

A BRIEF DESCRIPTION OF CLIMATIC CONDITIONS IN BALTA IALOMIȚEI REGION

Dr. CĂTĂLINA MĂRCULEȚ, Institute of Geography of the Romanian Academy, Bucarest
Prof. dr. IOAN MĂRCULEȚ, National High School “I. L. Caragiale”, Bucarest, Romania

ABSTRACT: A brief description of climatic conditions in Balta Ialomi ei region. This paper aims to describe the climate particularities of Balta Ialomi ei, as a result of the genetic factors: solar radiation, the general circulation of the atmosphere and the active surface underneath the atmosphere. Starting from the data registered at the weather stations from Călăra i, Fete ti, Cernavodă i Hâr ova, we are going to present the average and extreme characteristics of the main climatic elements: temperature, rainfalls and types of wind; alongside the specificity of some dangerous meteorological phenomena, such as drought, tornadoes, snowstorms, storms, fog, hail, hoar frost, glazed frost, etc.

Keywords: climatic conditions; Balta Ialomiței; temperature; precipitation; wind; meteorological phenomena;

Balta Ialomiței, being located in the south-east of Romania (Fig. 1), is marked by a temperate-continental climate with influences of aridity. The area's climatic

condition are shaped by the interaction of the main genetic factors: solar radiation, general atmospheric circulation and the active subjacent surface.

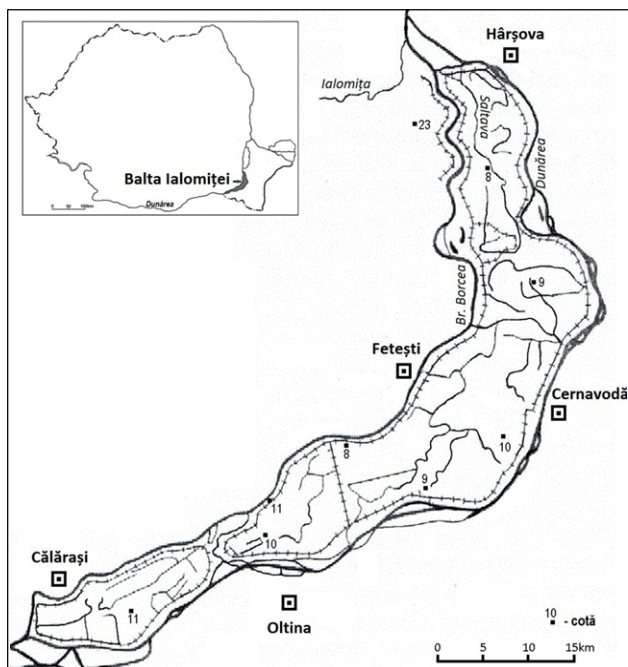


Fig. 1. Balta Ialomiței

Insolation in the region lasts for over 2,200 hrs/year, a value that falls from north to south.

Global solar radiation, which results from the cumulation of direct solar radiation and diffuse solar radiation, has fairly high values, 126.87 kcal/cm²/year and Călărași and 128.05 kcal/cm²/year at Fetești (Bogdan, 1980), (Table 1).

It follows that the radiative balance amounts to some 0.75 cal/cm²/min (Bâzâc, 1983).

couples thermodynamically with the reactivated Mediterranean cyclones, heavy snowfalls and violent snowstorms set in (Bogdan, 1980; Stoian, Neamu, 1983). The Est-European Anticyclone is by far less active in the Balta Ialimiței region during summertime, but increases dryness and drought.

The Azore Anticyclone forms between 20° and 40° latitude; it is of dynamic origin and acts almost throughout the year. Ushering in oceanic air from the west, it increases

Table 1. Global solar radiation in Călărași and at Fetești

| Weather station | Monthly sums | | | | | | | | | | | | Annual | Period | |
|-----------------|--------------|------|------|-------|-------|-------|-------|-------|-------|------|------|------|--------|--------|-------|
| | I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII | | Warm | Cold |
| Călărași | 3.64 | 5.75 | 9.08 | 12.41 | 15.52 | 17.26 | 18.45 | 17.02 | 12.27 | 4.48 | 4.07 | 2.92 | 126.87 | 92.93 | 33.94 |
| Fetești | 3.64 | 5.75 | 9.27 | 12.52 | 15.72 | 17.50 | 18.45 | 17.27 | 12.27 | 8.60 | 4.07 | 2.99 | 128.05 | 93.73 | 34.62 |

Source: Bogdan, 1980, p. 42, taken from Neacșa and Popovici, 1972.

