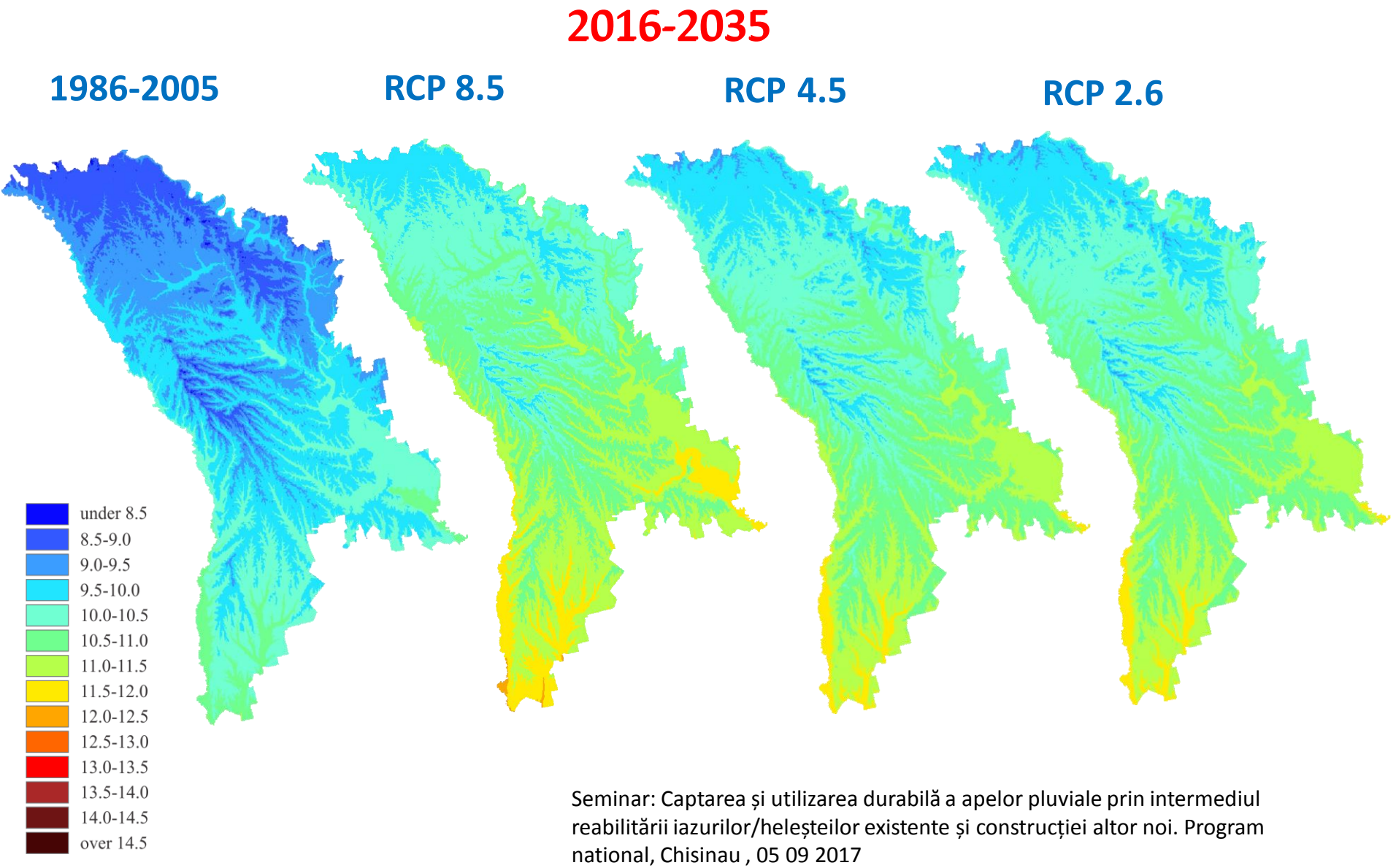
The Number of Grid Points and Corresponding AOGCM Climate Prediction Area (Frame) for the Territory of the Republic of Moldova.



Projected Multi-Model Ensemble Annual Mean Air Temperature (ΔT, °C) Changes over the Republic of Moldova AEZs

Season	AEZ	Average 1986-2005	Projected changes by the 2035			Projected changes by the 2065			Projected changes by the 2100		
			RCP 8.5	RCP 4.5	RCP 2.6	RCP 8.5	RCP 4.5	RCP 2.6	RCP 8.5	RCP 4.5	RCP 2.6
Annual	Northern	8.5	1.1	0.9	0.9	2.5	1.7	1.1	4.6	2.4	1.3
	Central	10.1	1.1	0.9	0.9	2.6	1.7	1.1	4.6	2.4	1.3
	Southern	10.2	1.1	0.9	0.9	2.6	1.6	1.1	4.6	2.3	1.3

