



# AGROMETEOROLOGICAL BULLETIN

*November 2018*  
*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



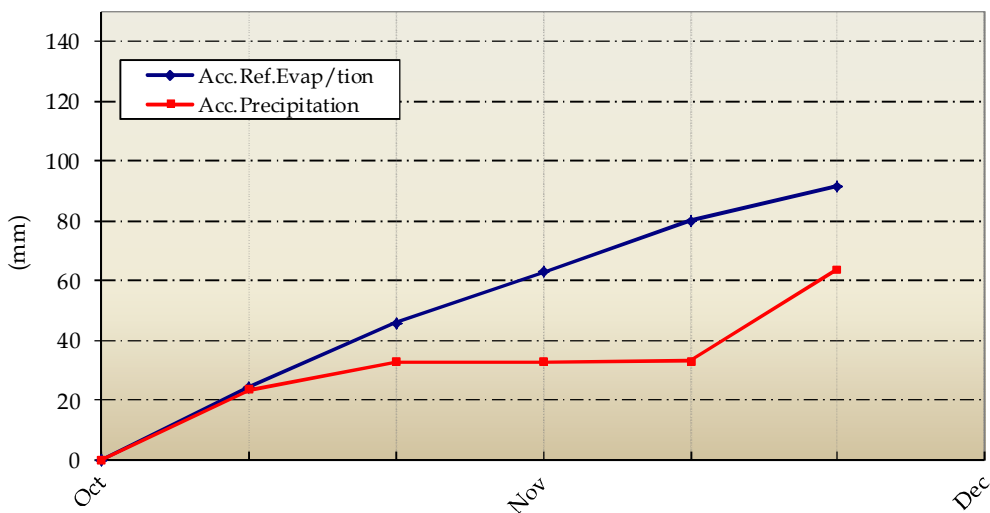
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2nd 10-day period (11-20/11/2018)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	19.8	19.2	16.0	15.0	13.6	12.0	9.2	10.4	15.4	12.4	14.3	16.4	14.4
	Min	9.8	6.0	8.8	6.0	6.8	3.6	3.0	6.6	8.4	9.6	6.9	10.6	6.2
Relative Humidity	Max	78	91	89	88	81	87	71	92	98	100	88	94	-
	Min	41	42	50	39	50	42	46	67	80	78	54	75	-
Soil Temperature at 10 cm	06 UTC	14.6	13.2	13.2	12.4	12.6	9.8	9.4	9.8	11.8	10.6	11.7	12.9	9.7
	12 UTC	17.4	16.0	14.8	14.2	13.0	12.0	10.4	10.6	13.2	12.0	13.4	14.0	11.5
Sunshine Duration		6.3	7.5	1.5	4.3	4.3	8.0	0.5	0.0	2.6	0.0	3.5	2.3	3.9
Precipitation						1.3			8.5	20.7	0.2	30.7	50.2	29.1
Evaporation		2.1	0.9	2.8	2.8	1.5	3.9	1.7	0.5	0.9	0.3	17.4	11.1	18.6
Growing Degrees	5	9.8	7.6	7.4	5.5	5.2	2.8	1.1	3.5	6.9	6.0	55.8	85.3	54.2
	10	4.8	2.6	2.4	0.5	0.2	0.0	0.0	0.0	1.9	1.0	13.4	37.4	17.6

2nd 10-day period (11-20/11/2018)	Previous Year Value	Past Years Mean Value	
Reference Evapotranspiration	11.6	9.0	11.3
Precipitation - Reference Evapotranspiration	19.1	41.2	17.8
Number of Rainy Days	4.0	5.0	2.9
Number of Dry Days	7.0	3.0	-

