



“ALEXANDRU IOAN CUZA”
UNIVERSITY OF IAȘI,
FACULTY OF GEOGRAPHY AND
GEOLOGY



SPATIO-TEMPORAL CHANGES OF DROUGHT IN ROMANIA (1961-2015), ACCORDING TO ATMOSPHERIC CIRCULATION TYPES AND TELECONNECTION INDICES

PhD. Stud. Radu-Vlad DOBRI
Prof. em. PhD. Liviu APOSTOL
Assoc. Prof. PhD. Lucian SFÎCĂ
Simona ȚÎMPU
PhD. Stud. Ion-Andrei NIȚĂ

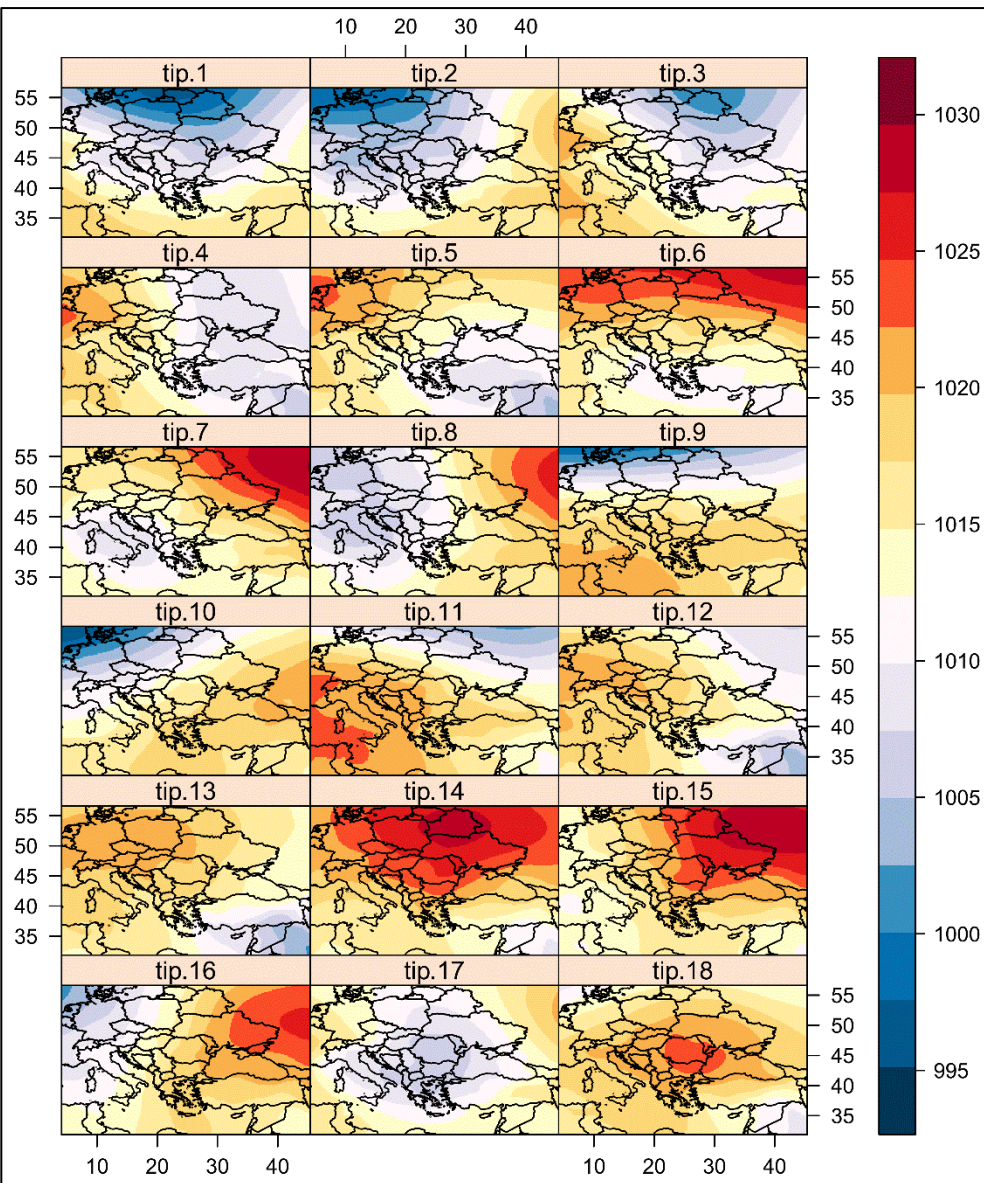
Vienna-Austria, May 2020

Data used

- total daily amount of precipitation for 27 weather stations in Romania, of which 22 stations for the period 1961-2015, 4 stations for the period 1961-2000 and one station for the period 1964-2015. Source: <https://www.ecad.eu/>.
- four indices were analyzed in the present study (**SPI (Standardized Precipitation Index)**, **PNI (Percent of Normal Index)**, **DI (Deciles index)**, and **ZSI (Z-score Index)**), through Meteorological Drought Monitoring software.
- 18 GWT (Großwettertypen) atmospheric circulation types of daily mean sea level pressure (SLP). This was done using COST733 class software.
- eight teleconnection indices were used, more exactly **Atlantic Multidecadal Oscillation (AMO)**, **Arctic Oscillation (AO)**, **East Atlantic (EA)**, **East Atlantic/Western Russia (EAWR)**, **North Atlantic Oscillation (NAO)**, **Pacific Decadal Oscillation (PDO)**, **Pacific/North American (PNA)**, **Scandinavia Pattern (SP)** that are recognized for their effect on climatic conditions at European scale, provided by National Oceanic and Atmospheric Administration (NOAA) – Climate Prediction Center.



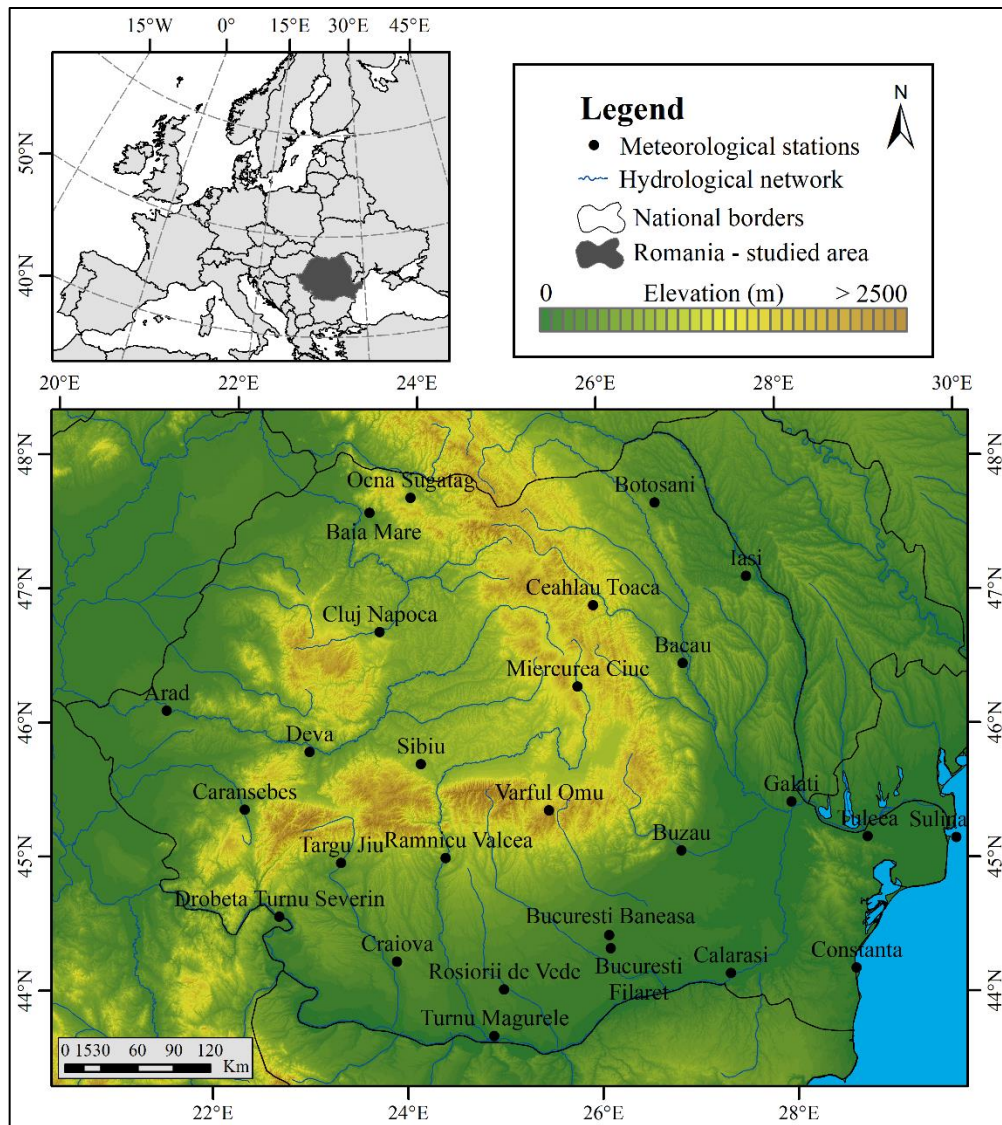
Results



Types of atmospheric circulation according to GWT classification for the region of Romania , where tip 1 – Nc (**North Cyclonic**), tip 2 – NWc (**Northwest cyclonic**), tip 3 – NEc (**Northeast cyclonic**), tip 4 – Ec (**East Cyclonic**), tip 5 – SEc (**Southeast Cyclonic**), tip 6 – Sc (**South Cyclonic**), tip 7 – SWc (**Southwest Cyclonic**), tip 8 – Wc (**West Cyclonic**), tip 9 – Sa (**South Anticyclonic**, tip 10 – SEa (**Southeast Anticyclonic**), tip 11 – SWa (**Southwest Anticyclonic**), tip 12 – Wa (**West Anticyclonic**), tip 13 – NWa (**Northwest Anticyclonic**), tip 14 – Na (**North Anticyclonic**), tip 15 – NEa (**Northeast Anticyclonic**), tip 16 – Ea (**East Anticyclonic**), tip 17 – L (**Central Low**), tip 18 – H (**Central High**).



