



AGROMETEOROLOGICAL BULLETIN

December 2012
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



Hellenic National Meteorological Service
Division of Climatology-Applications
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Helliniko, Athens

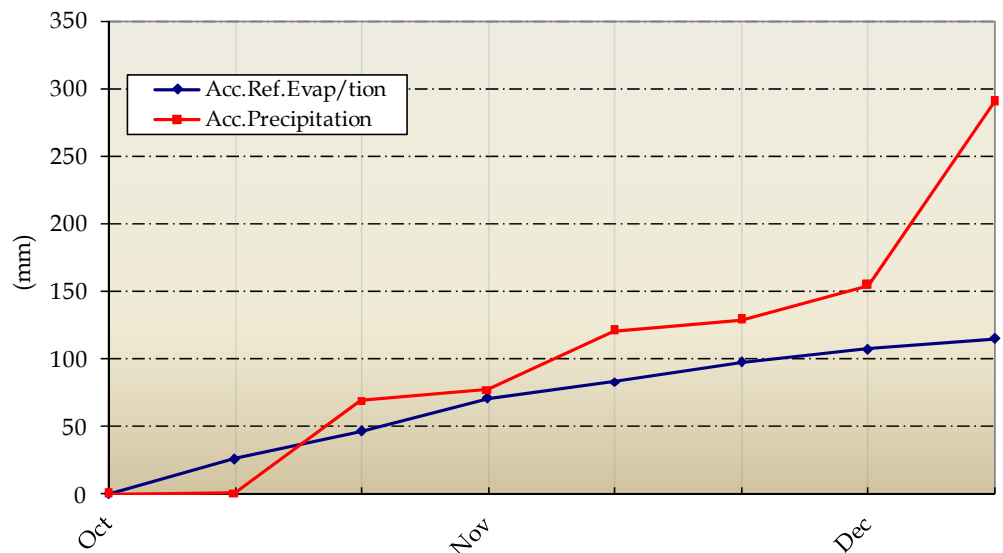
Web addresses of HNMS
www.hnms.gr
www.emy.gov.gr
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www.meteohellas.gr

Agrinio

1st 10-day period (1-10/12/2012)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	18.6	13.8	15.4	12.6	12.4	13.4	13.2	12.8	13.6	11.4	13.7	17.6	15.5
	Min	11.4	8.6	9.4	4.4	5.0	2.0	1.6	1.4	8.0	3.2	5.5	4.1	5.0
Relative Humidity	Max	98	96	95	81	97	97	97	94	97	100	95	96	-
	Min	65	95	72	33	94	69	69	88	66	43	69	57	-
Soil Temperature at 10 cm	06 UTC	14.4	13.4	12.8	11.0	9.6	9.6	9.4	9.0	10.4	9.4	10.9	10.2	9.1
	12 UTC	15.0	13.6	13.2	11.0	10.6	10.6	-	10.2	10.8	9.6	11.6	11.7	10.9
Sunshine Duration		5.7	0.0	1.4	8.6	0.2	3.6	6.6	0.0	2.4	8.2	3.7	5.4	4.0
Precipitation		22.0	15.1	9.0		19.7	16.8	0.9	37.2	15.3		136.0	32.8	44.2
Evaporation		1.3	0.2	3.0	1.0	1.2	0.2	0.4	1.1	1.3	0.4	10.1	17.2	14.2
Growing Degrees	5	10.0	6.2	7.4	3.5	3.7	2.7	2.4	2.1	5.8	2.3	46.1	58.5	53.0
	10	5.0	1.2	2.4	0.0	0.0	0.0	0.0	0.0	0.8	0.0	9.4	15.3	12.3

1st 10-day period (1-10/12/2012)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.7	7.3	8.7
Precipitation - Reference Evapotranspiration	128.3	25.5	35.5
Number of Rainy Days	8.0	4.0	4.5
Number of Dry Days	0.0	10.0	-

