



# AGROMETEOROLOGICAL BULLETIN

*July 2023*  
*2nd 10-day period*

- Temperature
- Relative Humidity
- Soil Temperature
- Sunshine Duration
- Precipitation
- Evaporation
- Growing Degrees
- Reference Evapotranspiration
- Accumulated Rainfall from the beginning of wet period
- Accumulated Reference Evapotranspiration
- Number of dry days



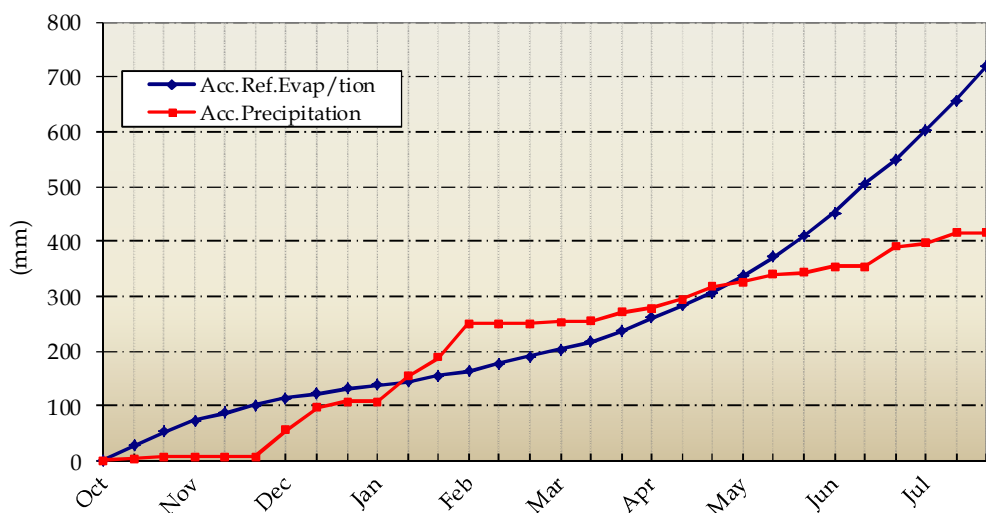
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2nd 10-day period (11-20/07/2023)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	31.0	33.6	32.4	36.6	37.0	35.4	35.8	35.4	34.4	34.2	34.6	31.1	31.3
	Min	17.4	20.6	20.4	21.8	24.8	24.4	23.8	21.8	22.0	21.4	21.8	18.3	19.0
Relative Humidity	Max	82	77	83	87	70	65	54	71	68	79	74	75	76
	Min	38	43	53	38	29	26	24	29	38	32	35	31	34
Soil Temperature at 10 cm	06 UTC	25.4	25.6	27.4	27.6	29.4	29.0	28.8	28.6	29.0	29.0	28.0	26.6	26.0
	12 UTC	28.4	29.6	31.4	32.2	33.4	32.2	32.4	32.6	33.4	33.0	31.9	30.1	29.5
Sunshine Duration		13.0	12.9	12.9	12.6	11.5	13.5	13.5	13.1	13.2	11.1	12.7	12.8	11.8
Precipitation														4.0
Evaporation		5.2	11.0	8.0	9.0	13.5	13.0	12.0	8.0	9.0	12.5	101.2	102.7	93.2
Growing Degrees	5	19.2	22.1	21.4	24.2	25.9	24.9	24.8	23.6	23.2	22.8	232.1	197.2	185.0
	10	14.2	17.1	16.4	19.2	20.9	19.9	19.8	18.6	18.2	17.8	182.1	147.2	139.2

2nd 10-day period (11-20/07/2023)	Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	63.8	62.2
Precipitation - Reference Evapotranspiration	-63.8	-62.2
Number of Rainy Days	0.0	0.0
Number of Dry Days	12.0	24.0