Geographical location of the meteorological stations used



Nr. Crt.	Station name	Latitude (N)	Longitude (E)	Altitude (m)	Data range
Western Romania					
1.	Arad	46°08'15"	21°21'13"	117	1961-2015
2.	Caransebeș	45°25'01"	22°13'30"	241	1961-2015
Eastern Romania					
3.	Botoșani	47°44'08"	26°38'40"	161	1961-2015
4.	Bacău	46°31'54"	26°54'45"	184	1961-2015
5.	Iași	47°10'15"	27°37'42"	102	1961-2015
6.	Galați	45°28'23"	28°01'56"	71	1961-2015
Southern Romania					
7.	Buzău	45°07'57"	26°51'05"	97	1961-2015
8.	Râmnicu Vâlcea	45°05'19"	24°22'45"	239	1961-2015
9.	Drobeta-Turnu Severin	44°37'43"	22°37'33"	77	1961-2015
10.	București Băneasa	44°31'00"	26°05'00"	90	1961-2015
11.	București Filaret	44°25'00"	26°05'00"	82	1961-2000
12.	Craiova	44°18'36"	23°52'00"	192	1961-2015
13.	Calarasi	44°12'22"	27°20'18"	19	1961-2015
14.	Rosiori de Vede	44°06'26"	24°58'42"	102	1961-2015
15.	Turnu Măgurele	43°45'00"	45°53'00"	31	1961-2000
Central Romania					
16.	Cluj-Napoca	46°46'39"	23°34'17"	410	1961-2015
17.	Deva	45°51'52"	22°53'55"	230	1961-2015
18.	Sibiu	45°47'21"	24°05'28"	444	1961-2015
Southwestern Romania					
19.	Tulcea	45°11'26"	28°49'26"	4	1961-2015
20.	Sulina	45°02'26"	23°16'35"	3	1961-2015
21.	Constanța	44°12'49"	28°38'41"	13	1961-2015
22.	Târgu Jiu	45°02'00"	23°17'00"	205	1961-2000
Northwestern Romania					
23.	Baia Mare	47°39'40"	23°29'36"	224	1961-2000
24.	Ocna Șugatag	47°47'00"	23°56'00"	504	1961-1998; 2001-2015
Mountain area					
25.	Vârful Omu	45°26'45"	25°27'24"	2504	1961-2015
26.	Ceahlău Toaca	46°58'65"	25°57'00"	1860	1964-2015
27.	Miercurea Ciuc	46°22'16"	25°46'21"	661	1961-2015