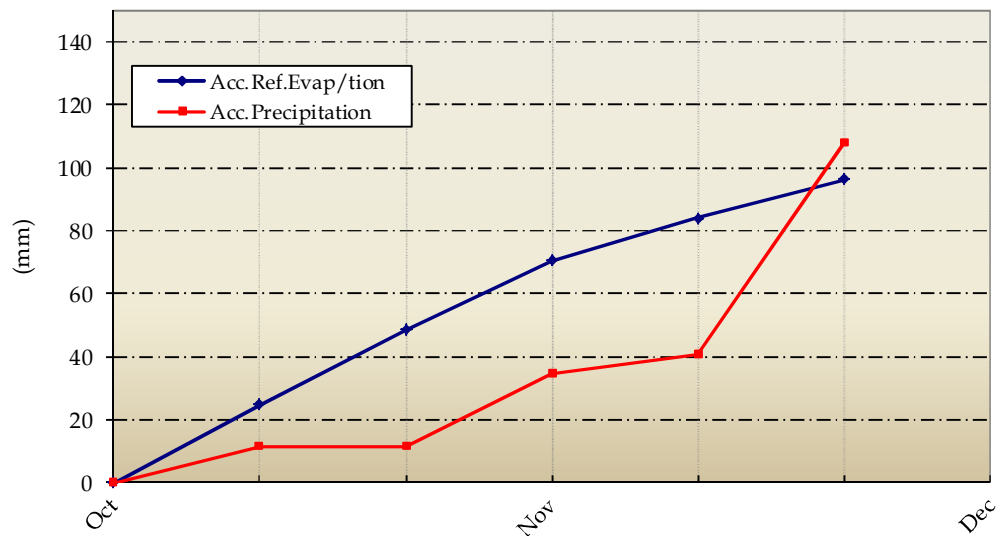
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



2nd 10-day period (11-20/11/2018)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	22.3	22.2	22.4	20.6	20.8	13.4	13.0	16.4	20.2	22.2	19.4	19.8	18.6
	Min	6.6	5.6	4.6	5.2	6.3	8.8	8.4	10.0	12.4	13.4	8.1	12.7	9.7
Relative Humidity	Max	91	93	91	86	89	98	100	100	100	89	94	87	-
	Min	34	31	32	33	31	65	78	68	54	55	48	52	-
Soil Temperature at 10 cm	06 UTC	14.0	14.2	14.0	13.8	13.8	14.6	13.6	13.5	14.4	15.4	14.1	15.6	13.2
	12 UTC	16.4	17.4	17.6	17.6	15.2	14.4	14.6	13.8	15.6	17.4	16.0	16.2	15.2
Sunshine Duration		8.6	7.8	8.8	8.2	8.0	0.0	0.0	0.0	6.2	0.0	4.8	4.1	4.9
Precipitation							7.9	21.0	28.5	9.9		67.3	109.3	50.9
Evaporation		3.6	3.8	3.0	3.0	3.6	0.2	0.1	0.2	1.4	0.2	19.1	24.3	21.4
Growing Degrees	5	9.5	8.9	8.5	7.9	8.6	6.1	5.7	8.2	11.3	12.8	87.4	112.7	91.7
	10	4.5	3.9	3.5	2.9	3.6	1.1	0.7	3.2	6.3	7.8	37.4	62.7	42.4

2nd 10-day period (11-20/11/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	12.5	17.3	11.8
Precipitation - Reference Evapotranspiration	54.8	92.0	39.1
Number of Rainy Days	4.0	7.0	4.2
Number of Dry Days	7.0	5.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

