



# AGROMETEOROLOGICAL BULLETIN

*November 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



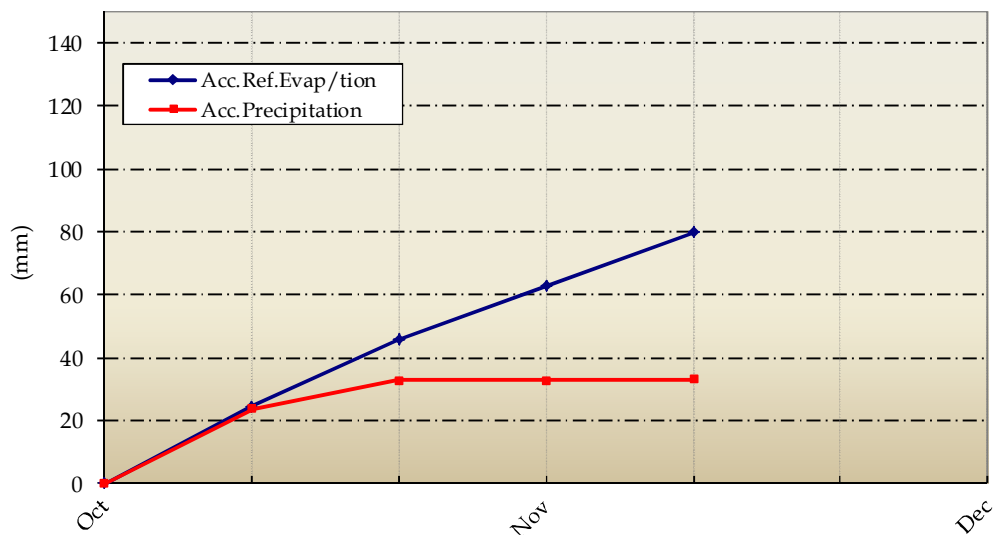
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1st 10-day period (1-10/11/2018)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	25.0	21.4	19.4	22.0	18.4	18.0	16.4	17.0	18.6	18.6	19.5	16.5	15.8
	Min	10.0	9.8	12.6	12.0	12.0	10.0	12.6	13.4	11.4	7.6	11.1	5.2	7.1
Relative Humidity	Max	100	91	80	70	81	85	89	75	71	89	83	93	-
	Min	50	51	46	45	50	59	63	55	41	52	51	60	-
Soil Temperature at 10 cm	06 UTC	16.4	16.6	16.4	15.6	15.6	14.6	15.4	15.4	15.0	14.0	15.5	10.1	11.0
	12 UTC	19.6	19.4	17.6	18.4	17.0	15.8	16.4	16.6	17.6	16.8	17.5	12.9	12.9
Sunshine Duration		7.5	7.5	6.5	7.7	5.6	3.6	0.1	0.4	7.8	8.7	5.5	6.9	4.1
Precipitation								0.3				0.3	0.2	19.0
Evaporation		3.6	4.0	3.5	2.6	2.3	3.6	1.3	2.6	2.7	3.3	29.5	17.5	25.4
Growing Degrees	5	12.5	10.6	11.0	12.0	10.2	9.0	9.5	10.2	10.0	8.1	103.1	58.5	64.9
	10	7.5	5.6	6.0	7.0	5.2	4.0	4.5	5.2	5.0	3.1	53.1	13.0	23.3

1st 10-day period (1-10/11/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	17.0	10.3	14.9
Precipitation - Reference Evapotranspiration	-16.7	-10.1	4.1
Number of Rainy Days	1.0	1.0	1.9
Number of Dry Days	14.0	9.0	-