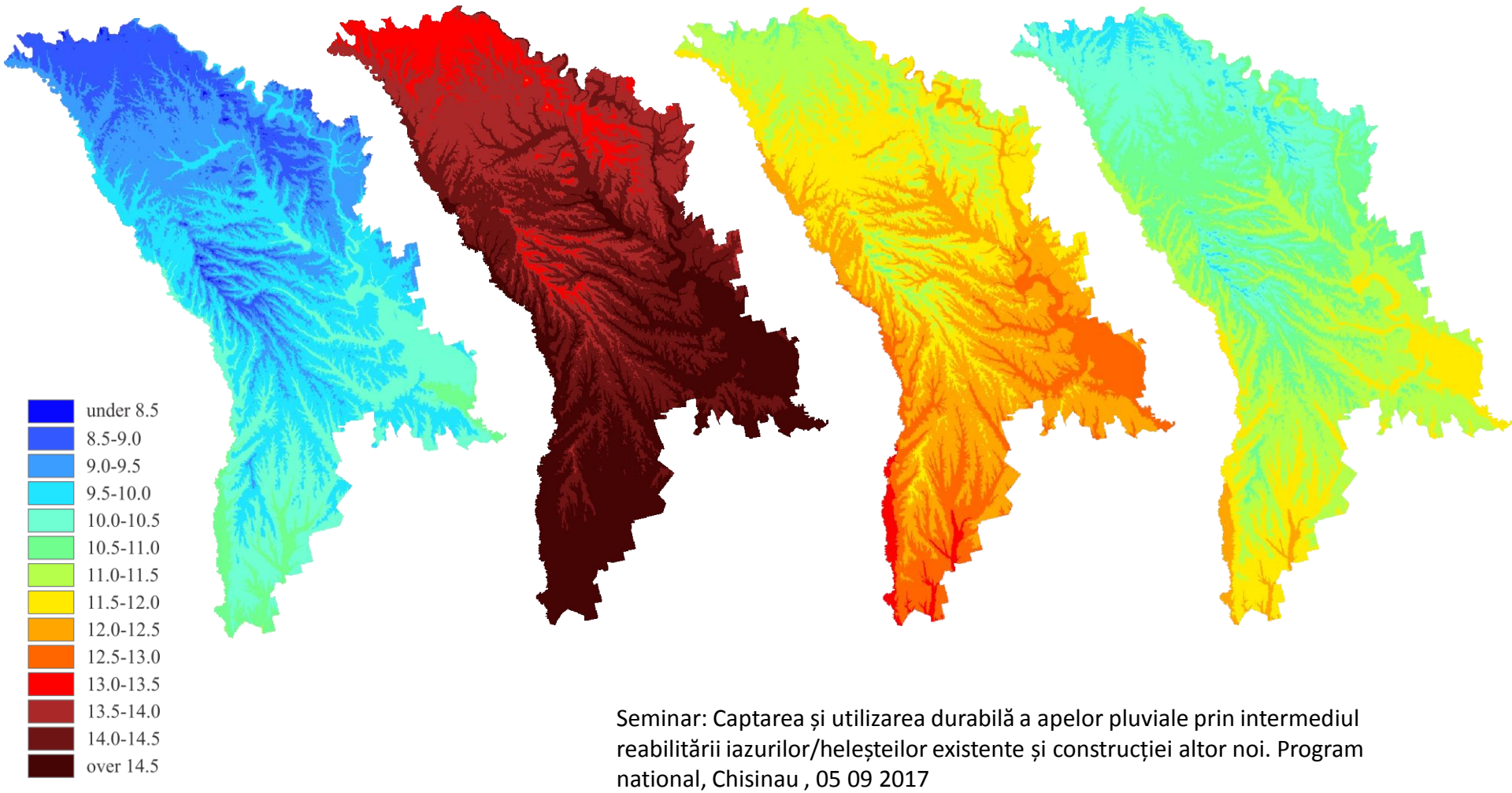
Projected Multi-Model Ensemble Annual Mean Air Temperature over the Republic of Moldova



Projected Multi-Model Ensemble Annual Mean Air Temperature over the Republic of Moldova

2081-2100

1986-2005 RCP 8.5 RCP 4.5 RCP 2.6



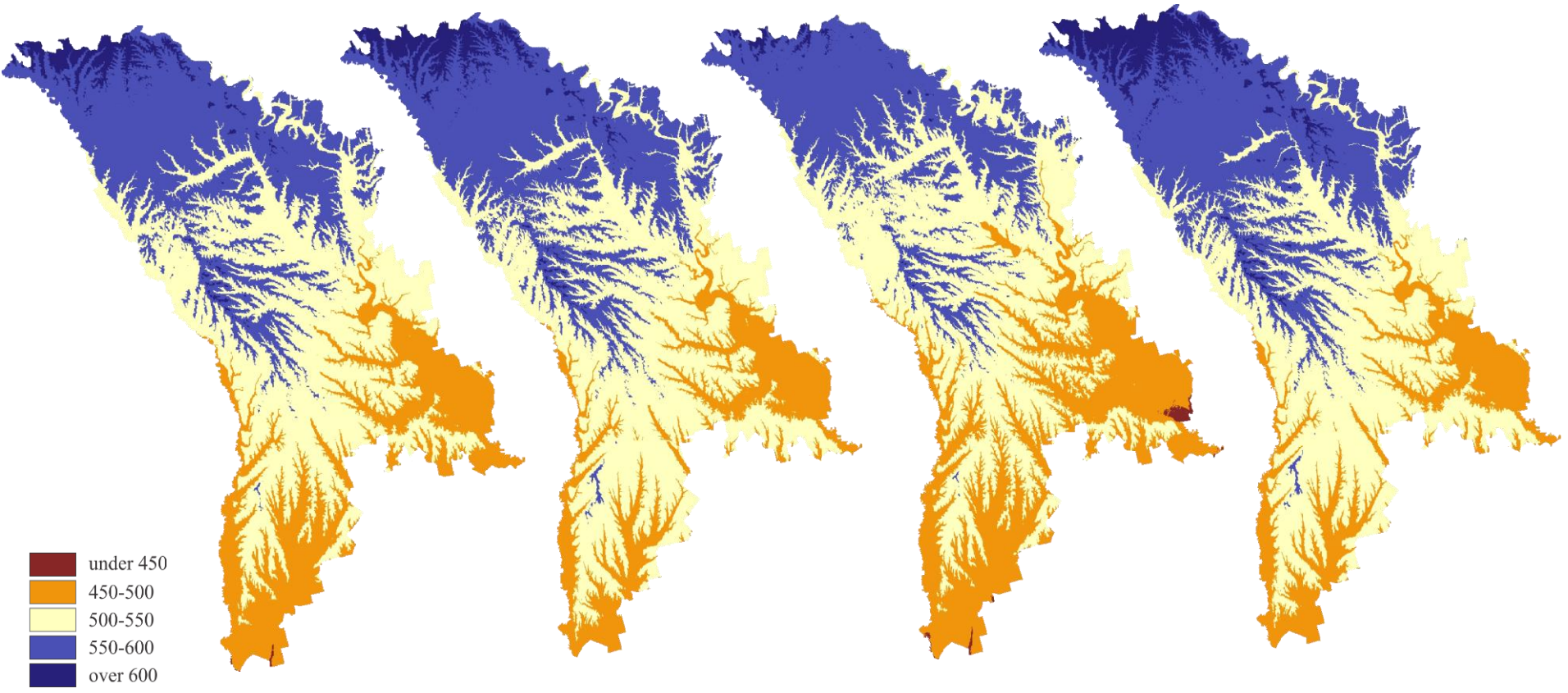
Projected Multi-Model Ensemble Annual Total Precipitation (ΔP, %) Changes over the Republic of Moldova

Season	AEZ	Average 1986-2005	Projected changes by the 2035			Projected changes by the 2065			Projected changes by the 2100		
			RCP 8.5	RCP 4.5	RCP 2.6	RCP 8.5	RCP 4.5	RCP 2.6	RCP 8.5	RCP 4.5	RCP 2.6
Annual	Northern	613.8	0.6	-1.5	1.5	1.3	-0.3	1.5	-9.9	3.6	3.1
	Central	550.4	0.1	-2	0.6	-0.6	1.2	-0.2	-11.5	1.2	4.1
	Southern	501.2	2.5	-0.3	2.3	0	0.7	3.5	-13.4	0.4	5.1