The values resulting from the calculation of the SPI index

	Bucuresti				Bucurest				Ceahlau				Drobeta				Miercurea				Ocna				Ramnicu				Rosiori de				Targu				Turnu				Varfu				Cluj			
	Arad	Bacau	Baia Mare	Botosani	Baneasa	i Filaret	Buzau	Calarasi	Caransebes	Toaca	Constanta	Craiova	Deva	TS	Galati	Iasi	Ciuc	Sugatag	Valcea	Vede	Sibiu	Sulina	Jiu	Tulcea	Magurele	Omul	Napoca																					
1961	-1.73	0.28	-2.23	0.81	0.04	0.23	-0.15	-0.34	-1.98		-1.25	-1.11	-1.48	1.13	-0.55	0.2	-0.92	-1.39	-1.08	-0.23	-0.72	-0.3	-0.16	-0.76	-0.61	0.94	-2.19																					
1962	-0.87	-1	0.14	0.36	-0.69	0.12	0.11	-1.17	-1.43		-0.59	-0.6	-1.87	-0.37	-0.16	-0.1	-0.12	0.54	-0.42	0.25	0.27	-0.21	-0.76	0.42	-0.14	1.08	-0.18																					
1963	0.34	-1.35	-1.11	-1.69	-0.55	-0.64	-1.48	-0.55	-0.41		0.16	-0.75	-0.87	0.34	-1	-0.57	-1.36	-0.33	-0.36	-0.47	-1.85	0.72	0.19	0.36	-0.05	0.23	-0.71																					
1964	0.08	-0.42	0.28	-0.83	0.34	0.19	0.51	0.37	0.31	0.57	0.01	-0.74	0.52	-0.54	-0.24	-0.18	0.27	0.8	-0.27	0.76	0.48	-0.31	0.16	-0.51	1.4	0.34	-0.41																					
1965	0.62	-0.71	0.5	-0.23	-1.46	-1.03	0.04	-0.41	-0.34	0.05	0.03	-0.82	-0.56	-0.85	-1.3	-0.81	-0.53	0.12	-0.69	-0.49	-0.55	0.4	-0.4	0.57	-0.53	0.2	-1.17																					
1966	0.89	0.41	1.66	0.04	1.34	1.37	1.33	2.12	1.75	0.91	1.32	0.96	1.22	1.27	1.48	0.88	-0.02	-0.07	1.21	1.58	0.99	2.55	1.29	1.74	1.34	1.87	0.08																					
1967	-0.81	-1.33	-0.15	-1.55	-0.48	-0.6	-0.65	-0.4	0.29	0.61	-0.07	-1.06	-0.09	-0.25	-0.59	-1.17	-0.28	-0.25	0.85	0.11	-0.28	0.33	-0.49	-1.47	-0.67	0.62	-0.42																					
1968	-0.19	-0.63	-0.28	-0.56	-1.26	-0.42	-1.23	-0.83	1.42	0.59	-1.38	0.57	0.48	0.6	0.36	-0.02	0.22	0.34	-0.16	-0.02	-0.09	0.62	0.71	-0.18	-0.08	1	0.54																					
1969	0.48	1.33	-0.55	1.71	0.8	1.75	0.96	1.02	0.58	-0.07	1.04	-0.1	-0.59	1.87	1.39	1.19	0.82	-1.23	0.32	1.63	0.85	0.68	1.72	0.94	1.21	1.32	1.11																					
1970	1.8	0.49	2.1	0.44	0.62	0.8	1.58	1.28	0.35	1.2	-0.14	0.09	1.29	-0.02	-0.6	1.74	1.88	1.13	0.96	1.36	1.43	0.51	0.83	-0.73	1.41	1.74	1.81																					
1971	-0.5	0.44	-1.33	0.92	0.87	1.31	0.9	0.95	-0.6	1	-0.11	0.13	-1.19	0.53	0.99	1.2	0.32	-1.02	0.48	0.49	-0.86	1.04	-0.51	0.26	0.84	1.19	-0.44																					
1972	0.1	2.08	-1.83	0.98	1.13	0.72	3.12	0.9	0.33	1.93	0.53	1.24	0.74	0.94	1.54	0.9	1.07	-0.65	1.18	1.27	0.94	1.79	1.44	0.36	2.31	1.2	0.49																					
1973	-0.86	-2.28	-1.46	-0.8	-0.59	-0.17	-1.24	-0.65	-0.84	-0.02	-0.24	-0.22	0.97	-0.69	-1.1	-1.52	-0.45	-0.69	0.25	0.07	-0.16	-0.02	-1.03	-1.31	0.62	1.7	-0.78																					
1974	1.33	-0.16	1.39	0.98	-0.2	-0.55	-0.36	-0.39	0.69	0.46	-0.41	-0.39	1.25	0.24	1.08	0.94	0.29	0.73	0.41	-1.06	0.55	-0.35	1.1	0.03	-1.31	0.94	0.76																					
1975	-0.99	-0.6	-0.87	-0.19	0.77	0.4	-0.99	0.4	-0.03	1.64	-0.31	0.24	0.11	0.6	0.04	0.07	0.54	-1.21	1.01	0.93	1.02	-0.37	0.89	-0.72	0.33	0.74	-0.78																					
1976	-0.54	0.27	-1.28	0.53	-0.03	-0.2	0	-1.06	0.38	0.58	-1.54	0.58	-0.15	1.3	-0.65	0.26	-0.18	-0.84	0.37	0.78	-0.3	0.95	1.3	-0.45	0.66	1	-0.54																					
1977	0.45	-0.82	0.84	-0.54	-0.24	-0.33	-0.13	-0.81	0.75	0.3	0.63	-0.78	0.29	-0.91	0.04	-0.43	-0.89	0.26	-0.5	-1.09	-0.07	0.94	-0.11	-0.83	-0.23	1.45	-0.89																					
1978	-0.03	-0.26	0.57	0.9	0.02	-0.08	0.09	0.17	0.66	0.24	-0.11	0.04	0.4	-0.16	-0.51	0.93	0.41	0.73	-0.07	-0.21	0.23	0.83	-0.21	-0.06	-0.17	0.53	0.63																					
1979	0.42	0.21	0.39	0.27	1.75	0.79	1.16	0.44	0.41	0.05	-0.25	0.61	0.95	0.9	0.33	0.41	1.08	0.29	1.29	0.45	0.31	1.23	1.41	0.22	0.76	0.29	-0.39																					
1980	-0.11	0.69	0.72	0.43	0.92	0.87	1.28	0.01	1.57	0.2	0.13	1.05	1.26	0.38	0.58	1.91	0.97	1.52	0.43	-0.01	1.63	1.05	0.54	1.42	1.17	-0.21	1.41																					
1981	0.95	-0.24	0.49	0.49	0.36	0.63	0.48	0.18	1.13	1.57	0.87	0.4	0.98	0.57	0.16	1.16	0.78	0.45	0.62	0.09	0.88	0.47	0.84	-0.21	-0.02	0.11	0.11																					
1982	0.39	-0.32	-0.94	-0.73	-1.05	-0.91	-1.38	-1.04	-1.13	-0.53	-1.22	-0.18	-0.72	-0.58	-1.02	-1.57	-0.37	0.32	-0.87	-1.42	0.07	-0.21	0.35	-2.02	-0.69	-0.96	-0.53																					
1983	-1.72	-0.38	-1.75	-1.21	-1.54	-0.74	-0.29	-1.12	-0.9	-0.43	-2.16	-1.45	-1.49	-1.8	-1.25	-0.98	-1.01	-1.21	-1.26	-0.73	-1.23	-1.3	-1.3	-2.18	-0.63	-0.73	-2.34																					
1984	-0.65	1.54	0.61	0.36	0.75	0.89	0.82	-0.28	-0.83	-0.56	0.02	0.28	-0.1	0.04	0.44	0.84	0.98	-0.83	0.38	0.82	0.25	-0.53	0.74	0.09	1.45	-1.36	0.48																					
1985	-0.56	-1.8	0.9	-0.11	-1.87	-1.68	-0.27	-1.41	-0.15	-1.5	-0.54	-0.75	0.2	-0.08	0.28	1.09	-0.1	0.31	-1.14	-1	0.02	-0.7	-0.4	-0.77	-1.94	-2.29	-0.05																					
1986	-0.18	-1.85	-0.19	-2.26	-0.99	-0.63	-1.97	-1.6	-0.44	-2.78	-1.15	-0.22	-0.99	-0.68	-0.28	-1.03	-1.77	-0.25	-1.14	0.09	-2.66	-0.01	-0.63	-1.06	-0.2	-1.14	-1.47																					
1987	0.01	-0.2	0.02	-0.48	-0.37	0.46	-0.91	-0.26	-0.25	-1.43	0.4	-0.21	-0.82	-0.32	-1.08	-0.32	-1.82	-0.62	-0.16	-0.25	-1.79	-0.4	-0.48	-0.49	0.36	-1.66	-0.01																					
1988	0.07	0.38	0.37	1.13	-0.1	0.39	0.31	0.41	-1.08	-0.03	0.02	-0.6	-0.51	-0.78	-0.32	0.58	-0.4	0.65	0.32	-0.35	-0.18	1.08	-0.71	1.44	-0.5	-1.07	-0.63																					
1989	-0.39	-0.43	-0.47	-0.48	-0.83	-1.19	-1.09	-0.74	0.4	-0.5	-1.19	-0.7	-0.69	-0.63	-1.3	0.2	-1.15	-0.28	-1.41	-1.24	-0.71	-0.6	-0.39	-0.24	-1.19	-1.72	0.51																					
1990	-1.04	-1.14	-1.07	-1.14	-0.92	-1.33	-0.64	-1.82	-0.89	-1.7	-1.9	-0.5	-0.51	-0.53	-1.15	-1.57	-1.31	-0.57	-1.85	-1.13	-0.96	-1.09	-1.08	-1.17	-1.42	-1.89	-1.83																					
1991	0.95	1.6	-0.01	1.11	1.63	2.17	1.54	0.33	-0.27	-0.06	-0.1	0.56	0.29	0.08	1.05	1.5	0.4	-1.34	0.43	-0.05	1.02	0.61	0.77	-0.43	1.06	0.23	0.54																					
1992	-1.2	-1.24	0.72	-1.4	-1.77	-2.13	-1	-1.46	-0.51	-1.54	-1.8	-2.64	-1.28	-1.77	-0.65	-1.03	-0.93	-0.94	-1.41	-2.5	-0.98	-0.78	-1.98	-0.27	-1.73	-1.09	-0.56																					
1993	-0.89	0.67	0.21	0.92	-0.47	0.17	-0.89	-0.39	-0.7	-0.03	-0.42	-1.53	-0.75	-1.03	-0.19	0.22	0.97	-0.29	-1.09	-1.47	0.08	-1.37	-1.27	-0.31	-0.76	-0.38	-0.1																					
1994	-0.78	-1.34	0.14	-0.82	-0.25	-0.95	-0.86	-0.65	-1.11	-1.66	-0.98	-0.9	-1.02	-0.59	-1.51	-1.45	-1.73	-0.32	-1.4	0.01	-0.81	-1.15	-0.17	-1.85	-0.38	0.04	-0.54																					
1995	0.64	-0.01	0.71	-0.24	0.77	0.81	0.04	0.34	0.49	-0.01	1.45	-0.03	0.58	-0.39	-0.7	1.03	0.98	0.41	0.13	0.44	0.6	1.45	0.18	-0.09	0.2	0.41	-0.16																					
1996	1.64	0.84	-0.32	0.56	-0.31	-0.6	0.35	-0.44	0.66	-0.37	0.18	-0.31	0.68	-0.43	-0.17	1.64	-0.09	-0.18	-0.76	-0.01	-1.4	-0.14	-0.18	0.54	-0.32	-0.46	0.13																					
1997	-0.01	1.42	0.64	-0.1	1.4	1.46	1.63	0.89	0.35	0.75	1.71	0.73	0.7	-0.53	2.77	0.25	0.45	0.44	0.44	0.21	0.63	0.9	-0.83	2.23	0.26	-0.01	1.16																					
1998	0.8	0.56	1.96	1.95	0.11	-0.37	-0.95	-0.34	-0.04	0.09	0.57	0.16	0.44	0.11	0.15	0.38	-0.44	1.56	0.79	0.22	1.82	-0.83	0.54	0.59	0.59	-0.41	0.84																					
1999	1.67	-0.25	0.51	-0.09	1.21	1.05	1.21	1.35	0.12	-0.84	0.91	0.57	0.39	1.73	0.16	-0.24	0.19	1.03	0.11	0.49	-0.73	1.22	1.54	0.07	-0.34	0.98																						
2000	-3.52	-0.74	0.01	-0.94	-1.83	-2.03	-1.85	-1.32	-2.73	-1.68	-1.35	-2.15	-1.53	-3.06	-1.14	-2.1	-1.97	-2.78	-2.3	-2.28	-1.96	-3.06	-1.16	-2.34	-2.09	-2.09	-1.69																					
2001	1.12	0.77		1.32	-0.78		-0.69	-0.73	1.26	-0.54	-0.21	0.33	1.49	-1.1	0.44	0.77	1.54	1.78	0.17	-0.81	0.78	-1.98	-0.44		-0.03	1.75																						
2002	-0.25	0.56		0.66	0.02		0.29	1.15	-1.1	-0.06	0.07	0.43																																				

