



AGROMETEOROLOGICAL BULLETIN

December 2019
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



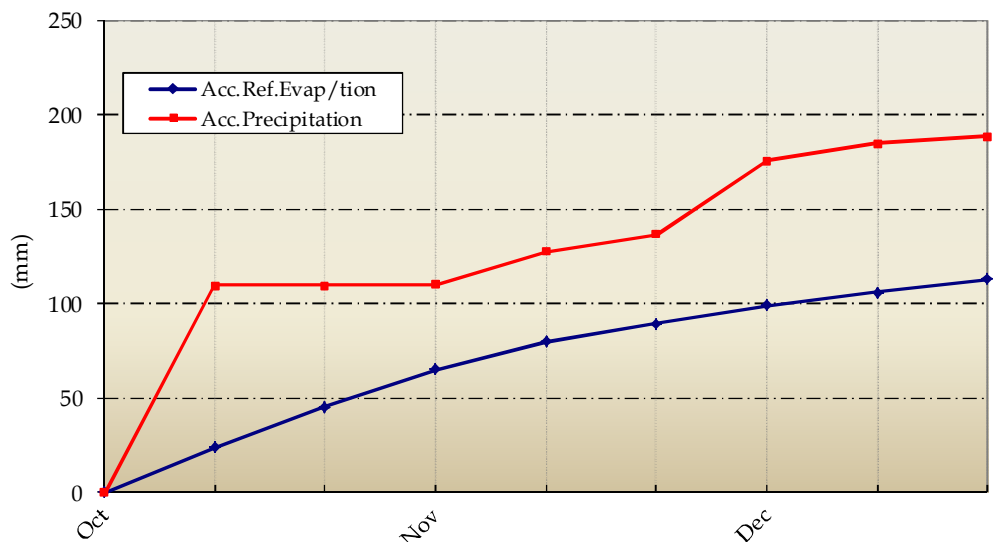
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Division of Climatology-Applications
El. Venizelou Street 14, 16777
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Web addresses of HNMS
www.hnms.gr
www.emy.gov.gr
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2nd 10-day period (11-20/12/2019)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	11.6	13.6	15.0	17.2	17.2	16.2	16.0	16.8	18.2	17.2	15.9	9.2	10.6
	Min	7.4	8.4	8.6	10.0	8.0	3.0	4.6	10.2	9.6	7.0	7.7	3.4	3.1
Relative Humidity	Max	85	98	97	95	97	98	99	92	98	97	96	89	-
	Min	68	73	74	65	58	77	75	68	63	65	69	67	-
Soil Temperature at 10 cm	06 UTC	8.4	9.6	10.4	10.6	11.6	9.4	9.6	11.0	11.8	11.8	10.4	6.8	6.3
	12 UTC	9.8	10.6	11.4	13.6	13.0	12.0	11.4	13.0	13.6	12.6	12.1	7.5	7.5
Sunshine Duration		0.0	0.8	1.9	4.2	3.2	4.0	0.5	4.6	5.7	3.8	2.9	1.6	2.5
Precipitation		2.6	0.2	0.5	0.3	0.0						3.6	32.0	23.7
Evaporation		1.0	0.8	0.5	0.5	1.0	0.8	0.2	0.4	2.2	0.8	8.2	6.5	11.7
Growing Degrees	5	4.5	6.0	6.8	8.6	7.6	4.6	5.3	8.5	8.9	7.1	67.9	18.8	26.7
	10	0.0	1.0	1.8	3.6	2.6	0.0	0.3	3.5	3.9	2.1	18.8	2.7	5.3

2nd 10-day period (11-20/12/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.8	6.4	8.1
Precipitation - Reference Evapotranspiration	-3.2	25.6	15.6
Number of Rainy Days	4.0	7.0	2.9
Number of Dry Days	3.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