Projected Multi-Model Ensemble Annual Precipitation Spatial Distribution over the Republic of Moldova

2016-2035

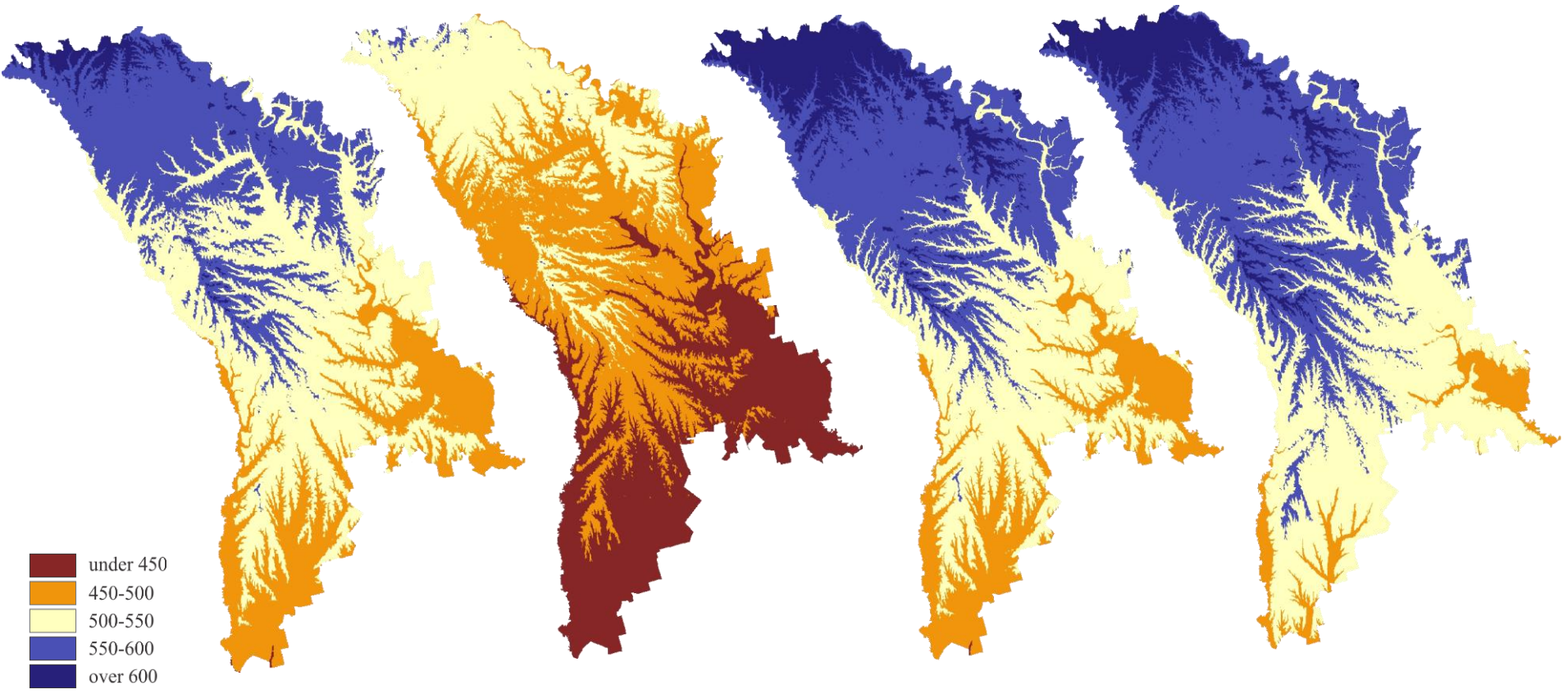
1986-2005 **RCP 8.5** **RCP 4.5** **RCP 2.6**



Projected Multi-Model Ensemble Annual Precipitation Spatial Distribution over the Republic of Moldova

2081-2100

1986-2005 RCP 8.5 RCP 4.5 RCP 2.6



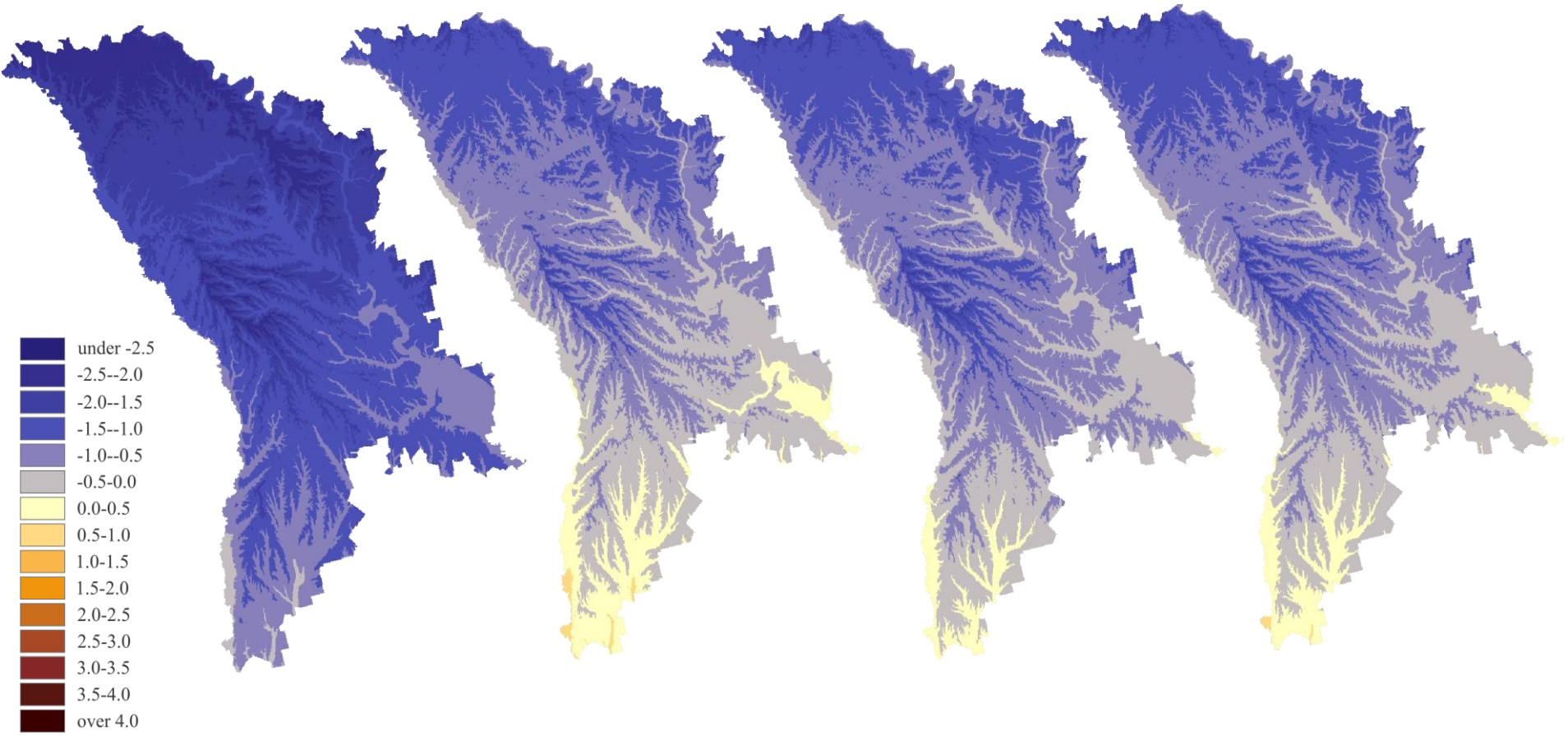
Projected Multi-Model Ensemble Seasons Mean Air Temperature (ΔT, °C) Changes over the Republic of Moldova AEZs