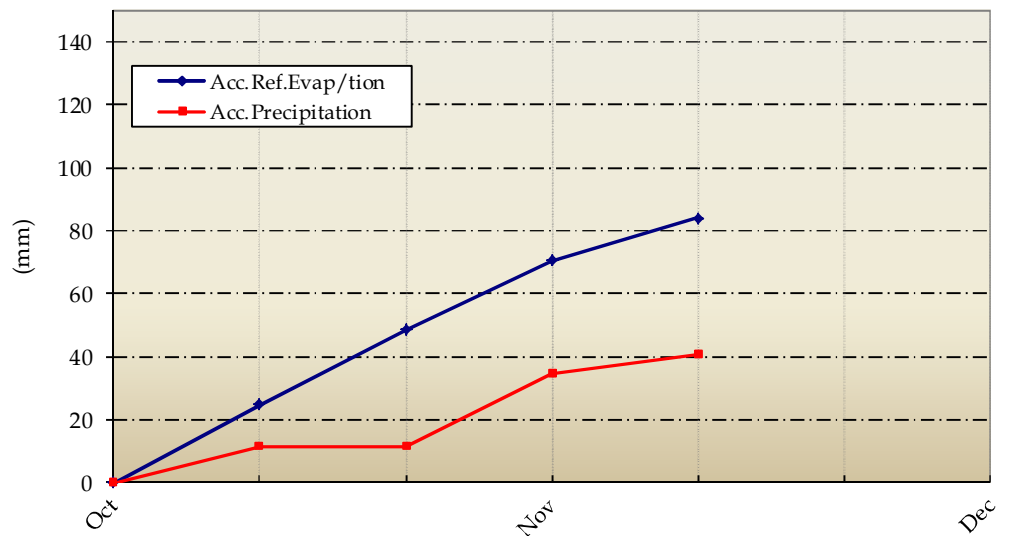
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



1st 10-day period (1-10/11/2018)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	28.4	26.7	25.4	24.5	23.0	24.0	22.5	20.7	21.7	21.6	23.8	20.6	20.0
	Min	13.2	12.8	12.6	12.6	11.2	8.1	9.5	12.2	8.0	6.4	10.7	10.7	10.4
Relative Humidity	Max	100	98	100	100	87	95	100	99	100	92	97	88	-
	Min	36	46	38	41	37	33	43	51	40	36	40	47	-
Soil Temperature at 10 cm	06 UTC	19.4	19.4	18.6	18.8	18.2	17.4	17.0	17.6	16.0	15.6	17.8	15.6	14.3
	12 UTC	21.8	21.8	21.0	21.6	20.0	19.0	19.0	18.0	18.4	18.4	19.9	17.4	16.6
Sunshine Duration		3.7	6.0	6.2	7.0	6.6	9.2	7.3	4.4	8.2	8.2	6.7	6.2	6.0
Precipitation								1.3	4.9			6.2	47.7	45.1
Evaporation		4.2	2.4	2.0	2.4	3.5	3.2	2.9	5.8	2.9	4.0	33.3	18.4	25.9
Growing Degrees	5	15.8	14.8	14.0	13.6	12.1	11.1	11.0	11.5	9.9	9.0	122.6	106.7	101.6
	10	10.8	9.8	9.0	8.6	7.1	6.1	6.0	6.5	4.9	4.0	72.6	56.7	52.1

1st 10-day period (1-10/11/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	13.4	14.5	14.3
Precipitation - Reference Evapotranspiration	-7.2	33.2	30.8
Number of Rainy Days	2.0	4.0	3.2
Number of Dry Days	14.0	1.0	-

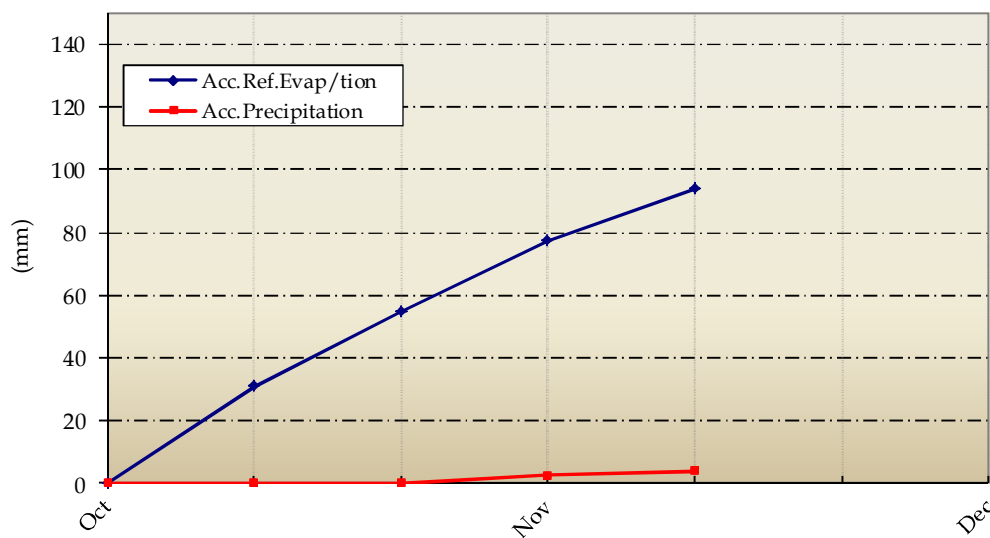
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



