



AGROMETEOROLOGICAL BULLETIN

December 2016
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



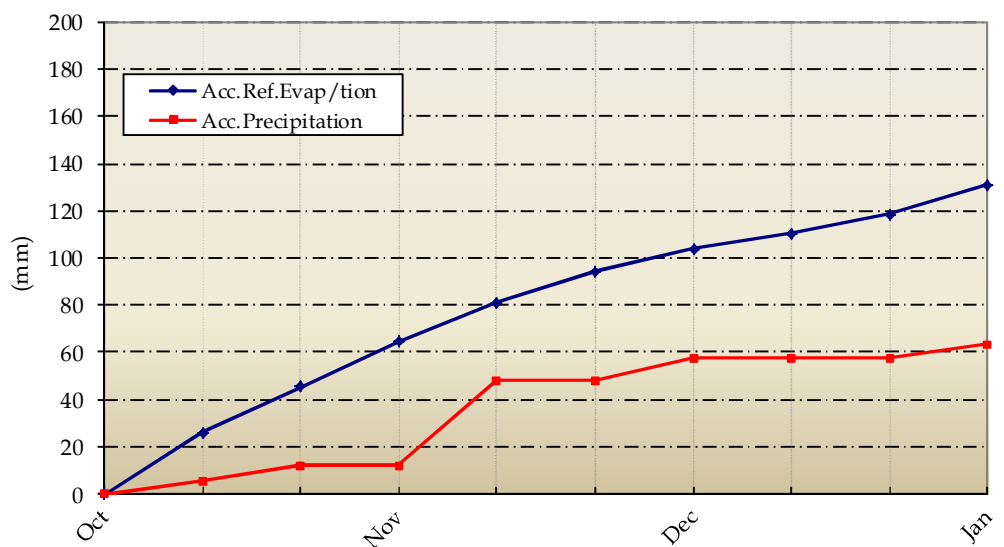
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www.hnms.gr
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3rd 10-day period (21-31/12/2016)		21	22	23	24	25	26	27	28	29	30	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	6.2	6.4	8.2	9.0	8.8	7.8	9.0	9.6	4.6	4.0	4.0	7.1	12.8	9.8
	Min	2.0	0.2	2.6	1.0	-5.0	-3.2	1.8	0.8	2.8	0.8	-0.4	0.3	-0.7	2.4
Relative Humidity	Max	64	55	51	85	90	89	89	81	51	57	96	73	89	-
	Min	31	39	18	30	60	62	57	35	36	41	65	43	49	-
Soil Temperature at 10 cm	06 UTC	3.4	3.0	5.0	4.6	2.4	3.6	5.4	5.6	5.6	4.0	3.8	4.2	4.1	6.0
	12 UTC	5.5	5.6	6.2	7.2	5.6	5.6	9.6	8.4	5.6	5.2	3.6	6.2	6.3	7.2
Sunshine Duration		7.8	5.8	0.1	7.1	3.4	4.5	2.9	6.1	0.0	0.8	0.0	3.5	6.9	2.6
Precipitation							0.0					5.9	5.9		24.7
Evaporation		0.0	0.0	0.0	0.0	0.0	0.0	4.1	3.9	0.0	0.0	0.0	8.0	6.6	12.0
Growing Degrees	5	0.0	0.0	0.4	0.0	0.0	0.0	0.4	0.2	0.0	0.0	0.0	1.0	18.7	24.9
	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	0.0	4.2

3rd 10-day period (21-31/12/2016)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	12.5	7.2	8.4
Precipitation - Reference Evapotranspiration	-6.6	-7.2	16.3
Number of Rainy Days	1.0	0.0	2.9
Number of Dry Days	31.0	20.0	-