Season	AEZ	Average 1986-2005	Projected changes by the 2035			Projected changes by the 2065			Projected changes by the 2100		
			RCP 8.5	RCP 4.5	RCP 2.6	RCP 8.5	RCP 4.5	RCP 2.6	RCP 8.5	RCP 4.5	RCP 2.6
DJF	Northern	-2.4	0.8	0.8	0.8	2.4	1.7	1.2	4.6	2.6	1.4
	Central	-1.1	0.8	0.6	0.7	2.4	1.7	1.2	4.2	2.5	1.2
	Southern	-1.1	0.9	0.7	0.8	2.3	1.6	1.3	4.3	2.5	1.2
JJA	Northern	19.1	1.5	1.4	1.3	3.2	2.2	1.7	5.9	2.9	1.4
	Central	21.3	1.5	1.3	1.1	3.0	2.2	1.7	6.0	2.9	1.3
	Southern	21.3	1.6	1.3	1.2	3.2	2.3	1.6	6.1	2.9	1.5

Projected Multi-Model Ensemble DJF Mean Air Temperature Spatial Distribution over the Republic of Moldova

2016-2035

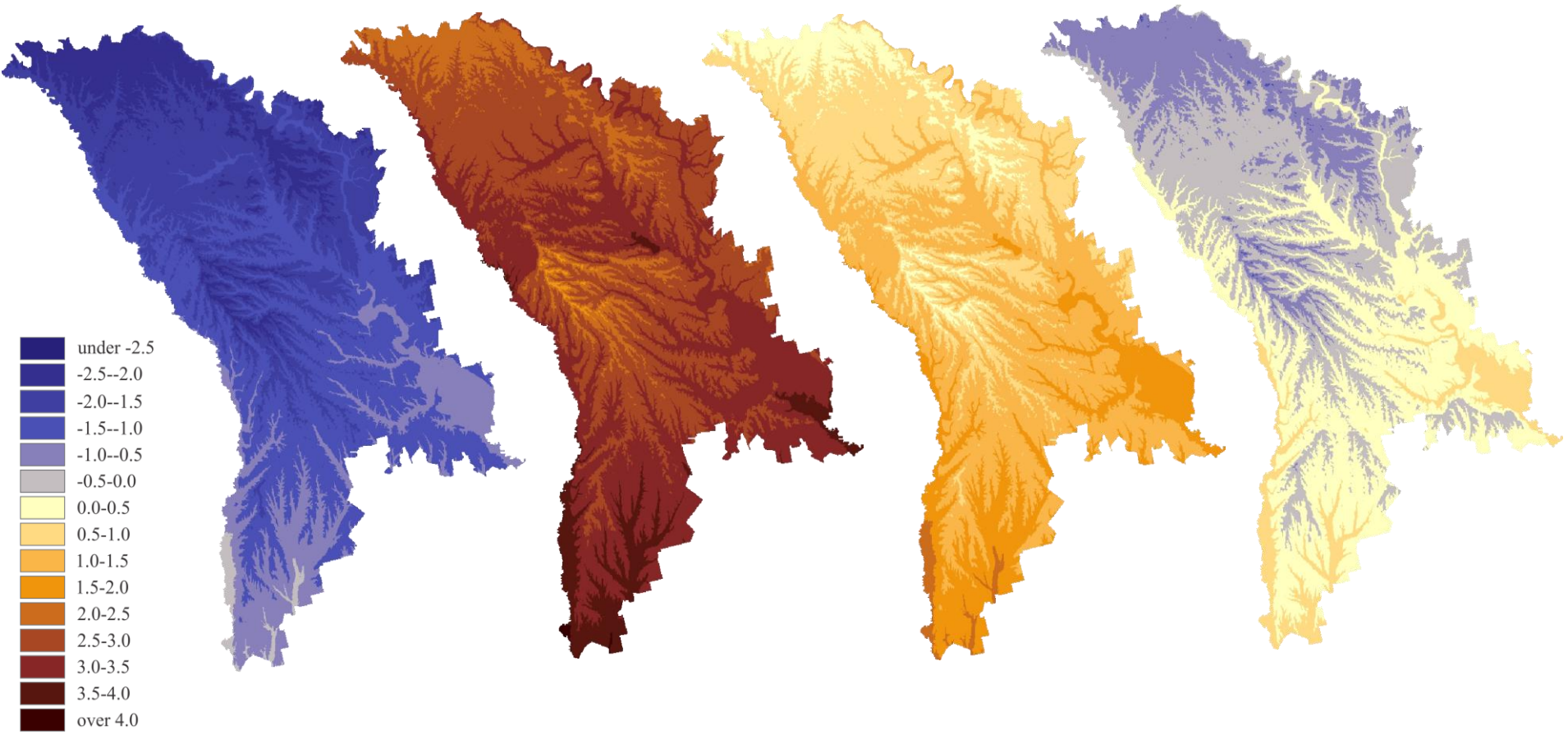
1986-2005 RCP 8.5 RCP 4.5 RCP 2.6



Projected Multi-Model Ensemble DJF Mean Air Temperature Spatial Distribution over the Republic of Moldova

