



# AGROMETEOROLOGICAL BULLETIN

*November 2019*  
*3rd 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



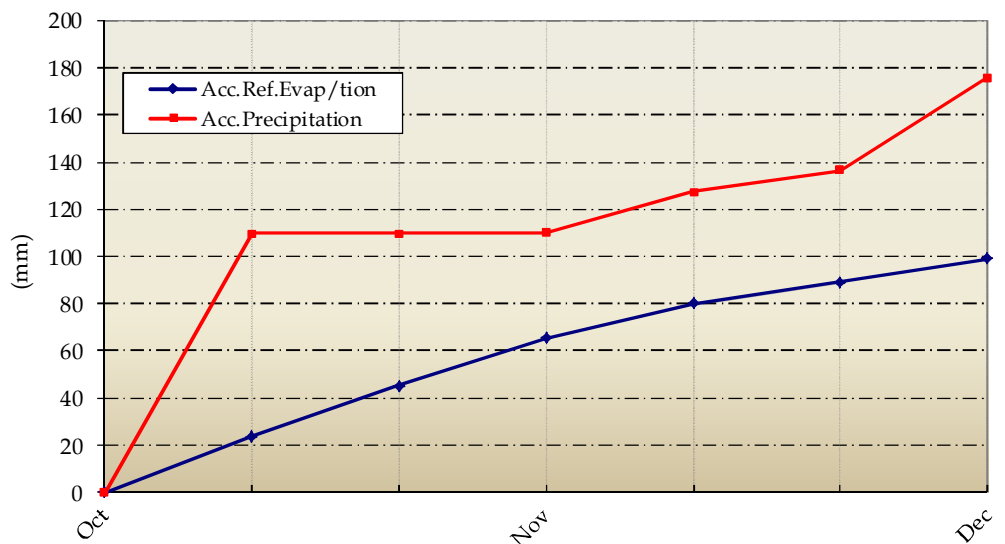
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3rd 10-day period (21-30/11/2019)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	17.4	15.2	13.4	16.4	15.6	15.8	15.8	19.6	20.2	19.0	16.8	12.8	12.8
	Min	14.0	11.4	10.2	9.8	10.4	12.4	9.8	9.2	15.4	6.6	10.9	6.2	5.0
Relative Humidity	Max	95	98	95	95	98	98	86	98	88	94	94	88	-
	Min	67	80	79	64	81	70	60	70	57	58	69	62	-
Soil Temperature at 10 cm	06 UTC	15.0	14.4	13.5	13.0	13.0	13.8	13.0	12.6	15.6	13.4	13.7	10.2	8.6
	12 UTC	15.2	14.6	14.0	14.6	14.2	14.8	14.6	15.4	17.2	15.4	15.0	11.3	10.3
Sunshine Duration		0.1	0.0	0.0	5.1	0.0	0.1	4.9	4.2	7.8	5.9	2.8	1.9	3.2
Precipitation		29.8	2.9	0.9		3.6	1.6			0.5		39.3	100.1	32.9
Evaporation		0.7	0.8	0.6	1.7	1.7	0.5	0.9	1.9	1.1	4.7	14.6	18.9	16.3
Growing Degrees	5	10.7	8.3	6.8	8.1	8.0	9.1	7.8	9.4	12.8	7.8	88.8	49.9	42.5
	10	5.7	3.3	1.8	3.1	3.0	4.1	2.8	4.4	7.8	2.8	38.8	16.8	11.5

3rd 10-day period (21-30/11/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	9.6	11.2	9.6
Precipitation - Reference Evapotranspiration	29.7	88.9	23.3
Number of Rainy Days	6.0	6.0	3.3
Number of Dry Days	5.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