General atmospheric circulation in the study-area is the result of the activity of several pressure centres at the level of the European Continent, a major role playing the Mediterranean Cyclones, the East-European Anticyclone and the Azore Anticyclone.

Mediterranean Cyclones are active almost all the year round, but more especially in the cold season, from October to March, and in the warm season as well, basically in the latter part of summer and in early autumn. Formed above the Mediterranean Sea, they use to move across the southern part of the Balkan Peninsula, sometimes reactivating above the Black Sea. As a result, Balta Ialimiței is hit by violent summer storms and great quantities of water precipitation, snowfalls and blizzards (Stoian, Neamu, 1983).

The East-European Anticyclone develops above the East European Plain coming from the north-east and east. It is more active in winter, from September to March. Its thermodynamic nature unleashes thermal inversions, radiation mists and significant nebulosity. Whenever this anticyclone

moisture and nebulosity in winter, and rain showers, electrical discharges and hail in summer, actually local phenomena in Balta Ialimiței region (Bogdan, 1980).

The Scandinavian Anticyclone is a secondary pressure centre, active especially in winter, little influencing Balta Ialimiței climate except for temperature falls.

The active subjacent surface plays an important part in stamping a regional specificity on climatic events. The fairly mozaic-like pattern of the studied region surface-area, e.g. a higher relief in the east and a lower one in the west, the presence of water types, bunches of forest trees, various crop cultures, irrigations, etc., influences the unequal development of some climatic processes (air movement, thermal convection, nocturnal radiation, evapotranspiration, etc., both diurnal and seasonally (Bogdan, 1980).

Water bodies (the Danube River, the lakes, etc.) have the highest influence in the region. Since the surrounding land (plain and tableland) warm up distinctively different, as do the Danube Floodplain elements, the air moves in the day-time and at night in the form of moisture-charged breezes. Given that

pretty much warmth is required for river and lake water to evaporate, the formation of convection currents is reduced, which intensifies the downcoming of the air. As a result, clouds are scattered, precipitation decreases (under 500 m), the sky is dominantly clear and almost clear (circa 75% /year) (Bogdan, 1980; Bogdan, 1983).

coldest month – January, oscillates around -1°C (-1.4°C in Călărași, -1.2°C at Fetești, -0.7°C in Cernavodă and -1.4°C in Hârșova); the mean temperature of the hottest month – July is of ca 23°C (22.9°C in Călărași, 22.7°C at Fetești, 23.0°C in Cernavodă and 22.6°C in Hârșova, Fig. 2).

Mean annual amplitudes, calculated as

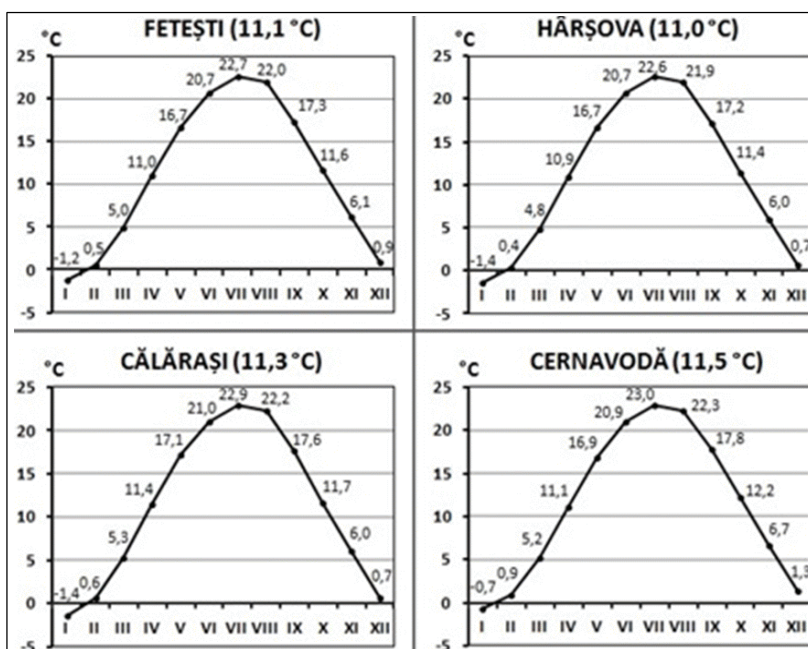


Fig. 2. Average monthly temperatures (1961-2013)

Climatic elements. Characteristics.

