



AGROMETEOROLOGICAL BULLETIN

December 2018
1st 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



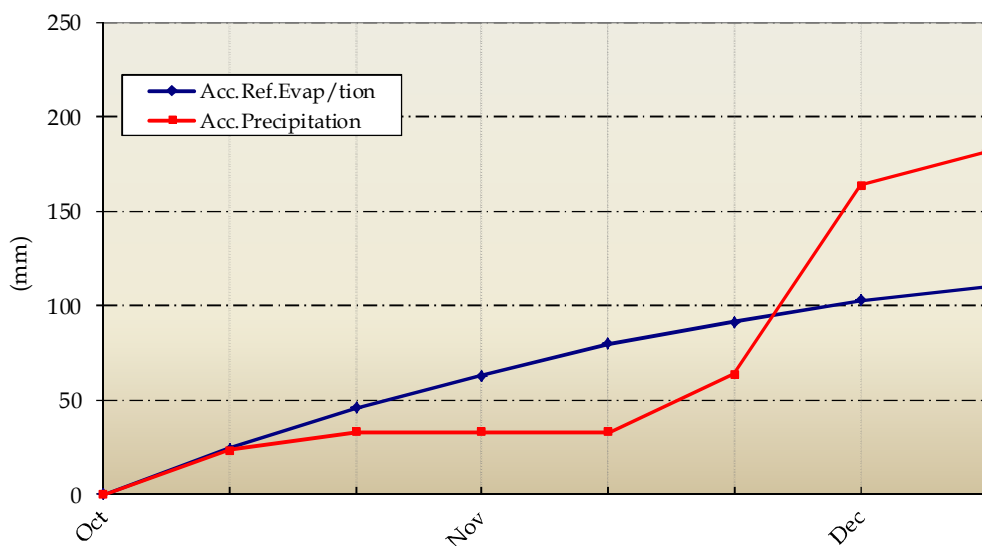
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1st 10-day period (1-10/12/2018)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	6.8	11.0	10.2	11.6	12.4	10.0	6.8	11.6	11.0	9.8	10.1	16.0	11.0
	Min	-4.0	-2.6	5.2	6.4	9.8	3.0	-4.8	-2.4	5.8	3.0	1.9	7.9	3.3
Relative Humidity	Max	87	89	95	89	82	57	83	93	95	97	87	90	-
	Min	37	48	70	71	54	44	27	67	89	86	59	58	-
Soil Temperature at 10 cm	06 UTC	4.6	4.0	7.0	8.4	9.2	7.2	4.0	4.0	7.6	6.8	6.3	10.8	7.1
	12 UTC	6.0	6.8	7.8	9.4	9.6	7.0	6.0	6.6	8.6	8.0	7.6	12.1	8.4
Sunshine Duration		6.1	5.7	0.0	0.0	0.0	4.9	7.7	4.6	0.0	0.0	2.9	5.8	2.7
Precipitation						0.0				14.7	2.8	17.5	6.0	30.2
Evaporation		0.0	0.0	0.2	1.3	2.4	0.0	0.0	0.0	0.8	0.4	5.1	16.8	14.9
Growing Degrees	5	0.0	0.0	2.7	4.0	6.1	1.5	0.0	0.0	3.4	1.4	19.1	69.8	28.2
	10	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	1.1	30.3	5.3

1st 10-day period (1-10/12/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.0	12.5	9.7
Precipitation - Reference Evapotranspiration	10.5	-6.5	20.5
Number of Rainy Days	2.0	1.0	3.2
Number of Dry Days	9.0	9.0	-