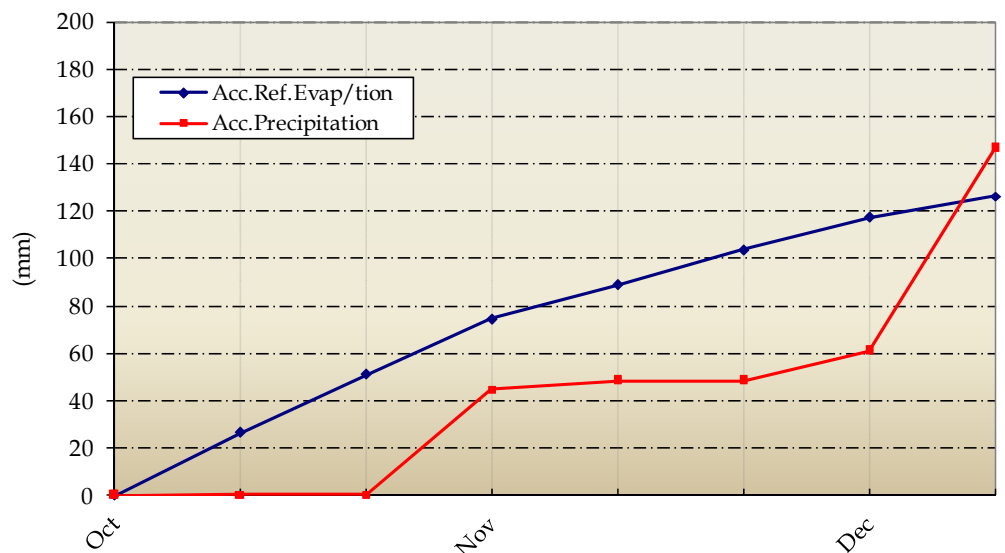
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



1st 10-day period (1-10/12/2012)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	18.2	17.0	17.0	11.2	13.6	11.8	8.4	9.6	12.8	9.6	12.9	14.0	11.0
	Min	14.0	9.2	10.0	5.6	5.6	2.4	2.4	1.0	7.6	2.0	6.0	2.8	3.3
Relative Humidity	Max	93	95	97	97	95	91	92	92	100	91	94	91	-
	Min	67	80	42	52	64	69	53	68	75	70	64	63	-
Soil Temperature at 10 cm	06 UTC	15.6	13.4	13.0	11.0	11.0	10.8	8.6	7.0	9.2	9.2	10.9	7.7	7.1
	12 UTC	15.6	14.6	13.0	11.8	11.8	10.4	-	8.2	10.6	9.0	11.7	8.8	8.4
Sunshine Duration		1.4	0.1	1.2	1.2	2.1	0.0	3.2	2.3	0.0	2.0	1.4	5.9	2.7
Precipitation		12.5	8.8	6.7	5.8	0.2	0.1			38.2	13.2	85.5	7.1	30.2
Evaporation		0.5	1.0	1.1	3.0	0.2	0.1	0.1	0.2	0.8	1.0	8.0	10.4	14.9
Growing Degrees	5	11.1	8.1	8.5	3.4	4.6	2.1	0.4	0.3	5.2	0.8	44.5	34.3	28.2
	10	6.1	3.1	3.5	0.0	0.0	0.0	0.0	0.0	0.2	0.0	12.9	7.9	5.3

1st 10-day period (1-10/12/2012)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	9.2	6.2	9.7
Precipitation - Reference Evapotranspiration	76.3	0.9	20.5
Number of Rainy Days	8.0	2.0	3.2
Number of Dry Days	0.0	50.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

