



“Climatic tendencies in the cold season in the Republic of Moldova”

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October 28, 2013, Moscow, Russia

Major climatic features of the winter season

- ▶ The beginning of the cold season (steady transition of the average daily temperature over 0°C) in Moldova is an average from 28 November (north) until December 13 (south).
 - ▶ Depending on the nature of the synoptic processes, the date of the onset of winter in some years may differ significantly from the average.
 - ▶ On average, once in 10 years in the northern regions and once in 4 years on the rest of the territory there is not observed any steady transition of temperature over 0°C.
 - ▶ The earliest winter for the entire observation period for the most part of the territory was recorded in 1988 on November 9.
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Major climatic features of the winter season

- ▶ The duration of winter is usually small and varies on the territory on average from 80 days in the southern part to 100 days in the northern part.
 - ▶ The average air temperature in the winter time on the territory is from 1.2 to 3.3°C below zero.
 - ▶ The coldest winter was registered in 1953-1954, when the average air temperature was -8..-9°C, which is lower than the norm with 6-7°C.
 - ▶ The warmest winter was registered in 2006-2007, when the average air temperature was +1..+3°C, which is higher than the norm with 4-5°C.
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Major climatic features of the winter season

- ▶ The lowest air temperature for the entire observation period was recorded on 20th of January 1963: -35.5°C (v. Brătușeni, region Edineț).
- ▶ The highest air temperature was recorded on 26th of February 1990: $+23.3^{\circ}\text{C}$ (Tiraspol).
- ▶ The instability of air temperature in winter is one of the most distinctive features of the climate in Moldova.
- ▶ The coldest month of the winter is January, where the average monthly temperature is $-3..-5^{\circ}\text{C}$.



Major climatic features of the winter season

- ▶ The characteristic feature of the winter in Moldova are the often and important changes in the air temperature, linked with thaws.
 - ▶ Thaws occur at the advection of warm air masses from the Atlantic, when the territory of Moldova is in the hollow of the cyclones moving from the west.
 - ▶ They are more intense at the motion of south-western and southern cyclones that cause the removal of warm air from the Mediterranean and Black seas.
 - ▶ As a result of the prevailing advection of warm and humid air, in the cold season dominates cloudy weather (60-75%), and often there is fog.
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Major climatic features of the winter season

- ▶ Continuous long freezing periods, when during the month the temperature is lower than 0°C, are rare.
 - ▶ Repeatability of this kind of winter is 7-10% in the southern part and 17-18% in the northern part of the republic.
 - ▶ Big negative anomalies of the air temperature in winter season are attracted by a few types of atmospheric processes: polar and ultra polar invasions stopping the anticyclones above the north-western part of Europe and Scandinavia and the influence of the ridge of the Siberian anticyclone.
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Major climatic features of the winter season

- ▶ During the winter season on the territory falls on average 85-110mm of rainfall, or 16-20% of the annual amount.
 - ▶ The precipitations fall mainly mixed – in the form of rain and snow, their daily maximum has reached 50-70 mm.
 - ▶ The snow cover (retaining no less than one month) is formed in more than 50% of winters only in the northern and north-eastern regions, in the rest of the republic, it is rarely observed (15 to 50% of the years).
 - ▶ In winter, the soil usually repeatedly freezes and thaws, sustainable freezing is observed only in the coldest winters. The depth of frost penetration is less than 1 m.
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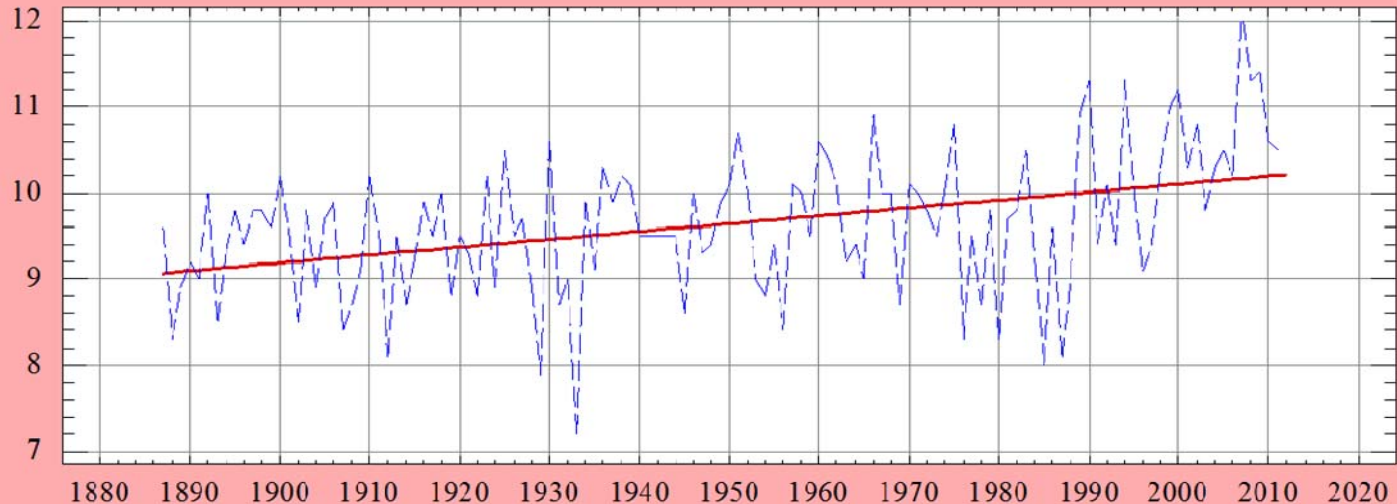