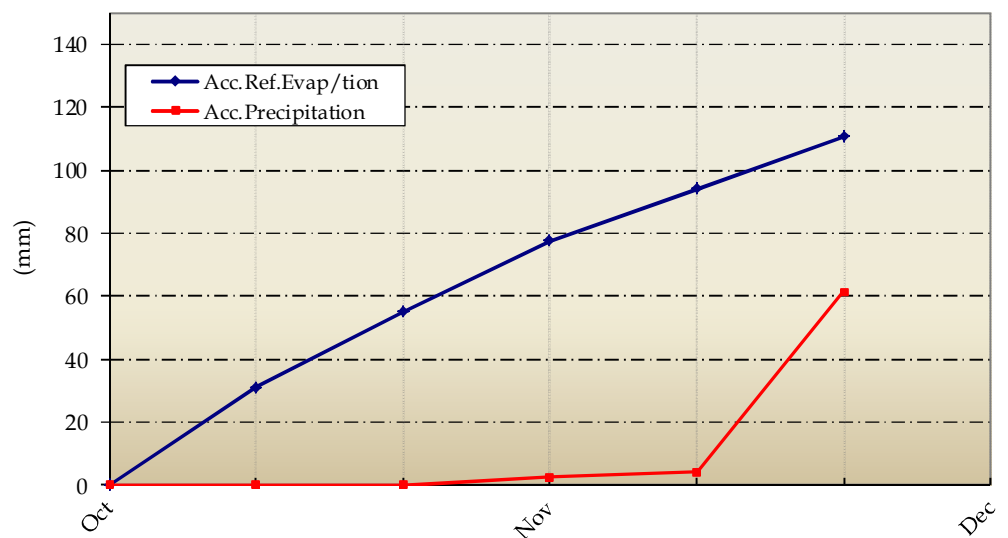


Iraklio

2nd 10-day period (11-20/11/2018)		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	21.0	18.8	17.4	17.8	17.0	18.6	22.0	22.4	24.2	20.0	22.5	19.7
	Min	14.0	15.0	17.8	16.4	16.4	14.4	12.2	15.0	17.0	14.4	15.3	15.1	13.2
Relative Humidity	Max	93	97	82	79	86	97	97	88	95	95	91	85	-
	Min	81	76	69	66	69	70	83	61	68	66	71	52	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		5.1	6.0	5.4	1.9	5.1	3.9	0.9	3.5	4.7	3.6	4.0	5.7	4.9
Precipitation			0.0				0.5	56.7				57.2	11.6	22.2
Evaporation		1.6	3.9	5.3	4.2	6.1	0.0	0.0	3.9	1.2	4.3	30.5	34.3	33.6
Growing Degrees	5	12.5	13.0	13.3	11.9	12.1	10.7	10.4	13.5	14.7	14.3	126.4	137.7	114.3
	10	7.5	8.0	8.3	6.9	7.1	5.7	5.4	8.5	9.7	9.3	76.4	87.7	64.3

2nd 10-day period (11-20/11/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	16.6	23.2	-
Precipitation - Reference Evapotranspiration	40.6	-11.6	22.2
Number of Rainy Days	2.0	3.0	2.7
Number of Dry Days	5.0	8.0	-

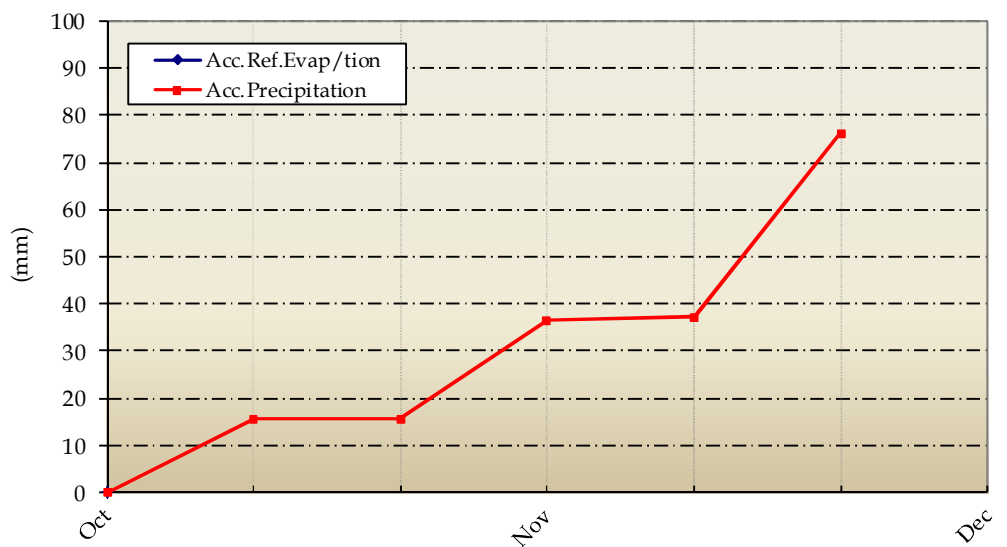
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



2nd 10-day period (11-20/11/2018)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	19.0	16.0	19.0	17.6	16.0	11.8	11.2	8.2	13.4	17.4	15.0	15.4	13.9
	Min	1.4	1.0	0.6	0.0	1.0	5.0	5.6	6.6	5.0	10.0	3.6	9.0	4.6
Relative Humidity	Max	100	100	100	100	100	97	98	100	100	97	99	99	-
	Min	44	35	35	47	33	85	50	94	84	64	57	66	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	8.9
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	10.1
Sunshine Duration		6.1	4.8	4.9	5.6	6.0	0.0	0.8	0.0	0.0	0.8	2.9	2.5	3.0
Precipitation							3.3	0.3	29.9	3.1	2.3	38.9	109.5	63.6
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	13.4
Growing Degrees	5	5.2	3.5	4.8	3.8	3.5	3.4	3.4	2.4	4.2	8.7	42.9	71.8	44.8
	10	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	3.9	24.0	8.8