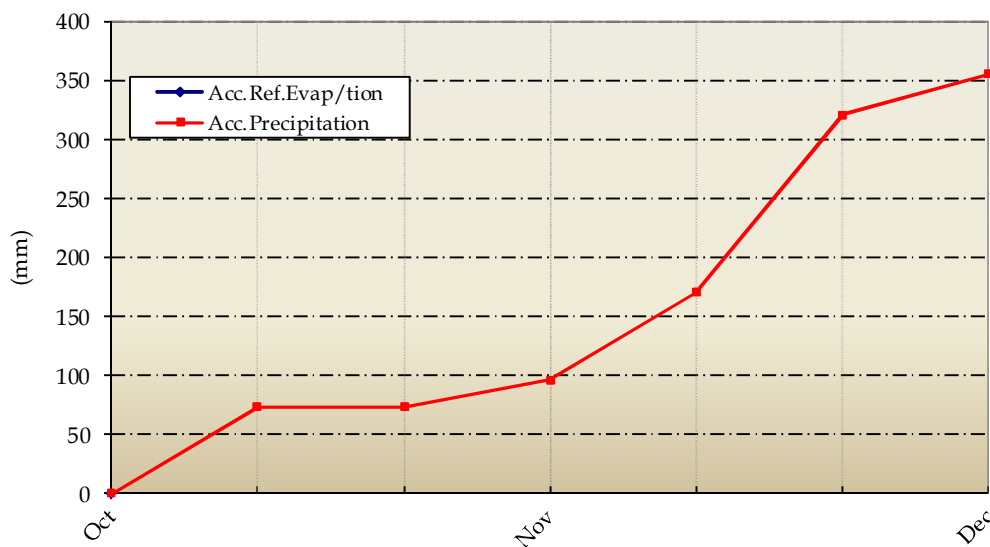


3rd 10-day period (21-30/11/2019)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	20.3	20.1	20.0	19.9	20.0	18.0	21.0	21.0	21.2	20.9	20.2	18.8	17.0
	Min	13.9	11.9	11.4	12.1	10.3	11.4	7.7	12.5	14.5	11.8	11.8	10.6	8.6
Relative Humidity	Max	100	95	90	96	96	96	92	95	88	90	94	95	-
	Min	60	45	58	54	58	54	53	51	52	55	54	52	-
Soil Temperature at 10 cm	06 UTC	17.0	17.0	16.0	15.8	15.5	15.2	14.6	14.0	16.6	16.0	15.8	15.0	11.7
	12 UTC	17.8	17.9	16.6	16.4	16.1	15.8	15.8	16.0	17.2	16.4	16.6	16.1	13.4
Sunshine Duration		1.7	6.1	1.6	0.6	3.1	2.5	7.0	4.7	6.4	6.4	4.0	5.0	4.6
Precipitation		2.6	0.1		0.5	24.6	6.7					34.5	28.5	62.9
Evaporation		2.0	3.0	1.0	1.0	0.2	3.1	0.4	1.2	3.1	2.0	17.0	22.7	20.2
Growing Degrees	5	12.1	11.0	10.7	11.0	10.2	9.7	9.4	11.8	12.9	11.4	110.0	97.1	78.3
	10	7.1	6.0	5.7	6.0	5.2	4.7	4.4	6.8	7.9	6.4	60.0	47.1	31.1

3rd 10-day period (21-30/11/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	10.9	10.9
Precipitation - Reference Evapotranspiration	-	17.6	52.0
Number of Rainy Days	5.0	6.0	5.0
Number of Dry Days	0.0	1.0	-