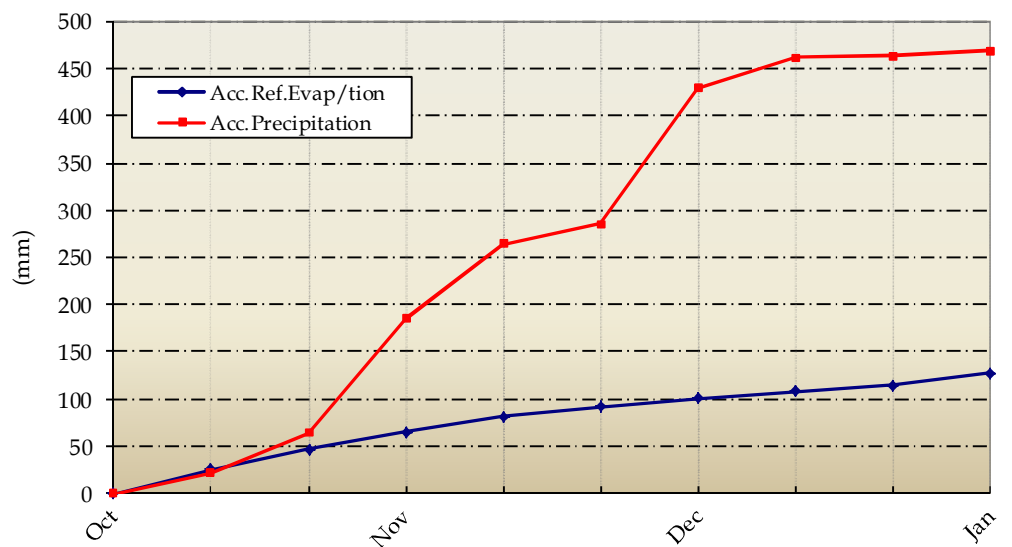
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-31/12/2016)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	13.8	11.0	10.8	14.4	15.0	15.2	16.8	11.2	10.0	8.6	12.0	12.6	16.3	14.4
	Min	0.8	0.8	-2.6	-1.4	2.0	1.0	2.8	7.8	1.1	0.4	-4.4	0.8	3.6	6.0
Relative Humidity	Max	91	79	84	82	89	91	87	92	62	75	86	83	90	-
	Min	32	28	32	39	33	32	43	30	34	32	35	34	52	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	9.0
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	10.5
Sunshine Duration		7.0	7.6	2.3	0.0	4.7	7.0	6.7	6.1	2.7	6.0	1.8	4.7	6.1	4.0
Precipitation									5.6				5.6	0.1	44.5
Evaporation		1.3	0.7	3.0	4.0	1.0	1.2	3.4	1.0	1.0	0.0	0.0	16.6	20.2	21.9
Growing Degrees	5	2.3	0.9	0.0	1.5	3.5	3.1	4.8	4.5	0.6	0.0	0.0	21.2	54.7	57.7
	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	6.4	13.8

3rd 10-day period (21-31/12/2016)	Previous Year Value	Past Years Mean Value	
Reference Evapotranspiration	12.6	7.9	9.5
Precipitation - Reference Evapotranspiration	-7.0	-7.8	35.0
Number of Rainy Days	1.0	1.0	4.8
Number of Dry Days	14.0	32.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