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

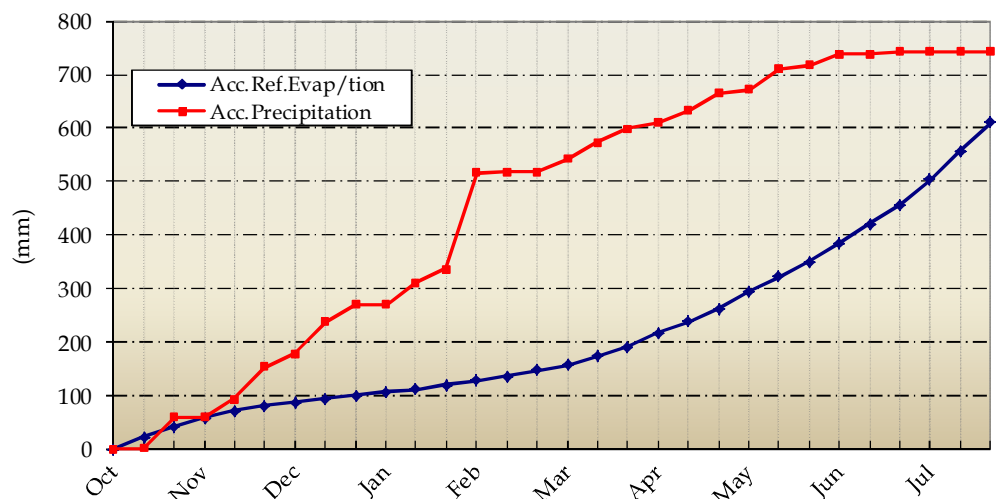


2nd 10-day period (11-20/07/2023)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	33.5	32.1	33.2	34.0	35.4	38.0	38.7	36.2	36.8	37.4	35.5	32.1	30.5
	Min	19.5	19.7	19.3	19.2	17.4	20.6	21.0	22.7	21.8	21.4	20.3	18.9	18.8
Relative Humidity	Max	89	92	93	93	90	91	90	88	90	92	91	82	88
	Min	26	41	45	37	39	33	32	33	37	35	36	34	39
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	28.2
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	33.5
Sunshine Duration		13.1	11.2	12.8	12.8	13.0	12.8	12.9	12.4	12.8	12.5	12.6	12.8	12.4
Precipitation														0.6
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	90.7
Growing Degrees	5	21.5	20.9	21.3	21.6	21.4	24.3	24.9	24.5	24.3	24.4	229.0	205.1	163.5
	10	16.5	15.9	16.3	16.6	16.4	19.3	19.9	19.5	19.3	19.4	179.0	155.1	122.0

2nd 10-day period (11-20/07/2023)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	53.0	51.0	52.8
Precipitation - Reference Evapotranspiration	-53.0	-51.0	-52.2
Number of Rainy Days	0.0	0.0	0.1
Number of Dry Days	33.0	40.0	-

The missing info in the tables are due to the absence of data.