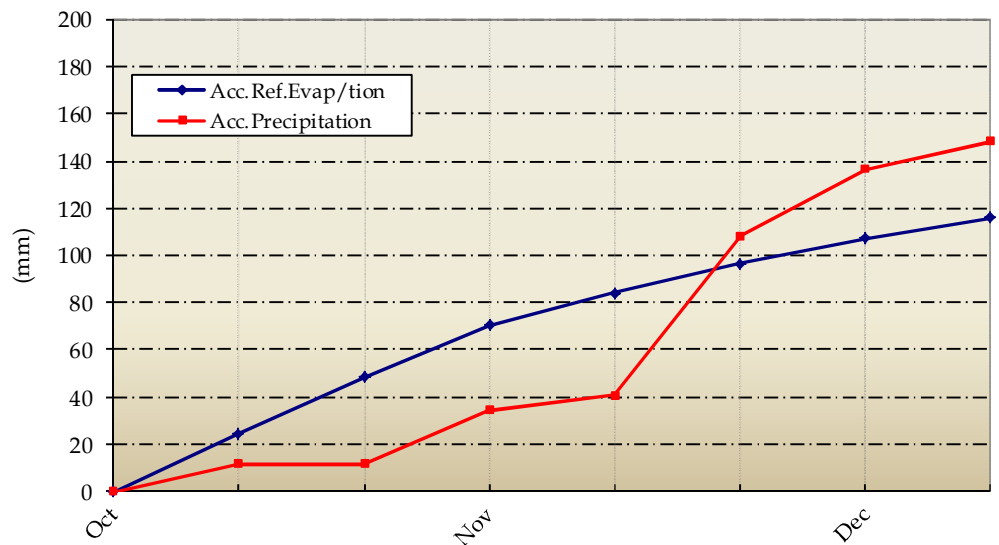
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



1st 10-day period (1-10/12/2018)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	15.5	17.0	16.6	16.8	18.2	16.8	15.7	15.6	17.5	16.2	16.6	16.7	15.9
	Min	2.6	7.4	1.7	8.2	4.9	5.0	0.2	4.6	12.0	8.7	5.5	8.7	7.3
Relative Humidity	Max	88	90	92	97	100	90	86	97	78	82	90	85	-
	Min	37	37	44	61	39	30	32	48	46	49	42	48	-
Soil Temperature at 10 cm	06 UTC	10.4	11.0	11.0	10.4	10.8	11.6	10.4	10.0	12.0	12.6	11.0	12.6	10.4
	12 UTC	13.2	13.4	13.0	15.0	15.2	12.2	12.0	11.0	13.4	12.8	13.1	13.7	12.0
Sunshine Duration		3.7	5.2	6.6	3.6	6.6	5.8	7.0	3.0	5.3	3.0	5.0	4.6	4.3
Precipitation									0.9	2.2	8.5	11.6	30.6	41.8
Evaporation		2.2	1.8	1.2	2.0	2.0	2.8	2.2	2.4	1.6	1.0	19.2	20.1	19.4
Growing Degrees	5	4.1	7.2	4.2	7.5	6.6	5.9	3.0	5.1	9.8	7.5	60.6	76.9	66.0
	10	0.0	2.2	0.0	2.5	1.6	0.9	0.0	0.1	4.8	2.5	14.5	31.2	20.7

1st 10-day period (1-10/12/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	8.6	15.0	9.1
Precipitation - Reference Evapotranspiration	3.0	15.6	32.7
Number of Rainy Days	3.0	6.0	4.6
Number of Dry Days	9.0	1.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