2081-2100

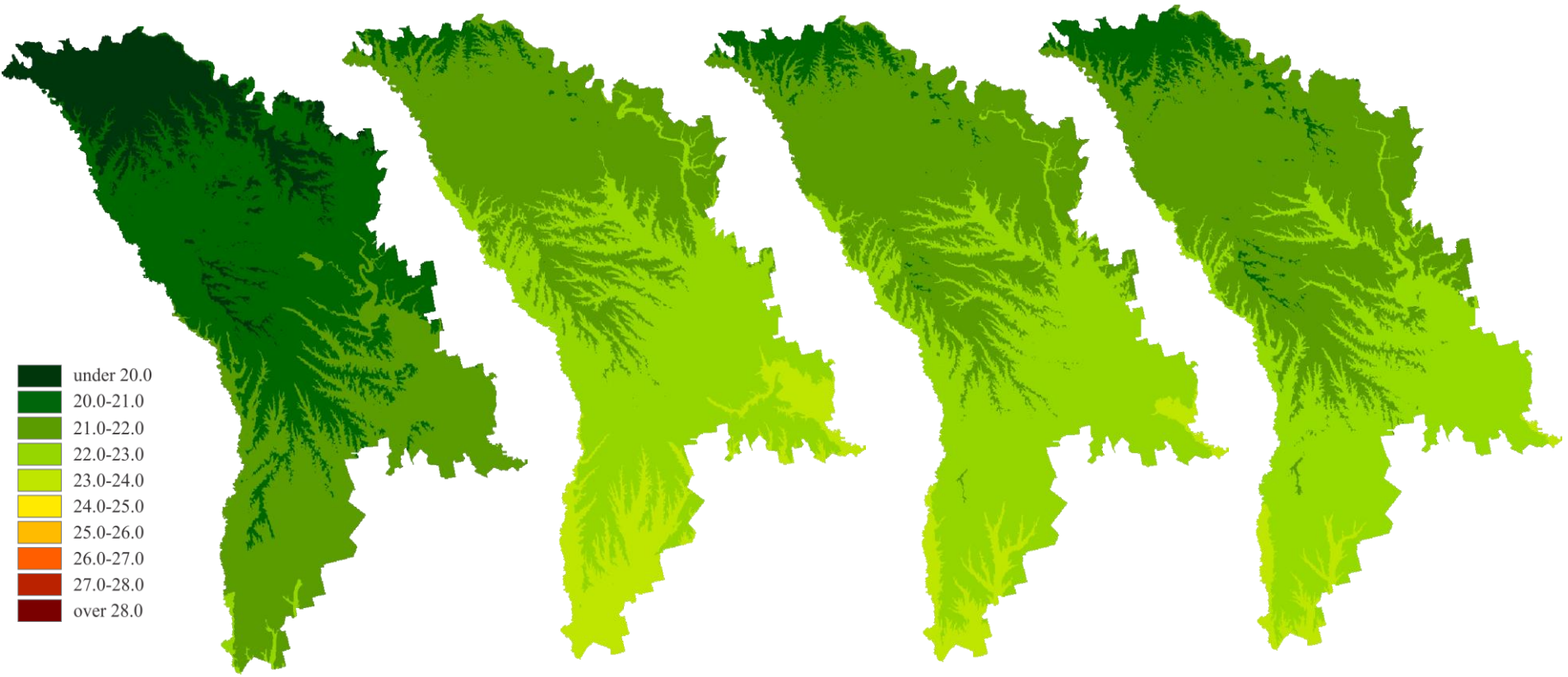
1986-2005 **RCP 8.5** **RCP 4.5** **RCP 2.6**



Projected Multi-Model Ensemble JJA Mean Air Temperature Spatial Distribution over the Republic of Moldova