2nd 10-day period (11-20/11/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	-	7.9
Precipitation - Reference Evapotranspiration	-	-	55.7
Number of Rainy Days	5.0	10.0	4.4
Number of Dry Days	7.0	0.0	-

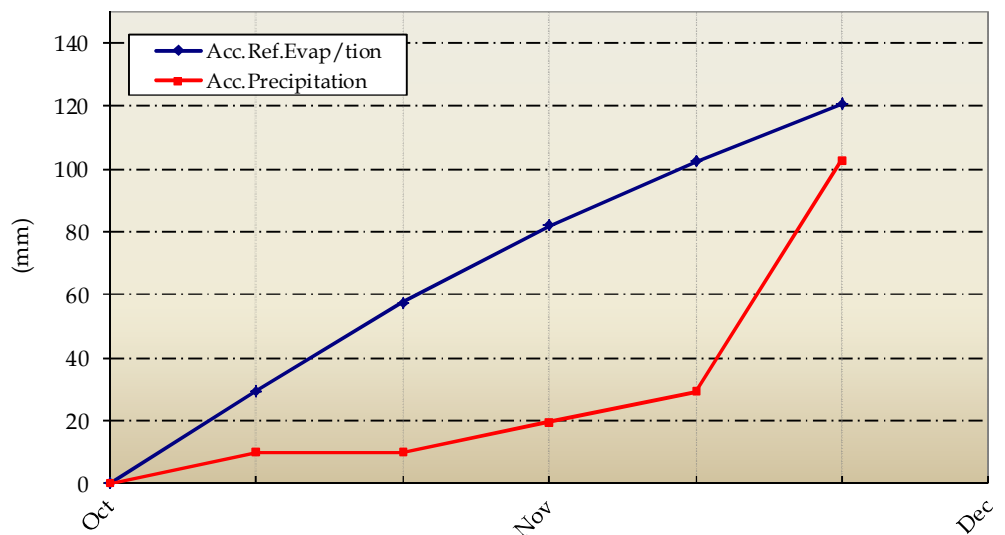
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



2nd 10-day period (11-20/11/2018)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	22.6	23.2	21.4	21.4	21.5	15.0	15.3	21.2	21.0	22.0	20.5	20.3	19.5
	Min	11.2	10.0	9.0	8.8	8.3	10.6	10.0	11.6	13.1	11.5	10.4	11.7	9.3
Relative Humidity	Max	86	82	79	87	84	89	91	93	90	89	87	92	-
	Min	39	34	34	35	37	71	58	54	52	59	47	57	-
Soil Temperature at 10 cm	06 UTC	16.0	14.2	15.4	14.8	14.6	14.4	13.2	14.4	15.0	15.0	14.7	-	14.0
	12 UTC	17.8	17.4	16.8	16.4	16.2	15.4	14.4	14.8	16.0	16.0	16.1	-	15.4
Sunshine Duration		9.0	9.0	9.0	8.9	7.4	0.0	0.6	0.6	6.6	0.6	5.2	4.0	4.6
Precipitation							5.3	4.7	54.1	9.6		73.7	101.6	55.3
Evaporation		4.1	5.2	2.2	1.7	2.0	0.0	1.7	0.0	3.2	0.1	20.2	16.5	22.8
Growing Degrees	5	11.9	11.6	10.2	10.1	9.9	7.8	7.7	11.4	12.1	11.8	104.4	110.1	93.9
	10	6.9	6.6	5.2	5.1	4.9	2.8	2.7	6.4	7.1	6.8	54.4	60.1	44.2

2nd 10-day period (11-20/11/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	18.1	14.9	13.4
Precipitation - Reference Evapotranspiration	55.6	86.7	41.9
Number of Rainy Days	4.0	8.0	3.8
Number of Dry Days	7.0	4.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