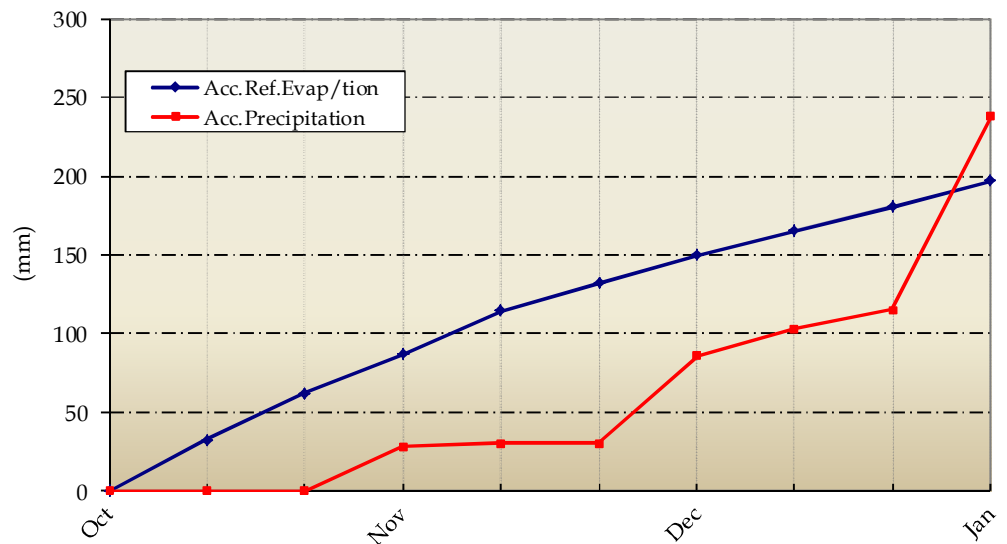


Iraklio

3rd 10-day period (21-31/12/2016)		21	22	23	24	25	26	27	28	29	30	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	12.4	10.4	11.2	13.4	13.8	13.8	13.8	13.0	8.4	8.8	7.0	11.5	16.0	15.9
	Min	10.2	8.0	8.6	7.0	10.0	10.0	9.8	7.0	4.4	6.6	5.0	7.9	10.7	10.0
Relative Humidity	Max	82	77	91	91	75	89	86	90	93	85	93	87	86	-
	Min	53	62	63	63	61	50	62	59	42	62	71	59	60	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		0.6	0.5	0.0	1.6	3.7	3.8	4.6	1.3	2.1	1.6	0.3	1.8	3.3	3.8
Precipitation		1.2	4.4	12.9	12.2	3.3	5.5	2.3	16.2	41.9	10.0	12.8	122.7	2.7	34.5
Evaporation		2.7	0.3	1.3	2.4	4.2	5.4	1.8	0.1	1.3	4.3	6.2	30.0	17.3	28.1
Growing Degrees	5	6.3	4.2	4.9	5.2	6.9	6.9	6.8	5.0	1.4	2.7	1.0	51.3	92.1	87.3
	10	1.3	0.0	0.0	0.2	1.9	1.9	1.8	0.0	0.0	0.0	0.0	7.1	40.0	33.4

3rd 10-day period (21-31/12/2016)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	16.8	15.5	-
Precipitation - Reference Evapotranspiration	105.9	-12.8	34.5
Number of Rainy Days	11.0	1.0	4.5
Number of Dry Days	3.0	18.0	-

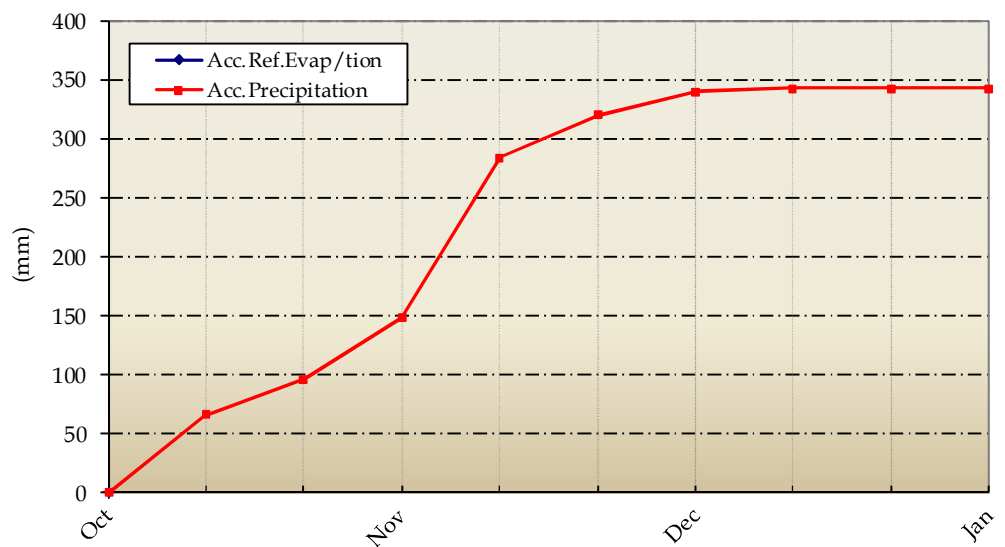
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-31/12/2016)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	-	11.3	13.0	14.6	7.2	13.7	10.4	8.0	5.8	4.8	6.0	9.5	11.9	8.8
	Min	-7.2	-5.0	-3.2	-6.2	-7.2	-6.6	-5.0	-1.5	-0.7	-4.2	-7.9	-5.0	-5.0	0.9
Relative Humidity	Max	100	82	89	100	100	100	100	100	60	60	-	89	97	-
	Min	29	11	17	21	50	35	53	25	27	25	38	30	54	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	4.0
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	4.7
Sunshine Duration		6.2	-	6.4	-	1.9	5.4	2.8	6.1	-	6.2	-	5.0	3.7	2.4
Precipitation								0.0	0.0				0.0	0.0	50.6
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	-	9.0
Growing Degrees	5	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	14.1
	10	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.9