2016-2035

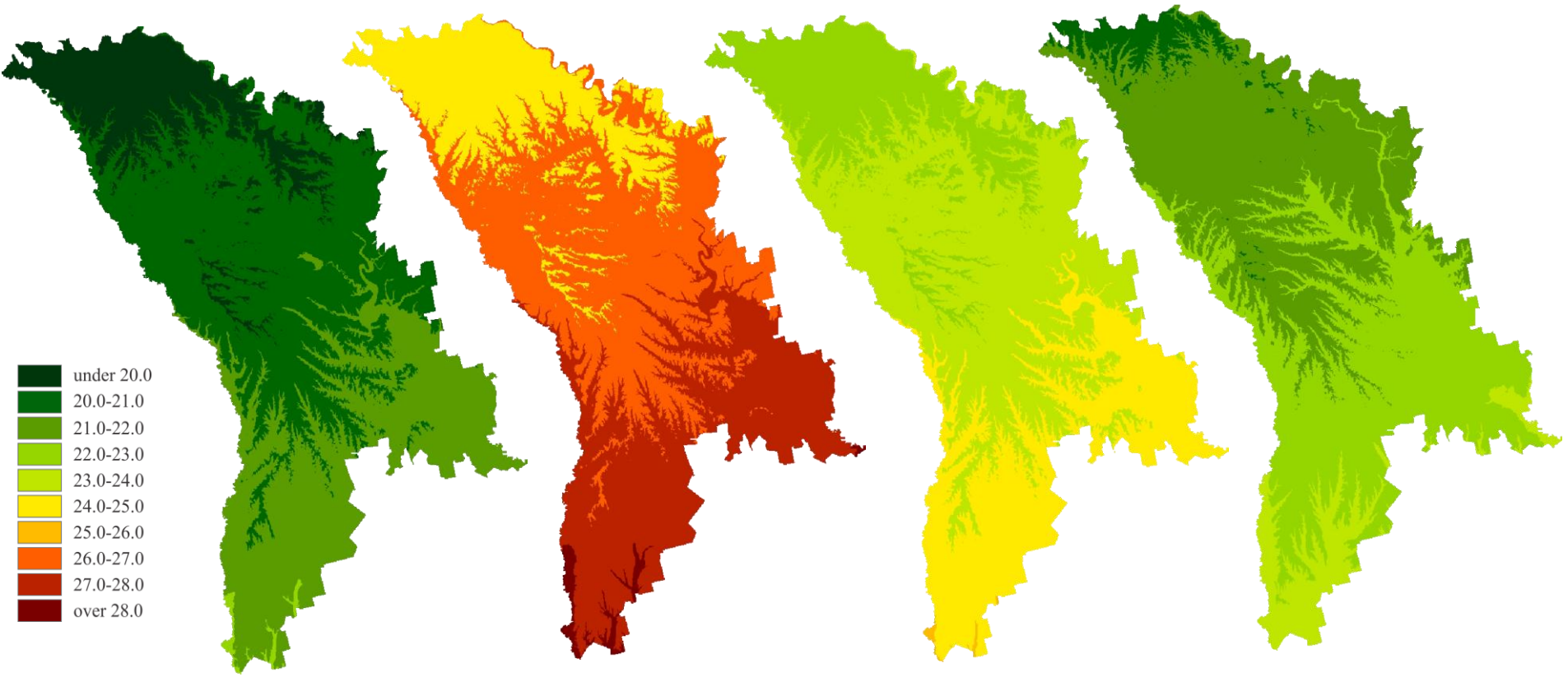
1986-2005 RCP 8.5 RCP 4.5 RCP 2.6



Projected Multi-Model Ensemble JJA Mean Air Temperature Spatial Distribution over the Republic of Moldova

2081-2100

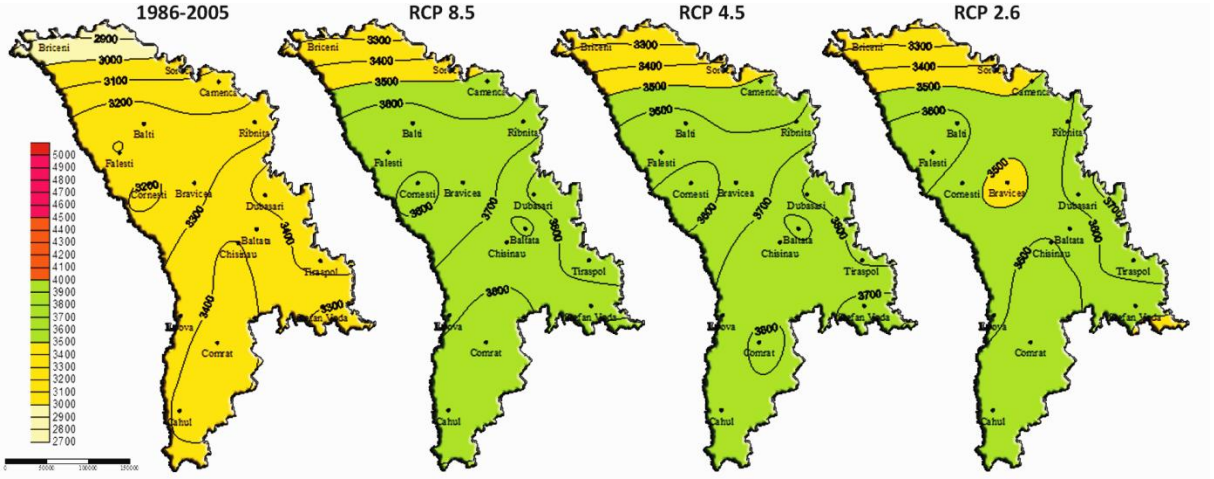
1986-2005 RCP 8.5 RCP 4.5 RCP 2.6

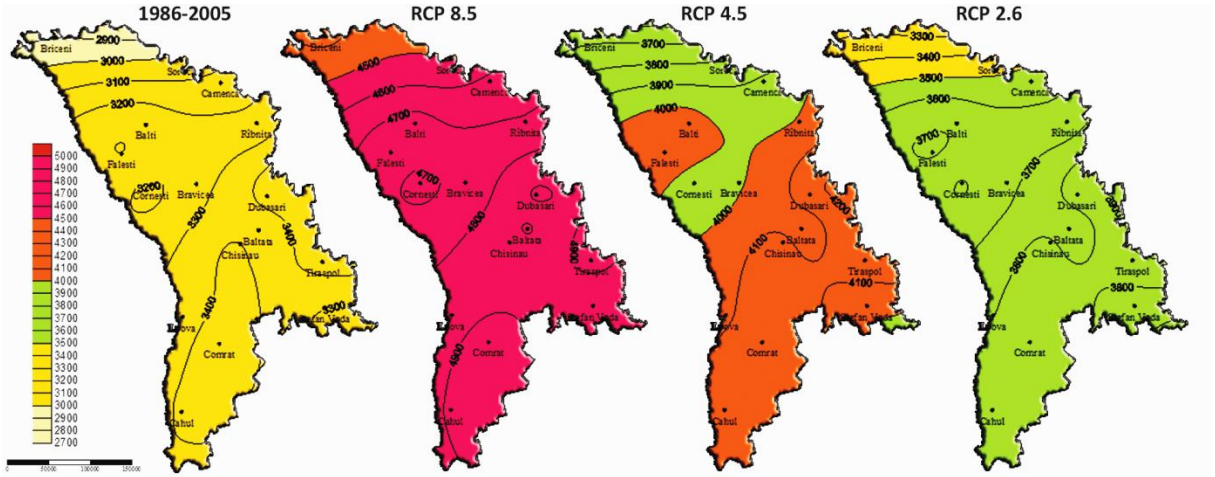


Projected Multi-Model Ensemble Season Total Precipitation (ΔP, %) Changes over the Republic of Moldova AEZs

