



AGROMETEOROLOGICAL BULLETIN

December 2013
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
El. Venizelou Street 14, 16777
Helliniko, Athens

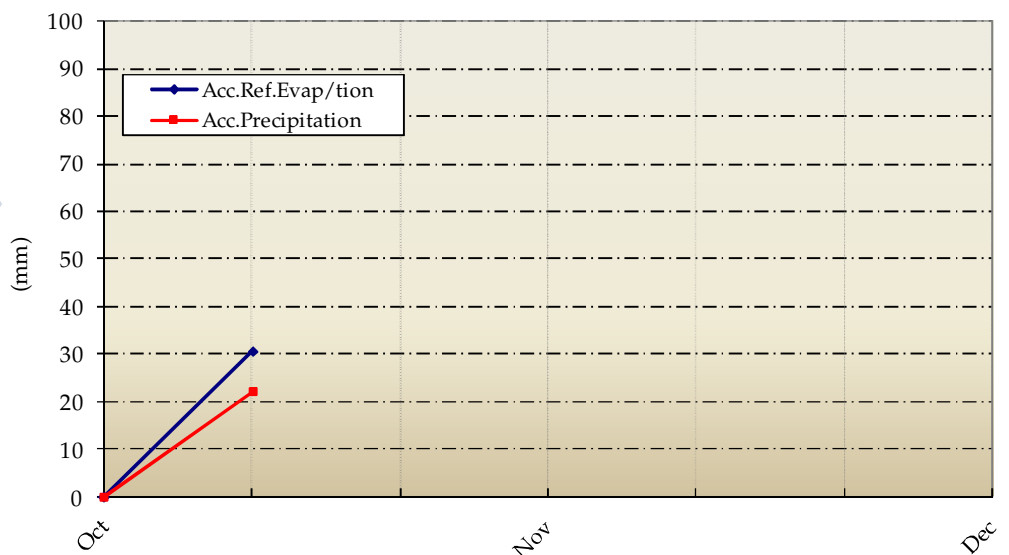
Web addresses of HNMS
www.hnms.gr
www.emy.gov.gr
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www.meteohellas.gr

Agrinio

1st 10-day period (1-10/12/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	-	-	-	-	-	-	-	-	-	-		13.7	15.5
	Min	-	10.4	9.2	5.2	4.4	-	-	-	1.0	2.4	5.4	5.5	5.0
Relative Humidity	Max	92	90	78	91	-	-	-	92	92	86	89	95	-
	Min	62	72	55	55	-	-	-	68	53	49	59	69	-
Soil Temperature at 10 cm	06 UTC	-	11.0	12.0	10.0	8.0	-	-	-	2.0	6.0	8.2	10.9	9.1
	12 UTC	-	13.0	13.0	12.0	11.0	-	-	-	9.0	12.0	11.7	11.6	10.9
Sunshine Duration		0.7	3.8	0.0	8.8	-	-	-	9.3	9.4	-	5.3	3.7	4.0
Precipitation			11.0									11.0	136.0	44.2
Evaporation		16.6	1.6	1.8	1.6	-	-	-	0.8	0.8	1.8	-	10.1	14.2
Growing Degrees	5	-	-	-	-	-	-	-	-	-	-	-	46.1	53.0
	10	-	-	-	-	-	-	-	-	-	-	-	9.4	12.3

1st 10-day period (1-10/12/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	7.7	8.7
Precipitation - Reference Evapotranspiration	-	128.3	35.5
Number of Rainy Days	1.0	8.0	4.5
Number of Dry Days	17.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