3rd 10-day period (21-31/12/2016)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	-	6.2
Precipitation - Reference Evapotranspiration	-	-	44.4
Number of Rainy Days	0.0	0.0	4.3
Number of Dry Days	25.0	12.0	-

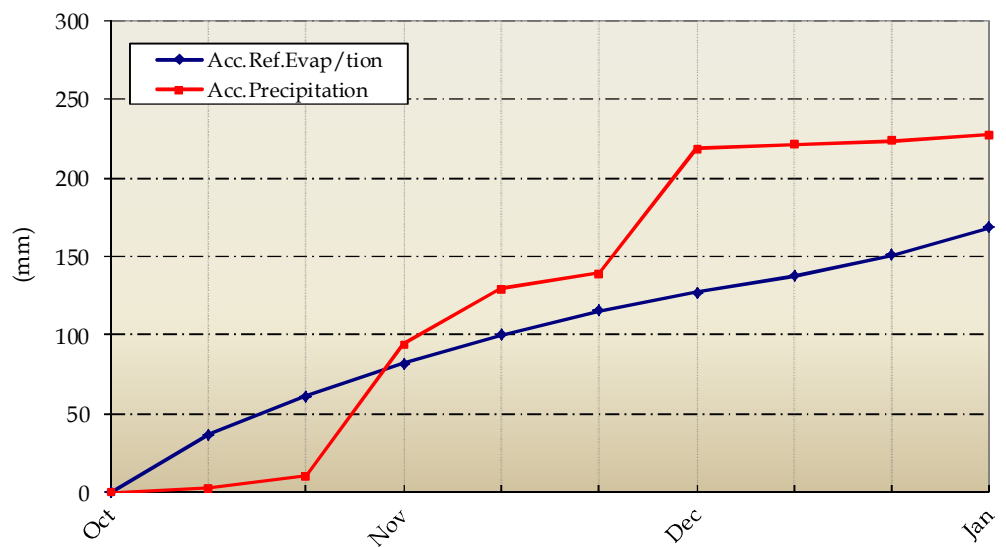
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-31/12/2016)		21	22	23	24	25	26	27	28	29	30	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	14.0	11.9	14.1	16.6	18.0	17.5	16.9	14.9	9.5	10.9	10.5	14.1	17.6	15.2
	Min	6.4	4.2	2.0	2.8	-0.2	2.0	1.1	4.1	1.0	4.3	-3.4	2.2	3.7	6.1
Relative Humidity	Max	77	78	69	78	85	86	88	93	57	69	92	79	91	-
	Min	29	20	27	24	20	33	33	33	33	27	36	29	43	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	10.5	10.0
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	11.2	10.9
Sunshine Duration		7.2	8.6	5.2	8.2	8.8	8.8	8.6	6.3	1.3	8.2	5.4	7.0	6.1	3.9
Precipitation									1.6			2.6	4.2	18.7	41.5
Evaporation		5.2	1.2	1.0	4.1	1.3	3.8	1.0	2.2	3.0	2.0	0.8	25.6	21.0	22.7
Growing Degrees	5	5.2	3.1	3.1	4.7	3.9	4.8	4.0	4.5	0.3	2.6	0.0	36.0	62.2	62.1
	10	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	10.8	14.5

3rd 10-day period (21-31/12/2016)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	17.6	14.8	11.8
Precipitation - Reference Evapotranspiration	-13.4	3.9	29.7
Number of Rainy Days	2.0	2.0	4.8
Number of Dry Days	14.0	18.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

