Project theme: GLOBAL WARMING

Project title: THE IMPACT OF CLIMATE CHANGES ON VEGETATION

Team: BUBURUZELE ISTETE

 Class II C, "Emil Isac" Secondary School Cluj-Napoca Age of the student: 8-9 years

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Research question:

IS THERE A CONNECTION BETWEEN CLIMATE CHANGES AND THE APPEARANCE OF THE VEGETATION IN THE PERIOD 1-9 MARCH IN THE DAMBUL ROTUND DISTRICT, CLUJ-NAPOCA, CLUJ COUNTY, ROMANIA?

Phase I

   In the ancient Roman calendar, the year began on March 1, and Baba Dochia appears as the embodiment of the old year, which is drawing to a close and must die. Dochia's death on March 9 is considered the boundary between the cold and warm seasons. Thus, the period between March 1 and 9 represents the time interval in which Dochia fulfills his destiny by climbing the mountain, together with his flock of sheep, to die towards rebirth. The unstable aspect of the weather during this period is considered to be due to the capricious character of Baba Dochia. Spring babes are also known as Baba Dochia days. Whenever we celebrate Babel we will, in fact, be celebrating the transition from winter to summer. The first days of March are considered changeable, some being too hot and others cold. Ethnographers say that the tradition of "babes" arose from the myth of Baba Dochia, one of the most important in Romanian culture. Baba Dochia would have taken its name from Saint Evdochia, celebrated by the church on March 1. Tradition says that between March 1-9, each person has a "grandmother". For choosing the baby, one method is to choose a day between March 1 and 9 at random. Another method is to choose your baba based on your birthday: if the day is between the 1st and 9th of any month then the baba will be on that day as well.

In order to check if this tradition is still respected or if the weather has changed due to climate change, I searched the archives of the Meteorological Society for the temperature values recorded in recent years https://www.meteoromania.ro/clim/caracterizare-multianuala/cc_1961_2023_03.html

We reproduce here the obtained data:

Table 2: Data related to air temperature (absolute monthly maximum and minimum, respectively multiannual monthly average) and atmospheric precipitation (absolute monthly maximum,

monthly average multiannual and absolute maximum in 24 hours) from March, for 13 weather stations evenly distributed on the territory of Romania

Stația meteorologică	Temperatura aerului (°C)			Precipitaţii atmosferice (mm)		
	Maxima absolută/Anul	Media lunară multianuală (1961-2023)	Minima absolută/Anul	Cantitatea lunară maximă absolută/Anul	Cantitatea lunară, medie multianuală (1961-2023)	Cantitatea maximă absolută căzută în 24 ore/Anul
Bucureşti-Filaret	28,8/1947	6,2	-19,0/1883	127,9/1984	42,0	49,3/1973
Buzău	28,0/2001	5,3	-17,0/1901	84,8/2018	26,6	42,0/1897
Ceahlău Toaca	13,8/1989	-5,3	-29,0/1987	105,6/2021	38,9	34,7/2021
Cluj-Napoca	28,9/1927	4,0	-22,0/1932	108,5/1962	30,2	32,2/2006
Constanţa	30,8/1952 (Constanţa Port)	5,5	-12,8/1929; 1940 (Constanţa Aer; Constanţa Port)	95,7/1995	31,5	44,7/1995
Craiova	29,0/1947	5,6	-21,0/1929	144,0/2016	42,6	44,8/2016
Iaşi	27,0/1926 (Iaşi Internat)	3,8	-22,7/1952	95,3/1900 (Iaşi Internat)	31,9	59,7/1901 (Iaşi Internat)
Satu Mare	26,0/1974	4,8	-20,6/1940	180,9/2013	36,9	35,6/2004
Semenic	17,5/1977	-2,1	-21,7/1987	193,2/1962	66,1	48,8/1982
Tg. Mureş	27,0/1975	4,3	-27,3/1932	97,1/1962	29,7	57,0/1897
Timişoara	28,2/1952	6,2	-20,0/1933	116,0/1915	35,4	28,4/1924
Vf. Omu	12,2/1974	-8,1	-29,6/1987	307,7/1944	66,0	55,0/1944
Vlădeasa 1800	12,8/1991	-4,5	-26,3/1987	180,7/2006	66,1	34,0/2001

Tabelul 3: Topul anilor cu cele mai calde luni martie din România, din perioada 1961-2023