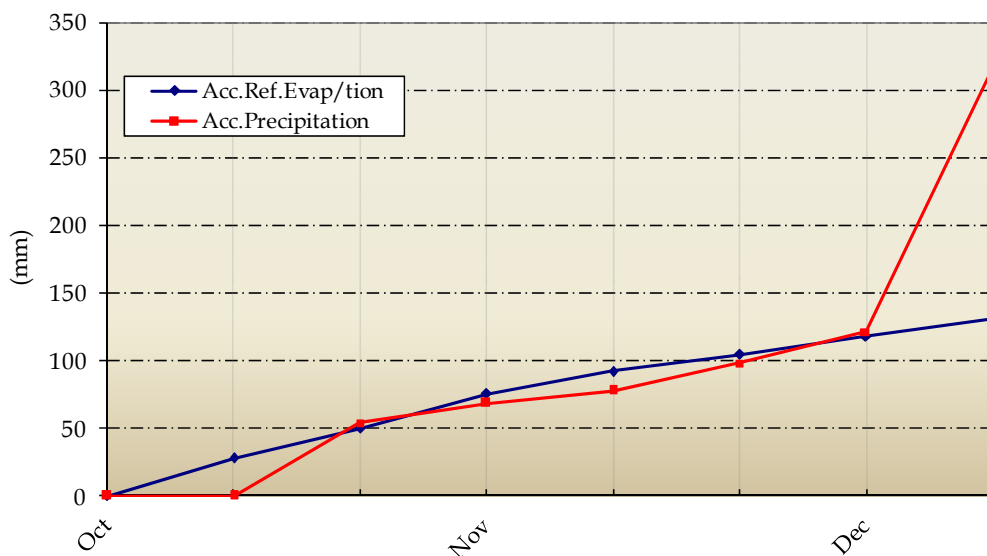


Andravida

1st 10-day period (1-10/12/2012)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	19.1	15.5	18.2	13.1	15.3	15.4	13.0	14.3	13.3	11.9	14.9	17.9	15.9
	Min	12.0	11.2	9.5	8.6	7.4	7.7	5.2	5.8	7.1	6.5	8.1	7.2	7.3
Relative Humidity	Max	92	92	86	80	90	92	90	97	88	91	90	93	-
	Min	49	58	48	51	58	55	55	50	63	50	54	55	-
Soil Temperature at 10 cm	06 UTC	14.6	14.4	12.8	12.0	12.0	11.4	10.0	10.6	11.6	10.4	12.0	10.8	10.4
	12 UTC	16.6	16.4	14.8	14.0	13.6	12.8	-	12.0	12.0	11.0	13.7	13.8	12.0
Sunshine Duration		3.6	0.0	4.6	7.6	1.0	3.9	5.6	7.9	0.9	2.7	3.8	5.5	4.3
Precipitation		27.1	18.1	2.9	5.5	14.8	14.5	8.2	70.0	24.9	8.4	194.4	29.6	41.8
Evaporation		0.9	0.0	5.9	1.4	5.3	-	0.8	-	0.7	0.8	-	11.4	19.4
Growing Degrees	5	10.6	8.4	8.9	5.9	6.4	6.6	4.1	5.1	5.2	4.2	65.1	75.1	66.0
	10	5.6	3.4	3.9	0.9	1.4	1.6	0.0	0.1	0.2	0.0	16.8	25.3	20.7

1st 10-day period (1-10/12/2012)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	12.3	6.0	9.1
Precipitation - Reference Evapotranspiration	182.1	23.6	32.7
Number of Rainy Days	10.0	4.0	4.6
Number of Dry Days	0.0	41.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