Major climatic features of the winter season

- ▶ Out of the elemental meteorological phenomena, the most dangerous ones are:
 - ✓ heavy snowfall (on average once in 2 years), snowstorm (on average once in 5 years)
 - ✓ glazed ice and rime deposits (on average once in 3 years).
- ▶ In the years with warm winter thaws are dangerous for winter crops.
- ▶ The most dangerous thaws are those at an average daily air temperature of $+5^{\circ}\text{C}$ and higher. Such thaws are encountered almost every year.

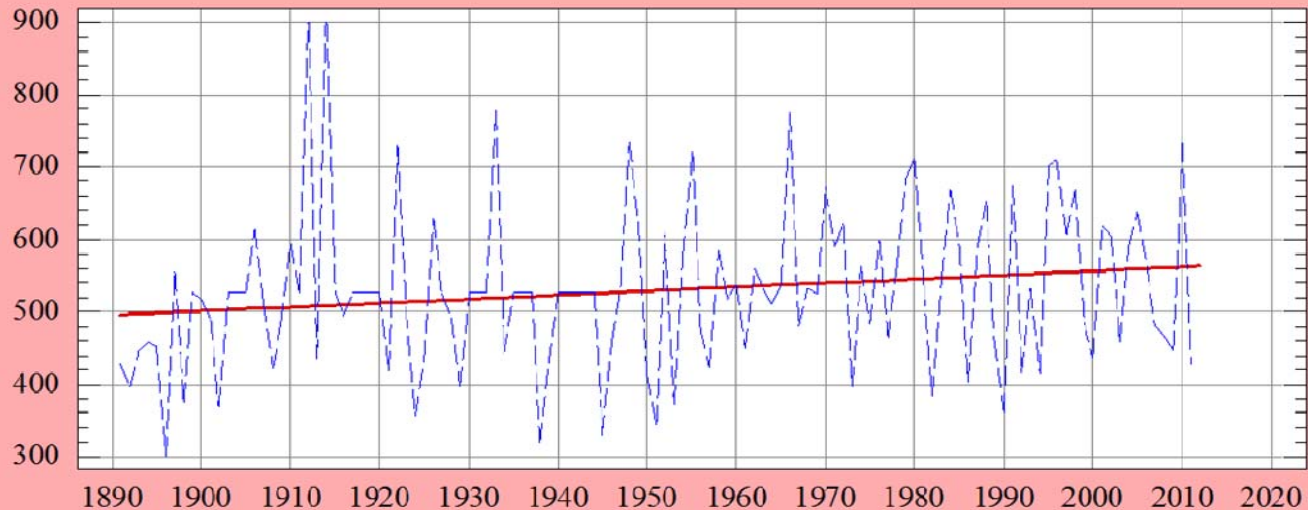


Change in the average year temperature (°C). Chisinau(1887-2012)



- ▶ Based on the data from MS Chisinau, compared with the beginning of 20 century, the average annual air temperature has increased by 1,0°C.

The change in the annual precipitation quantity (mm) Chisinau (1891-2012)



- ▶ The amount of precipitation has increased by 10%.