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

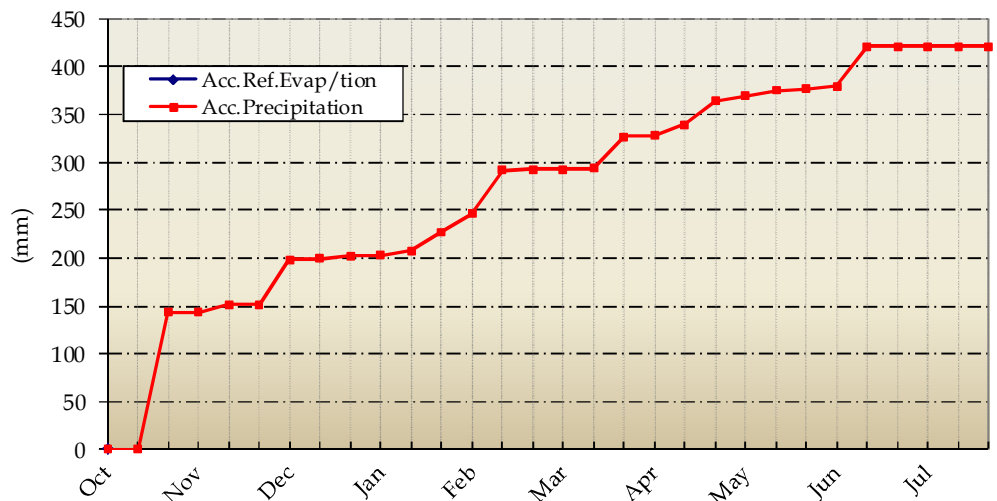


2nd 10-day period (11-20/07/2023)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	29.4	29.8	31.6	33.2	33.0	32.6	30.2	30.6	31.4	31.0	31.3	28.1	29.3
	Min	24.4	22.0	22.4	23.4	25.4	27.2	26.6	26.0	26.6	24.8	24.9	23.8	22.7
Relative Humidity	Max	75	82	75	75	72	77	71	68	65	77	74	71	77
	Min	54	58	49	44	45	45	47	55	46	53	50	50	52
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		12.8	12.6	12.6	12.9	12.6	12.7	12.8	12.8	12.7	12.7	12.7	12.6	12.4
Precipitation														0.2
Evaporation		16.9	5.3	8.0	7.2	8.3	9.9	9.1	8.5	11.2	3.8	88.2	94.8	73.7
Growing Degrees	5	21.9	20.9	22.0	23.3	24.2	24.9	23.4	23.3	24.0	22.9	230.8	209.6	197.5
	10	16.9	15.9	17.0	18.3	19.2	19.9	18.4	18.3	19.0	17.9	180.8	159.6	150.5

2nd 10-day period (11-20/07/2023)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	-	
Precipitation - Reference Evapotranspiration	-	-	
Number of Rainy Days	0.0	0.0	0.1
Number of Dry Days	31.0	38.0	-

The missing info in the tables and the graph are due to the absence of data.

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

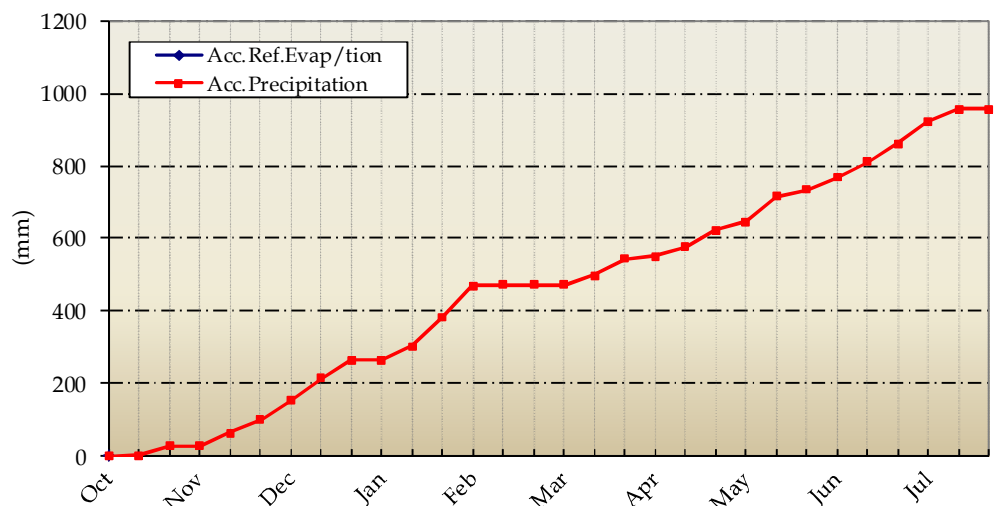


2nd 10-day period (11-20/07/2023)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	32.5	34.6	36.3	37.9	38.2	37.3	38.1	38.7	37.7	37.5	36.9	32.0	31.2
	Min	13.5	13.7	14.4	14.8	15.6	17.3	18.5	18.2	19.5	17.1	16.3	15.9	15.5
Relative Humidity	Max	100	100	100	96	99	100	98	100	92	100	98	64	88
	Min	32	24	26	15	15	32	26	26	27	31	25	28	35
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	22.4
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	25.0
Sunshine Duration		12.4	12.3	12.8	12.7	12.9	12.2	12.8	11.7	12.7	12.6	12.5	11.7	11.0
Precipitation													7.7	8.4
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	-
Growing Degrees	5	18.0	19.2	20.4	21.4	21.9	22.3	23.3	23.5	23.6	22.3	215.7	189.2	150.6
	10	13.0	14.2	15.4	16.4	16.9	17.3	18.3	18.5	18.6	17.3	165.7	139.2	109.8

2nd 10-day period (11-20/07/2023)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	-	41.8
Precipitation - Reference Evapotranspiration	-	-	-33.4
Number of Rainy Days	0.0	1.0	1.2
Number of Dry Days	16.0	8.0	-

The missing info in the tables and the graph are due to the absence of data.