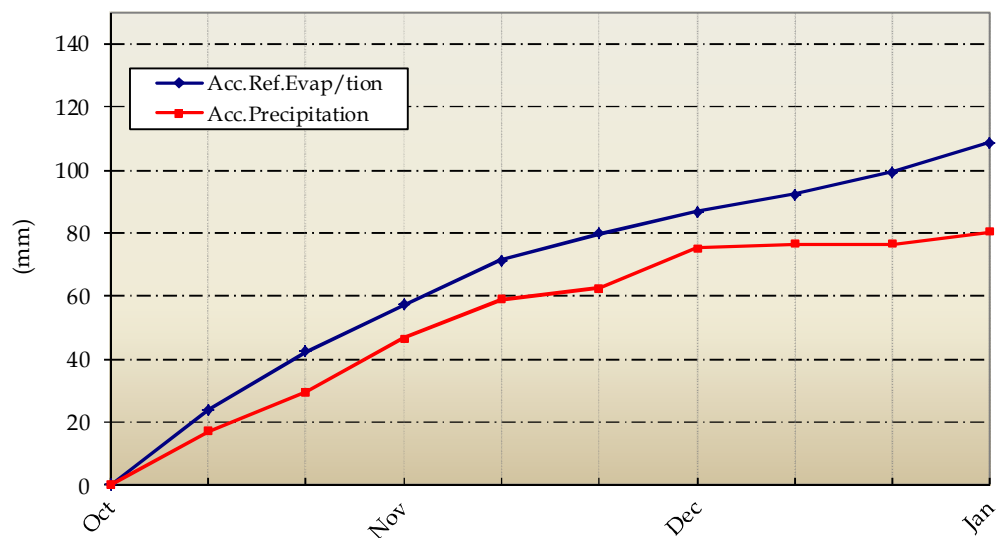


Larisa

3rd 10-day period (21-31/12/2016)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	9.0	7.8	10.5	10.6	7.6	12.9	13.2	10.5	7.8	5.6	5.0	9.1	12.9	10.0
	Min	-3.6	0.4	-5.8	-6.0	-6.8	-2.4	-1.7	3.0	3.0	-1.8	-3.8	-2.3	-1.4	1.1
Relative Humidity	Max	100	85	96	92	94	91	100	94	67	65	78	87	100	-
	Min	58	28	26	32	58	37	47	32	26	26	41	37	49	-
Soil Temperature at 10 cm	06 UTC	5.6	5.8	5.4	4.8	3.6	4.2	5.0	5.4	5.4	4.8	4.2	4.9	6.8	5.7
	12 UTC	5.4	7.0	6.7	14.8	4.2	4.2	5.2	5.4	5.4	5.8	4.0	6.2	7.0	6.1
Sunshine Duration		4.2	6.9	6.1	6.3	2.1	4.8	3.0	0.0	4.7	4.1	1.2	3.9	5.3	3.0
Precipitation		0.1						1.5	2.2				3.8	1.0	14.0
Evaporation		0.0	0.5	0.2	0.0	0.0	0.0	0.6	2.6	0.0	0.0	0.0	3.9	0.4	7.2
Growing Degrees	5	0.0	0.0	0.0	0.0	0.0	0.3	0.8	1.8	0.4	0.0	0.0	3.2	11.3	18.9
	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	0.0	2.2

3rd 10-day period (21-31/12/2016)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	9.4	7.0	6.4
Precipitation - Reference Evapotranspiration	-5.6	-6.0	7.6
Number of Rainy Days	3.0	1.0	3.0
Number of Dry Days	14.0	12.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