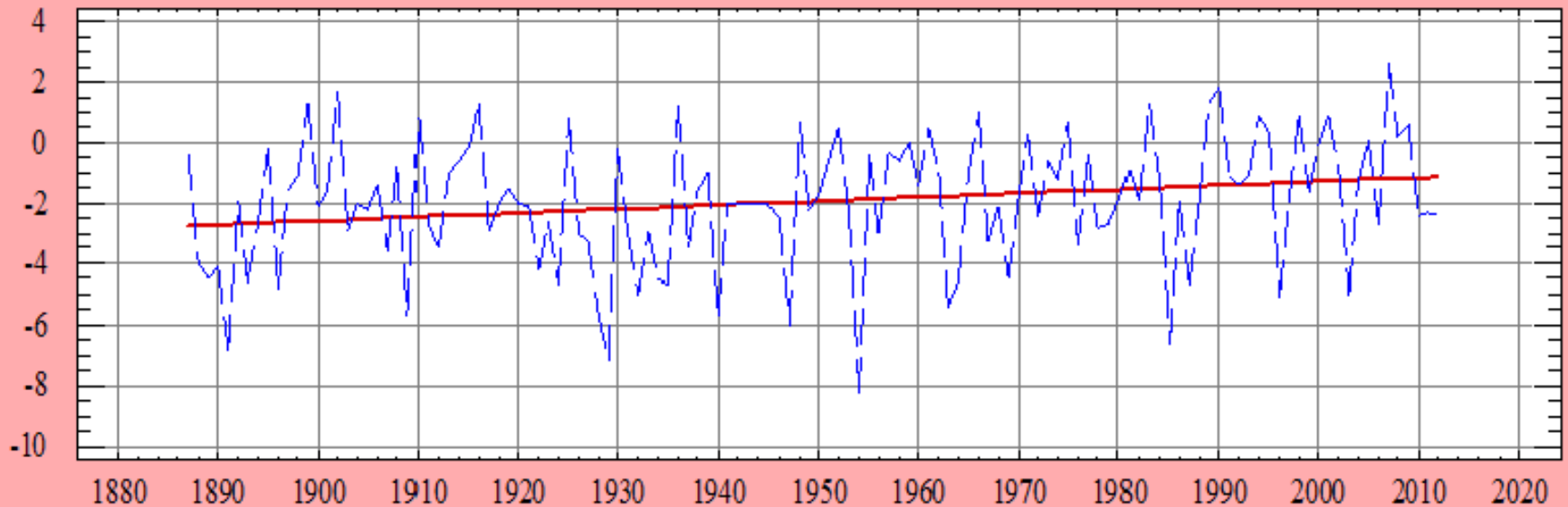


The tendency in the change of air temperature and precipitation (1900-2012 yy.)

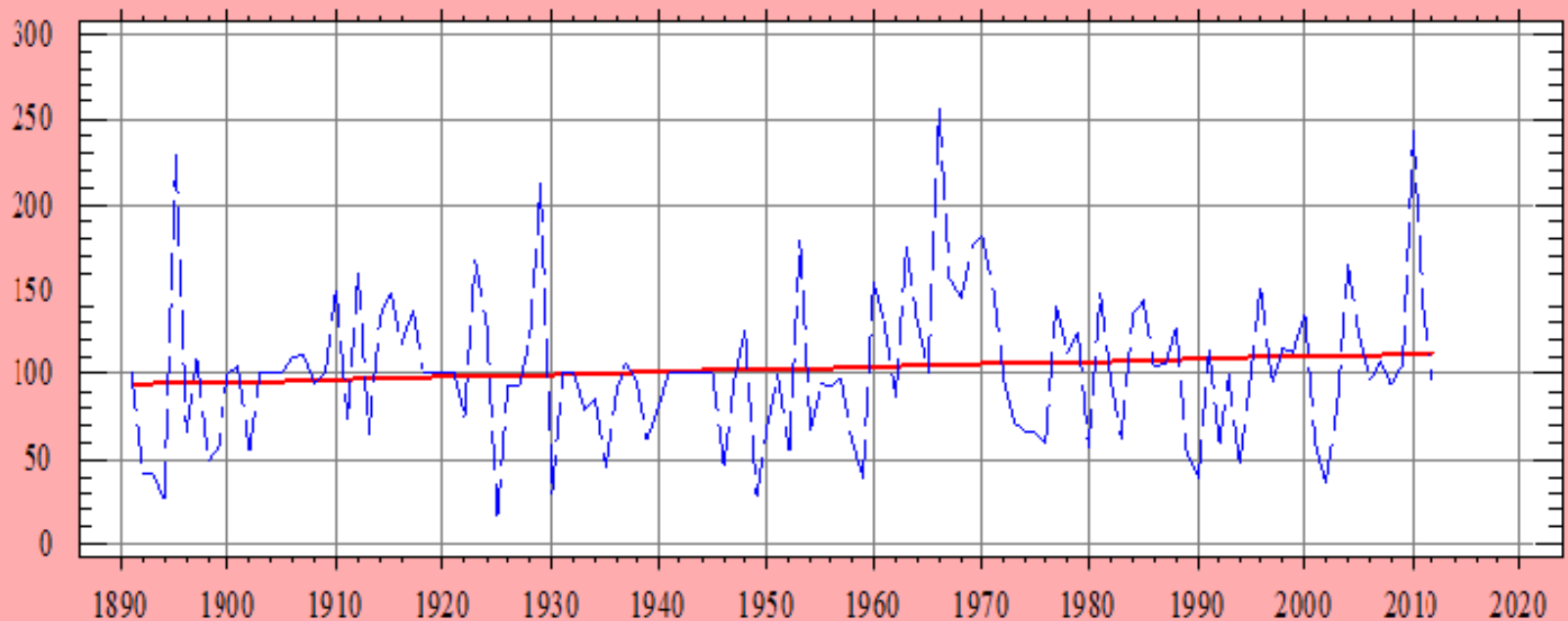
Season	Air temperature, °C	Amount of precipitation, % (mm)
winter	1,5	15 (20)
spring	1,2	-5 (-5)
summer	1,1	5 (10)
autumn	0,4	25 (25)
year	1,0	10 (50)