1st 10-day period (1-10/11/2018)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	23.2	23.0	22.4	21.6	21.6	21.0	22.0	21.2	19.6	19.0	21.5	20.2	20.4
	Min	17.4	16.6	16.4	18.6	14.2	17.6	16.8	15.6	15.8	14.4	16.3	13.6	14.3
Relative Humidity	Max	100	100	93	91	93	89	91	93	93	95	94	85	-
	Min	87	84	75	73	66	76	73	78	78	82	77	57	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		8.2	5.5	6.5	6.4	8.0	6.1	6.9	7.9	2.9	0.9	5.9	6.1	5.0
Precipitation										1.5	0.1	1.6	2.3	20.0
Evaporation		3.0	1.2	1.8	2.6	2.5	4.9	3.0	1.9	0.6	0.2	21.7	27.4	39.9
Growing Degrees	5	15.3	14.8	14.4	15.1	12.9	14.3	14.4	13.4	12.7	11.7	139.0	118.8	123.4
	10	10.3	9.8	9.4	10.1	7.9	9.3	9.4	8.4	7.7	6.7	89.0	68.8	73.4

1st 10-day period (1-10/11/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	16.6	20.1	-
Precipitation - Reference Evapotranspiration	-15.0	-17.8	20.0
Number of Rainy Days	2.0	1.0	2.6
Number of Dry Days	15.0	5.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

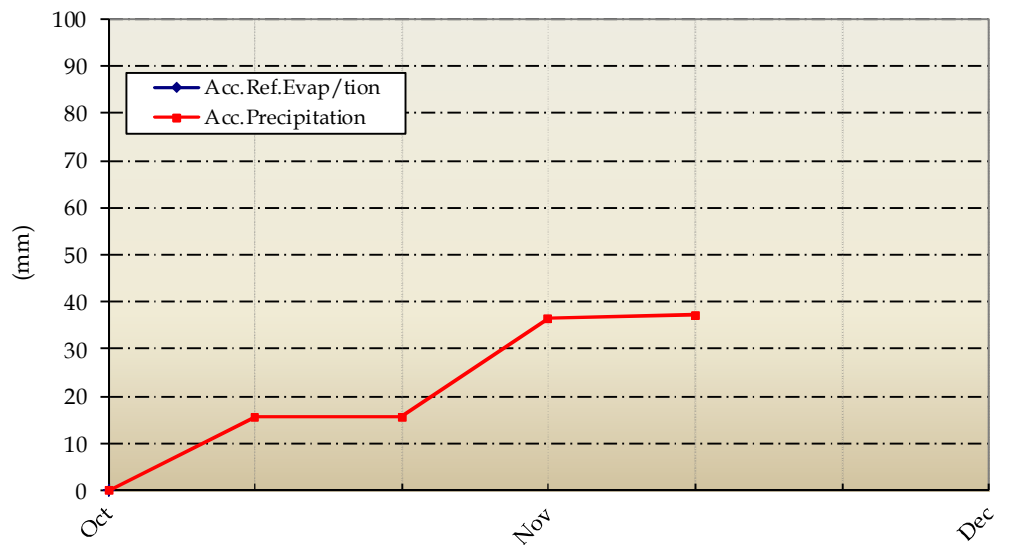


Ioannina

1st 10-day period (1-10/11/2018)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	22.4	22.6	23.6	23.6	19.0	20.0	19.0	16.0	18.0	16.8	20.1	16.1	16.0
	Min	13.8	10.0	8.6	8.0	6.0	3.4	3.6	10.2	4.0	0.6	6.8	3.9	5.4
Relative Humidity	Max	100	100	100	100	88	94	100	100	100	100	98	100	-
	Min	63	54	31	34	38	39	40	73	38	45	46	53	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	10.0
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	11.8
Sunshine Duration		0.7	5.6	6.3	6.3	4.0	6.7	5.5	0.1	6.4	5.5	4.7	4.0	4.1
Precipitation									0.7			0.7	55.4	40.1
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	16.8
Growing Degrees	5	13.1	11.3	11.1	10.8	7.5	6.7	6.3	8.1	6.0	3.7	84.6	50.1	57.3
	10	8.1	6.3	6.1	5.8	2.5	1.7	1.3	3.1	1.0	0.0	35.9	6.6	16.4