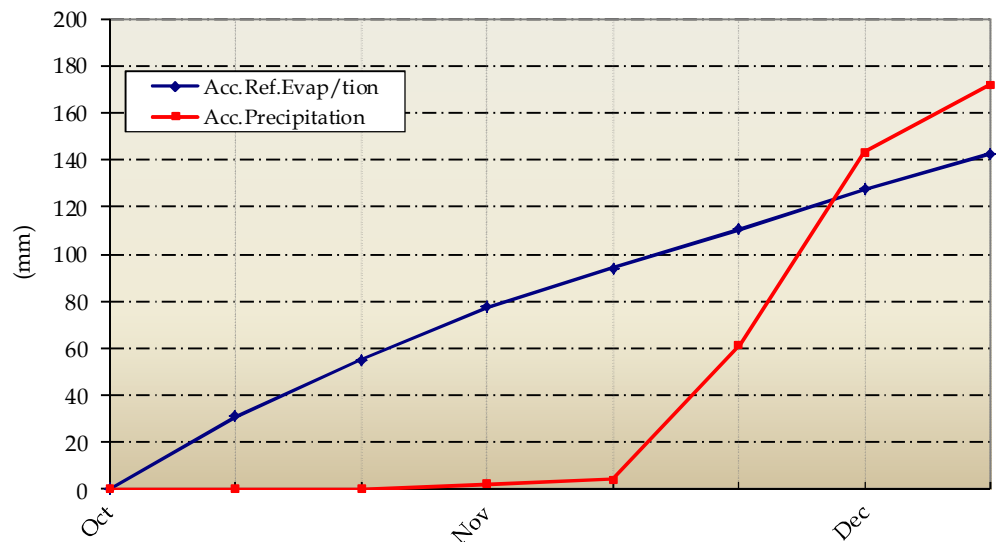


Iraklio

1st 10-day period (1-10/12/2018)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	13.8	15.2	15.2	16.2	16.0	15.4	13.0	18.0	17.0	21.0	16.1	18.7	17.3
	Min	12.0	7.8	13.0	14.0	12.8	14.4	11.2	8.2	11.4	11.6	11.6	13.1	11.5
Relative Humidity	Max	88	91	95	97	93	76	87	93	91	83	89	78	-
	Min	70	71	72	48	74	70	61	72	72	57	67	54	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		0.0	2.1	0.0	6.4	1.8	2.6	2.6	7.8	1.3	6.8	3.1	5.5	3.5
Precipitation		0.0		17.6		9.2				2.0		28.8	22.2	24.2
Evaporation		1.7	0.9	0.7	3.7	2.4	5.0	5.2	0.2	2.8	2.9	25.5	27.9	28.3
Growing Degrees	5	7.9	6.5	9.1	10.1	9.4	9.9	7.1	8.1	9.2	11.3	88.6	109.1	94.2
	10	2.9	1.5	4.1	5.1	4.4	4.9	2.1	3.1	4.2	6.3	38.6	59.1	44.6

1st 10-day period (1-10/12/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	14.9	22.1	-
Precipitation - Reference Evapotranspiration	13.9	0.1	24.2
Number of Rainy Days	3.0	2.0	3.7
Number of Dry Days	2.0	6.0	-

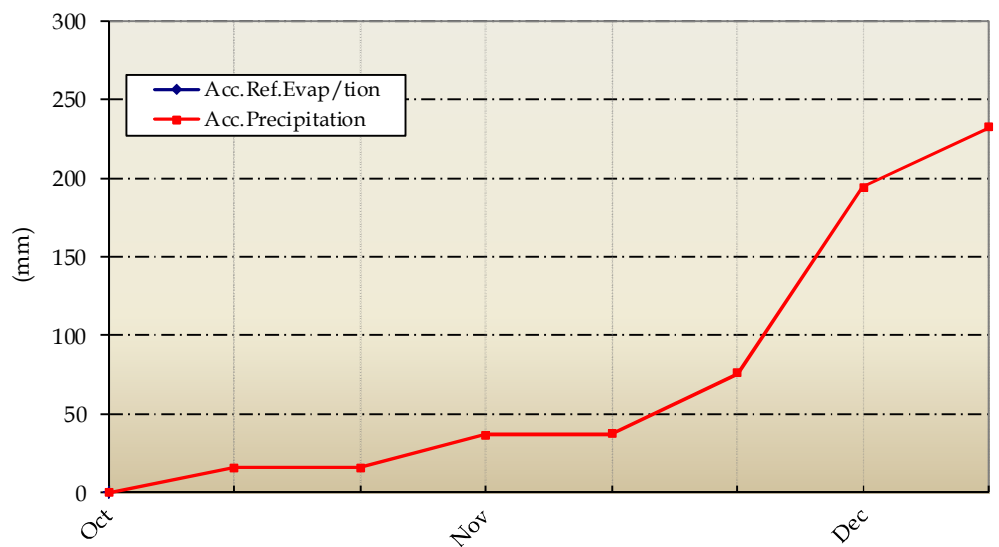
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



1st 10-day period (1-10/12/2018)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	12.2	9.0	13.4	12.8	14.4	10.0	9.2	8.2	11.2	12.4	11.3	11.6	10.3
	Min	1.0	1.6	-1.6	5.0	2.6	0.0	-5.4	1.2	7.0	5.2	1.7	3.2	1.9
Relative Humidity	Max	94	100	100	100	100	100	92	100	100	100	99	98	-
	Min	59	78	59	61	34	33	35	77	78	61	58	61	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	5.5
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	6.5
Sunshine Duration		4.9	0.2	4.2	3.3	5.0	5.7	5.3	0.1	1.9	4.3	3.5	3.1	2.5
Precipitation									5.8	13.4	18.8	38.0	100.5	51.5
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	10.5
Growing Degrees	5	1.6	0.3	0.9	3.9	3.5	0.0	0.0	0.0	4.1	3.8	18.1	29.1	17.8
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9	0.9