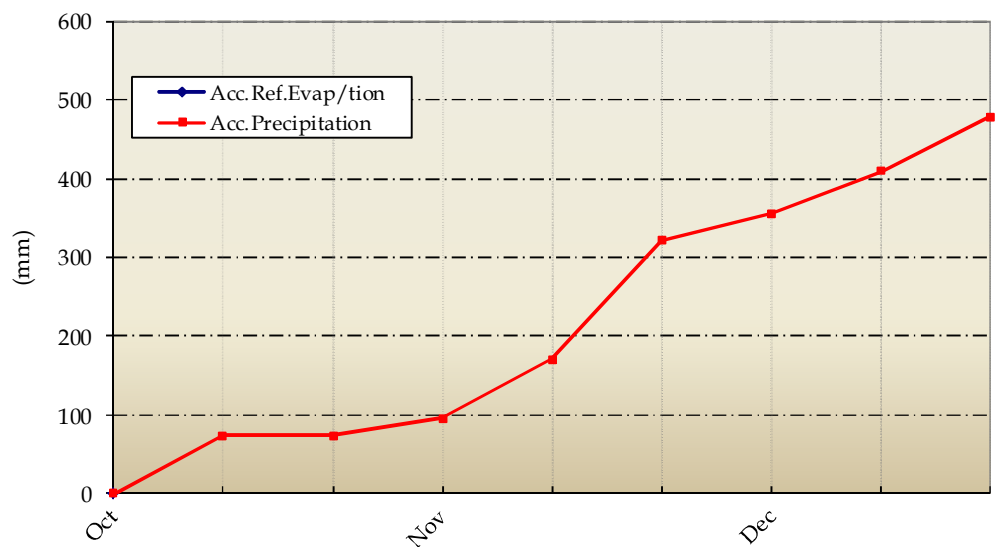


2nd 10-day period (11-20/12/2019)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	15.2	16.5	15.4	16.0	19.2	21.6	20.2	20.5	20.4	19.6	18.5	15.5	15.1
	Min	9.0	7.7	8.9	9.6	6.6	6.6	9.9	6.5	7.9	11.7	8.4	6.8	6.8
Relative Humidity	Max	95	93	93	92	93	94	90	92	89	90	92	98	-
	Min	68	55	67	66	62	56	53	49	50	60	59	52	-
Soil Temperature at 10 cm	06 UTC	13.8	14.0	13.6	13.8	12.2	12.8	12.4	13.4	13.4	14.4	13.4	11.3	9.7
	12 UTC	14.0	15.0	13.6	13.6	13.2	13.8	14.4	14.0	14.0	14.8	14.0	12.4	11.2
Sunshine Duration		1.0	5.3	1.0	0.0	6.4	6.1	6.3	6.1	3.4	2.8	3.8	3.2	4.1
Precipitation		17.0		17.0	31.8						3.7	69.5	65.5	43.9
Evaporation		2.1	5.5	0.4	1.0	1.2	1.4	3.1	1.2	1.5	1.0	18.4	17.9	19.6
Growing Degrees	5	7.1	7.1	7.2	7.8	7.9	9.1	10.1	8.5	9.2	10.7	84.5	61.5	59.8
	10	2.1	2.1	2.2	2.8	2.9	4.1	5.1	3.5	4.2	5.7	34.5	14.2	16.6

2nd 10-day period (11-20/12/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	8.0	9.0
Precipitation - Reference Evapotranspiration	-	57.5	34.9
Number of Rainy Days	4.0	8.0	4.7
Number of Dry Days	0.0	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