1st 10-day period (1-10/11/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	-	10.7
Precipitation - Reference Evapotranspiration	-	-	29.4
Number of Rainy Days	1.0	4.0	3.4
Number of Dry Days	7.0	9.0	-

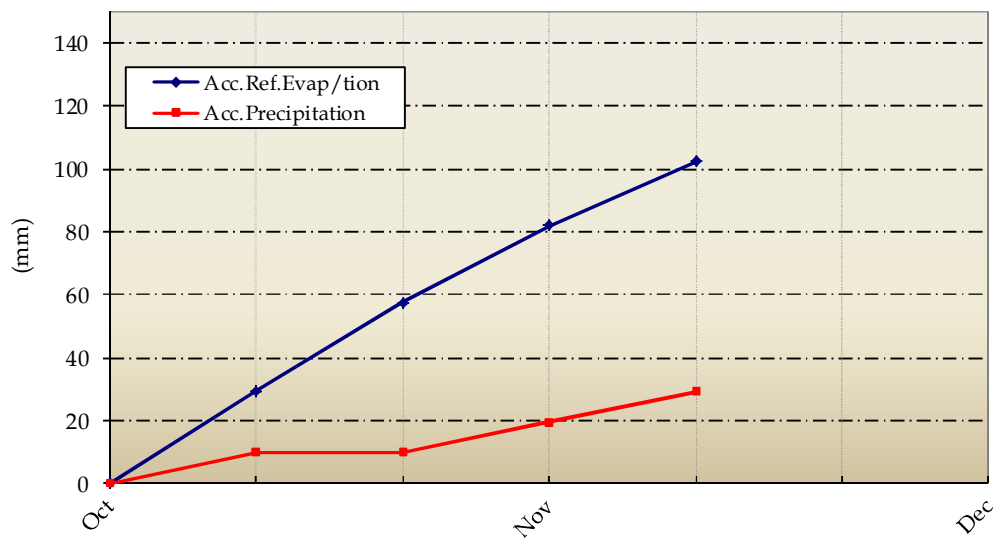
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



1st 10-day period (1-10/11/2018)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	28.4	26.7	24.6	25.2	23.1	22.4	23.8	20.8	23.3	22.1	24.0	20.8	21.0
	Min	14.4	12.9	10.9	12.6	11.5	10.3	14.7	11.9	9.8	9.1	11.8	10.2	10.2
Relative Humidity	Max	92	91	92	81	84	89	92	93	87	83	88	91	-
	Min	42	40	41	38	38	43	38	35	39	35	39	47	-
Soil Temperature at 10 cm	06 UTC	19.2	19.0	18.6	18.4	18.0	17.4	18.0	18.0	16.2	15.6	17.8	-	15.1
	12 UTC	21.4	21.2	20.4	20.0	19.6	19.2	19.8	19.4	17.8	17.4	19.6	-	16.9
Sunshine Duration		6.4	8.1	7.0	7.3	8.1	7.5	6.5	3.8	6.9	8.6	7.0	6.2	5.6
Precipitation								0.0	9.5			9.5	34.1	35.3
Evaporation		4.1	2.1	2.2	3.4	3.2	5.2	2.3	1.5	1.6	2.0	27.6	22.2	30.4
Growing Degrees	5	16.4	14.8	12.8	13.9	12.3	11.4	14.3	11.4	11.6	10.6	129.3	105.2	105.8
	10	11.4	9.8	7.8	8.9	7.3	6.4	9.3	6.4	6.6	5.6	79.3	55.2	55.9

1st 10-day period (1-10/11/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	20.4	17.0	16.4
Precipitation - Reference Evapotranspiration	-10.9	17.1	18.9
Number of Rainy Days	1.0	4.0	3.1
Number of Dry Days	7.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