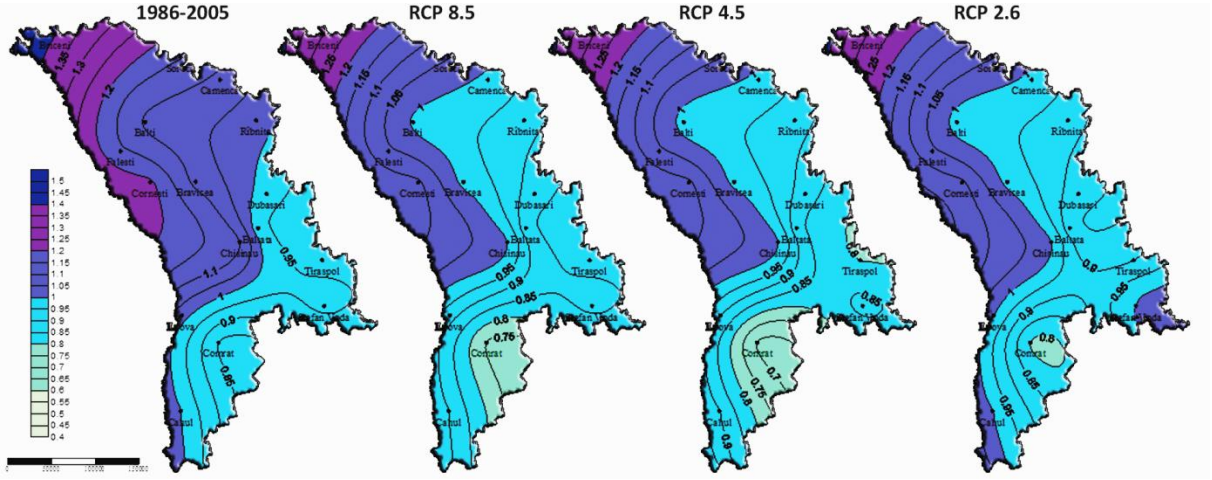
Season	AEZ	Average 1986-2005	Projected changes by the 2035			Projected changes by the 2065			Projected changes by the 2100		
			RCP 8.5	RCP 4.5	RCP 2.6	RCP 8.5	RCP 4.5	RCP 2.6	RCP 8.5	RCP 4.5	RCP 2.6
DJF	Northern	96.5	5	6	2	11	5	6	12	10	4
	Central	97.0	5	5	3	11	6	5	7	11	3
	Southern	82.0	1	6	2	10	1	5	9	5	3
JJA	Northern	245.7	1	-6	-3	-8	-4	-2	-18	-7	0
	Central	188.2	2	-6	-3	-8	-3	-1	-25	-13	-1
	Southern	180.6	1	-4	-2	-8	-6	3	-21	-4	8

Projected 21 Multi - Model Ensemble Sum of Active $\Sigma T_{ac>10°C}$ Temperature, °C Development throughout the Republic of Moldova



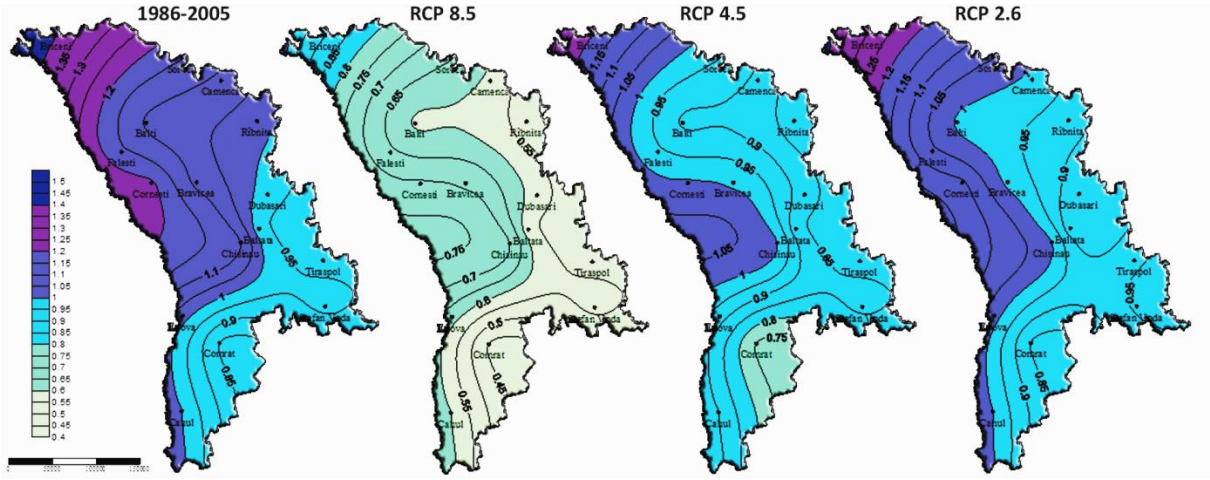


Projected Multi - Model Ensemble HTC Indices Development for the Vegetation Period throughout the Republic of Moldova