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

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

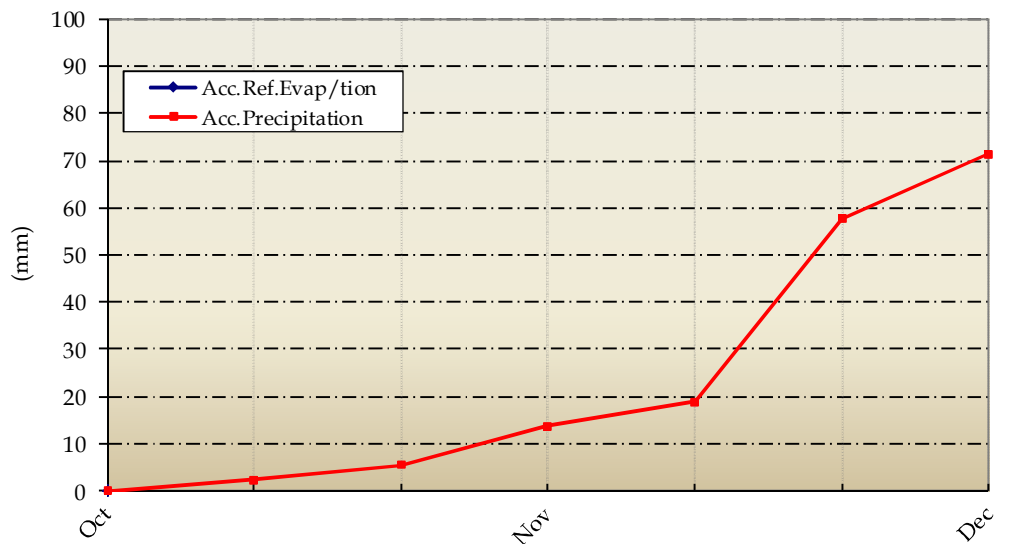


3rd 10-day period (21-30/11/2019)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	24.0	21.4	21.4	21.0	21.0	20.6	19.8	22.8	23.6	21.4	21.7	19.7	18.8
	Min	17.6	16.0	16.2	13.0	17.0	14.2	13.4	12.6	17.0	13.4	15.0	15.3	12.7
Relative Humidity	Max	76	89	91	88	91	91	95	81	79	81	86	91	-
	Min	52	49	54	57	57	54	61	49	48	55	54	68	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		6.1	6.8	6.8	3.3	1.5	3.8	5.8	7.9	7.7	7.8	5.8	3.8	4.6
Precipitation						12.0	0.2	1.4				13.6	82.0	25.7
Evaporation		1.4	4.0	1.7	0.9	0.3	1.2	0.3	2.4	1.3	3.3	16.8	24.8	32.4
Growing Degrees	5	15.8	13.7	13.8	12.0	14.0	12.4	11.6	12.7	15.3	12.4	133.7	124.7	107.2
	10	10.8	8.7	8.8	7.0	9.0	7.4	6.6	7.7	10.3	7.4	83.7	74.7	57.3

3rd 10-day period (21-30/11/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	17.0	-
Precipitation - Reference Evapotranspiration	-	65.0	25.7
Number of Rainy Days	3.0	6.0	3.7
Number of Dry Days	6.0	4.0	-

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

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

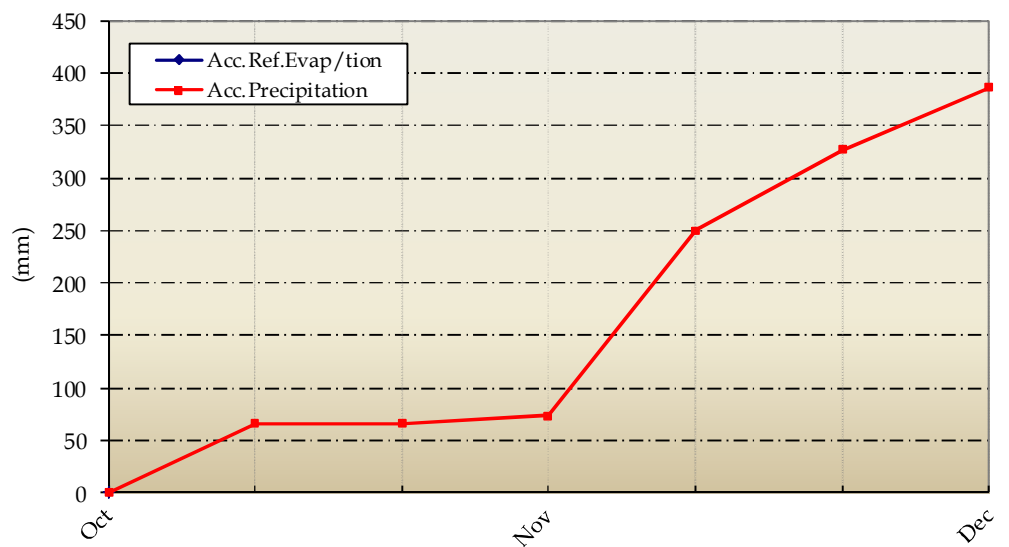


3rd 10-day period (21-30/11/2019)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	12.0	15.0	15.6	16.8	9.8	13.7	14.0	14.4	15.8	14.8	14.2	13.5	12.0
	Min	6.4	7.0	2.7	2.0	6.4	4.2	4.4	8.4	9.1	8.8	5.9	6.5	3.6
Relative Humidity	Max	100	100	100	100	100	100	100	99	100	100	100	98	-
	Min	88	60	68	42	80	75	62	80	75	86	72	71	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	7.1
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	8.3
Sunshine Duration		0.1	2.2	1.7	-	-	-	-	-	3.0	1.6	1.7	2.7	2.6
Precipitation						24.7		0.0	4.4	18.6	11.3	59.0	118.1	57.0
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	9.5
Growing Degrees	5	4.2	6.0	4.2	4.4	3.1	4.0	4.2	6.4	7.5	6.8	50.7	50.2	31.9
	10	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.4	2.5	1.8	6.7	9.1	4.7