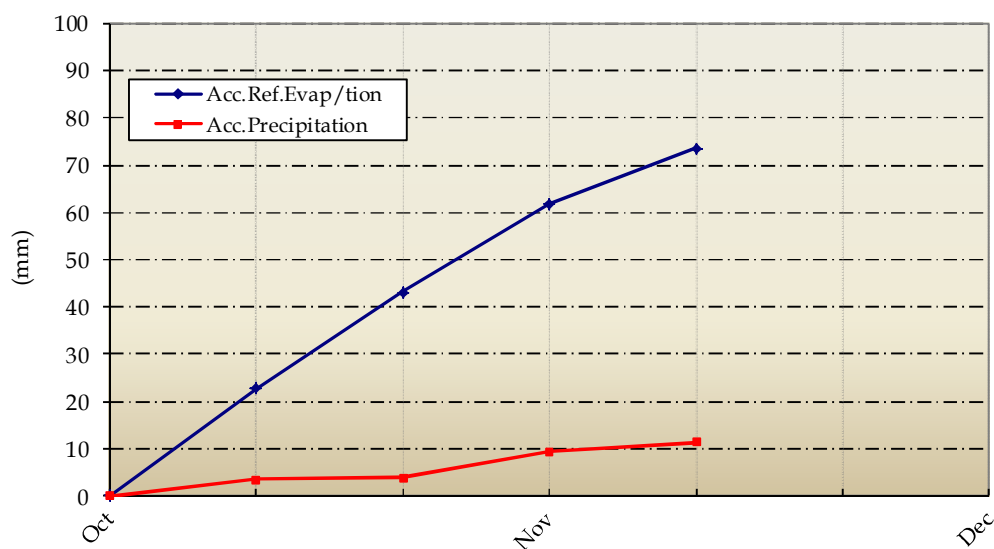


Larisa

1st 10-day period (1-10/11/2018)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	23.6	25.2	21.8	20.8	19.0	20.4	18.8	15.2	16.4	14.6	19.6	17.1	17.2
	Min	11.6	10.7	7.6	8.4	8.8	5.1	9.8	12.6	7.9	6.6	8.9	5.6	6.7
Relative Humidity	Max	99	98	93	96	93	96	89	98	100	100	96	90	-
	Min	61	46	49	48	55	47	62	80	73	80	60	51	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	12.3
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	13.2
Sunshine Duration		1.2	5.6	5.6	6.0	1.5	6.2	0.9	0.0	3.0	0.0	3.0	3.6	4.1
Precipitation									1.1	0.9		2.0	6.4	20.6
Evaporation		2.4	2.9	3.0	2.7	2.3	2.2	1.2	0.1	1.1	1.1	19.0	22.4	17.6
Growing Degrees	5	12.6	13.0	9.7	9.6	8.9	7.8	9.3	8.9	7.2	5.6	92.5	63.6	69.6
	10	7.6	8.0	4.7	4.6	3.9	2.8	4.3	3.9	2.2	0.6	42.5	15.6	25.7

1st 10-day period (1-10/11/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	11.6	12.5	11.7
Precipitation - Reference Evapotranspiration	-9.6	-6.1	8.9
Number of Rainy Days	2.0	1.0	2.7
Number of Dry Days	15.0	12.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