The values resulting from the calculation of the PNI index

	Arad	Buc Ban	Buzau	Calarasi	Cluj N	DTS	Vf. Omu	Bacau	Botosani	Caransebes	Constanta	Craiova	Deva	Galati	Iasi	M Ciuc	Ramnicu V	Rosiori de V	Sibiu	Sulina	Tulcea	Baia M	Buc Fil	Tg Jiu	Turnu M	Ceahlau T	Ocna S
1961	67.1	99.1	95.2	90.2	59.9	127.5	129.4	104.3	117	64.8	69.2	74.2	73	87.4	102.8	84.9	76.2	92.5	85.7	89.1	82.7	69.5	103.4	94.5	84.7		76.8
1962	81.8	83.1	100.8	73.1	94.9	90.2	135	79.6	106.4	73.4	83.4	84.7	67	95.1	96.5	97.2	89.3	104.3	104	91.6	107.9	101.4	101.1	81.9	94.9		111.8
1963	105.7	86	69.4	85.8	84.6	107	104.1	73.4	66.5	90.8	101.9	81.6	83	78.9	87.1	78.6	90.5	86.9	67.8	119	106.5	83.5	85.7	102.7	97.1		96.2
1964	100.2	106.3	110	107.1	90.4	85.8	107.6	90.2	81.8	104.9	98	81.6	109.1	93.6	94.8	103.6	92.5	117.9	108.1	88.9	87.7	103.5	102.5	101.9	134.4		116.7
1965	112	69	99.3	88.8	76.3	79.4	102.9	84.8	93.6	92.2	98.5	80.1	88.5	73.6	82.6	90.7	83.6	86.4	88.8	109.1	111.4	106.9	78.6	89.4	86.4		104.1
1966	118.2	132.8	130.3	156.8	100.3	131.4	168.4	107.2	99.2	136.9	135.5	122.5	124	132.8	117.8	98.7	127.8	141.7	118.7	187.4	141.4	126.1	130.1	130.7	132.8		118
1967	82.7	87.5	84.9	88.9	90.2	92.4	117.6	73.7	68.8	104.5	95.9	75.1	97.1	86.6	76.3	94.7	118.4	100.6	93.6	106.9	69.7	97	86.6	87.4	83.3		97.7
1968	94.6	71.7	73.8	79.8	110.2	112.9	131.8	86.2	86.8	129.1	66.6	112.3	108.2	106.3	98.2	102.8	94.9	97.5	97.1	115.7	94.4	95.1	90.1	115.4	96.3		111.1
1969	108.7	117.8	121	124	123.3	149.3	144.8	128.4	139.9	110.5	126.8	95.8	87.8	130.7	125.3	113	105.7	143.5	115.8	117.8	120.4	91.2	139.7	142.9	129.1		97.3
1970	140.5	113.3	137.2	131.4	140.8	97.7	162.7	108.9	108.2	105.7	94.1	100.4	125.5	86.4	139.2	132.8	121.2	135.2	128.3	112.4	83.3	134	116.1	118.5	134.6		124.8
1971	89.5	119.8	119.5	122.1	89.8	111.1	139.3	107.9	119.4	87.5	95	101.2	77.6	120.7	125.6	104.4	109.5	110.3	83.4	129.6	104.2	80.7	128.6	87	119		120.1
1972	100.6	126.8	152.3	120.7	109.1	122.1	139.9	147.6	121	105.2	111.8	130.4	113.7	134.5	118.5	117.4	127	132.4	117.8	156.2	106.5	74.4	114.3	135	158.8		90.6
1973	81.9	85.1	73.7	83.6	83.2	82.6	160.7	59	82.3	83.2	91.8	93	118.6	77.1	70.3	92	104	99.6	95.7	96.9	72.6	78.9	94.9	76.5	113.2		98.3
1974	128.6	93.6	90.8	89.3	115.1	104	129.3	95.3	121	112.9	87.6	89.3	124.7	122.9	119.4	103.9	107.6	74.3	109.7	87.8	98.9	121.5	87.4	125.4	70.8		108.3
1975	79.5	117.2	78.3	107.7	83.3	113.1	121.9	86.7	94.5	98.2	90.1	103.8	100.8	99.3	100	108.2	122.7	122.5	119.4	87.4	83.6	86.7	107.1	120	106.1		135.5
1976	87.8	97.4	98.3	75.3	87.8	132.4	131.6	104.2	110.2	106.3	63.6	112.3	96	85.6	104	96.2	106.8	118.4	93.2	126.3	88.9	81.3	94.5	131	114.3		110.9
1977	108.2	92.6	95.6	80.2	81.3	78.1	149.8	82.6	87.3	114.1	114.7	80.8	104.4	99.4	90	85.5	87.5	73.6	97.5	126.2	81.3	112.3	91.8	95.7	92.8		104.7
1978	98	98.6	100.3	102.2	112.1	94.4	114.2	93.3	119.1	112.2	95.1	99.1	106.7	88.2	119.1	105.9	96.7	92.8	103.1	122.5	97	108	96.8	93.5	94.2		103.5
1979	107.5	144.8	106	108.8	90.7	121	106	102.8	104.3	107	91.6	113.3	118.1	105.6	107.2	116.6	129.9	109.4	104.8	136	103.3	105.2	115.9	134	117		99.6
1980	96.3	121	129.1	98.5	130.6	107.3	90.1	113.4	107.9	132.7	101.3	124.9	125	111.2	143.5	115.7	108.2	97.7	133	129.7	132.7	110.3	117.8	111	127.8		102.8
1981	119.5	106.8	109.3	102.5	100.9	112.2	99.9	93.8	109.3	122.4	121.7	107.9	118.8	101.9	124.5	112.4	118.2	100.1	116.3	111.1	93.9	106.8	112.2	118.6	97.7		133.9
1982	106.9	75.8	71.2	75.7	88	112.5	69.2	92.2	83.7	78.2	69.8	94	85.5	78.6	69.6	93.3	80.1	67.4	100.1	91.5	60.7	85.9	80.8	106.4	83		88.3
1983	67.2	66.7	92.1	74.1	57.7	61.4	75.4	91	74.7	82.2	52.5	67.9	72.9	74.6	79.7	83.7	72.8	81.3	77.4	65.4	58.1	75.3	83.8	71.5	84.2		90.2
1984	85.6	116.6	117.3	91.6	108.9	99	59.6	133.6	106.3	83.4	98.2	105	96.9	108	116.9	115.8	107.2	119.5	103.5	83.3	100.3	108.6	118.2	116	135.9		87.8
1985	87.4	60.8	92.6	68.5	97.5	96.1	41.1	66.1	96.1	95.9	84.6	81.4	106.2	104.6	122.9	97.4	75	57	99.1	79	82.6	113.3	67.4	89.5	59.7		71.3
1986	94.8	77	61.4	65.2	71.2	82.9	64.8	65.3	57.5	90.3	71.4	93.1	81	92.7	78.7	73.2	75	100.2	56.6	97.1	77.1	96.4	86	84.6	93.5		97.6
1987	98.8	89.9	79.8	92.2	98.4	90.8	53.1	94.5	88.5	93.9	108.5	93.1	83.8	77.5	92.2	72.5	94.7	91.9	68.6	86.6	88.2	99.5	108.5	87.6	106.7		72.4
1988	100	95.8	105.4	108	86.1	80.7	66.4	106.6	124.7	79.1	98.4	84.7	89.3	92	111.1	92.7	105.6	89.7	95.5	130.8	133.2	104.9	106.9	82.8	86.9		98
1989	90.6	80.2	76.5	81.8	109.5	84	51.9	90.1	88.5	106.7	70.6	82.6	86.1	73.8	102.7	81.7	70.1	70.7	86	81.5	93.3	92.4	75.8	89.5	73		88.8
1990	78.7	78.2	85.1	61.3	65.5	86	48.4	77.1	76	82.3	57	86.8	89.3	76.4	69.4	79.4	62.6	72.8	81.8	70	75	84.2	73.3	75.7	68.7		92
1991	119.5	141.2	136.1	106.1	110.2	100	103.9	135.1	124.2	93.5	95.3	111.9	104.3	122.2	132.9	105.8	108.1	96.6	119.3	115.4	89.3	99.2	151.1	116.9	124.9		97.5
1992	75.8	62.5	78.1	67.7	87.5	61.9	66	75.3	71.3	89	58.7	48.3	76.3	85.5	78.7	84.9	70.1	48.9	81.3	77.1	92.7	110.4	60.5	59.7	63.3		70.8
1993	81.3	87.7	80.1	89.3	96.4	75.7	85.1	113	119.6	85.7	87.4	66.3	85	94.5	103.2	115.6	76	66.3	100.4	63.8	91.7	102.4	102.2	72.1	81.5		97.9
1994	83.4	92.5	80.8	83.6	87.8	84.9	97.9	82		78.5	74.9	78.4	80.5	70.2	71.5	73.6	70.3	98.2	84.3	68.5	63.3	101.3	80	94.3	89.5		96.3
1995	112.3	117.1	99.2	106.2	95.4	89.1	110	98.5	93.4	108.5	139.7	97.3	110.3	84.5	121.5	115.9	101.2	109.1	110.7	143.6	96.4	110.2	116.5	102.3	103		98.3
1996	136.4	91.2	106.3	88.2	101.2	88.2	82.6	116.8	110.9	112.1	102.5	91	112.4	95.1	136.6	97.6	82.2	97.7	74.6	93.3	110.7	94.6	86.5	94.1	90.9		91.4
1997	98.5	134.4	138.4	120.6	124.4	86	96.2	130.6	96.4	105.8	148.2	116.3	112.8	168.6	103.8	106.5	108.4	103.1	111.2	124.8	155.3	109.1	132.3	80.5	104.4		114.6
1998	116.1	100.7	79	90.4	116.9	100.8	84.1	110.6	146.3	98	113	101.9	107.3	101.7	106.6	92.2	116.9	103.5	137.3	75.8	111.9	131.5	91	111	112.5		100.4
1999	137.2	129	127.4	133.5	120.2	145.1	86.3	93.6	96.6	101	122.8	112.1	106.4	101.9	93.7	102.2	123	100.8	108.4	78.4	136	107.1	122.2	128.8	99.9		82.6
2000	42.6	61.6	63.2	70.2	67.7	42.3	44.7	84.2	79.6	54.5	67.3	55.8	72.2	76.5	61.3	70.5	48.6	52	61.7	52.3	75.2	99.3	61.9	43.8	53.3		68.5
2001	123.6	81.1	84.1	82	139.3	74.2	95.5	115.2	129.6	125.4	92.5	106.1	130.3	108	115.4	126.2	102.1	79.6	114.4	52	89.1						88.1
2002	93.5	98.7	104.8	127.6	79.6	100.3	72.5	110.6	113.3	78.8	99.5	108.6	85.7	115.8	87	110.4	101.5	106.9	89.5	83	97.7						97.5
2003	78.2	97.1	78.3	99.2	68.5	99.6	69.9	80.7	80.9	76.7	80.9	112.2	72.5	80.9	78.5	72.8	105.8	101.7	78.8	42.1	84.3						76.6
2004	120.4	116.2	94.8	105.8	108.9	103.7	83.3	97.9	90.2	96.2	155.2	99.1	131.2	124.3	101.7	105	106.7	92	108.9	91.8	131.2						86.4
2005	124.4	175.2	143	177.4	134	125.3	104.1	146.1	127.8	155.6	150.2	178.1	131.3	153.6	105.5	133.5	153.4	181.2	135.5	108.9	138.3						102.8
2006	100.7	88.8	104.1	102.2	118.7	105.7	76.4	106	109.5	117.5	105.9	111	117.1	81.1	91	103.2	102.9	90.1	114.4	91.2	89.4						92.7
2007	117.3	86.2	102.9	87.6	137.1	109.6	89.2	105	116.6	130.7	114.1	123.8	114.5	101.2	89.8	115.8	114.3	127.5	122	65.4	107.9						113.8
2008	95.2	66.4	73.3	66.4	114.8	94.8	110.9																				