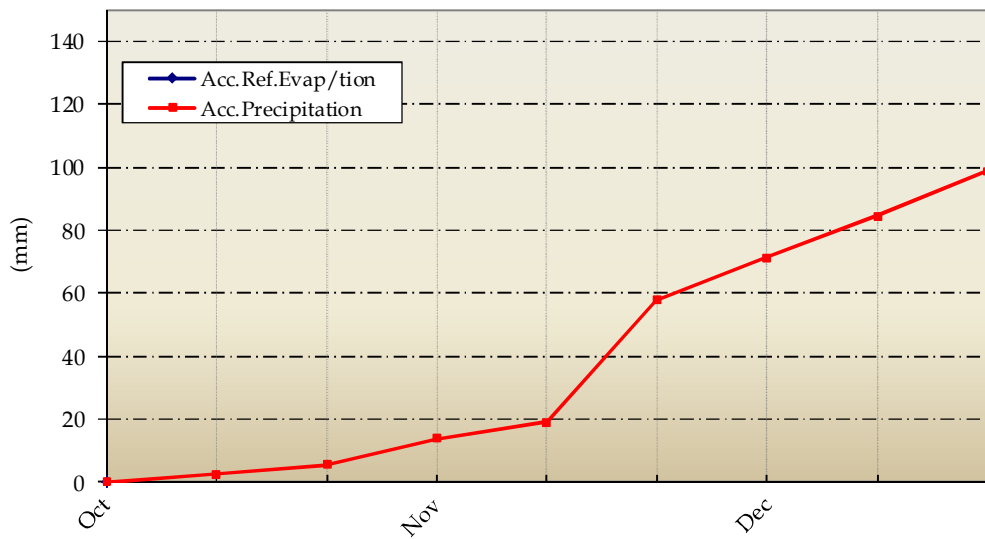
Iraklio

2nd 10-day period (11-20/12/2019)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	21.0	17.8	19.6	16.0	18.0	19.2	19.6	19.4	21.6	19.6	19.2	16.5	16.6
	Min	14.4	11.0	9.2	12.4	8.8	12.2	11.2	11.0	11.4	11.4	11.3	11.4	10.5
Relative Humidity	Max	92	92	89	89	96	95	90	93	93	90	92	90	-
	Min	44	54	48	62	93	79	62	63	60	66	63	69	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		4.5	4.5	5.9	0.9	3.6	6.9	7.9	7.7	7.0	5.3	5.4	3.6	3.8
Precipitation		0.2	4.5	0.5	9.1	0.2						14.5	44.9	23.4
Evaporation		3.4	0.5	0.0	0.2	0.1	1.5	0.9	2.0	2.9	0.3	11.8	24.3	25.9
Growing Degrees	5	12.7	9.4	9.4	9.2	8.4	10.7	10.4	10.2	11.5	10.5	102.4	89.4	85.7
	10	7.7	4.4	4.4	4.2	3.4	5.7	5.4	5.2	6.5	5.5	52.4	39.4	36.5

2nd 10-day period (11-20/12/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	13.6	-
Precipitation - Reference Evapotranspiration	-	31.3	23.4
Number of Rainy Days	5.0	7.0	3.8
Number of Dry Days	0.0	1.0	-

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Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

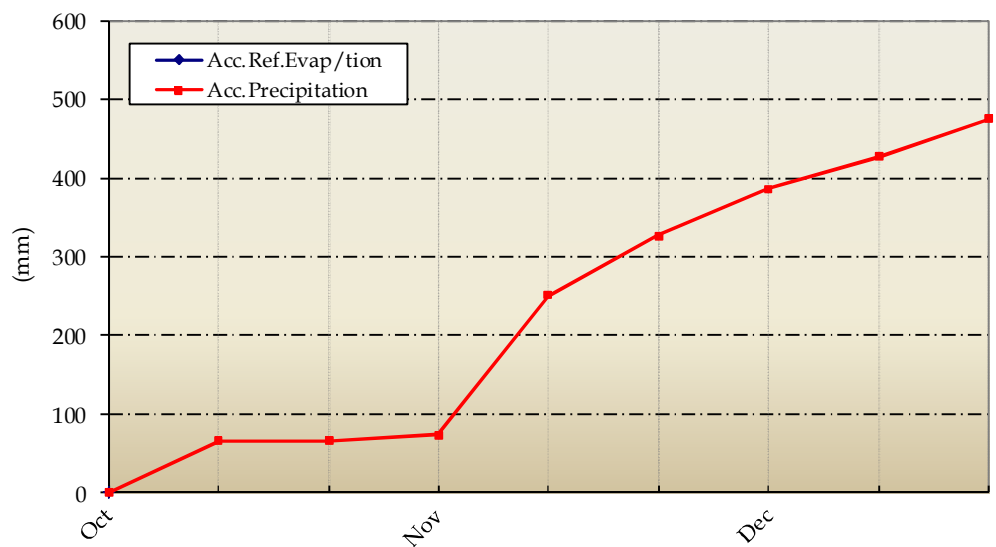


2nd 10-day period (11-20/12/2019)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	12.0	12.4	8.8	11.0	14.0	14.0	12.0	9.5	8.2	13.0	11.5	8.6	9.6
	Min	6.2	-2.0	3.6	6.8	0.6	-1.0	2.6	2.0	2.0	6.4	2.7	0.6	1.6
Relative Humidity	Max	100	100	100	100	100	100	100	100	100	100	100	100	-
	Min	50	59	76	77	64	67	90	94	94	85	76	68	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	4.9
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	5.7
Sunshine Duration		0.0	5.8	0.1	0.2	3.4	5.4	0.7	0.4	0.0	0.0	1.6	2.2	2.5
Precipitation		1.9	0.8	2.8	36.7		0.0			0.0	6.6	48.8	56.4	54.5
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	5.5
Growing Degrees	5	4.1	0.2	1.2	3.9	2.3	1.5	2.3	0.8	0.1	4.7	21.1	9.9	16.0
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8