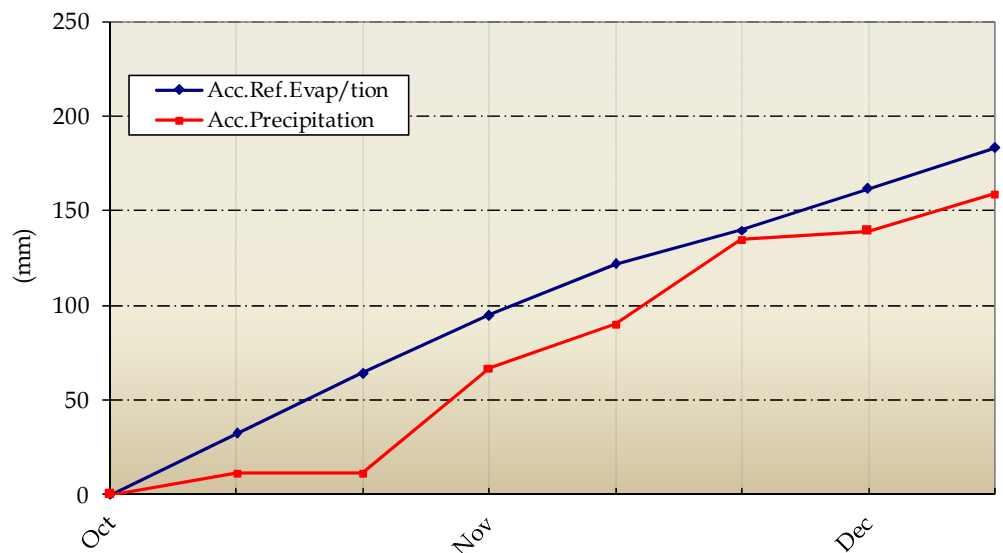


Iraklio

1st 10-day period (1-10/12/2012)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	23.4	23.6	20.8	16.4	19.4	18.8	17.4	16.0	19.6	14.8	19.0	-	17.3
	Min	19.2	17.2	15.8	12.4	7.8	10.4	9.8	8.6	12.0	10.0	12.3	-	11.5
Relative Humidity	Max	81	78	82	83	87	89	80	79	91	90	84	-	-
	Min	42	47	49	52	53	55	55	50	56	54	51	-	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		3.6	9.5	6.5	7.0	4.6	2.8	6.9	0.0	6.2	3.6	5.1	-	3.5
Precipitation				0.3	1.3	2.4	6.6			4.8	4.0	19.4	-	24.2
Evaporation		12.4	4.0	-	7.4	4.5	0.5	3.0	1.6	4.4	6.0	-	-	28.3
Growing Degrees	5	16.3	15.4	13.3	9.4	8.6	9.6	8.6	7.3	10.8	7.4	106.7	-	94.2
	10	11.3	10.4	8.3	4.4	3.6	4.6	3.6	2.3	5.8	2.4	56.7	-	44.6

1st 10-day period (1-10/12/2012)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	21.5	-	-
Precipitation - Reference Evapotranspiration	-2.1	-	24.2
Number of Rainy Days	6.0	-	3.7
Number of Dry Days	10.0	-	-

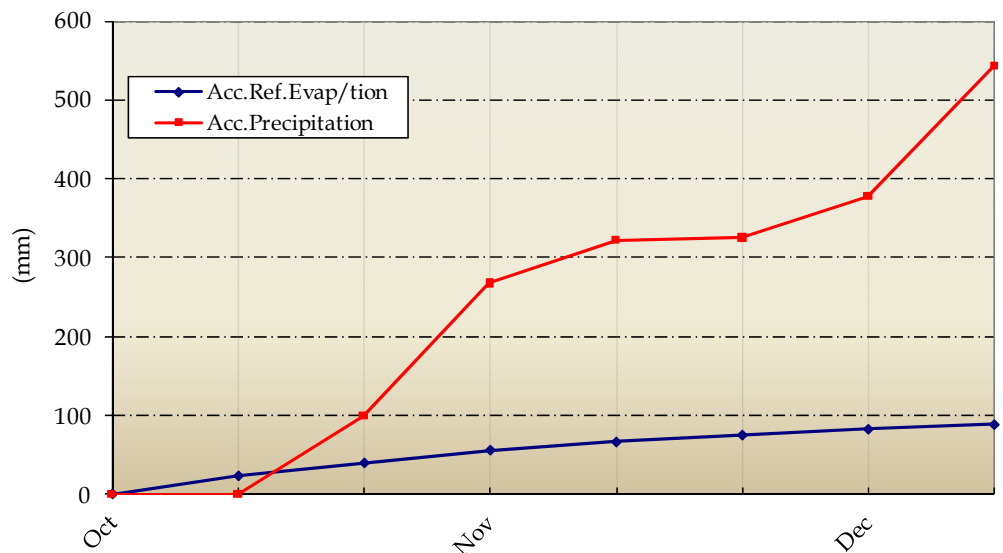
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