The values resulting from the calculation of the DI index

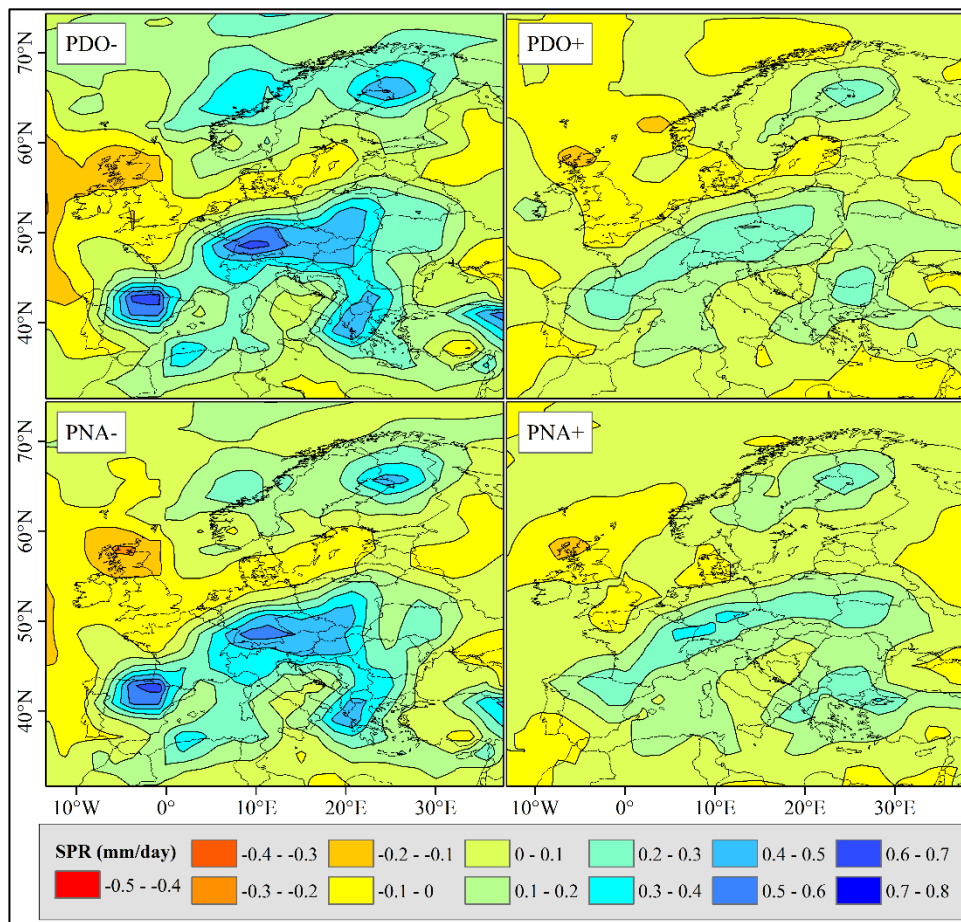
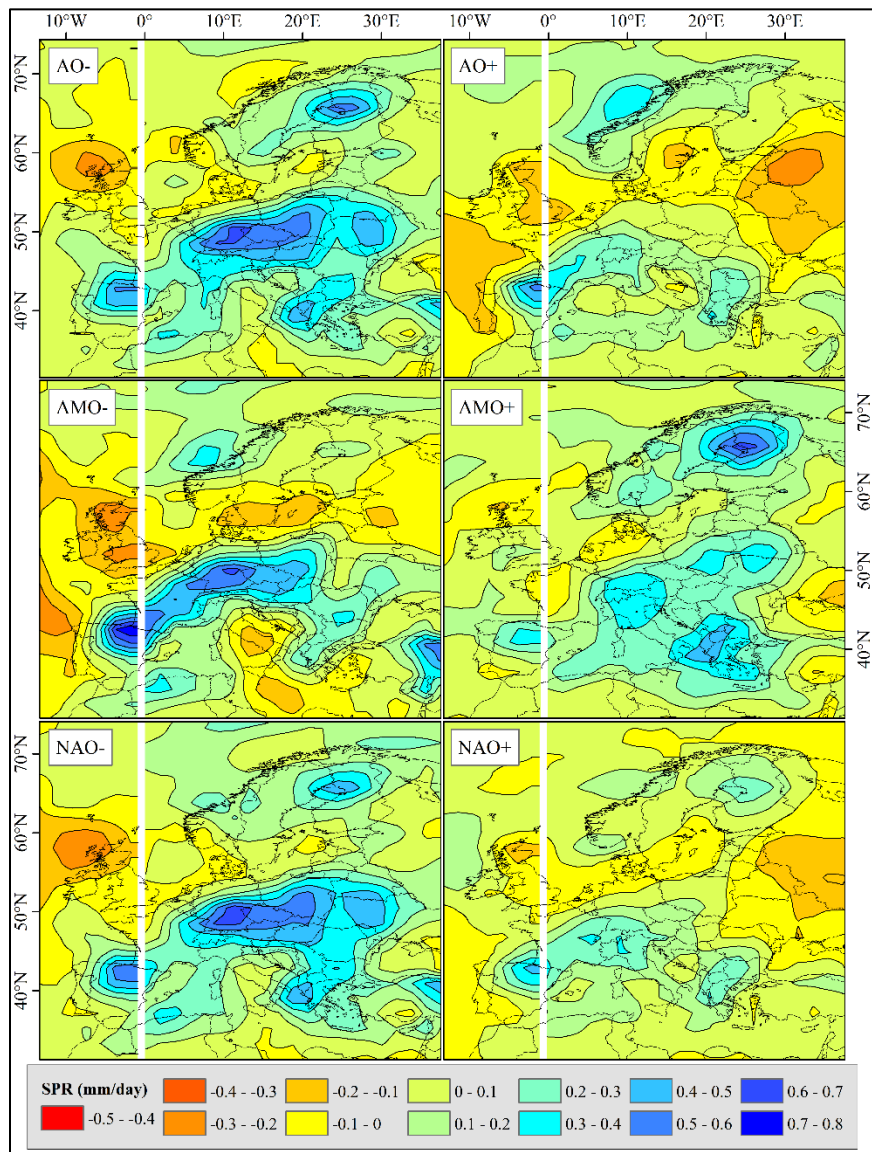
	Arad	Buc Ban	Buzau	Calarasi	Cluj N	DTS	Vf. Omu	Bacau	Botosani	Caransebes	Constanta	Craiova	Deva	Galati	Iasi	M Ciuc	Ramnicu V	Rosiori de V	Sibiu	Sulina	Tulcea	Baia M	Buc Fil	Tg Jiu	Turnu M	Ceahlau T	Ocna S
1961	1	6	5	5	1	9	8	6	8	1	2	1	2	4	6	3	3	4	3	4	3	1	6	5	3		1
1962	2	3	6	2	5	4	9	2	6	1	3	3	1	5	5	5	4	7	6	5	7	6	6	2	5		8
1963	7	3	1	4	3	7	6	1	1	4	7	3	3	3	3	2	4	3	1	8	7	2	3	6	6		4
1964	6	7	8	7	4	3	7	4	2	6	5	3	7	5	5	6	4	9	6	4	3	6	6	6	10		9
1965	7	2	6	4	2	2	6	3	5	4	6	2	4	1	3	3	3	3	4	7	8	7	2	4	3		6
1966	8	9	9	10	6	10	10	7	5	10	9	9	9	10	8	5	10	10	9	10	10	10	10	9	9		5
1967	3	4	4	4	4	4	10	2	1	6	5	2	5	4	2	4	9	6	4	6	1	4	4	3	3		5
1968	4	2	2	2	7	8	9	3	3	10	1	8	7	7	5	6	4	5	5	7	5	4	4	7	5		7
1969	7	8	9	9	9	10	10	9	10	8	9	5	4	9	9	8	6	10	9	8	9	3	10	10	9		2
1970	10	7	10	10	5	10	8	4	7	6	4	6	10	4	10	10	9	8	10	7	3	10	8	8	10		9
1971	4	9	8	8	4	8	9	7	8	3	4	6	2	9	10	7	8	8	3	9	7	2	9	3	8		9
1972	6	9	10	8	7	9	9	10	9	6	7	10	8	10	8	9	9	9	9	10	7	1	8	10	10		3
1973	2	3	2	3	2	2	10	1	3	3	4	4	9	2	2	3	5	5	4	6	1	1	5	2	8		5
1974	10	5	4	5	8	7	8	5	9	8	4	4	9	9	9	7	7	2	7	4	6	10	4	9	2		7
1975	2	8	2	7	2	9	8	4	5	5	4	6	5	5	5	8	9	9	9	4	3	3	7	9	7		10
1976	4	6	5	2	4	10	9	6	7	7	1	8	5	4	7	4	7	9	4	9	4	2	5	10	8		3
1977	7	5	5	3	2	2	10	3	4	8	8	2	6	6	4	3	3	2	5	9	2	9	5	6	4		7
1978	5	6	6	6	8	4	7	4	8	8	5	6	6	4	9	7	4	4	6	8	6	8	5	5	5		7
1979	7	10	9	8	5	9	6	6	6	7	4	9	8	7	7	10	10	8	6	10	7	7	8	10	8		6
1980	5	9	9	6	9	7	5	9	6	10	6	9	9	8	10	9	7	5	10	9	9	9	9	7	9		9
1981	9	7	7	6	6	8	5	5	7	9	8	7	9	6	9	8	8	5	9	7	5	7	7	8	6		10
1982	7	2	2	2	4	8	2	4	3	2	2	5	3	2	1	4	3	1	5	5	1	3	2	7	2		6
1983	1	4	4	1	3	4	3	4	2	2	1	3	1	2	3	2	2	3	2	2	1	3	3	1	3		2
1984	3	8	8	5	7	5	2	9	6	3	6	7	5	7	8	9	7	9	6	4	6	8	9	8	10		3
1985	3	1	5	1	5	5	1	1	5	5	3	3	6	7	9	5	2	1	5	3	2	9	1	4	1		2
1986	4	2	1	1	2	2	2	1	1	4	2	5	2	5	2	1	2	6	1	6	2	4	3	3	5		1
1987	5	4	3	5	5	4	1	5	4	4	7	5	3	2	4	1	4	4	1	4	4	5	7	4	7		2
1988	6	5	7	7	3	2	2	7	9	2	6	4	4	4	7	4	6	3	4	9	9	6	7	3	4		5
1989	4	3	2	3	7	3	1	4	4	4	2	3	4	1	6	2	1	2	3	3	5	3	2	4	2		3
1990	2	2	4	1	1	3	1	2	2	3	1	4	4	2	1	2	1	2	2	2	2	1	2	1	1		4
1991	9	10	9	7	7	6	6	10	9	4	5	8	6	9	10	7	7	4	9	7	4	5	10	8	9		5
1992	1	1	2	1	3	1	2	2	2	4	1	1	2	3	3	3	2	1	2	2	5	9	1	1	1		3
1993	2	4	3	5	5	2	4	8	9	3	3	1	3	5	6	8	2	1	5	1	5	6	6	1	2		5
1994	3	5	3	3	3	5	1	3	2	3	3	2	2	1	2	1	2	5	3	2	1	5	2	5	4		4
1995	8	8	6	7	5	4	7	5	4	7	10	5	7	3	9	5	2	8	7	10	5	8	8	6	8		7
1996	10	4	4	7	4	6	4	8	7	8	7	4	7	5	10	5	3	5	1	5	8	4	3	5	4		3
1997	5	10	10	8	9	3	5	9	5	7	10	9	8	10	6	7	8	7	7	9	10	8	10	2	7		9
1998	8	6	3	5	9	6	4	8	10	5	8	6	7	6	7	4	9	7	10	2	8	10	4	7	7		10
1999	10	9	9	10	9	10	4	5	5	6	9	8	6	7	4	5	9	6	7	3	10	7	9	9	6		2
2000	1	1	1	2	1	1	1	3	3	2	1	1	1	2	1	1	1	1	1	1	2	5	1	1	1		1
2001	9	3	4	3	10	1	5	9	10	9	4	7	10	7	7	10	5	2	8	1	4						10
2002	4	6	7	9	2	6	3	8	7	2	6	7	3	8	3	8	5	7	4	3	6						7
2003	2	5	2	6	1	5	2	2	2	2	3	8	1	3	2	1	6	6	2	1	3						2
2004	9	7	5	7	7	6	4	5	4	5	10	5	10	9	6	7	7	4	7	5	9						10
2005	9	10	10	10	10	9	6	10	10	10	10	10	10	10	7	10	10	10	10	6	10						9
2006	6	4	7	6	9	7	3	7	7	9	7	7	8	3	4	6	5	4	8	5	4						8
2007	8	4	7	4	10	7	4	7	8	10	8	9	8	6	4	9	8	9	10	2	7						9
2008	5	1	1	1	8	5	7	6	9	5	5	2	5	1	8	9	1	2	7	1	4						10
2009	6	6	7	6	7	7	7	3	3	7	9	5	6	2	6	6	6	6	7	1	6						6
2010	10	9	5	10	10	9	9	10	10	9	9	10	10	10	5	10	10	8	8	8	9						10
2011	1	2	3	4	3	1	3	2	1	1	2	2	1	1	1	6	1	8	2	5	2						8
2012	5	8	8	9	4	5	7	8	4	5	8	4	7	8	4	2	6	3	2	3	8						1
2013	8	5	8	9	6	8	5	6	9	9	9	7	9	8	8	2	8	7	8	7	8						9
2014	9	10	10	9	8	10	8	10	8	9	10	10	4	9	5	5	10	10	8	10	10						4
2015	3	7	6	9	8	6	3	3	1	1	9	10	2	8	1	4	5	7	3	6	9						5

Extreme drought	1	
Severe drought	2	
Moderate drought	3	
Weak drought	4	
No drought	>=5	