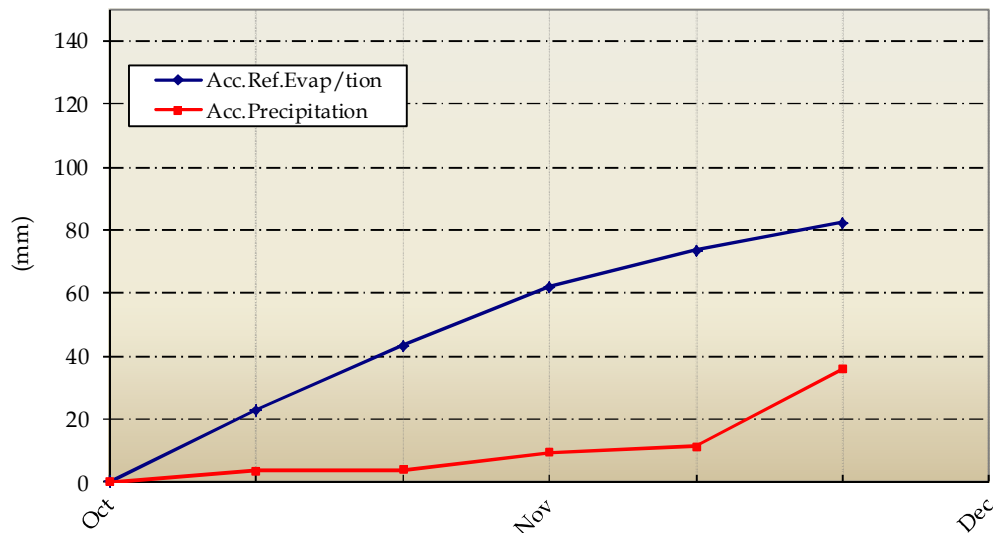


Larisa

2nd 10-day period (11-20/11/2018)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	19.0	18.9	17.5	18.4	17.0	10.8	9.0	8.5	13.4	15.2	14.8	16.3	15.3
	Min	8.8	2.4	3.8	5.1	6.2	6.7	7.8	6.0	5.7	9.0	6.2	8.8	5.5
Relative Humidity	Max	98	98	94	80	83	93	91	98	97	98	93	100	-
	Min	42	44	51	71	33	69	75	91	68	79	62	69	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	10.9
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	11.6
Sunshine Duration		3.9	6.3	4.4	5.5	5.6	0.0	0.0	0.0	4.5	0.0	3.0	2.0	3.5
Precipitation						0.0	1.0	7.0	16.2	0.3		24.5	64.1	21.2
Evaporation		0.9	3.2	1.1	3.5	4.9	5.0	0.1	0.1	1.8	0.2	20.8	12.5	13.7
Growing Degrees	5	8.9	5.7	5.7	6.8	6.6	3.8	3.4	2.3	4.6	7.1	54.6	75.7	54.7
	10	3.9	0.7	0.7	1.8	1.6	0.0	0.0	0.0	0.0	2.1	10.7	26.2	14.5

2nd 10-day period (11-20/11/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	8.9	10.1	8.8
Precipitation - Reference Evapotranspiration	15.6	54.0	12.4
Number of Rainy Days	4.0	8.0	3.4
Number of Dry Days	6.0	2.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