3rd 10-day period (21-30/11/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	-	6.7
Precipitation - Reference Evapotranspiration	-	-	50.3
Number of Rainy Days	4.0	6.0	5.1
Number of Dry Days	4.0	0.0	-

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

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

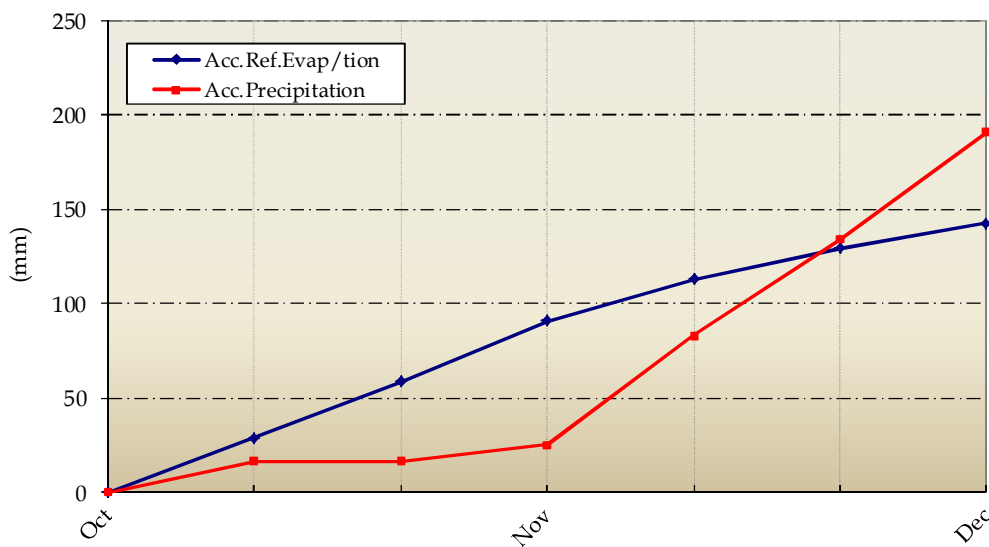


Kalamata

3rd 10-day period (21-30/11/2019)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	22.2	20.5	21.0	19.0	18.6	18.5	22.6	18.9	22.4	21.6	20.5	19.2	18.0
	Min	15.1	12.3	9.0	10.8	8.8	10.2	7.4	11.3	12.6	8.6	10.6	11.1	8.3
Relative Humidity	Max	89	93	90	90	90	93	89	91	93	97	92	86	-
	Min	69	49	47	62	65	61	41	71	47	57	57	53	-
Soil Temperature at 10 cm	06 UTC	17.6	16.8	15.4	15.0	15.0	15.2	15.0	14.6	15.4	15.0	15.5	15.1	12.7
	12 UTC	16.8	17.6	16.4	16.0	15.4	15.4	15.4	15.4	16.4	15.6	16.0	15.8	13.9
Sunshine Duration		2.2	7.1	7.2	0.4	3.2	1.9	8.1	2.4	7.0	4.7	4.4	5.0	4.3
Precipitation		19.9	2.7		4.9	17.3	7.9		2.9	1.3		56.9	70.1	54.0
Evaporation		0.0	3.0	2.0	1.3	2.2	0.9	2.1	1.9	2.0	1.0	16.4	13.7	26.0
Growing Degrees	5	13.7	11.4	10.0	9.9	8.7	9.4	10.0	10.1	12.5	10.1	105.7	101.4	81.4
	10	8.7	6.4	5.0	4.9	3.7	4.4	5.0	5.1	7.5	5.1	55.7	51.4	33.0

3rd 10-day period (21-30/11/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	13.5	15.4	12.1
Precipitation - Reference Evapotranspiration	43.4	54.7	41.9
Number of Rainy Days	7.0	5.0	4.8
Number of Dry Days	0.0	1.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