Nr. crt.	Anul	Temperatura medie lunară (ºC)	Abaterea faţă de mediana intervalului de referinţă 1991 – 2020 (ºC)
1	1990	7,4	3,5
2	2014, 2017	7,2	3,3
3	2001	6,6	2,7
4	2019	6,5	2,6
5	1989	6,2	2,3
6	1975, 2002, 2007	6,1	2,2
7	2020	6,0	2,1

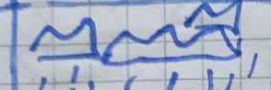| Nr. crt.	Anul	Temperatura medie lunară (ºC)	Abaterea față de mediana intervalului de referință 1991 – 2020 (ºC)
8	2023	5,9	2,0
9	1994, 2008	5,7	1,8
10	1977, 2016	5,5	1,6
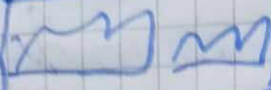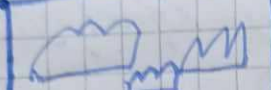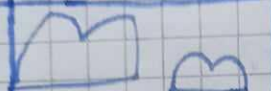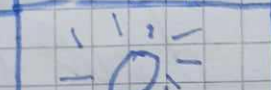
Tabelul 4: Topul anilor cu cele mai reci luni martie din România, din perioada 1961-2023

Nr. crt.	Anul	Temperatura medie lunară (ºC)	Abaterea față de mediana intervalului de referință 1991 – 2020 (ºC)
1	1987	-2,0	-6,0
2	1996	-1,4	-5,4
3	1969	0,1	-3,9
4	1963	0,4	-3,6
5	1962	0,7	-3,3
6	1976	0,9	-3,1
7	1964	1,0	-3,0
8	1993	1,4	-2,6
9	1973,1985,2003,2005	1,5	-2,5
10	1998	1,6	-2,4

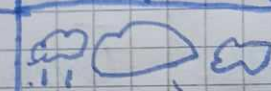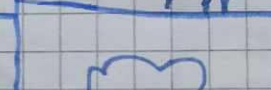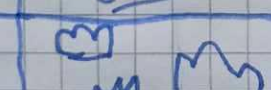**According to these data, we observe that the average temperature in March was 6.1 degrees in 1975, rising in the following years, reaching 7.2 degrees in 2014 and 2017. In a period of 42 years, the average temperature of March has increased by one degree, but this actually means temperature increases during each day. If at the beginning of March there were changes in the weather, one day it snowed, then it froze, then it melted, then it rained, now we have more sunny days at the beginning of March.**

Phase II
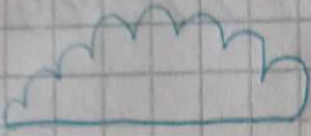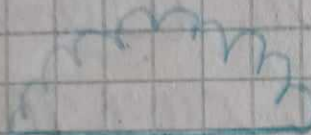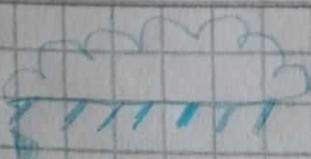
The students of the 2nd grade C created a nature calendar for the period March 1-9, 2024. We will present some of the data obtained by them. From the calendars made by them, it can be seen that in 2024, the temperature was quite high, with no minus temperatures.

Data	Fenomenul meteo	Temperatura			Observații
1.03		7°	11°	10°	timp plăcut
2.03		8°	14°	10°	cald
3.03		7°	12°	8°	călduț și plăcut
4.03		4°	12°	7°	
5.03		3°	16°	9°	ploios dar cald
6.03		4°	10°	8°	foarte cald
7.03		3°	6°	6°	înorat plouă
8.03		3°	8°	5°	înghețidar plăcut
9.03		4°	7°	6°	nori

Dat	FENE METEO	TEMPE RATU		OBSER VATIE
1.03		7°	11	TIMP PLAC
2.03		8°	15	CALD
3.03		6 0	16	PLĀ CUT
5.03		6°	16	CALD
05.03		16°	8	CALD
06.03		16°	8	PLĀ CUT E OK
07.03		7	1	E OK
8.03		8	9	E OK
9.03		6 20	0	PLĀ CUS

Data	Fenomenul meteo	Temperatura			Observații
1.03		7°	11°	10°	timp plăcut
2.03		8°	14°	10°	cald
3.03		7°	12°	8°	călduț și plăcut
4.03		4°	12°	7°	
5.03		3°	6°	9°	ploios dar cald
6.03		4°	10°	8°	foarte cald
7.03		3°	6°	6°	înorat plouă
8.03		3°	8°	5°	înorat dar plăcut
9.03		4°	7°	6°	nori