Beside the main climatic elements (temperature and precipitation), defining the mean and extreme characteristics of the Balta Ialimiței area implied resorting to the 1961-2013 data available in the ROCADA v.1 set of data grid developed by the National Administration of Meteorology (Bîrsan, Dumitrescu, 2014). The selected points were afferent to the weather stations located at the periphery of the studied region: Călărași, Fetești, Cernavodă and Hârșova.

Average annual air temperature characteristic of Balta Ialimiței region is one of the highest in Cernavodă and 11°C in Hârșova. The average temperature of the

grade differences between the two extreme months are: 24.3°C in Călărași, 24.1°C at Fetești, 23.7°C in Cernavodă and 24.0°C in Hârșova.

Extreme temperatures stand for the great non-periodic climate variations produced by various types of air masses. In the studied region, the absolute lowest air temperature was of -30°C (on January 8, 1938, in Călărași), while the absolute maximum exceeded 40°C ($40.6^{\circ}\text{C}/22$ in August 1952 at Fetești, $41.4^{\circ}\text{C}/$ August 10, 1951 in Călărași and $42.2^{\circ}\text{C}/$ August 20, 1945 in Cernavodă) (Bogdan, 2005a).

Freezing sets in Balta Ialimiței area from November to March for 90 days in the air and over 120 days on the ground. In some years

featuring heavy cooling as from January 20-24 on average, the negative air temperatures may form ice bridges on the river arms, possibly lasting for 35-45 days (Bogdan, 2005a).

Average quantities of precipitation in Balta Ialomiței region are by far lower than in the western neighbouring regions due to weaker thermal convection over the Danube water. Annual mean quantities are falling from south to north and from west to east, most precipitation occurring specifically in Călărași, lowest amounts being recorded in Hâr ova (505.3 mm in Călărași, 472.5 mm at Fetești, 446.1 mm in Cernavodă and 431.8 mm in Hârșova). În June, the month with the highest precipitation record, values are fairly low: 62.4 mm in Călărași, 56.3 mm at Fetești, 52.7 mm in Cernavodă and 52.2 mm in Hârșova. February features the lowest amounts of average precipitation, basically half those recorded in June: 26.2 mm in Călărași, 25.6 mm at Fetești, 25.4 mm in Cernavodă and 24.4 mm in Hârșova (Fig. 3).

Quite exceptionally, due to the occurrence of frontal and sometime convective cyclonic activity, summer months may register particularly heavy rainfall. Absolute maxima/24 hrs: 149.4 mm in Călărași, 95.9 mm at Fetești and 96.7 mm in Hârșova.

Fenomena of dryness and drought are often seen, they are triggered by high temperatures and few precipitation, negatively affecting agricultural works in the region studied by us. These phenomena occur in the warm period of the year: dryness in April-October, drought in July-August (Bogdan, 2005b).

Because of open space there is little atmospheric calm (18.8% in Călărași and 10.7% in Hârșova), the wind blowing from all directions, speeding up at a rate of 10 - 15%.

Among local winds in Balta Ialomiței region, worth-mentioning are Crivățul, Băltărețul and Suhoveiul. The Crivăț develops at the periphery of the East-European Anticyclone. It is a very strong (occasionally 100-120 km/hr) cold and