The values resulting from the calculation of the ZSI index

	Arad	Buc Ban	Buzau	Calarasi	Cluj N	DTS	Vf. Omu	Bacau	Botosani	Caransebes	Constanta	Craiova	Deva	Galati	Iasi	M Ciuc	Ramnicu V	Rosiori de V	Sibiu	Sulina	Tulcea	Baia M	Buc Fil	Tg Jiu	Turnu M	Ceahlau T	Ocna S
1961	-1.65	-0.04	-0.22	-0.40	-1.06	1.18	0.94	0.21	0.81	-1.80	-1.20	-1.04	-1.43	-0.58	0.14	-0.93	-1.08	-0.30	-0.78	-0.39	-0.78	-0.09	0.16	-0.25	-0.66	-0.90	
1962	-0.91	-0.71	0.04	-1.10	-0.25	-0.42	1.12	-0.98	0.30	-1.36	-0.64	-0.62	-1.75	-0.22	-0.17	-0.17	-0.48	0.17	0.22	-0.30	0.36	0.09	0.05	-0.82	-0.22	0.46	
1963	0.28	-0.59	-0.58	-0.58	-0.75	0.80	0.13	-0.54	-0.59	-0.47	0.07	-0.75	-0.90	-0.96	-0.63	-0.82	-0.43	-0.53	-0.74	0.68	0.29	-1.11	-0.68	0.12	-0.13	-0.15	
1964	-0.01	-0.36	0.45	0.28	-0.47	-0.61	0.24	-0.74	-0.87	0.25	-0.08	-0.75	0.48	-0.29	-0.25	0.22	-0.34	-0.52	0.44	-0.39	-0.55	0.23	0.12	0.08	1.48	0.65	
1965	0.60	-1.35	-0.03	-0.46	-1.16	-0.88	0.09	-0.73	-0.31	-0.40	-0.06	-0.81	-0.61	-1.21	-0.85	-0.57	-0.74	-0.55	-0.61	0.32	0.51	0.46	-1.02	-0.48	-0.59	-0.02	
1966	0.91	1.38	1.36	2.32	0.01	1.35	2.19	0.35	-0.04	1.89	1.37	0.91	1.27	1.50	0.87	-0.08	1.26	1.68	1.01	3.11	1.87	1.75	1.44	1.39	1.41	0.88	
1967	-0.87	-0.53	-0.68	-0.45	-0.48	-0.33	0.56	-1.26	-1.48	0.23	-0.16	-1.01	-0.15	-0.62	-1.15	-0.33	0.84	0.03	-0.34	0.25	-1.37	-0.20	-0.64	-0.57	-0.72	0.56	
1968	-0.27	-1.19	-1.17	-0.82	0.50	0.55	1.02	-0.66	-0.63	1.49	-1.29	0.50	0.43	0.29	-0.09	0.17	-0.23	-0.10	-0.16	0.56	-0.25	-0.33	-0.47	0.70	-0.16	0.54	
1969	0.44	0.75	0.94	0.98	1.14	2.11	1.43	1.37	1.90	0.54	1.04	-0.17	-0.65	1.41	1.23	0.80	0.26	1.75	0.85	0.63	0.92	-0.59	1.90	1.94	1.25	-0.13	
1970	2.03	0.56	1.67	1.28	0.10	-0.10	2.01	0.43	0.39	0.29	0.10	1.35	-0.62	1.91	2.02	0.96	1.42	1.54	0.44	-0.75	-2.26	0.77	0.84	1.49	1.21	0.89	
1971	-0.57	0.83	0.87	0.90	-0.50	0.48	1.26	0.38	0.92	-0.64	-0.19	0.05	-1.19	0.95	1.25	0.27	0.43	0.42	-0.90	1.05	0.19	-1.28	1.37	-0.59	0.82	0.99	
1972	0.03	1.13	2.34	0.84	0.45	0.95	1.28	2.29	1.00	0.27	0.46	1.23	0.73	1.58	0.90	1.07	1.23	1.30	0.96	2.00	0.29	-1.72	0.68	1.58	2.53	2.10	
1973	-0.91	-0.63	-1.18	-0.67	-0.82	-0.74	1.94	-1.97	-0.84	-0.86	-0.32	-0.29	0.99	-1.05	-1.44	-0.49	0.18	-0.02	-0.23	-0.11	-1.24	-1.42	-0.24	-1.07	0.57	-0.08	
1974	1.43	-0.27	-0.41	-0.44	0.74	0.17	0.94	-0.23	1.00	0.66	-0.48	-0.43	1.31	1.05	0.94	0.24	0.35	-1.04	0.52	-0.43	-0.05	1.45	-0.60	1.15	-1.26	0.41	
1975	-1.03	0.72	-0.97	0.31	-0.81	0.56	0.70	-0.64	-0.26	-0.09	-0.38	0.15	0.04	-0.03	0.00	0.50	1.03	0.91	1.05	-0.45	-0.74	-0.89	0.34	0.91	0.26	1.74	
1976	-0.61	-0.11	-0.06	-1.09	0.61	1.39	1.01	0.26	0.49	0.32	0.10	0.59	-0.21	0.74	0.20	-0.24	0.31	0.74	-0.37	0.93	-0.50	-0.26	1.41	0.61	0.53	-0.49	
1977	0.41	-0.31	-0.20	-0.81	-0.91	-0.94	1.60	-0.84	-0.60	0.72	0.57	-0.78	0.23	-0.03	-0.49	-0.90	-0.57	-1.06	-0.14	0.93	-0.84	0.83	-0.39	-0.20	-0.31	0.23	
1978	-0.10	-0.06	0.01	0.09	0.59	-0.24	0.46	-0.32	0.91	0.63	-0.19	-0.04	0.36	-0.54	0.93	0.37	-0.15	-0.29	0.17	0.80	-0.13	0.54	-0.15	-0.29	-0.25	0.17	
1979	0.38	1.88	1.17	0.36	-0.45	0.90	0.19	0.14	0.21	0.36	-0.32	0.54	0.96	0.26	0.35	1.08	1.36	0.38	0.26	1.28	0.15	0.35	0.76	1.54	0.73	-0.02	
1980	-0.18	0.88	1.31	-0.06	1.50	0.31	-0.32	0.65	0.37	1.68	0.05	1.01	1.32	0.52	2.12	0.97	0.37	-0.09	1.79	1.06	1.47	0.69	0.85	0.50	1.20	0.14	
1981	0.98	0.29	0.42	0.10	0.05	0.52	0.00	-0.30	0.44	1.15	0.84	0.32	1.00	0.08	1.19	0.76	0.58	0.00	0.89	0.40	-0.27	0.46	0.58	-0.10	1.66	0.39	
1982	0.35	-1.02	-0.29	-0.99	0.53	-0.99	-0.37	-0.78	-1.12	-1.12	-1.17	-0.24	-0.77	-0.98	-0.48	-0.41	-0.90	-1.89	0.01	-0.30	-1.77	-0.95	-0.82	0.29	0.73	-0.57	
1983	-1.64	-1.40	-0.35	-1.06	-2.06	-1.65	-0.79	-0.43	-1.20	0.91	-1.84	-1.38	-0.44	-1.17	-0.99	-1.00	-1.23	-0.75	-1.23	-1.23	-1.89	-1.64	-0.77	-1.29	-0.68	-0.48	
1984	-0.72	0.70	0.78	-0.34	0.43	-0.04	-1.30	1.62	0.30	-0.85	-0.07	0.20	-0.16	0.37	0.83	0.97	0.32	0.79	0.19	-0.59	0.02	0.58	0.87	0.72	1.55	-0.60	