1st 10-day period (1-10/12/2012)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	13.0	9.2	9.4	8.4	7.8	9.0	6.6	7.6	7.4	7.0	8.5	10.6	10.3
	Min	7.0	6.4	4.4	0.2	1.2	1.2	-0.4	3.0	2.2	-0.6	2.5	1.5	1.9
Relative Humidity	Max	92	97	97	97	94	93	96	94	96	89	94	98	-
	Min	74	89	87	42	86	53	73	81	79	42	71	66	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	5.5
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	6.5
Sunshine Duration		1.3	0.0	0.0	7.2	0.5	3.5	1.4	0.0	0.0	6.0	2.0	2.5	2.5
Precipitation		18.5	43.2	28.6		25.0	6.8	1.0	11.0	28.3	2.1	164.5	37.7	51.5
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	10.5
Growing Degrees	5	5.0	2.8	1.9	0.0	0.0	0.1	0.0	0.3	0.0	0.0	10.1	15.2	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	0.7	0.9

1st 10-day period (1-10/12/2012)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	5.8	5.1	6.1
Precipitation - Reference Evapotranspiration	158.7	32.6	45.4
Number of Rainy Days	9.0	5.0	4.2
Number of Dry Days	0.0	10.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

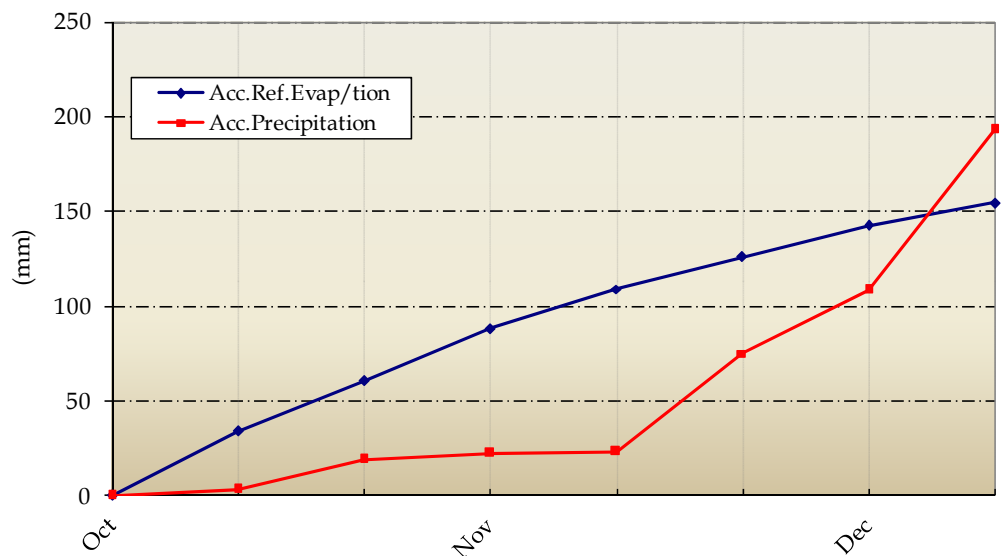


Kalamata

1st 10-day period (1-10/12/2012)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	22.0	21.1	18.8	14.8	12.9	14.6	13.9	13.8	15.2	13.2	16.0	18.2	16.9
	Min	12.9	10.0	10.4	6.9	5.6	6.6	5.3	4.2	8.1	5.0	7.5	5.7	7.2
Relative Humidity	Max	95	92	91	90	95	96	93	92	92	94	93	98	-
	Min	45	64	53	47	86	60	49	68	68	56	60	60	-
Soil Temperature at 10 cm	06 UTC	16.0	15.6	15.2	14.2	13.4	12.6	12.4	11.6	12.8	11.6	13.5	11.8	11.5