2nd 10-day period (11-20/12/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	-	5.7
Precipitation - Reference Evapotranspiration	-	-	48.8
Number of Rainy Days	5.0	5.0	4.4
Number of Dry Days	0.0	2.0	-

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

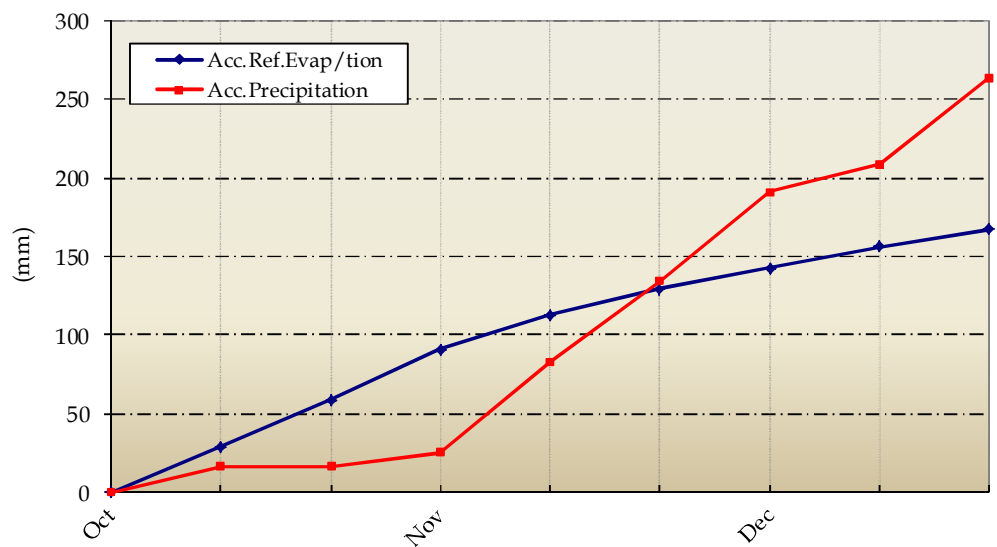
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



2nd 10-day period (11-20/12/2019)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	12.6	18.1	17.0	15.6	19.7	21.0	20.8	20.4	19.1	19.8	18.4	16.0	15.9
	Min	8.6	8.2	8.3	9.8	8.3	8.0	7.1	7.1	9.0	10.3	8.5	7.0	6.6
Relative Humidity	Max	93	92	93	91	89	91	92	92	91	92	92	91	-
	Min	85	49	59	65	45	47	49	46	62	58	56	55	-
Soil Temperature at 10 cm	06 UTC	13.4	12.4	12.6	13.6	12.0	12.2	12.2	12.6	12.2	14.0	12.7	11.9	10.6
	12 UTC	13.5	13.6	13.8	14.0	13.5	14.0	13.8	13.2	13.2	14.6	13.7	12.5	11.5
Sunshine Duration		0.2	5.2	3.7	1.9	8.4	7.3	6.2	6.2	6.2	5.4	5.1	4.4	3.9
Precipitation		17.0	13.6	6.5	17.8							54.9	81.8	53.6
Evaporation		0.5	1.3	1.2	1.8	5.0	8.8	6.6	1.4	0.6	2.0	29.2	14.7	23.9
Growing Degrees	5	5.6	8.2	7.7	7.7	9.0	9.5	9.0	8.8	9.1	10.1	84.4	65.3	62.3
	10	0.6	3.2	2.7	2.7	4.0	4.5	4.0	3.8	4.1	5.1	34.4	18.4	17.2

2nd 10-day period (11-20/12/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	11.3	12.5	10.5
Precipitation - Reference Evapotranspiration	43.6	69.3	43.1
Number of Rainy Days	4.0	7.0	4.7
Number of Dry Days	0.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