1985	-0.63	-1.65	-0.33	-1.28	-0.12	-0.17	-1.89	-1.63	-0.18	-0.21	-0.60	-0.76	0.14	0.21	1.11	-0.16	-1.13	-1.73	-0.05	-0.75	-0.79	0.90	-1.56	-0.48	-1.73	-1.40	
1986	-0.26	-0.97	-1.73	-1.42	-1.41	-0.73	-1.13	-1.67	-2.02	-0.49	-1.11	-0.28	-1.01	-0.33	-1.04	-1.65	-1.14	0.01	-2.35	-0.10	-1.03	-0.24	-0.67	-0.70	-0.28	-3.32	
1987	-0.06	-0.43	-0.90	-0.32	-0.08	-0.40	-1.90	-0.26	-0.55	-0.31	0.33	-0.28	-0.86	-1.03	-0.38	-1.79	-0.24	-0.33	-1.79	-0.48	-0.53	-0.04	0.41	-0.56	0.29	-1.35	
1988	0.00	-0.18	0.24	0.82	-0.68	-0.83	-1.07	0.32	1.17	-0.07	-0.06	-0.62	-0.57	-0.37	0.54	-0.45	0.25	-0.41	-0.25	1.09	1.50	0.33	-0.78	-0.56	-0.10	0.54	
1989	-0.47	-0.93	-1.05	-0.74	0.47	-0.69	-1.54	-0.48	-0.54	0.34	-1.14	-0.70	-0.74	-1.30	0.13	-1.13	-0.36	-1.18	-0.76	-0.66	-0.30	-0.51	-1.16	-0.48	1.16	-0.55	
1990	-1.07	-0.91	-0.67	-1.58	-1.69	-0.60	-1.65	-1.10	-1.14	-0.90	-1.67	-0.54	-0.57	-1.08	-1.43	-1.27	-1.70	-1.09	-0.99	-1.07	-1.13	-1.06	-1.28	-1.10	-1.35	-1.56	
1991	0.98	1.73	1.62	0.25	0.50	0.00	0.12	1.69	1.15	-0.33	-0.18	0.48	0.23	1.02	1.60	0.36	0.37	-0.14	1.05	0.55	-0.48	-0.06	2.44	0.76	1.07	-0.12	
1992	-1.21	-1.58	-0.98	-1.32	-0.61	-1.63	-1.09	-1.19	-1.36	-0.56	-1.60	-2.10	-1.26	-0.66	-1.04	-0.93	-1.36	-2.06	-1.01	-0.81	-0.33	0.70	-1.89	-1.83	-1.58	-1.43	
1993	-0.94	-0.52	-0.89	-0.44	-0.18	-1.04	-0.48	0.63	0.93	-0.73	-0.49	-1.37	-0.80	-0.25	0.16	0.96	-1.09	-1.36	0.02	-1.29	-0.37	0.16	0.11	-1.26	-0.80	-0.10	
1994	-0.83	-0.31	-0.86	-0.67	-0.60	-0.65	-0.07	-1.62	-0.86	-1.10	-0.97	-0.88	-1.03	-1.08	-1.49	-0.89	-1.08	-0.07	-0.85	-1.12	-1.68	0.09	-0.96	-0.26	-0.45	-0.84	
1995	0.62	0.72	-0.04	0.25	-0.47	0.32	-0.07	0.32	-0.12	0.44	1.54	-0.11	0.55	-0.71	1.05	0.98	0.05	0.37	0.59	1.55	-0.16	0.69	0.79	0.11	0.13	-0.08	
1996	1.82	-0.37	0.28	-0.48	0.06	-0.51	-0.56	0.81	0.52	0.62	0.10	-0.36	0.66	-0.22	1.78	-0.15	-0.81	-0.09	-1.38	-0.24	0.48	-0.36	-0.64	-0.27	-0.39	-0.42	
1997	-0.08	1.44	1.72	0.84	1.19	-0.60	-0.12	1.47	-0.17	0.30	1.87	0.66	0.68	3.14	0.19	0.40	0.38	0.13	0.61	0.88	2.49	0.61	1.54	-0.88	0.19	0.72	
1998	0.81	0.03	-0.94	-0.39	0.83	0.03	-0.51	0.51	2.20	-0.10	0.50	0.08	0.39	0.08	0.32	-0.48	0.77	0.14	2.02	-0.86	0.54	2.12	-0.43	0.50	0.54	0.02	
1999	1.86	1.22	1.23	1.36	0.99	1.93	-0.44	-0.31	-0.16	0.05	0.88	0.49	0.34	0.09	-0.30	0.14	1.04	0.03	0.45	-0.77	1.62	0.48	1.06	1.31	0.00	-0.85	
2000	-2.98	-1.69	-1.64	-1.21	-3.58	-2.47	-3.57	-0.76	-0.97	-2.54	-1.42	-3.70	-2.47	-3.80	-1.82	-2.43	-3.80	-2.68	-2.68	-1.70	-1.12	-0.04	-1.82	-2.54	-2.01	1.54	
2001	-1.18	-0.80	-0.71	-0.73	1.92	-1.11	-0.14	0.73	1.41	1.30	0.25	1.60	0.36	0.75	1.62	0.10	-0.82	0.48	0.78	-0.74	-0.49	-0.49	-0.49	-0.49	-0.49	-0.49	
2002	-0.32	-0.06	0.21	1.12	-1.00	0.01	-0.88	0.51	0.63	-1.08	-0.02	0.35	-0.76	0.72	-0.63	0.64	0.07	0.28	-0.57	-0.61	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	
2003	-1.09	-0.12	-0.97	-0.03	-1.54	-0.02	-0.96	-0.93	-0.91	-1.19	-0.74	0.49	-1.46	-0.87	-1.05	-1.68	0.26	0.07	-1.15	-2.06	-0.71	-0.71	-0.71	-0.71	-0.71	-0.71	
2004	1.02	0.68	-0.23	0.24	0.43	0.16	-0.53	-0.10	-0.47	-0.20	2.14	-0.04	1.66	1.11	0.08	0.31	0.30	-0.32	0.48	-0.29	1.41	1.41	1.41	1.41	1.41	1.41	
2005	1.22	3.16	1.93	3.15	1.66	1.08	0.13	2.22	1.32	2.85	1.95	3.17	1.66	2.46	0.27	2.06	2.42	3.27	1.93	0.32	1.73	1.73	1.73	1.73	1.73	1.73	
2006	0.03	-0.47	0.18	0.09	0.92	0.25	-0.75	0.29	0.45	0.90	0.23	0.45	0.91	-0.87	-0.44	0.20	0.13	-0.40	0.78	-0.31	-0.48	-0.48	-0.48	-0.48	-0.48		
2007	0.86	-0.58	0.13	-0.50	1.81	0.41	-0.34	0.24	0.79	1.57	0.55	0.97	0.77	0.05	-0.50	0.97	0.65	1.11	1.19	-1.21	0.95	0.95	0.95	0.95	0.95	0.95	
2008	-0.24	-1.41	-1.20	-1.37	0.72	-0.22	0.35	0.21	1.27	-0.27	-0.08	-0.82	0.08	-1.31	0.86	0.98	-1.37	-0.83	0.60	-1.20	-0.49	-0.49	-0.49	-0.49	-0.49	-0.49	
2009	0.03	0.13	-0.41	0.43	0.05	0.34	0.39	0.23	-0.61	0.46	0.26	0.63	0.12	-0.01	-1.08	0.15	0.22	0.07	0.06	0.56	0.12	0					