	12 UTC	16.6	16.2	15.8	14.8	13.2	13.0	-	12.0	13.0	12.2	14.1	12.9	12.5
Sunshine Duration		4.7	0.8	4.2	7.9	0.2	3.6	6.6	0.0	1.2	6.2	3.5	6.4	4.0
Precipitation		25.0	0.0	3.1	1.9	15.7	13.2	2.2	4.8	14.8	4.1	84.8	37.9	45.8
Evaporation		0.9	2.0	0.2	2.1	0.0	0.7	1.8	0.1	4.4	7.9	20.1	11.5	26.7
Growing Degrees	5	12.5	10.6	9.6	5.9	4.3	5.6	4.6	4.0	6.7	4.1	67.7	69.6	70.4
	10	7.5	5.6	4.6	0.9	0.0	0.6	0.0	0.0	1.7	0.0	20.7	19.6	22.7

1st 10-day period (1-10/12/2012)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	12.0	10.8	10.9
Precipitation - Reference Evapotranspiration	72.8	27.1	34.9
Number of Rainy Days	9.0	3.0	4.7
Number of Dry Days	0.0	8.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

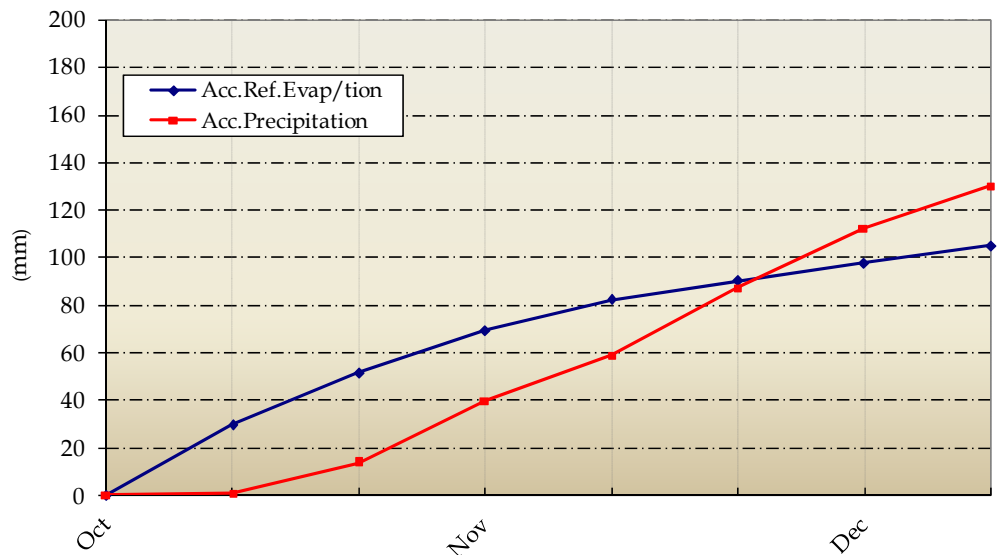


Larisa

1st 10-day period (1-10/12/2012)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	18.8	10.6	15.2	11.6	9.2	12.4	11.6	9.8	10.9	9.8	12.0	15.1	11.5
	Min	8.0	4.6	4.4	0.2	-0.2	2.1	1.8	-1.6	4.2	1.4	2.5	0.0	2.7
Relative Humidity	Max	99	100	100	87	97	98	96	99	100	93	97	93	-
	Min	39	87	47	27	70	50	49	70	74	32	54	46	-
Soil Temperature at 10 cm	06 UTC	12.8	9.4	11.4	10.8	9.4	9.0	8.4	8.2	9.4	8.8	9.8	6.7	8.1
	12 UTC	13.2	12.2	12.0	10.6	9.6	10.0	-	8.6	9.6	10.0	10.6	8.9	8.8
Sunshine Duration		6.4	0.0	4.6	7.4	1.5	6.8	7.2	0.9	0.9	7.8	4.4	5.8	2.9
Precipitation		0.1	11.9	0.2		0.3	0.5		0.0	4.8		17.8	0.6	18.5
Evaporation		1.0	0.6	0.8	4.5	0.2	0.3	0.5	0.2	0.6	0.5	9.2	8.0	7.8
Growing Degrees	5	8.4	2.6	4.8	0.9	0.0	2.3	1.7	0.0	2.6	0.6	23.8	25.5	25.6
	10	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	4.7	2.3