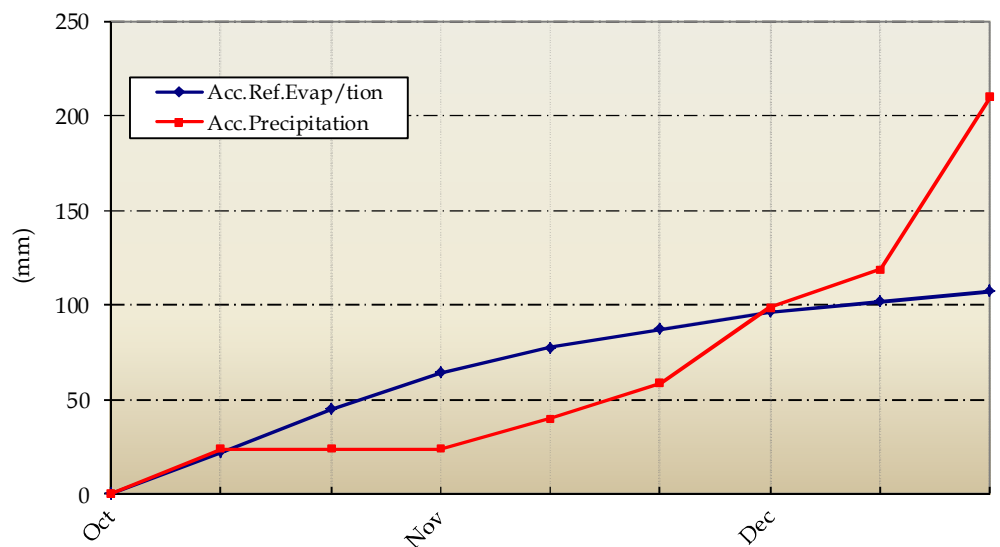
Larisa

2nd 10-day period (11-20/12/2019)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	11.0	12.2	13.0	13.2	18.2	16.2	9.8	10.4	10.3	11.6	12.6	8.9	11.0
	Min	8.0	6.8	4.6	4.8	9.4	3.0	5.0	7.8	8.1	9.0	6.6	2.0	1.7
Relative Humidity	Max	99	99	100	99	100	100	100	99	95	96	99	95	-
	Min	77	68	70	76	55	68	93	88	84	83	76	66	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	6.9
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	7.3
Sunshine Duration		0.0	3.4	4.6	0.0	6.5	6.4	0.0	0.0	0.0	0.0	2.1	2.3	3.1
Precipitation		64.9	0.7		25.3				0.3			91.2	14.2	14.0
Evaporation		0.0	0.5	-	8.2	1.0	2.1	-	0.4	0.4	0.3	-	4.9	6.0
Growing Degrees	5	4.5	4.5	3.8	4.0	8.8	4.6	2.4	4.1	4.2	5.3	46.2	10.1	20.8
	10	0.0	0.0	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.3	4.1	0.0	2.1

2nd 10-day period (11-20/12/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	5.5	5.2	5.8
Precipitation - Reference Evapotranspiration	85.7	9.0	8.2
Number of Rainy Days	4.0	5.0	3.3
Number of Dry Days	0.0	2.0	-