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

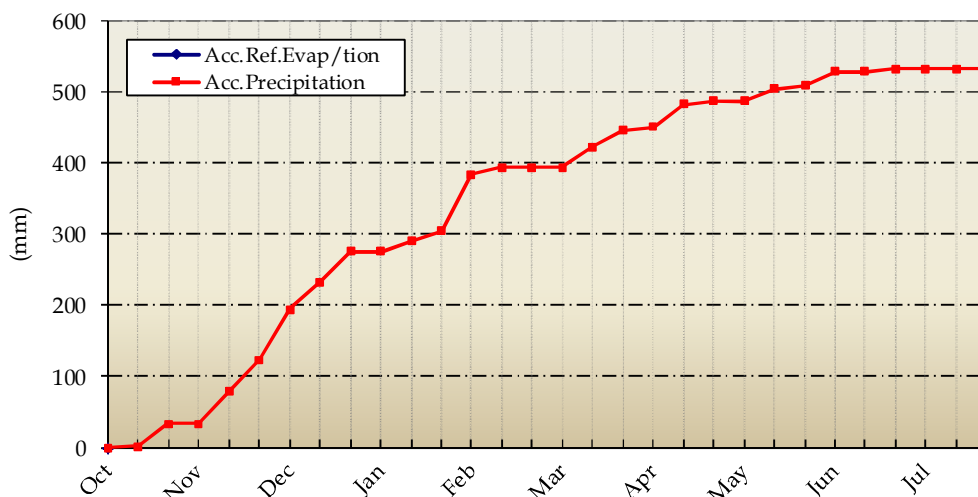


2nd 10-day period (11-20/07/2023)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	33.9	34.6	36.2	36.3	41.1	37.2	37.7	41.8	41.5	38.0	37.8	32.7	31.7
	Min	18.0	19.6	21.0	23.6	20.1	20.6	23.2	23.4	24.2	22.1	21.6	18.6	18.7
Relative Humidity	Max	82	69	71	68	75	74	88	82	84	77	77	85	85
	Min	28	27	34	29	18	31	27	18	20	31	26	32	34
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	25.7
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	29.0
Sunshine Duration		12.6	12.5	12.5	12.6	12.3	12.2	12.4	12.7	12.6	12.6	12.5	12.2	11.8
Precipitation													88.0	4.2
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	76.4
Growing Degrees	5	21.0	22.1	23.6	25.0	25.6	23.9	25.5	27.6	27.9	25.1	247.1	206.3	184.9
	10	16.0	17.1	18.6	20.0	20.6	18.9	20.5	22.6	22.9	20.1	197.1	156.3	139.2

2nd 10-day period (11-20/07/2023)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	-	53.0
Precipitation - Reference Evapotranspiration	-	-	-48.8
Number of Rainy Days	0.0	1.0	0.5
Number of Dry Days	32.0	22.0	-

The missing info in the tables and the graph are due to the absence of data.