1st 10-day period (1-10/12/2012)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.2	6.8	6.7
Precipitation - Reference Evapotranspiration	10.6	-6.2	11.8
Number of Rainy Days	6.0	2.0	3.6
Number of Dry Days	1.0	11.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

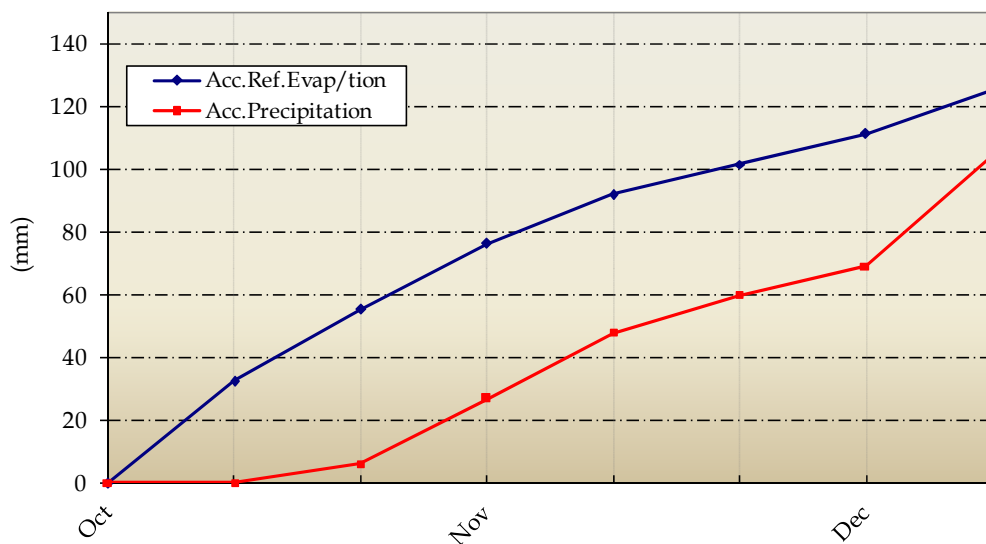


Mikra

1st 10-day period (1-10/12/2012)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	18.8	14.8	16.8	10.0	8.5	11.4	8.6	7.2	13.2	6.6	11.6	12.5	11.5
	Min	11.0	8.0	5.8	3.0	1.8	4.6	3.0	-1.4	3.4	1.0	4.0	2.5	3.4
Relative Humidity	Max	89	92	90	67	91	89	85	89	91	71	85	94	-
	Min	45	71	50	31	59	46	44	75	63	31	52	61	-
Soil Temperature at 10 cm	06 UTC	14.0	12.8	11.4	9.0	8.2	8.4	8.0	6.4	9.0	5.8	9.3	7.5	7.3
	12 UTC	15.2	15.0	18.4	12.2	11.4	10.0	-	7.6	9.4	8.0	11.9	9.3	8.9
Sunshine Duration		5.0	0.2	5.9	7.5	0.0	5.7	7.9	0.0	0.7	8.3	4.1	5.0	3.1
Precipitation			19.4	3.6		2.6			0.1	9.3		35.0	0.7	19.0
Evaporation		2.1	5.9	8.1	4.8	-	1.4	1.1	0.7	-	3.7	-	12.8	13.0
Growing Degrees	5	9.9	6.4	6.3	1.5	0.2	3.0	0.8	0.0	3.3	0.0	31.4	25.1	28.1
	10	4.9	1.4	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.6	2.4	3.2