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

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



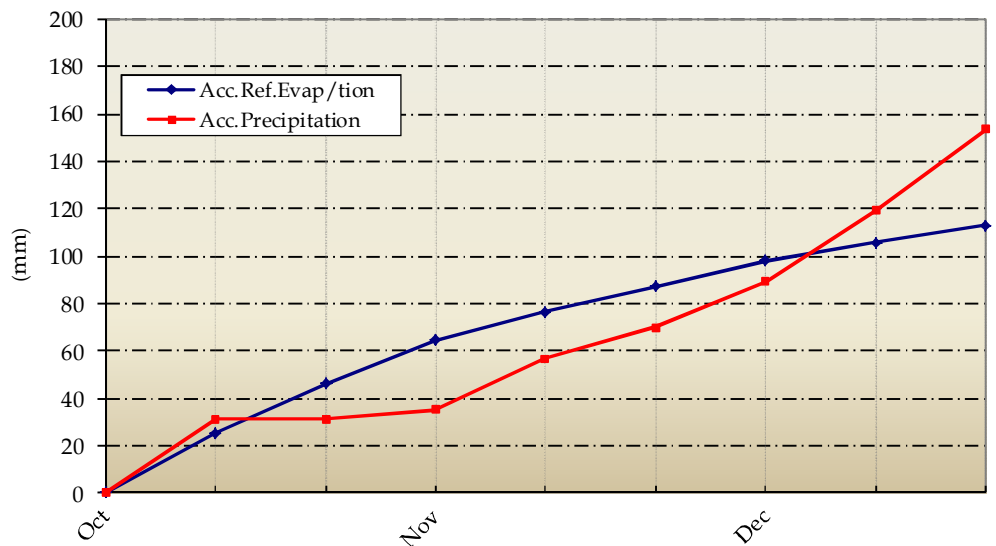
Mikra

2nd 10-day period (11-20/12/2019)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	12.9	11.2	12.2	15.9	16.8	14.7	14.1	13.0	11.4	12.5	13.5	9.0	10.6
	Min	9.0	8.4	6.1	6.5	9.5	6.4	9.8	10.8	9.9	9.5	8.6	3.5	3.0
Relative Humidity	Max	90	98	99	98	96	98	95	83	88	96	94	84	-
	Min	61	82	77	73	60	80	73	79	78	74	74	59	-
Soil Temperature at 10 cm	06 UTC	11.2	10.1	10.2	11.0	11.8	11.0	12.0	12.4	11.9	11.3	11.3	6.5	6.2
	12 UTC	10.8	11.0	11.0	12.0	12.6	12.4	12.6	12.2	12.4	12.2	11.9	7.8	7.7
Sunshine Duration		0.0	0.0	2.7	0.6	7.6	4.9	3.0	0.0	0.0	0.4	1.9	2.6	2.8
Precipitation		17.4	2.8		14.2						0.0	34.4	33.5	12.5
Evaporation		-	-	-	-	-	-	-	-	-	-	-	6.5	10.6
Growing Degrees	5	6.0	4.8	4.2	6.2	8.2	5.6	7.0	6.9	5.7	6.0	60.3	16.3	24.9
	10	1.0	0.0	0.0	1.2	3.2	0.6	2.0	1.9	0.7	1.0	11.4	0.0	2.8

2nd 10-day period (11-20/12/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.2	10.8	8.4
Precipitation - Reference Evapotranspiration	27.2	22.7	4.1
Number of Rainy Days	3.0	6.0	2.9
Number of Dry Days	0.0	2.0	-

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Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