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

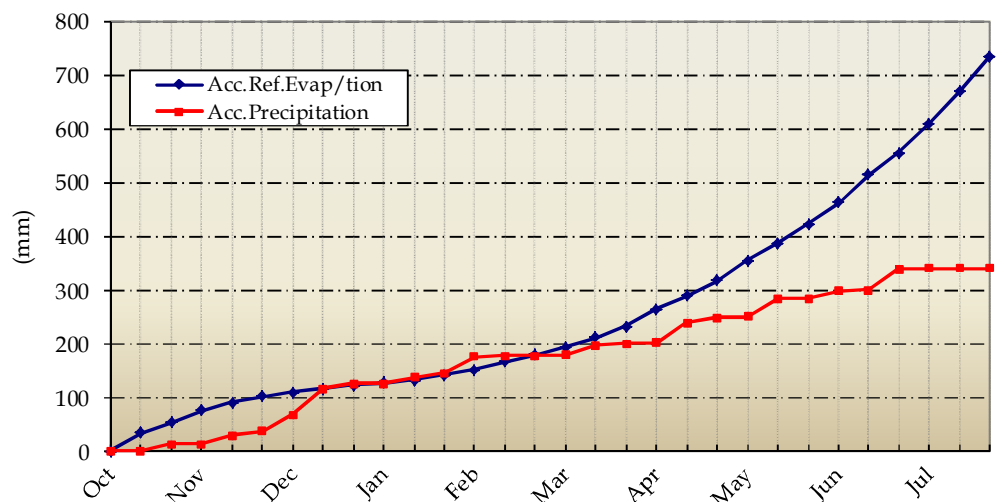


Larisa

2nd 10-day period (11-20/07/2023)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	35.2	38.8	41.2	41.0	37.0	36.2	36.4	38.9	38.6	40.6	38.4	31.6	33.3
	Min	16.2	18.6	20.0	20.6	22.4	22.6	22.0	22.4	26.2	21.0	21.2	18.5	18.9
Relative Humidity	Max	77	71	71	75	71	71	70	69	59	67	70	76	76
	Min	23	20	12	17	29	30	33	23	23	21	23	27	26
Soil Temperature at 10 cm	06 UTC	29.4	29.8	30.4	31.0	30.8	31.4	31.0	30.8	31.8	31.4	30.8	25.5	27.3
	12 UTC	30.4	30.8	31.6	32.2	37.4	32.4	32.6	32.4	32.8	33.0	32.6	26.6	29.5
Sunshine Duration		9.2	10.7	10.9	10.6	10.1	10.8	10.6	10.3	10.8	10.4	10.4	10.4	11.0
Precipitation													0.5	4.0
Evaporation		-	-	-	-	-	-	-	-	-	-	-	108.9	114.7
Growing Degrees	5	20.7	23.7	25.6	25.8	24.7	24.4	24.2	25.7	27.4	25.8	248.0	200.7	190.4
	10	15.7	18.7	20.6	20.8	19.7	19.4	19.2	20.7	22.4	20.8	198.0	150.7	145.6

2nd 10-day period (11-20/07/2023)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	66.7	59.1	73.4
Precipitation - Reference Evapotranspiration	-66.7	-58.6	-69.4
Number of Rainy Days	0.0	1.0	1.0
Number of Dry Days	24.0	2.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