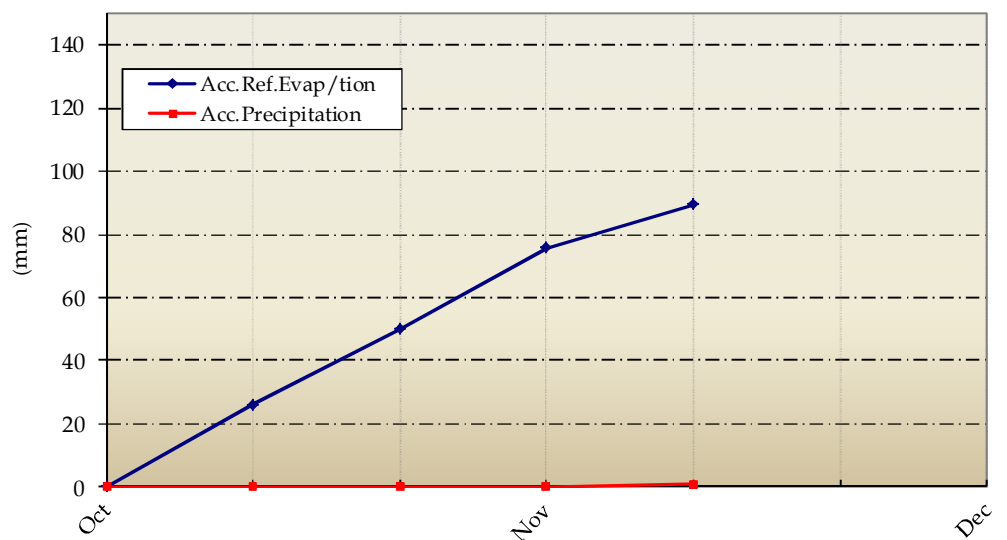


Mikra

1st 10-day period (1-10/11/2018)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	21.3	24.4	20.9	20.8	19.8	19.6	17.5	16.7	18.8	18.0	19.8	16.7	16.5
	Min	13.1	12.7	10.6	9.2	7.5	7.2	8.4	13.8	9.0	7.7	9.9	6.3	7.9
Relative Humidity	Max	92	87	88	78	98	85	82	87	88	84	87	84	-
	Min	63	49	61	37	43	49	59	68	46	51	53	45	-
Soil Temperature at 10 cm	06 UTC	18.4	18.0	17.5	15.4	15.6	15.0	15.2	16.2	15.2	14.4	16.1	12.9	11.5
	12 UTC	20.4	21.5	19.8	18.8	20.0	17.6	16.6	17.5	17.0	17.0	18.6	14.3	13.8
Sunshine Duration		1.9	7.8	4.7	8.3	7.2	8.4	0.0	0.0	8.5	8.0	5.5	4.4	4.0
Precipitation									0.7			0.7	0.0	18.1
Evaporation		1.4	2.4	6.0	1.0	0.9	2.1	1.7	0.0	2.1	2.8	20.4	15.1	22.5
Growing Degrees	5	12.2	13.6	10.8	10.0	8.7	8.4	8.0	10.3	8.9	7.9	98.5	65.1	72.4
	10	7.2	8.6	5.8	5.0	3.7	3.4	3.0	5.3	3.9	2.9	48.5	18.4	27.9

1st 10-day period (1-10/11/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	13.8	11.2	13.6
Precipitation - Reference Evapotranspiration	-13.1	-11.2	4.5
Number of Rainy Days	1.0	0.0	2.5
Number of Dry Days	26.0	13.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



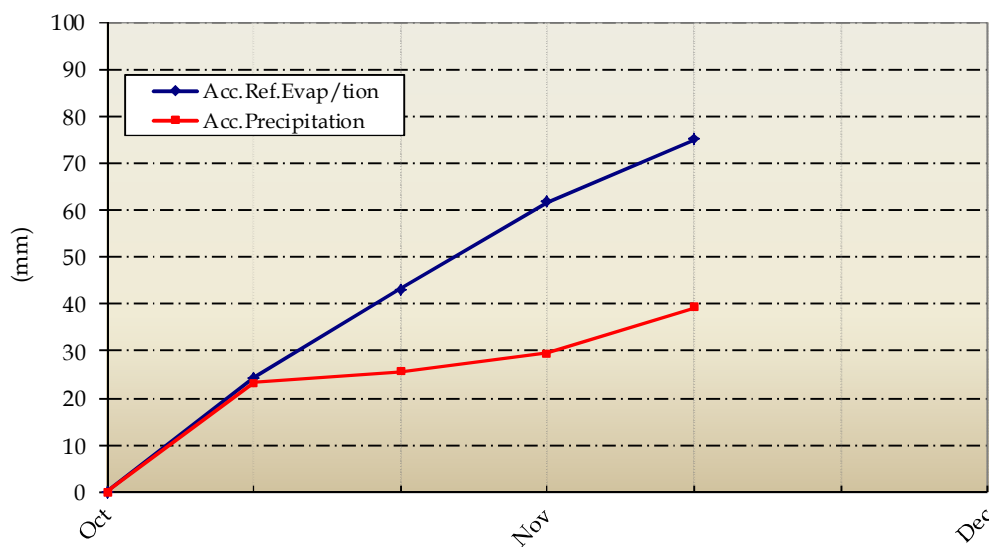


Tanagra

1st 10-day period (1-10/11/2018)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	23.0	24.0	20.0	19.4	18.8	18.4	19.7	17.0	17.0	18.0	19.5	17.3	19.0
	Min	14.0	13.2	12.2	11.4	10.6	11.0	12.7	8.1	11.7	8.3	11.3	8.4	9.1
Relative Humidity	Max	100	100	96	91	96	95	95	100	99	99	97	93	-
	Min	70	38	55	48	58	50	51	60	62	53	54	45	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		2.5	8.0	6.8	7.1	3.0	5.5	3.8	1.7	4.6	5.7	4.9	5.3	
Precipitation								0.0	8.9	0.8		9.7	10.0	19.6
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	-
Growing Degrees	5	13.5	13.6	11.1	10.4	9.7	9.7	11.2	7.6	9.4	8.2	104.3	78.3	
	10	8.5	8.6	6.1	5.4	4.7	4.7	6.2	2.6	4.4	3.2	54.3	28.3	