1st 10-day period (1-10/12/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	-	6.1
Precipitation - Reference Evapotranspiration	-	-	45.4
Number of Rainy Days	3.0	6.0	4.2
Number of Dry Days	9.0	0.0	-

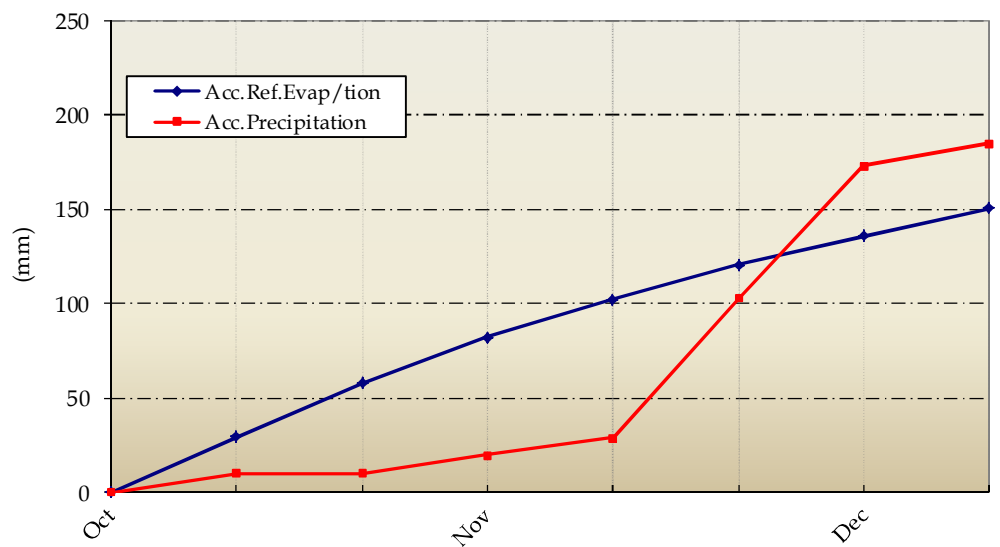
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



1st 10-day period (1-10/12/2018)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	16.3	17.0	18.2	16.6	20.0	17.8	17.8	17.2	17.8	15.2	17.4	17.9	16.9
	Min	4.4	6.8	8.2	5.6	8.7	7.0	6.5	3.3	8.1	6.3	6.5	8.3	7.2
Relative Humidity	Max	87	80	83	90	89	74	83	87	93	91	86	87	-
	Min	49	40	46	61	33	31	33	44	46	61	44	46	-
Soil Temperature at 10 cm	06 UTC	12.4	12.8	13.4	12.6	13.0	12.2	11.5	11.5	12.6	12.4	12.4	-	11.5
	12 UTC	13.2	13.6	14.0	13.4	13.6	13.0	12.5	12.0	13.4	13.4	13.2	-	12.5
Sunshine Duration		6.5	5.9	7.1	1.2	7.5	8.8	7.7	6.3	5.4	2.9	5.9	5.5	4.0
Precipitation										5.1	6.9	12.0	20.5	45.8
Evaporation		3.6	2.1	2.3	2.1	4.7	2.6	2.4	0.0	1.5	0.3	21.6	24.8	26.7
Growing Degrees	5	5.4	6.9	8.2	6.1	9.4	7.4	7.2	5.3	8.0	5.8	69.4	80.8	70.4
	10	0.4	1.9	3.2	1.1	4.4	2.4	2.2	0.3	3.0	0.8	19.4	32.9	22.7

1st 10-day period (1-10/12/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	14.7	17.7	10.9
Precipitation - Reference Evapotranspiration	-2.7	2.8	34.9
Number of Rainy Days	2.0	6.0	4.7
Number of Dry Days	10.0	1.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