Calendarul naturii

Data	Fenomenul meteo	Temperatura		Observatii
01.03.2024		$7°$	$11°$	timp plăcut
02.03.2024		$2°$	$15°$	înnorat
03.03.2024		$3°$	$16°$	însorit
04.03.2024		$2°$	$16°$	partial noros
05.03.2024		$3°$	$16°$	înnoru
06.03.2024		$2°$	$73°$	ploi

Calendarul naturii

Data	Fenomenul meteo	Temperatura	Observații
1.03		7° 11°	timp plăcut
2.03		7° 16°	timp plăcut
3.03		3° 14	înnorat
4.03		2° 16°	timp frumos
5.03		3° 17	timp frumos
6.03		5° 16°	timp plăcut
7.03		4° 10°	
8.03		8° 4°	
9.03		10° 4°	

Impreuna cu ei am căutat imagini din satelit ale cartierului Dambul Rotund din Cluj-Napoca , unde majoritatea locuiesc și unde se afla și școala unde învața „ Școala Gimnaziala „Emil Isac".

Vegetatie cartier Dambul Rotund 1-9 martie 2024 2024-03-06 00:00 - 2024-03-06 23:59, Sentinel-2 L2A, NDVI

Credit: European Union, contains modified Copernicus Sentinel data 2024, processed with EO Browser

The first image discovered is from 2018.03.08, the next image is from 2020.03.07, and the last one is from 2024.03.06. all of them are captured by the Sentinel 2.12 satellite. Looking at them carefully, we notice that the intensity of the green color is increasing year by year, although the same period of the year is captured, the days of the Babes, 1-9.m apps.sentinel-hub.com/eo-browser/?zoom=15&lat=46.78748&lng=23.56855&themeId=FORESTRY&visualizationUrl=https%3A%2F%2Fservices .sentinel-hub.com%2Fogc%2Fwms%2F2730da16-e275-480d-a58a-a6956ca3d025&datasetId=S2L2A&fromTime=2020 03-07T00 %3A00%3A00.000Z&toTartie. I used the Sentinel HubEO browser website,

Main results and conclusions:

After analyzing the weather data of the area from the last years and the information, the students could see that the temperature has increased, which has led to the blooming of snowdrops and all kinds of flowers that herald spring much earlier.

Taking all this into account, the students could see a direct relationship between the positive temperatures both during the day, but especially during the night in recent years and the changes over time. In the years 1980-1990, snowdrops bloomed between March 1-9, but after the year 2000 they can be seen blooming even from the beginning of February.

The conclusions that can be drawn from here are: climate changes are obvious: increasing temperatures, long periods of winter without precipitation in the form of snow, no low temperatures below 0 degrees, these changes can cause changes in the development of these species up to disappearance. Our intervention to stop climate change is necessary, because with everyone's help we can improve the situation.

What's next? Actions to make a difference and help reduce pollution.

Earth's climate is changing. With this research activity we were able to see how the average temperature of the planet is increasing and this has repercussions in many areas, such as the environment, the economy, health and everyday life.

What can we do to stop this?

   Let's reimagine a sustainable world where we
to reuse everything to avoid the consumption of new products, which involve the use or pollution of natural resources.

– Using organic products to treat pests in our crops.

– We take care of our forests, with the sustainable harvesting of their products.

- Activities of afforestation and greening of intensively deforested areas.

– Use green transport: walk or cycle around our town, use public transport to get to other locations, to reduce the emission of greenhouse gas pollutants.

– Set an example through our actions around us so that our families, friends and neighbors become aware of the importance of caring for the environment.

– Giving voice to our actions, through social networks, informative posters.

And so, to help improve the environment and mitigate climate change, the students culminated this research with the creation of an exhibition of ecologically themed drawings that will be displayed on our school's social networks.

DA √   NU X

STOP POLUARE

DA √   NU X

PLANTĂM CO PACI ȘI FACEM PĂDURI, FRUMOASE PENTRU O PLANETĂ MAI BUNĂ

NU RUPEM CRENGILE COPACILOR ȘI NU TĂIEM PĂDURILE.

PUTEM DEȘEURILE LA COȘUL DE GUNOI ȘI ADUNĂM DEȘEURILE DE PE JOS PENTRU REDUCEREA POLUĂRII.

NU ARUNCĂM DEȘEURI PE IARBĂ CI DOAR LA COȘUL DE GUNOI

DUCEM AMBALAJELE ȘI DEȘEURILE LA CENTRU DE RECICLARE

NU ARUNCĂM GUNOAIE ÎN LACURI CA SĂ PĂSTRĂM RÂURILE CURATE

DA   NU