1st 10-day period (1-10/11/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	13.4	11.8	
Precipitation - Reference Evapotranspiration	-3.7	-1.8	19.6
Number of Rainy Days	2.0	3.0	3.1
Number of Dry Days	7.0	5.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

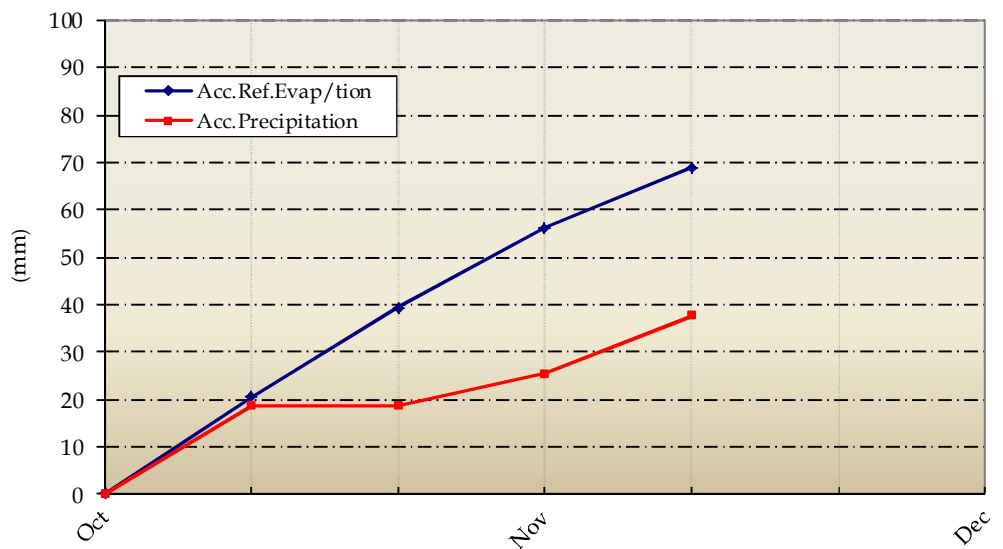


Tripoli

1st 10-day period (1-10/11/2018)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	25.6	25.2	21.7	19.0	18.7	18.5	17.9	17.9	14.7	15.6	19.5	16.1	16.5
	Min	8.1	7.1	5.9	5.5	3.2	1.9	1.9	8.6	5.5	1.3	4.9	4.9	5.2
Relative Humidity	Max	100	99	93	95	97	100	100	90	100	100	97	98	-
	Min	33	28	31	44	29	48	47	38	57	53	41	52	-
Soil Temperature at 10 cm	06 UTC	14.4	14.2	13.4	12.6	11.6	10.6	10.8	-	11.2	9.8	12.1	11.3	11.0
	12 UTC	17.8	17.8	-	-	14.6	-	14.2	-	13.4	-	15.6	13.3	12.3
Sunshine Duration		5.0	8.8	9.0	7.8	7.0	8.4	6.5	0.0	4.5	6.8	6.4	5.4	5.1
Precipitation									12.3	0.1		12.4	15.9	28.3
Evaporation		4.2	2.4	2.3	2.5	2.0	0.3	-	0.0	0.6	0.9	-	12.8	18.0
Growing Degrees	5	11.9	11.2	8.8	7.3	6.0	5.2	4.9	8.3	5.1	3.5	71.9	55.0	58.6
	10	6.9	6.2	3.8	2.3	1.0	0.2	0.0	3.3	0.1	0.0	23.6	7.8	17.0

1st 10-day period (1-10/11/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	12.7	11.6	13.6
Precipitation - Reference Evapotranspiration	-0.3	4.3	14.7
Number of Rainy Days	2.0	2.0	2.6
Number of Dry Days	7.0	0.0	-

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<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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