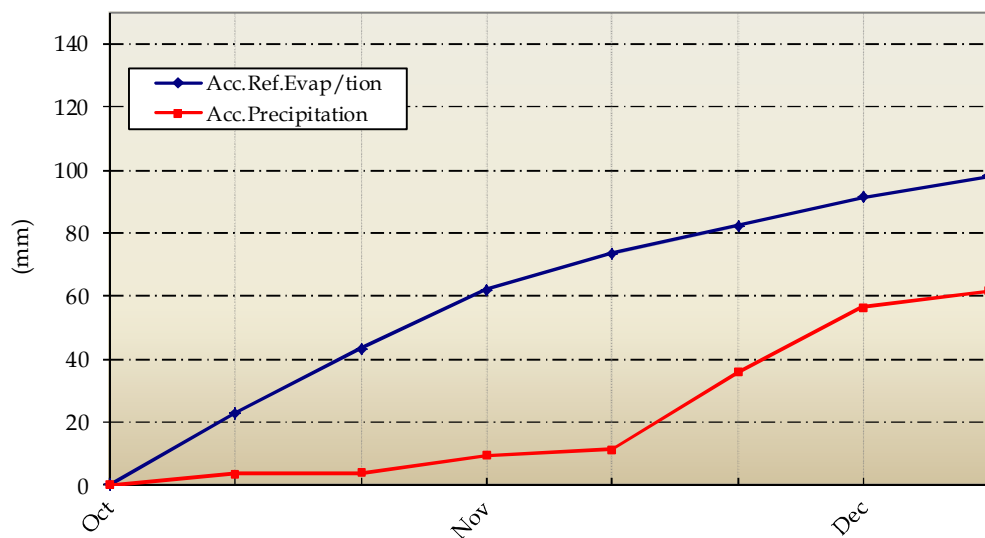


Larisa

1st 10-day period (1-10/12/2018)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	10.3	12.9	12.4	12.6	14.9	11.4	11.1	9.2	14.3	12.6	12.2	15.0	11.5
	Min	-0.4	2.6	-0.7	0.0	3.9	0.2	-2.5	-2.9	2.2	3.8	0.6	2.9	2.7
Relative Humidity	Max	98	97	98	99	99	85	93	95	98	98	96	98	-
	Min	53	51	51	61	42	36	39	56	59	51	50	48	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	8.1
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	8.8
Sunshine Duration		5.3	4.6	6.9	3.2	5.3	6.4	6.9	1.4	6.6	4.6	5.1	5.2	2.9
Precipitation										0.7	4.6	5.3	49.1	18.5
Evaporation		0.6	1.7	1.2	0.1	3.0	1.0	0.9	0.4	0.1	2.5	11.5	-	7.8
Growing Degrees	5	0.0	2.8	0.9	1.3	4.4	0.8	0.0	0.0	3.3	3.2	16.6	39.9	25.6
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.2	2.3

1st 10-day period (1-10/12/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.4	9.1	6.7
Precipitation - Reference Evapotranspiration	-1.1	40.0	11.8
Number of Rainy Days	2.0	4.0	3.6
Number of Dry Days	9.0	3.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