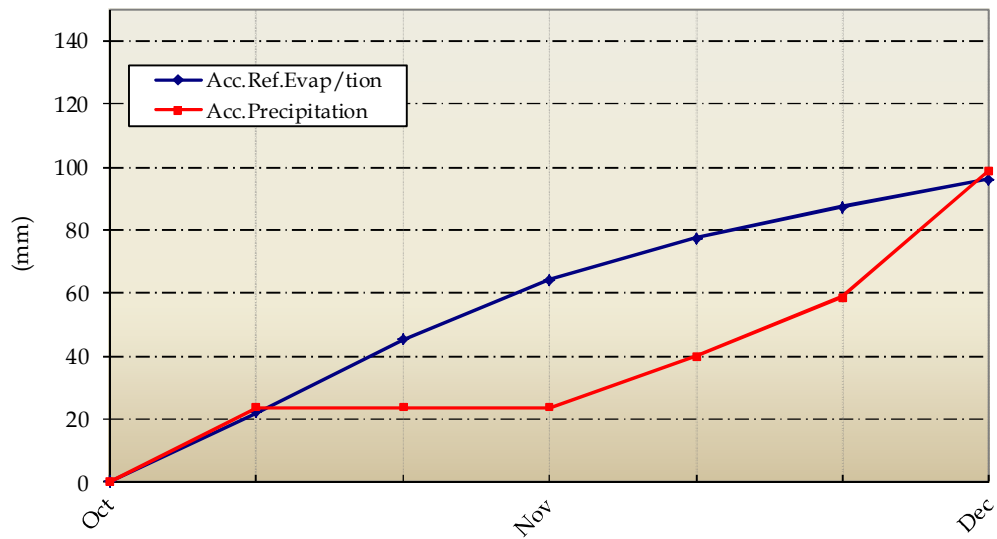
Larisa

3rd 10-day period (21-30/11/2019)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	17.6	19.1	16.8	16.4	16.8	16.2	16.2	17.4	20.7	18.0	17.5	15.0	13.6
	Min	14.4	13.0	8.4	11.0	11.3	6.0	5.1	7.8	10.0	6.9	9.4	8.0	4.1
Relative Humidity	Max	99	98	97	98	98	100	99	98	98	94	98	94	-
	Min	81	63	70	81	81	67	70	70	44	55	68	65	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	9.5
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	10.2
Sunshine Duration		0.0	3.9	4.3	0.4	1.9	5.7	6.0	2.8	3.3	0.0	2.8	2.0	3.5
Precipitation		12.5	4.7		1.3	16.0				5.5		40.0	20.6	21.8
Evaporation		6.6	0.5	0.3	0.0	0.0	0.0	2.0	0.2	2.6	0.7	12.9	11.4	10.2
Growing Degrees	5	11.0	11.1	7.6	8.7	9.1	6.1	5.7	7.6	10.4	7.5	84.6	65.0	40.6
	10	6.0	6.1	2.6	3.7	4.1	1.1	0.7	2.6	5.4	2.5	34.6	22.3	8.0

3rd 10-day period (21-30/11/2019)		Previous Year Value	Past Years Mean Value	
Reference Evapotranspiration		8.8	9.1	7.3
Precipitation - Reference Evapotranspiration		31.2	11.5	14.5
Number of Rainy Days		5.0	5.0	3.5
Number of Dry Days		0.0	1.0	-