2016-2035

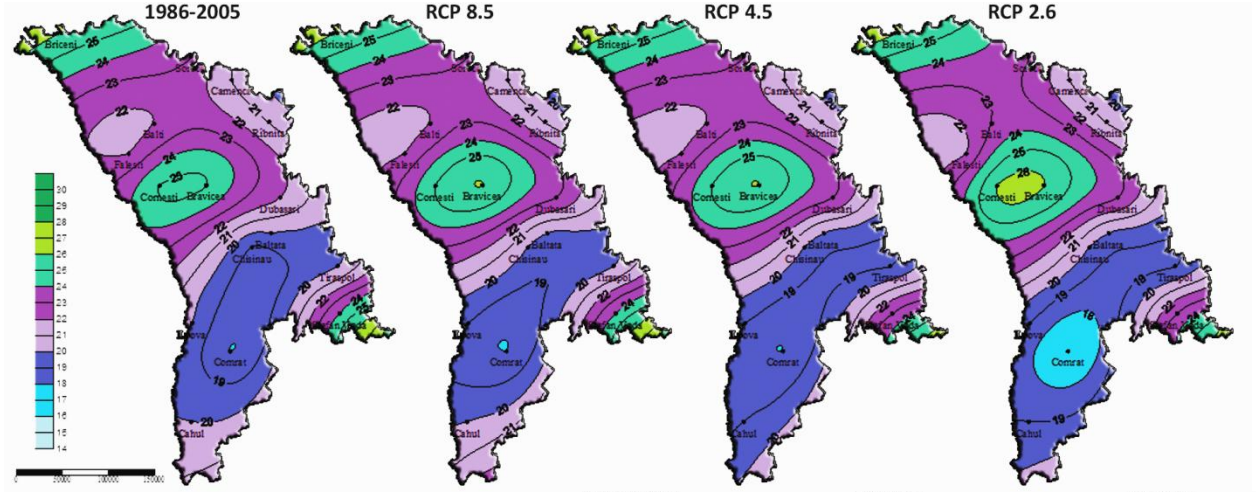
2081-2100



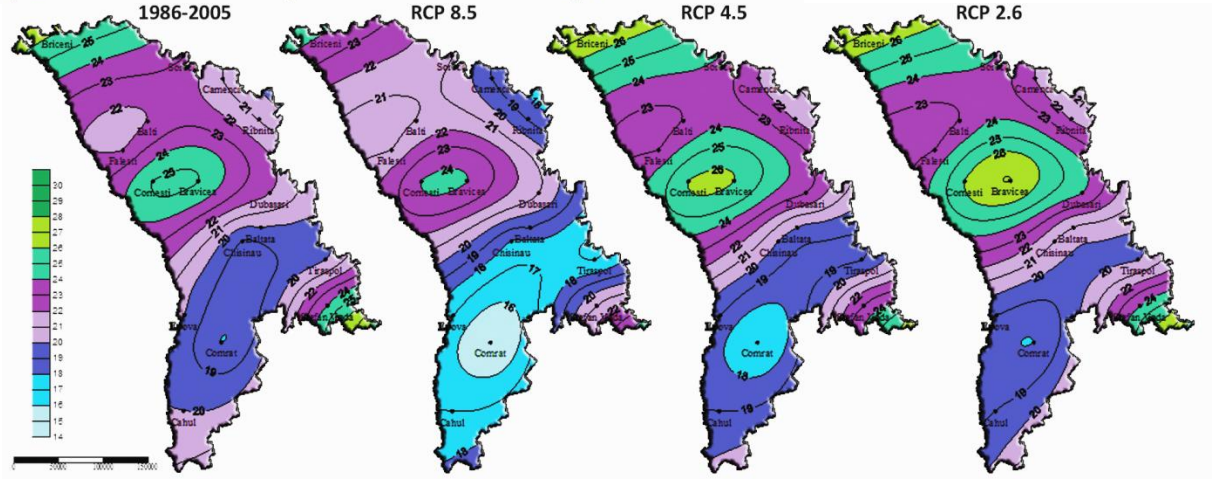
Projected Ensemble Changes in the (HTC) during the growing season by the 2081–2100 Briceni, Chisinau, Cahul

HTC> 1 - sufficient humidity;
HTC ≤ 0.7 - drought conditions;
HTC = 0.6 - medium drought;
HTC ≤ 0.5 - strong drought

Projected Multi - Model Ensemble Ivanov Index of the Biological Effectiveness of Climate (IBEC) Development throughout the Republic of Moldova

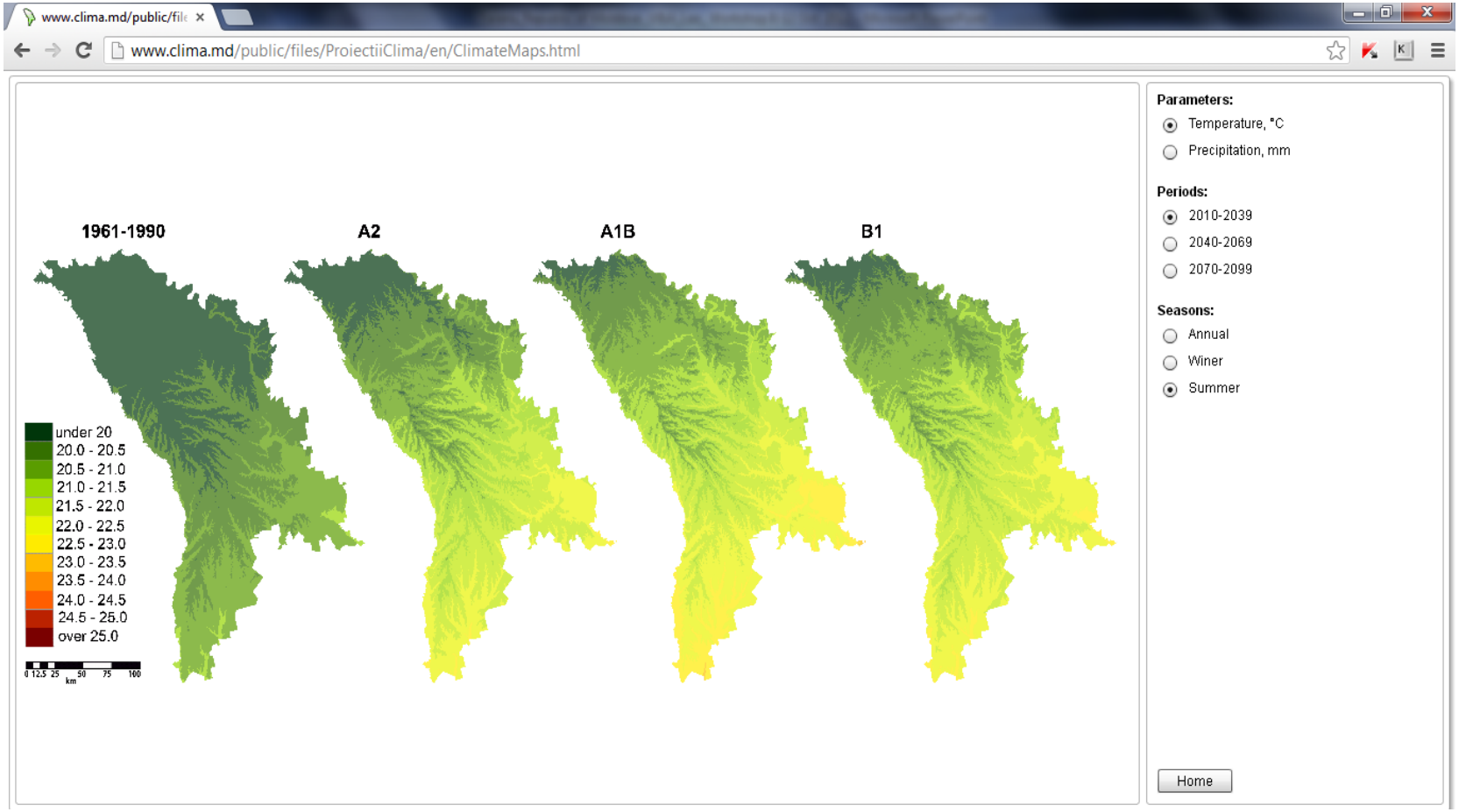


2016-2035



2081-2100

www.clima.md


www.clima.md/public/file
www.clima.md/public/files/ProiectiiClima/en/ClimateMaps.html
1961-1990
A2
A1B
B1
under 20
20.0 - 20.5
20.5 - 21.0
21.0 - 21.5
21.5 - 22.0
22.0 - 22.5
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23.0 - 23.5
23.5 - 24.0
24.0 - 24.5
24.5 - 25.0
over 25.0
0 12.5 25 50 75 100
km
Parameters:
Temperature, °C
Precipitation, mm
Periods:
2010-2039
2040-2069
2070-2099
Seasons:
Annual
Winer
Summer
Home

Thank you for attention!

Contact e-mail:

l.taranu@yahoo.com