- ▶ The largest contribution to the changes in the annual air temperature has made the winter season.
- ▶ The average air temperature in winter, compared to the beginning of 20th century, has increased with 1.5°C.

The change in the average air temperature for the winter season (°C). Chisinau (1887-2012)



The change in the amount of precipitation (mm) for the winter season. Chisinau(1891-2012)



Average air temperature($t, ^\circ\text{C}$) and the deviation from the norm ($\Delta t ^\circ\text{C}$) for different periods. Winter

Period	t	Δt
Norm-00	-2,0	
For individual 10 years		
1951-1960	-1,6	0,4
1961-1970	-2,2	-0,2
1971-1980	-1,4	0,6
1981-1990	-1,5	0,5
1991-2000	-1,0	1,0
2001-2010	-0,8	1,2
For individual 20 years		
1951-1970	-1,9	0,1
1971-1990	-1,5	0,5
1991-2010	-0,9	1,1
For individual 30 years		
1951-1980	-1,7	0,3
1981-2010	-1,1	0,9

Tendency of change of air temperature and precipitation (1900-2012 yy.)

- ▶ In winter, the substantial increase of air temperature has occurred under the influence of temperature range of the last 20-years (1991-2010 yy.), which average temperature was 1,1°C higher than the norm.
- ▶ Thus winter period of 2001-2010 yy. was the warmest for the whole observation period.
- ▶ Its air temperature on average was 0,8°C, which is 1,2°C higher than the norm.
- ▶ Rainfall in this season is 10% higher than the norm.



Tendency of the air and precipitation temperature change (1900-2012 yy.)

- ▶ From 30-years periods the warmest winter was in the period since 1981 till 2010 yy. (in the average $0,9^{\circ}\text{C}$ higher than normal).
- ▶ In this period only in winter season in 1984-85, 1986-87, 1995-96 and 2002-03 yy. was much colder than normal(with $3-5^{\circ}\text{C}$).
- ▶ The temperature range of other winters was close to normal or higher basically with $1-3^{\circ}\text{C}$.
- ▶ On this 30-years was noticed and the warmest winter in last 125-year period of observations – winter 2006-07 yy., which average temperature was $4,6^{\circ}\text{C}$ higher than normal.
- ▶ The amount of fallen precipitation per winter on the last 30 years was close to normal.



Characteristic of winter of 2012-2013

- ▶ In Moldova was basically within the normal and with abundant precipitation.
- ▶ Average season air temperature on the territory was $-1..-3^{\circ}\text{C}$, that in most of the territory is within normal, and sometimes $1,0^{\circ}\text{C}$ higher.
- ▶ Minimal temperature of the air during the season lowered sometimes to -23°C , which in winter can be noticed once in 3 years.
- ▶ The amount of precipitation per season was 125-240 mm (150-280% normal), which can be noticed once in 10-30 years.



Characteristic of winter of 2012-2013

- ▶ Most of precipitation fell in December. Its sum per month was 75-145 mm (200-450% normal), which is noticed on 85% of the territory of the country for the first time during the entire observation period.
- ▶ The average decadal height of the snow cover in the 2nd and 3d period of December on meteorological site was 30-45 cm, which in December is noticed in the average once in 30-60 years.
- ▶ The maximum height of the snow cover sometimes reached 59 cm, which in winter season is noticed in the average once in 15 years.



Thank you for your attention!