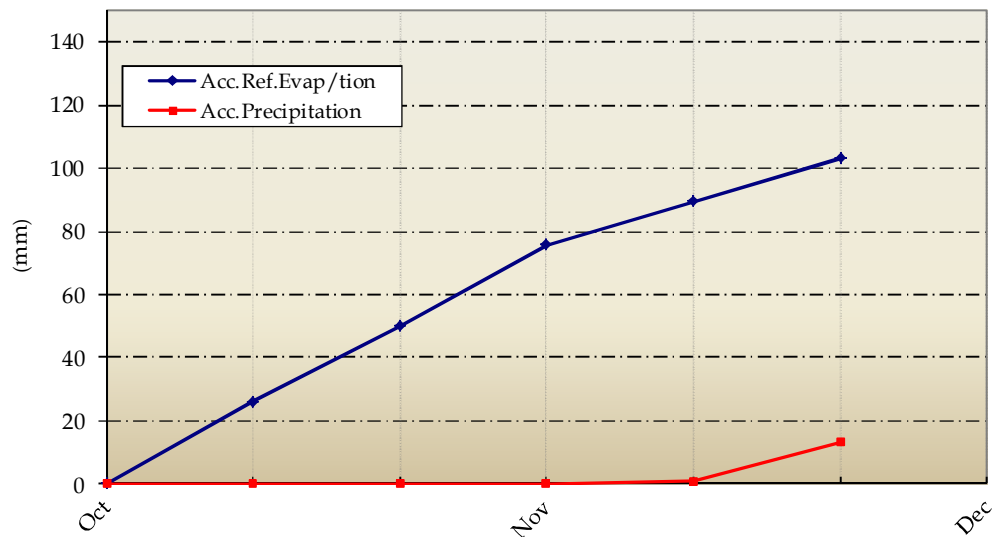


Mikra

2nd 10-day period (11-20/11/2018)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	19.0	18.8	17.5	17.8	18.2	14.6	10.7	10.6	14.0	13.2	15.4	16.7	14.7
	Min	8.0	5.8	7.2	6.2	9.9	6.9	8.9	8.7	8.6	9.0	7.9	11.1	6.8
Relative Humidity	Max	76	79	77	81	65	86	78	90	89	91	81	91	-
	Min	36	41	45	45	30	55	44	70	54	85	50	58	-
Soil Temperature at 10 cm	06 UTC	14.0	13.4	13.6	13.0	13.8	13.0	12.6	12.0	11.5	12.2	12.9	14.2	10.3
	12 UTC	17.5	16.0	15.8	15.6	15.6	14.5	12.6	12.5	12.4	12.8	14.5	15.0	12.2
Sunshine Duration		8.8	8.6	4.6	6.7	6.5	0.4	0.0	0.0	4.1	0.0	4.0	1.9	3.5
Precipitation							0.4	0.1	8.9	1.7	1.4	12.5	49.4	21.1
Evaporation		1.6	0.5	2.2	3.9	8.5	7.5	1.5	0.2	0.8	1.5	28.2	24.9	18.7
Growing Degrees	5	8.5	7.3	7.4	7.0	9.1	5.8	4.8	4.7	6.3	6.1	66.8	88.9	57.6
	10	3.5	2.3	2.4	2.0	4.1	0.8	0.0	0.0	1.3	1.1	17.4	39.4	17.1

2nd 10-day period (11-20/11/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	13.7	12.4	11.2
Precipitation - Reference Evapotranspiration	-1.2	37.0	9.9
Number of Rainy Days	5.0	9.0	3.0
Number of Dry Days	7.0	13.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



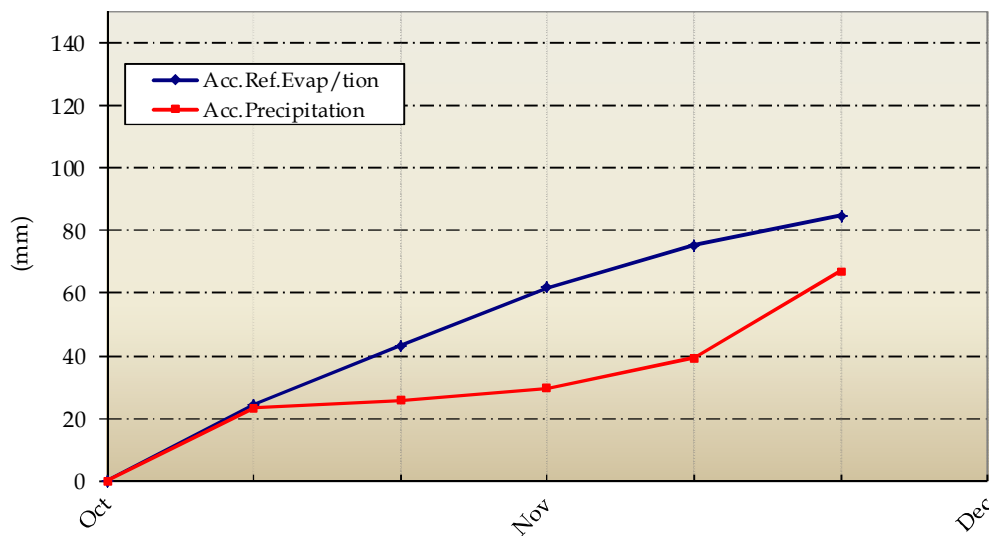


Tanagra

2nd 10-day period (11-20/11/2018)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	17.6	17.3	16.6	15.4	15.3	11.9	11.0	10.4	17.5	18.8	15.2	18.0	17.8
	Min	8.1	9.2	10.6	10.4	8.8	6.3	8.1	8.2	10.0	9.1	8.9	10.1	8.3
Relative Humidity	Max	99	98	83	92	95	95	100	100	100	100	96	98	-
	Min	61	63	48	56	47	56	91	99	70	62	65	62	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		5.8	4.0	4.0	5.5	4.3	0.0	0.0	0.0	2.8	0.0	2.6	2.5	
Precipitation						0.0		2.5	25.3	0.0	0.0	27.8	70.7	21.4
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	-
Growing Degrees	5	7.9	8.3	8.6	7.9	7.1	4.1	4.6	4.3	8.8	9.0	70.3	90.5	
	10	2.9	3.3	3.6	2.9	2.1	0.0	0.0	0.0	3.8	4.0	22.4	40.5	