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

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



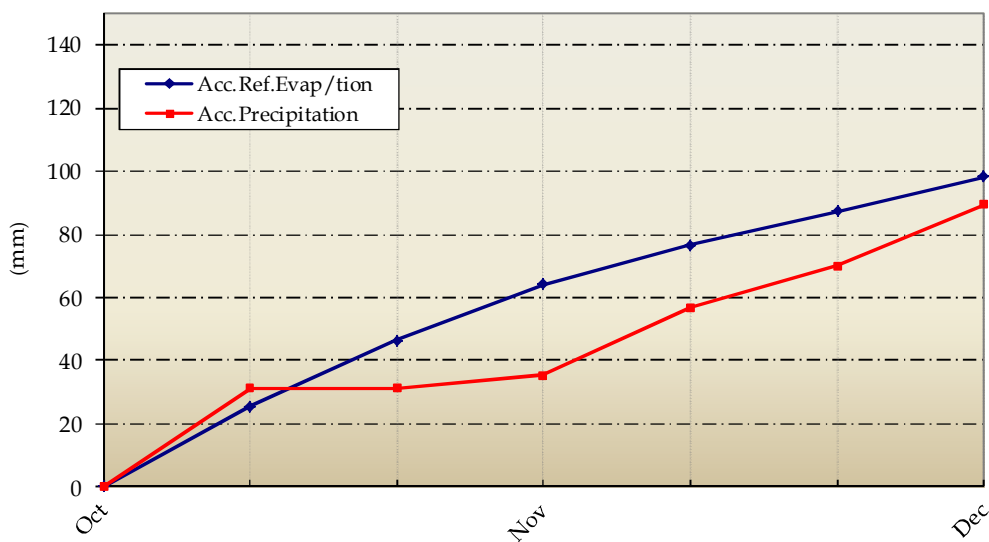
Mikra

3rd 10-day period (21-30/11/2019)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	18.7	17.7	16.8	15.8	16.0	16.4	17.1	17.0	21.6	18.4	17.6	14.5	13.2
	Min	14.4	11.3	11.4	12.0	12.2	9.4	9.7	10.2	11.5	8.4	11.0	9.8	5.2
Relative Humidity	Max	96	93	96	92	98	99	96	98	98	83	95	84	-
	Min	80	64	68	65	68	71	70	74	38	44	64	57	-
Soil Temperature at 10 cm	06 UTC	16.4	16.2	15.2	15.2	15.0	14.0	14.0	14.2	14.5	13.6	14.8	12.5	8.8
	12 UTC	17.2	16.4	15.5	15.8	15.6	14.0	15.4	15.0	16.0	14.4	15.5	13.7	10.6
Sunshine Duration		1.7	3.0	4.4	0.0	0.0	5.4	6.9	1.3	7.7	4.6	3.5	1.8	3.5
Precipitation		0.4	5.7		0.3	12.5	0.5					19.4	13.5	21.0
Evaporation		-	-	-	-	-	-	-	-	-	-	-	14.7	15.7
Growing Degrees	5	11.6	9.5	9.1	8.9	9.1	7.9	8.4	8.6	11.6	8.4	93.0	71.7	43.9
	10	6.6	4.5	4.1	3.9	4.1	2.9	3.4	3.6	6.6	3.4	43.0	27.9	10.2

3rd 10-day period (21-30/11/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	10.9	12.7	9.9
Precipitation - Reference Evapotranspiration	8.5	0.8	11.1
Number of Rainy Days	5.0	8.0	3.6
Number of Dry Days	0.0	0.0	-

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Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



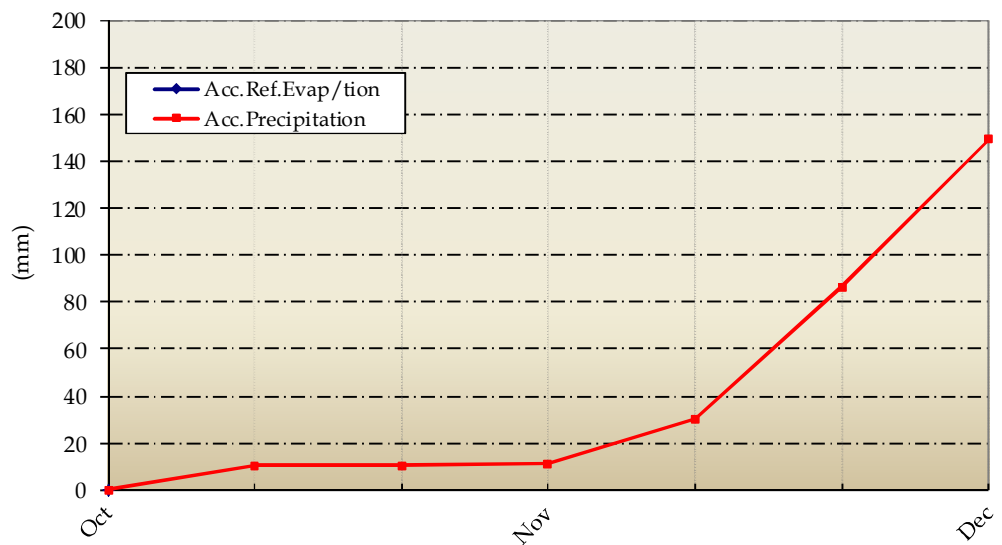


3rd 10-day period (21-30/11/2019)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	21.4	19.4	18.2	17.5	17.8	16.5	18.2	22.2	21.2	20.4	19.3	16.1	15.7
	Min	15.5	10.8	8.6	9.1	11.4	8.4	8.7	7.4	14.5	13.3	10.8	9.0	6.7
Relative Humidity	Max	100	100	100	100	100	100	98	100	62	74	93	94	-
	Min	54	45	56	10	59	67	55	42	41	40	47	59	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		0.8	6.6	6.4	1.1	5.4	3.3	6.8	5.9	5.4	4.6	4.6	2.4	
Precipitation		32.6	10.7			13.2	6.7					63.2	16.2	23.8
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	-
Growing Degrees	5	13.5	10.1	8.4	8.3	9.6	7.5	8.5	9.8	12.9	11.9	100.3	75.9	
	10	8.5	5.1	3.4	3.3	4.6	2.5	3.5	4.8	7.9	6.9	50.3	30.0	