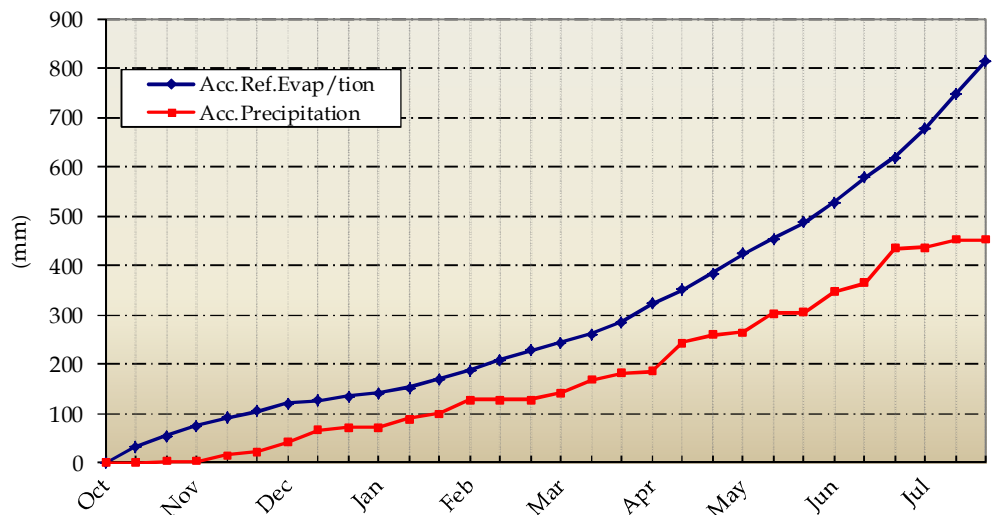
Mikra

2nd 10-day period (11-20/07/2023)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	33.0	37.4	37.0	37.4	36.4	34.9	35.2	36.1	38.0	36.4	36.2	31.2	32.1
	Min	18.4	20.4	21.6	21.4	23.8	23.5	23.8	22.9	23.6	23.9	22.3	20.5	20.7
Relative Humidity	Max	78	70	70	75	78	72	71	82	91	64	75	66	73
	Min	32	23	32	32	36	40	35	43	24	31	33	32	33
Soil Temperature at 10 cm	06 UTC	25.0	25.8	26.2	26.8	27.4	27.8	28.0	28.0	28.6	27.8	27.1	24.8	27.7
	12 UTC	29.4	29.8	29.4	29.6	32.0	30.6	30.8	31.2	31.2	33.2	30.7	27.6	32.8
Sunshine Duration		13.1	13.0	13.2	13.0	12.8	13.1	12.9	11.8	13.0	12.6	12.8	12.9	11.6
Precipitation														4.9
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	105.4
Growing Degrees	5	20.7	23.9	24.3	24.4	25.1	24.2	24.5	24.5	25.8	25.2	242.6	208.5	193.9
	10	15.7	18.9	19.3	19.4	20.1	19.2	19.5	19.5	20.8	20.2	192.6	158.5	148.8

2nd 10-day period (11-20/07/2023)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	69.1	70.5	51.4
Precipitation - Reference Evapotranspiration	-69.1	-70.5	-46.5
Number of Rainy Days	0.0	0.0	0.9
Number of Dry Days	15.0	11.0	-

The missing info in the tables are due to the absence of data.

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



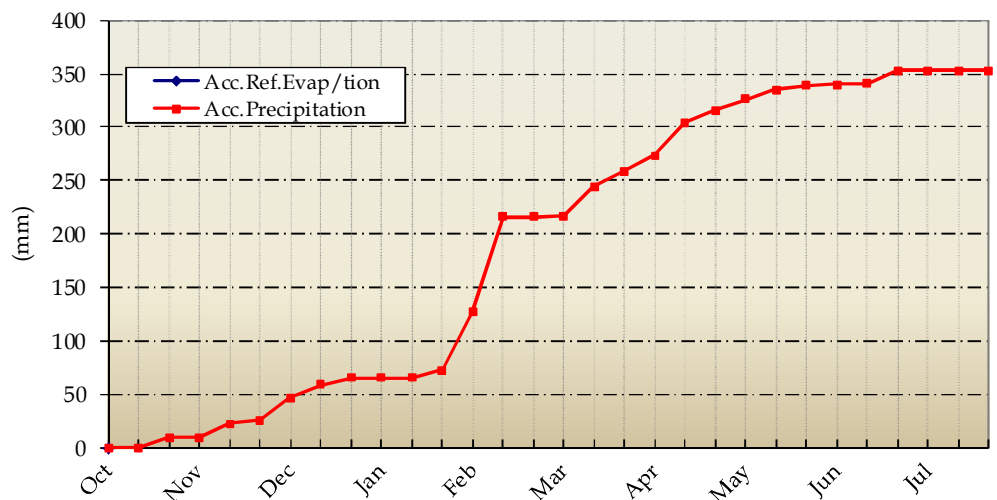


2nd 10-day period (11-20/07/2023)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	33.8	36.9	39.0	41.2	38.0	35.0	34.5	35.5	35.7	39.2	36.9	29.8	32.1
	Min	17.3	17.5	22.2	22.9	22.1	22.7	24.5	22.4	23.8	21.2	21.7	19.1	19.6
Relative Humidity	Max	59	54	58	57	58	64	53	51	57	53	56	63	70
	Min	12	16	16	13	23	22	21	23	20	16	18	25	27
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		13.1	12.7	12.8	12.7	12.6	13.0	13.3	13.2	13.0	12.7	12.9	12.6	12.1
Precipitation														4.9
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	93.6
Growing Degrees	5	20.6	22.2	25.6	27.1	25.1	23.9	24.5	24.0	24.8	25.2	242.7	194.4	180.5
	10	15.6	17.2	20.6	22.1	20.1	18.9	19.5	19.0	19.8	20.2	192.7	144.4	137.4

2nd 10-day period (11-20/07/2023)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	-	-
Precipitation - Reference Evapotranspiration	-	-	-
Number of Rainy Days	0.0	0.0	0.3
Number of Dry Days	32.0	10.0	-

The missing info in the tables and the graph are due to the absence of data.