2nd 10-day period (11-20/11/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	9.4	9.6	
Precipitation - Reference Evapotranspiration	18.4	61.1	21.4
Number of Rainy Days	2.0	8.0	3.7
Number of Dry Days	7.0	4.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

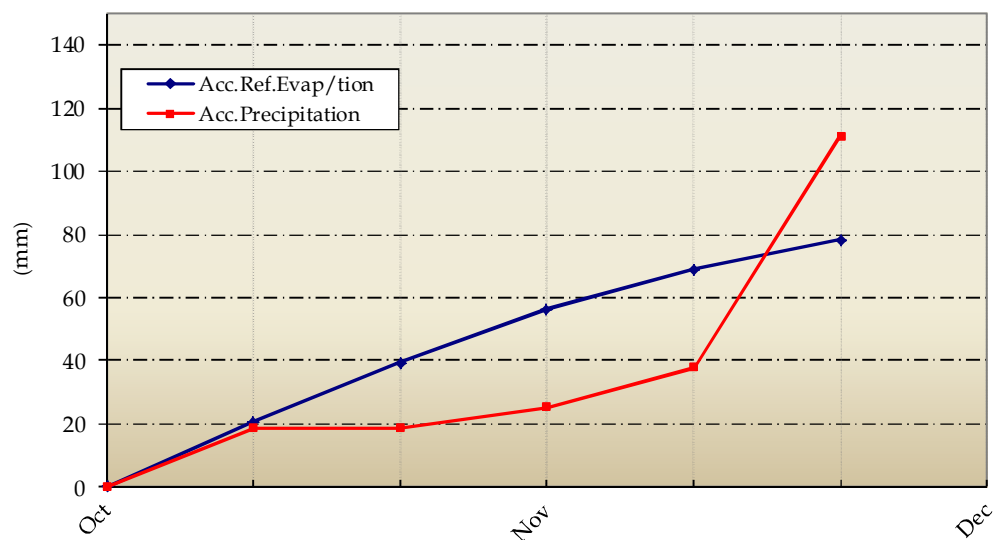


Tripoli

2nd 10-day period (11-20/11/2018)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	16.0	14.8	14.7	15.6	15.6	10.2	7.6	9.4	16.5	17.2	13.8	16.1	14.9
	Min	1.3	2.2	-0.7	2.5	0.8	4.7	4.5	6.5	8.6	5.2	3.6	6.8	4.4
Relative Humidity	Max	100	100	100	100	100	94	100	100	100	100	99	100	-
	Min	52	49	51	55	49	66	79	92	50	67	61	54	-
Soil Temperature at 10 cm	06 UTC	9.6	9.4	8.2	8.6	8.0	10.2	8.0	8.4	9.6	7.2	8.7	11.4	9.7
	12 UTC	-	12.0	11.2	11.6	11.0	10.0	-	-	-	11.6	11.2	12.7	10.8
Sunshine Duration		7.3	6.8	8.1	7.9	4.5	0.0	0.0	0.0	6.5	1.1	4.2	3.8	4.5
Precipitation							8.4	9.3	55.3	0.4		73.4	47.3	45.7
Evaporation		1.4	1.1	1.4	0.6	1.1	0.0	0.0	0.0	1.9	1.6	9.1	18.3	15.6
Growing Degrees	5	3.7	3.5	2.0	4.1	3.2	2.5	1.1	3.0	7.6	6.2	36.6	64.9	46.8
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	1.2	3.8	16.0	10.1

2nd 10-day period (11-20/11/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	9.4	9.8	10.5
Precipitation - Reference Evapotranspiration	64.0	37.5	35.2
Number of Rainy Days	4.0	7.0	4.0
Number of Dry Days	6.0	4.0	-

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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The present bulletin was designed and implemented under the support of Water Resources Management Division of Agriculture University of Athens