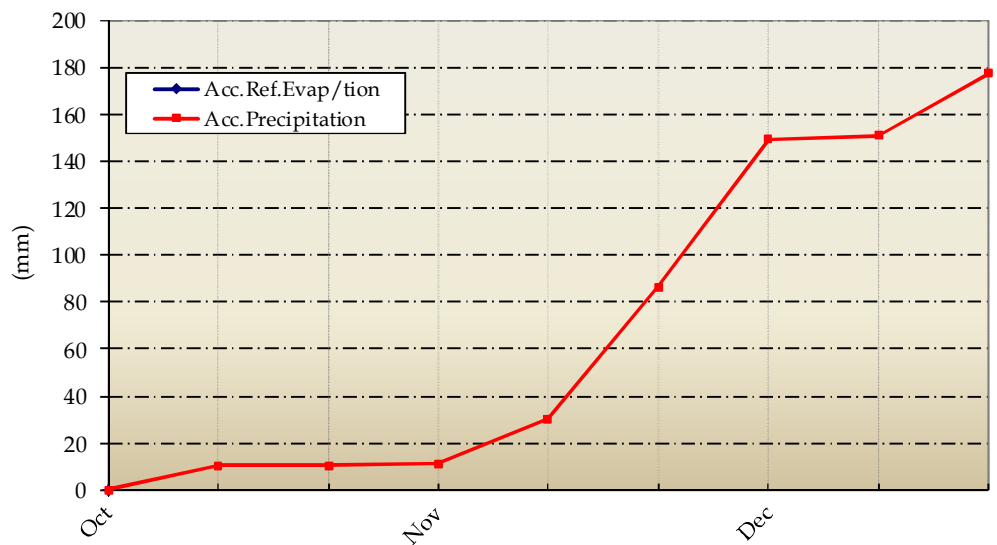
Tanagra

2nd 10-day period (11-20/12/2019)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	14.4	11.0	16.0	15.2	16.0	18.5	16.6	16.4	16.2	19.7	16.0	11.1	13.4
	Min	10.2	8.7	5.1	9.6	10.2	5.0	4.2	6.9	5.7	7.7	7.3	4.5	5.0
Relative Humidity	Max	100	100	100	100	100	100	100	100	100	100	100	97	-
	Min	76	82	50	63	61	57	75	71	80	51	67	59	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		2.0	0.1	4.6	0.0	0.0	7.0	6.3	6.2	1.6	5.8	3.4	2.0	
Precipitation		12.3	1.5		11.8	0.8						26.4	27.6	25.9
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	-
Growing Degrees	5	7.3	4.9	5.6	7.4	8.1	6.8	5.4	6.7	6.0	8.7	66.7	30.6	
	10	2.3	0.0	0.6	2.4	3.1	1.8	0.4	1.7	1.0	3.7	16.8	4.7	

2nd 10-day period (11-20/12/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	6.6	
Precipitation - Reference Evapotranspiration	-	21.0	25.9
Number of Rainy Days	4.0	6.0	4.3
Number of Dry Days	0.0	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



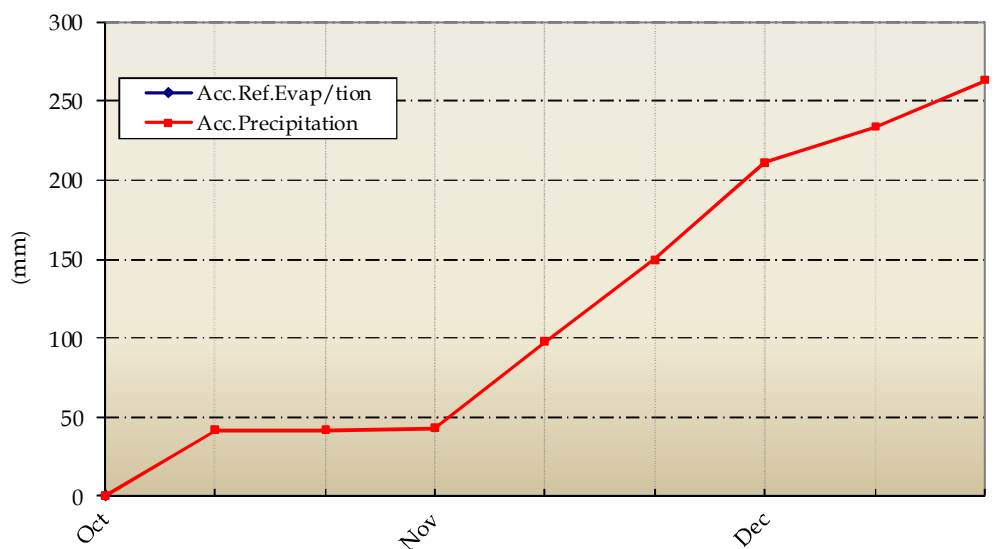
Tripoli

2nd 10-day period (11-20/12/2019)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	10.6	12.4	12.3	9.8	14.6	16.2	17.1	17.4	14.8	15.6	14.1	10.6	10.8
	Min	4.4	5.8	3.2	6.7	4.3	2.1	-0.4	-0.8	1.0	5.8	3.2	1.7	1.8
Relative Humidity	Max	100	100	100	99	100	100	100	100	100	100	100	100	-
	Min	65	61	55	58	60	58	52	51	64	55	58	61	-
Soil Temperature at 10 cm	06 UTC	9.0	9.0	8.2	-	-	7.8	6.8	-	-	-	8.2	6.1	6.0
	12 UTC	10.0	10.2	-	-	-	10.0	9.0	-	-	-	9.8	7.4	6.7
Sunshine Duration		2.0	1.0	3.0	2.3	1.9	5.2	6.4	6.1	1.0	4.9	3.4	4.6	3.6
Precipitation		9.3	1.3	3.0	15.9	0.0	0.0	0.0	0.0		0.0	29.5	81.4	40.9
Evaporation		0.2	0.0	-	-	-	1.6	-	-	-	-	-	-	10.0
Growing Degrees	5	2.5	4.1	2.8	3.3	4.5	4.2	3.4	3.3	2.9	5.7	36.5	16.7	19.6
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.2	1.5

2nd 10-day period (11-20/12/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	5.6	7.6
Precipitation - Reference Evapotranspiration	-	75.8	33.3
Number of Rainy Days	4.0	6.0	4.3
Number of Dry Days	0.0	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





◆ **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.

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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