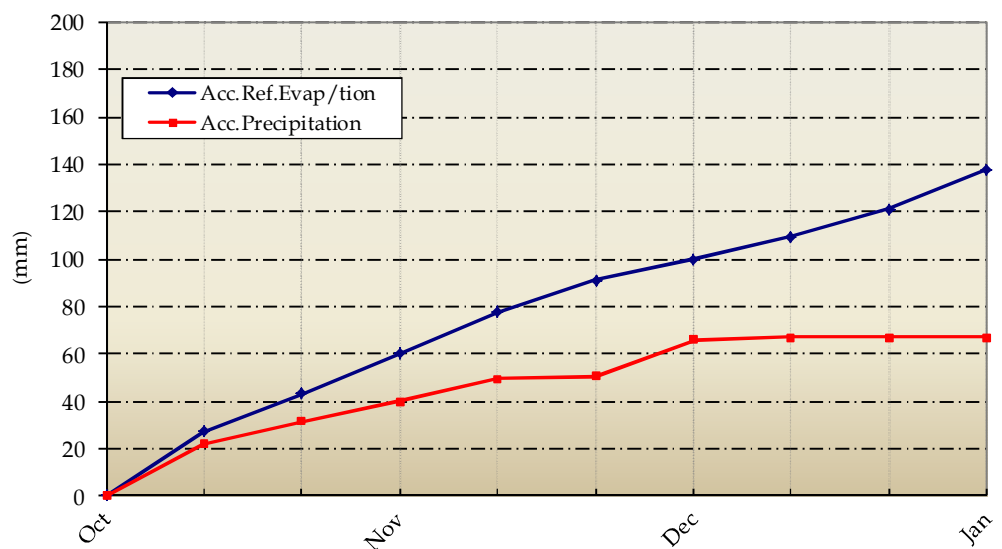


Mikra

3rd 10-day period (21-31/12/2016)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	9.1	7.8	10.6	11.0	11.2	13.4	13.7	10.3	8.2	6.0	5.6	9.7	14.0	10.2
	Min	0.0	-3.6	-4.4	-3.9	-4.0	5.7	2.9	4.8	4.0	1.4	0.0	0.3	0.9	2.2
Relative Humidity	Max	85	87	82	85	85	65	82	49	49	50	74	72	91	-
	Min	47	36	34	28	41	47	33	38	36	32	42	38	46	-
Soil Temperature at 10 cm	06 UTC	3.7	3.0	2.2	2.2	2.4	5.4	6.4	6.0	5.2	3.5	4.0	4.0	6.2	5.3
	12 UTC	5.2	5.3	4.0	4.2	4.2	7.2	7.0	8.6	5.8	4.4	4.6	5.5	8.0	6.8
Sunshine Duration		4.8	7.9	4.9	7.8	2.5	5.2	3.0	5.7	7.1	4.1	0.4	4.9	7.0	3.0
Precipitation												0.0	0.0	0.2	14.9
Evaporation		0.0	0.0	0.0	0.0	0.0	1.9	3.1	8.6	0.0	0.0	0.0	13.6	10.7	13.5
Growing Degrees	5	0.0	0.0	0.0	0.0	0.0	4.6	3.3	2.6	1.1	0.0	0.0	11.5	31.1	22.3
	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	0.0	3.0

3rd 10-day period (21-31/12/2016)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	17.0	9.0	8.7
Precipitation - Reference Evapotranspiration	-17.0	-8.8	6.2
Number of Rainy Days	0.0	1.0	3.0
Number of Dry Days	27.0	32.0	-

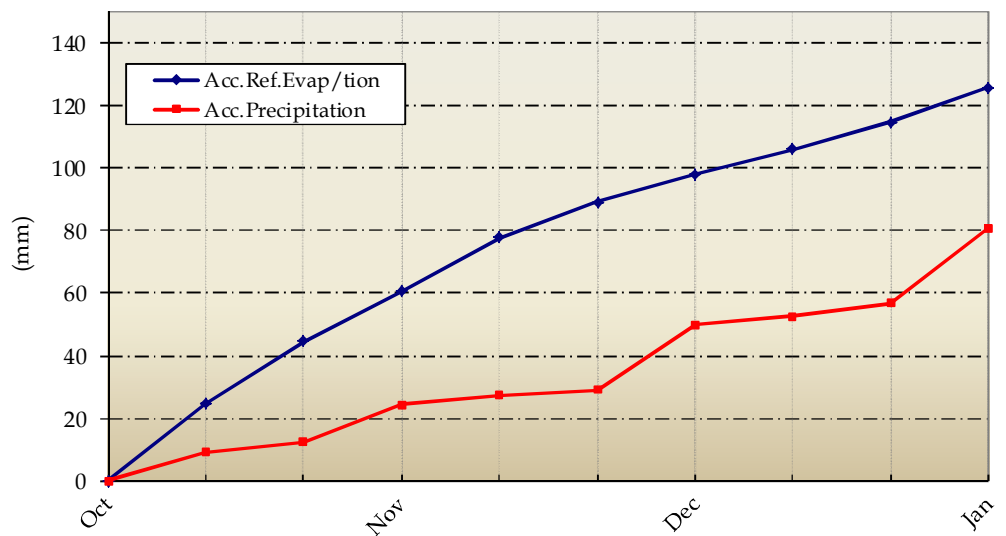
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-31/12/2016)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	8.7	6.8	8.7	11.2	13.7	13.5	14.8	6.9	3.4	3.3	2.5	8.5	14.5	13.1
	Min	-0.4	2.8	6.2	7.5	0.4	4.4	5.0	5.4	-0.1	1.7	0.7	3.1	2.6	4.6
Relative Humidity	Max	96	68	52	74	81	74	98	97	100	99	85	84	96	-
	Min	47	44	41	33	25	33	46	49	57	63	50	44	45	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		6.3	0.6	0.7	4.7	6.6	6.5	3.8	0.0	0.0	1.1	0.0	2.8	5.6	-
Precipitation		0.7	0.5				0.0		5.7	15.6	1.4	0.2	24.1	6.2	24.3
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	18.5	4.8
Growing Degrees	5	0.0	0.0	2.5	4.4	2.1	4.0	4.9	1.2	0.0	0.0	0.0	18.9	42.0	
	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	0.4	