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



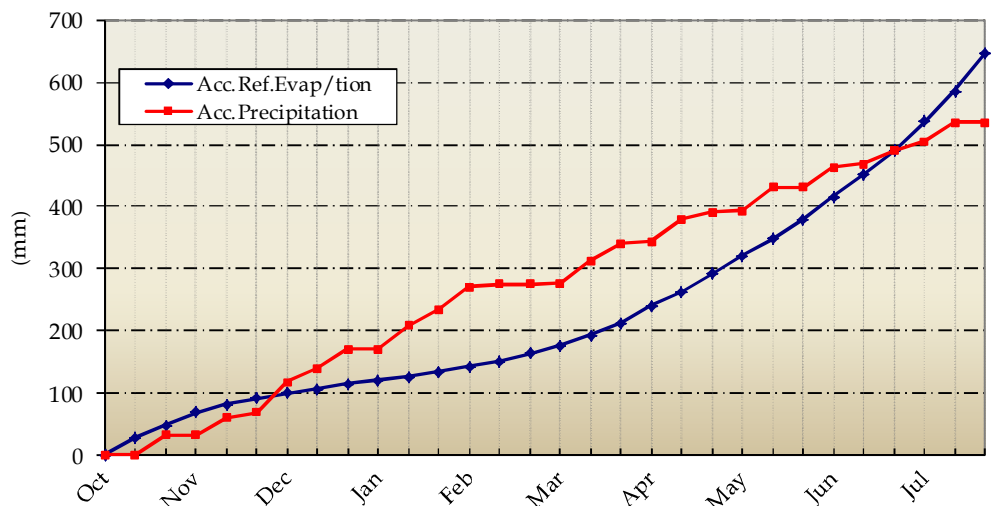
Tripoli

2nd 10-day period (11-20/07/2023)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	32.3	33.8	36.9	39.5	38.2	29.5	34.4	35.6	35.0	38.0	35.3	29.4	31.0
	Min	12.1	12.1	14.2	15.8	15.8	17.4	22.3	19.6	22.9	15.6	16.8	15.2	14.4
Relative Humidity	Max	94	90	93	93	92	85	60	69	73	82	83	80	83
	Min	18	16	16	9	13	24	22	16	18	14	17	25	27
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	25.5
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	29.8
Sunshine Duration		13.2	13.1	13.1	12.2	13.0	12.9	13.1	13.0	13.0	13.0	13.0	11.3	10.9
Precipitation													18.3	5.6
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	63.7
Growing Degrees	5	17.2	18.0	20.6	22.7	22.0	18.5	23.4	22.6	24.0	21.8	210.5	172.6	144.8
	10	12.2	13.0	15.6	17.7	17.0	13.5	18.4	17.6	19.0	16.8	160.5	122.6	103.8

2nd 10-day period (11-20/07/2023)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	61.4	55.6	39.4
Precipitation - Reference Evapotranspiration	-61.4	-37.3	-33.8
Number of Rainy Days	0.0	2.0	1.1
Number of Dry Days	15.0	1.0	-

The missing info in the tables are due to the absence of data.

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration





## ◆ List of Symbols and Abbreviations

### Reference Evapotranspiration $ETo$ (mm):

Calculated by the FAO Penman-Montieth equation

$$ET_0 = \frac{0.408 * \Delta * (R_n - G) + \gamma * \frac{900}{T + 273} * u_2 * (e_s - e_a)}{\Delta + \gamma * (1 + 0.34 * u_2)}$$

using 10-day step.

$R_n$  is estimated from sunshine measurements and  $G$  assumed to be zero.

**Growing Degrees:** Degrees with mean temperature exceeding the base of 5 or 10 °C.

**Number of Rainy Days:** Number of days with precipitation of at least 0.1 mm.

**Number of Dry Days:** Number of dry days recorded since the last rainy day.

**Past Years Mean Values 1991-2020** (Evaporation, Reference Evapotranspiration, Max and Min Relative Humidity 2005-2020)

### Mesurements Units

- ◆ Temperature : °C
- ◆ Relative Humidity : %
- ◆ Soil Temperature : °C
- ◆ Sunshine Duration : Hours
- ◆ Precipitation : mm
- ◆ Evaporation (Pan) : mm
- ◆ Growing Degrees : °C

### UTC (Universal Time coordinates) in Greece

- ◆ Winter : Time(UTC) = Local time - 2
- ◆ Summer : Time(UTC) = Local time - 3

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