1st 10-day period (1-10/12/2012)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	13.9	7.7	8.7
Precipitation - Reference Evapotranspiration	21.1	-7.0	10.3
Number of Rainy Days	5.0	2.0	3.0
Number of Dry Days	2.0	11.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

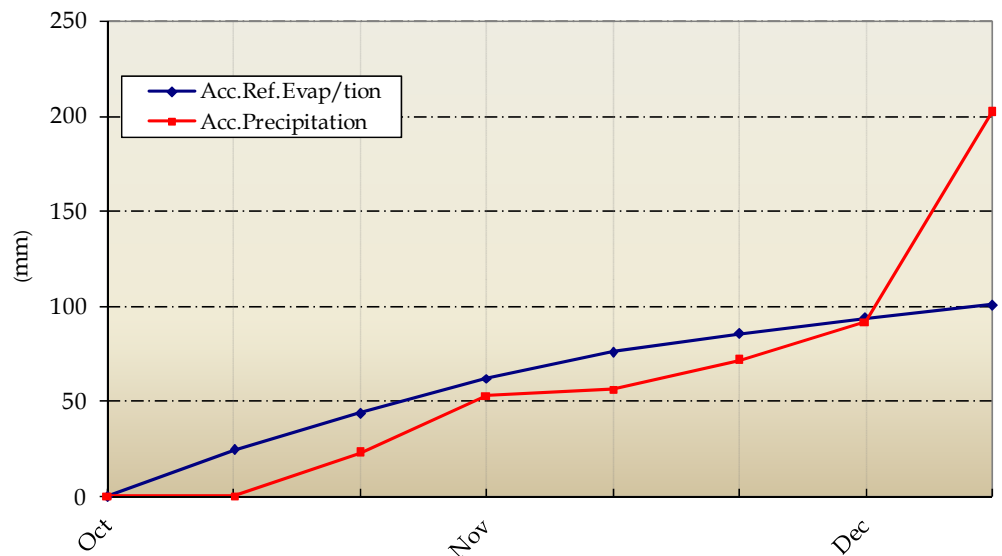


Tripoli

1st 10-day period (1-10/12/2012)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	15.4	15.3	12.2	11.1	9.1	9.1	9.1	9.9	9.0	9.4	11.0	14.5	11.6
	Min	9.9	2.8	6.4	1.5	-1.6	2.5	0.4	-1.9	3.1	-1.1	2.2	-0.3	2.8
Relative Humidity	Max	98	98	83	73	96	100	97	97	89	100	93	94	-
	Min	60	75	65	31	76	62	75	95	75	50	66	42	-
Soil Temperature at 10 cm	06 UTC	11.0	8.6	9.0	6.6	5.4	5.0	5.2	3.8	7.2	4.2	6.6	3.6	7.1
	12 UTC	13.4	10.4	10.6	9.4	7.4	7.6	-	-	7.8	7.0	9.2	7.2	7.9
Sunshine Duration		5.9	0.8	4.0	7.7	0.0	4.9	6.7	1.5	0.0	7.2	3.9	7.2	3.7
Precipitation		15.5	2.3	15.9	4.8	16.1	19.9	4.9	2.7	25.4	2.5	110.0	28.7	38.8
Evaporation		1.3	0.5	0.7	1.9	0.0	1.4	0.2	0.0	-	1.6	-	-	9.1
Growing Degrees	5	7.7	4.1	4.3	1.3	0.0	0.8	0.0	0.0	1.1	0.0	19.2	21.1	26.1
	10	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	2.0	2.6

1st 10-day period (1-10/12/2012)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.9	10.3	8.4
Precipitation - Reference Evapotranspiration	103.1	18.4	30.4
Number of Rainy Days	10.0	4.0	4.3
Number of Dry Days	0.0	13.0	-

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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