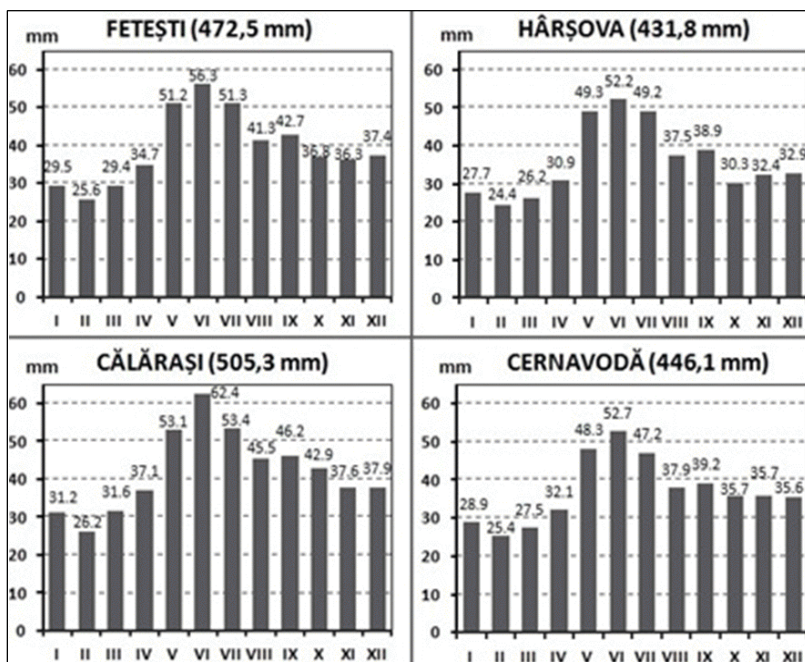


Fig. 3. Average monthly quantities of precipitation (1961-2013)

dry wind that blows in winter from the north-east and north, producing intense freezing, heavy frosts, rainfall and blizzards which scatter and heap up the snow. The Băltărețul rarely blows, it is the work of cyclones formed in the Mediterranean and the Black Sea. It occurs especially in winter and in spring along a south-east – north-west and east-west direction, accompanied by thick black clouds with short small rainfall spells. In winter it brings rains, in summer it cools the air. The Suhovei blows in the warm season of the year from various directions. It is a hot, dry wind that causes drought and dust storms (Mihăilescu, Bogdan, 1983; Mărculeț, 2018).

Dangerous meteorological phenomena (snowstorms, tornadoes, storms, fog, hail, hoar frost, glazed frost, rime) strike Balta Ialimiței region, causing casualties to some economic sectors and actually jeopardising people's property and animal life.

Snowstorm is a complex weather phenomenon, it scatters the snow on the ground, the falling snow being scattered by the wind that blows at higher or lower speed, reducing visibility on the horizontal and on the vertical, snow-heaps blocking access routes. Balta Ialimiței region experiences an average of 3-4 snowstorms/year (3.7 days/year in Călărași) (Bălescu, Beșleagă, 1962; Mărcuși, 2008).

The Balta Ialimiței and its surroundings have over the past decades recorded a few tornado-like phenomena. Noteworthy is the Făcăeni tornado – a communal seat located on the left bank of the Borcea Arm, at some 20 km north of Fetești Town. The event

(grade F3 on Fujita scale) was recorded on August 12, 2002. The toll were two dead and 14 wounded; 3 houses were destroyed, over 428 being deteriorated. The electrical and communication networks were severely affected. The trees on over 120 ha were put to the ground. The cumulated damage amounted to more than 40 billion lei (about 1.5 billion Euro at the time) (Bălțeanu, Trandafir, 2004 cited by Mărculeț, 2010). However, some consider that the disaster was caused by the manifestation of a violent, short lasting storm, a summer phenomenon stirred by the passage of a cold atmospheric front (Baltă, Achim, 2003). On May 23, 2017 another tornado struck Făcăeni Commune, destroying, in two minutes' time, solariums and putting over 100 trees to the ground (Libertatea, the newspaper of May 23, 2017; Mărculeț, 2018).

Storms with electrical discharges are unlished by specific processes in the evolution of Cumulonimbus clouds. Such phenomena hit Balta Ialimiței region on an average of 25-30 days/year, the local maximum being 53 days at Fetești, 44 in Călărași and 43 in Hârșova/year. Electrical discharges over the year occur within an interval of 145-160 days. However, the first such event may exceptionally take place on January, 1 at the earliest and on December 25 at the latest (Iliescu, 1989).

The characteristic features for other dangerous phenomena to occur are (Mărcuși, 2008; Iorga, Mărculeț, 2018): fog (50 - 80 days/year), hail (1-2 days/year), hoar frost (50-70 days/year – 55.5 days in Călărași), glazed frost (5-10 days/year – 5.1 days/year in Călărași) and 5-10 days/year of rime.

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