Surface Precipitation Rate (mm/day) produced by teleconnection indices between 1948-2020. With minus and plus are the values from the years with negative and positive values of the indices. Source: NOAA Physical Sciences Laboratory (PSL).



Bibliography

- Apostol L., Machidon O.** (2009), *Impact of the abundant precipitations of 22-27 July 2008 in the north and north –east Moldova*, Present Environment and Sustainable Development, vol. 3, pag. 73-82.
- Apostol L., Machidon D., Machidon O., Buruiană D.** (2012), *Characteristics of precipitations trends in the area of Iași, Bacău, and Suceava airports over the last 50 years*, în vol. conf. int. „Aerul și apa – componente ale mediului”, Univ. „Babeș-Bolyai”, Presa Universitară Clujeană, Cluj-Napoca, pp. 252-259, ISSN 2067-743X.
- Beck, C.** (2000). *Zirkulationsdynamische Variabilität im Bereich Nordatlantik-Europa seit 1780*.
- Beck, C., Jacobeit, J., & Jones, P. D.** (2007). *Frequency and within-type variations of large-scale circulation types and their effects on low-frequency climate variability in central europe since 1780*. International Journal of Climatology: A Journal of the Royal Meteorological Society, 27(4), 473-491.
- Dee, D. P., Uppala, S. M., Simmons, A. J., Berrisford, P., Poli, P., Kobayashi, S., ... & Bechtold, P.** (2011). *The ERA-Interim reanalysis: Configuration and performance of the data assimilation system*. Quarterly Journal of the royal meteorological society, 137(656), 553-597
- Demuzere, M., Kassomenos, P., & Philipp, A.** (2011). *The COST733 circulation type classification software: an example for surface ozone concentrations in Central Europe*. Theoretical and applied climatology, 105(1-2), 143-166.
- Dobri, R. V., Sfică, L., Ichim, P., & Harpa, G. V.** (2017). *THE DISTRIBUTION OF THE MONTHLY 24-HOUR MAXIMUM AMOUNT OF PRECIPITATION IN ROMANIA ACCORDING TO THEIR SYNOPTIC CAUSES*. GEOGRAPHIA TECHNICA, 12(2), 62-72.
- Dogan, S., Berktaş, A., & Singh, V. P.** (2012). *Comparison of multi-monthly rainfall-based drought severity indices, with application to semi-arid Konya closed basin, Turkey*. Journal of Hydrology, 470, 255-268.
- Hayes, M. J., Svoboda, M. D., Wilhite, D. A., & Vanyarkho, O. V.** (1999). *Monitoring the 1996 drought using the standardized precipitation index*. Bulletin of the American meteorological society, 80(3), 429-438.
- Klein Tank, A.M.G.** and Coauthors, 2002. *Daily dataset of 20th-century surface air temperature and precipitation series for the European Climate Assessment*. Int. J. of Climatol., 22, 1441-1453.
- Philipp, A., Bartholy, J., Beck, C., Erpicum, M., Esteban, P., Fettweis, X., ... & Krennert, T.** (2010). *Cost733cat–A database of weather and circulation type classifications*. Physics and Chemistry of the Earth, Parts A/B/C, 35(9-12), 360-373.
- Philipp, A., Beck, C., Huth, R., & Jacobeit, J.** (2016). *Development and comparison of circulation type classifications using the COST 733 dataset and software*. International Journal of climatology, 36(7), 2673-2691.
- Poli, P., Hersbach, H., Tan, D., Dee, D., Thepaut, J. N., Simmons, A., ... & Dragani, R.** (2013). *The data assimilation system and initial performance evaluation of the ECMWF pilot reanalysis of the 20th-century assimilating surface observations only (ERA-20C)*. European Centre for Medium Range Weather Forecasts.
- Salehnia, N., Alizadeh, A., Sanaeinejad, H., Bannayan, M., Zarrin, A., & Hoogenboom, G.** (2017). *Estimation of meteorological drought indices based on AgMERRA precipitation data and station-observed precipitation data*. Journal of Arid Land, 9(6), 797-809.
- Sfică, L., Croitoru, A. E., Iordache, I., & Ciupertea, A. F.** (2017). *Synoptic conditions generating heat waves and warm spells in Romania*. Atmosphere, 8(3), 50.
- Stepanek, P.** (2007). *AnClim-software for time series analysis (for Windows)*. Dept. of Geography, Fac. of Natural Sciences, Masaryk University, Brno, 1.
- <https://psl.noaa.gov/cgi-bin/data/composites/printpage.pl>
- <https://www.ecad.eu/>