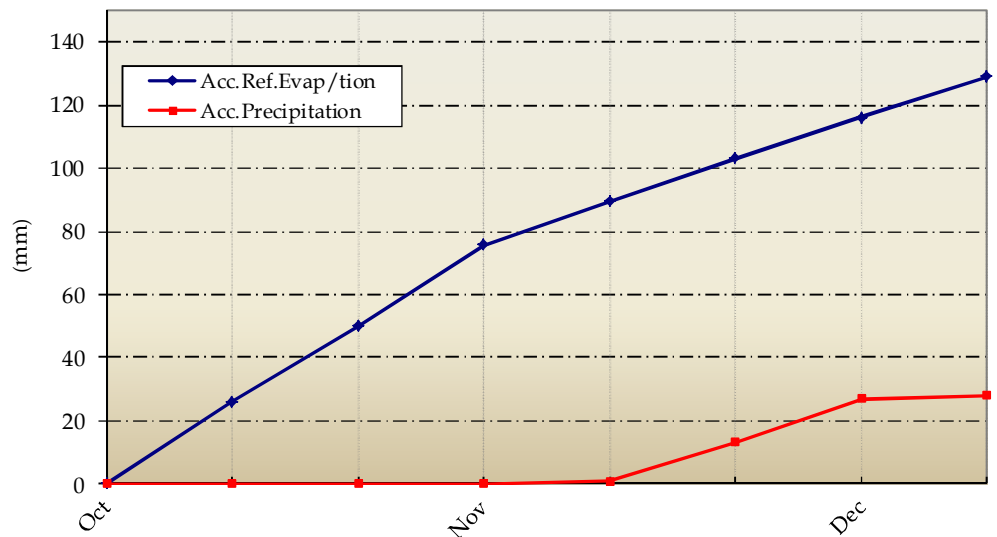


Mikra

1st 10-day period (1-10/12/2018)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	10.5	11.1	11.9	13.0	14.6	11.2	10.5	9.2	13.8	10.6	11.6	15.6	11.5
	Min	2.2	2.2	0.7	2.0	8.2	4.2	-1.6	-0.8	2.8	4.4	2.4	6.0	3.4
Relative Humidity	Max	82	91	91	90	68	78	87	91	90	86	85	78	-
	Min	51	53	49	51	38	37	36	59	46	47	47	43	-
Soil Temperature at 10 cm	06 UTC	8.6	8.0	7.0	7.0	9.4	8.0	6.0	5.4	7.0	7.0	7.3	9.4	7.3
	12 UTC	10.0	9.4	9.5	9.0	11.0	11.0	7.0	7.0	8.6	8.6	9.1	11.0	8.9
Sunshine Duration		5.6	3.8	5.0	4.6	6.2	7.2	7.1	2.8	6.4	1.3	5.0	5.9	3.1
Precipitation					0.0					0.4	0.7	1.1	26.6	19.0
Evaporation		1.3	4.4	0.8	1.4	6.2	0.0	0.0	1.4	1.8	0.7	18.0	29.8	13.0
Growing Degrees	5	1.4	1.7	1.3	2.5	6.4	2.7	0.0	0.0	3.3	2.5	21.7	58.4	28.1
	10	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	1.4	17.6	3.2

1st 10-day period (1-10/12/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	13.0	16.8	8.7
Precipitation - Reference Evapotranspiration	-11.9	9.8	10.3
Number of Rainy Days	2.0	4.0	3.0
Number of Dry Days	9.0	3.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

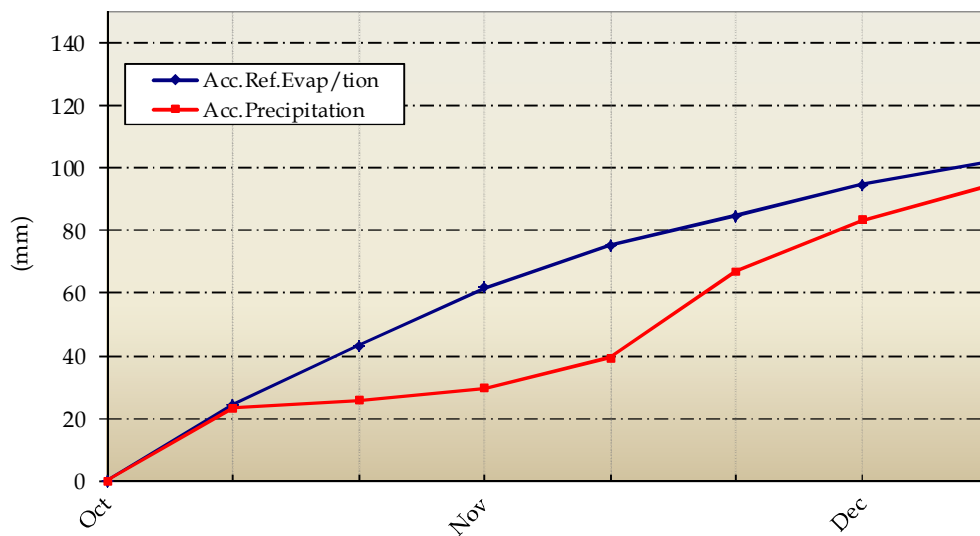


Tanagra

1st 10-day period (1-10/12/2018)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	11.2	10.2	14.0	13.8	14.1	8.2	10.0	14.8	17.4	13.8	12.8	16.6	14.0
	Min	5.0	7.1	3.6	3.4	5.4	7.9	1.5	-0.8	6.0	4.9	4.4	8.7	5.7
Relative Humidity	Max	95	97	99	100	97	99	100	100	76	98	96	78	-
	Min	60	73	59	60	53	61	57	57	49	52	58	39	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		2.4	0.3	4.5	5.2	4.3	0.0	6.6	7.9	7.4	2.8	4.1	4.9	
Precipitation						0.0	4.9				6.2	11.1	0.2	28.6
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	-
Growing Degrees	5	3.1	3.7	3.8	3.6	4.8	3.1	0.8	2.0	6.7	4.4	35.8	76.5	
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	1.7	34.9	