3rd 10-day period (21-31/12/2016)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	11.3	7.9	
Precipitation - Reference Evapotranspiration	12.8	-1.7	24.3
Number of Rainy Days	6.0	2.0	
Number of Dry Days	4.0	12.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

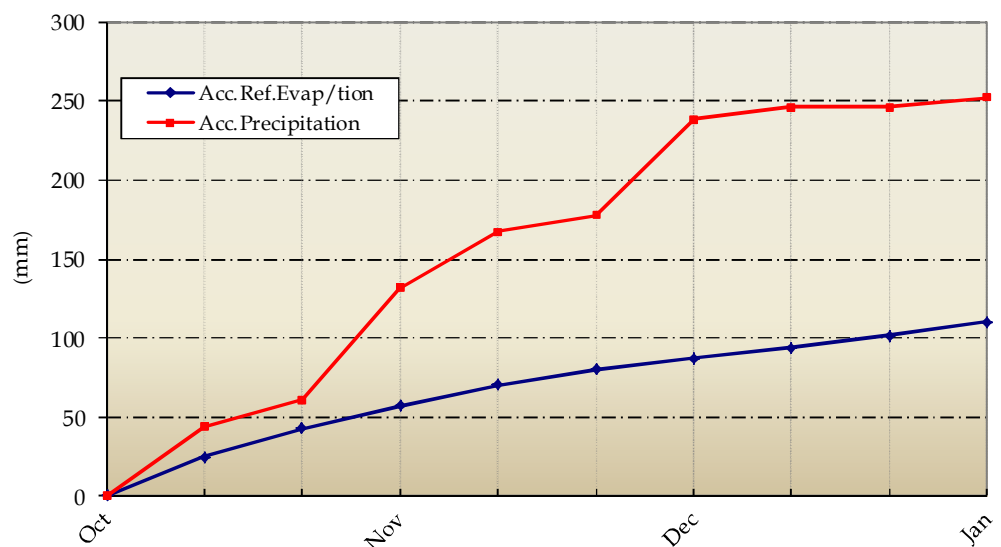


Tripoli

3rd 10-day period (21-31/12/2016)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	7.8	5.5	8.0	10.3	13.1	11.8	14.3	5.3	2.7	2.5	1.8	7.6	14.3	9.8
	Min	-3.7	0.2	-1.0	-3.6	-7.5	-5.1	-4.8	-1.3	-5.5	-3.3	-9.6	-4.1	-4.1	1.5
Relative Humidity	Max	98	83	89	93	99	97	100	100	100	100	100	96	100	-
	Min	45	32	34	29	23	32	36	54	61	63	62	43	37	-
Soil Temperature at 10 cm	06 UTC	2.2	2.6	1.8	1.6	1.2	1.6	1.6	3.4	1.8	1.8	1.0	1.9	2.5	5.3
	12 UTC	3.6	3.8	3.8	-	-	-	3.8	-	1.6	2.4	-	3.2	4.6	6.0
Sunshine Duration		4.7	7.4	4.7	7.5	5.4	7.2	6.7	2.2	1.1	4.2	0.0	4.6	5.0	3.7
Precipitation		0.0	0.0						4.7	0.8	0.5	0.0	6.0	6.2	36.8
Evaporation		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	9.0
Growing Degrees	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.9	18.6
	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	0.0	1.8

3rd 10-day period (21-31/12/2016)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	8.8	8.5	8.4
Precipitation - Reference Evapotranspiration	-2.8	-2.3	28.4
Number of Rainy Days	3.0	2.0	4.5
Number of Dry Days	20.0	18.0	-

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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Division of Climatology-Applications

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