3rd 10-day period (21-30/11/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	10.1	
Precipitation - Reference Evapotranspiration	-	6.1	23.8
Number of Rainy Days	4.0	6.0	3.9
Number of Dry Days	0.0	2.0	-

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

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

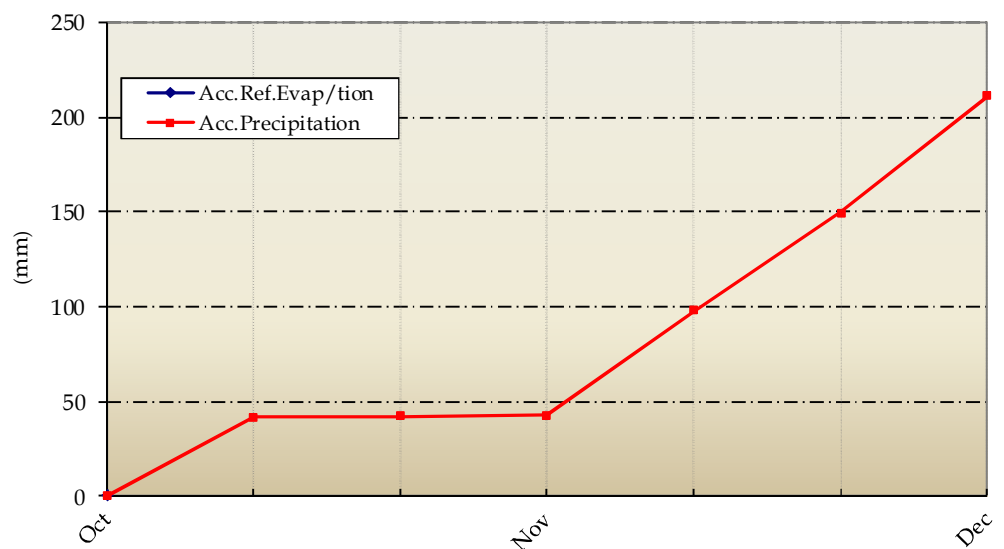


3rd 10-day period (21-30/11/2019)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	17.8	15.9	17.6	13.7	14.2	13.0	16.4	14.4	17.2	15.7	15.6	13.6	12.9
	Min	9.0	7.9	1.8	3.1	4.3	6.5	1.2	6.2	12.2	10.5	6.3	6.2	3.6
Relative Humidity	Max	100	100	100	100	100	100	100	97	87	-	98	98	-
	Min	64	44	36	77	65	64	46	75	50	52	57	61	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	9.8	10.8	9.2	9.8	11.8	-	10.3	9.8	8.3
	12 UTC	-	-	-	-	12.6	12.6	11.4	11.2	13.2	-	12.2	11.5	9.4
Sunshine Duration		1.4	7.3	6.8	0.5	3.5	0.4	6.3	1.3	5.7	4.3	3.8	4.1	4.2
Precipitation		26.2	1.6	-	9.9	20.6	1.2	0.0	1.4	0.8	0.0	61.7	55.3	45.1
Evaporation		-	-	-	-	-	0.0	0.5	0.4	-	-	-	-	13.0
Growing Degrees	5	8.4	6.9	4.7	3.4	4.3	4.8	3.8	5.3	9.7	8.1	59.3	49.7	35.8
	10	3.4	1.9	0.0	0.0	0.0	0.0	0.0	0.3	4.7	3.1	13.4	9.1	5.3

3rd 10-day period (21-30/11/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	9.6	9.3
Precipitation - Reference Evapotranspiration	-	45.7	35.8
Number of Rainy Days	7.0	5.0	4.7
Number of Dry Days	0.0	1.0	-

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

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration





◆ **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<sub>n</sub> 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.

**Measurements 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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