1st 10-day period (1-10/12/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.4	14.0	
Precipitation - Reference Evapotranspiration	3.7	-13.8	28.6
Number of Rainy Days	2.0	1.0	4.4
Number of Dry Days	5.0	5.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

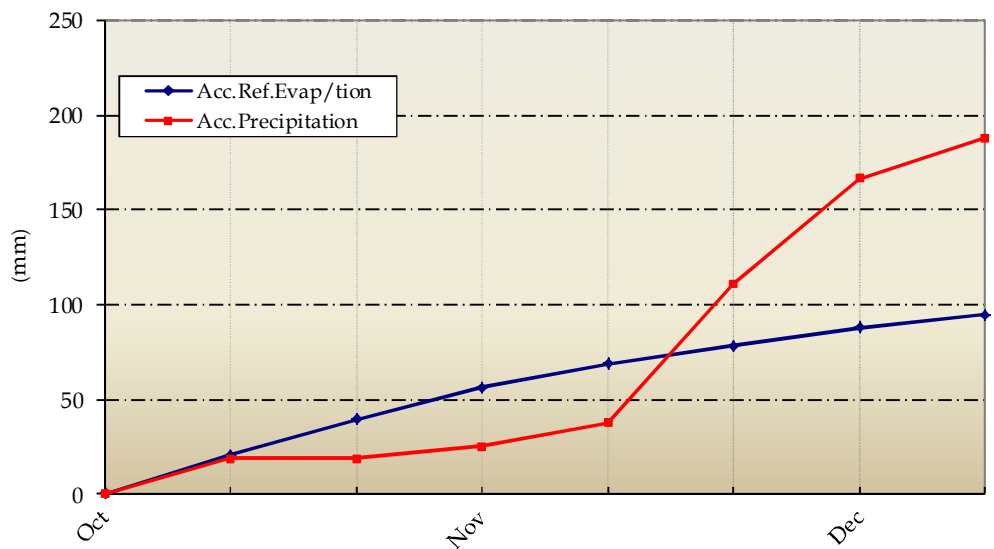


Tripoli

1st 10-day period (1-10/12/2018)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	10.2	9.7	13.4	10.2	11.8	9.4	10.6	13.7	12.2	12.2	11.3	13.6	11.6
	Min	-3.1	3.8	2.0	-1.6	0.5	-2.1	-4.3	-4.6	6.5	5.9	0.3	3.1	2.8
Relative Humidity	Max	100	94	100	100	100	100	100	100	100	95	99	94	-
	Min	59	49	50	68	57	51	43	30	48	43	50	44	-
Soil Temperature at 10 cm	06 UTC	4.6	7.2	7.2	5.2	6.2	5.2	4.0	3.0	7.0	7.8	5.7	7.6	7.1
	12 UTC	-	-	9.2	7.2	8.2	7.4	6.6	-	-	8.8	7.9	8.4	7.9
Sunshine Duration		5.5	4.1	6.6	0.0	5.0	5.1	6.7	6.4	7.0	3.6	5.0	4.9	3.7
Precipitation		0.0				0.0				9.8	11.5	21.3	11.4	38.8
Evaporation		0.0	1.0	0.6	0.0	0.6	0.0	0.0	0.0	1.9	1.3	5.4	3.3	9.1
Growing Degrees	5	0.0	1.8	2.7	0.0	1.2	0.0	0.0	0.0	4.4	4.1	14.0	34.7	26.1
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.2	2.6

1st 10-day period (1-10/12/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.8	9.1	8.4
Precipitation - Reference Evapotranspiration	14.5	2.3	30.4
Number of Rainy Days	2.0	4.0	4.3
Number of Dry Days	9.0	2.0	-

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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