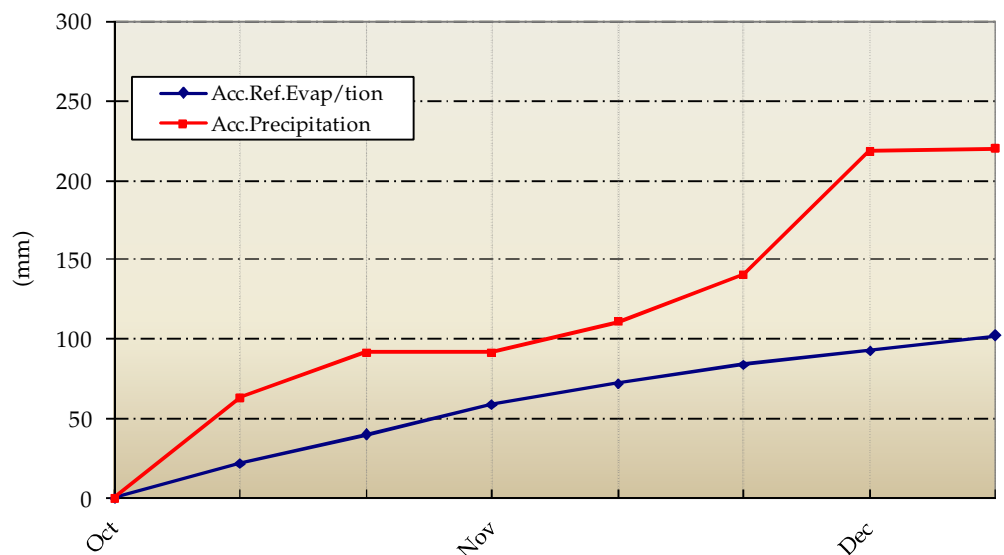


This station is not fully operated

1st 10-day period (1-10/12/2013)		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	12.2	8.2	7.2	11.6	12.0	10.8	10.0	11.8	7.6	10.3	12.9	11.0
	Min	5.0	7.2	2.8	1.6	-2.0	-1.6	4.0	-2.8	-2.0	0.2	1.2	6.0	3.3
Relative Humidity	Max	85	94	58	72	88	92	91	75	88	85	83	94	-
	Min	61	57	31	49	51	60	20	30	51	56	47	64	-
Soil Temperature at 10 cm	06 UTC	8.2	9.0	7.2	5.6	4.6	4.6	7.0	4.0	4.0	6.2	6.0	10.9	7.1
	12 UTC	9.6	10.2	7.6	7.2	7.2	7.4	7.4	6.0	5.8	6.6	7.5	11.7	8.4
Sunshine Duration		0.0	0.1	3.9	2.3	7.9	7.4	7.4	8.3	6.0	0.1	4.3	1.4	2.7
Precipitation		0.6	0.4					0.9			0.0	1.9	85.5	30.2
Evaporation		1.1	4.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5	8.0	14.9
Growing Degrees	5	3.1	4.7	0.5	0.0	0.0	0.2	2.4	0.0	0.0	0.0	10.9	44.5	28.2
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.9	5.3

1st 10-day period (1-10/12/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	9.6	9.2	9.7
Precipitation - Reference Evapotranspiration	-7.7	76.3	20.5
Number of Rainy Days	3.0	8.0	3.2
Number of Dry Days	3.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

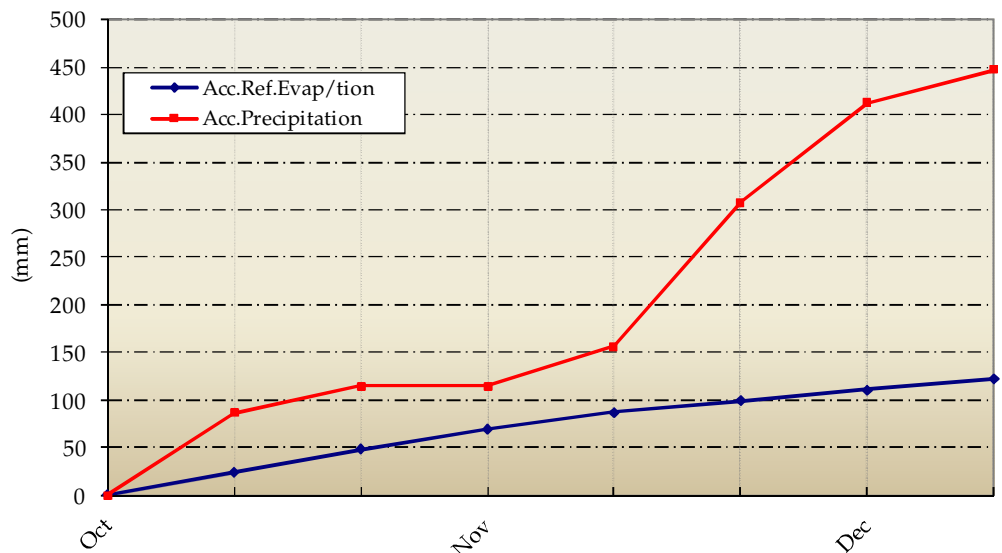


Andravida

1st 10-day period (1-10/12/2013)		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	19.9	14.8	12.8	14.6	16.4	16.9	14.8	15.9	16.2	16.4	14.9	15.9
	Min	12.2	12.2	8.6	5.9	1.8	2.6	10.0	3.3	1.7	7.0	6.5	8.1	7.3
Relative Humidity	Max	89	91	91	88	86	82	88	90	91	88	88	90	-
	Min	47	63	74	40	34	48	50	45	44	46	49	54	-
Soil Temperature at 10 cm	06 UTC	13.0	14.0	14.4	11.4	8.8	8.6	11.6	10.0	8.2	10.4	11.0	12.0	10.4
	12 UTC	14.6	16.0	13.6	13.6	11.4	11.4	13.4	13.6	11.6	12.4	13.2	13.7	12.0
Sunshine Duration		0.9	3.4	0.0	7.3	8.4	5.8	5.2	8.1	8.1	7.7	5.5	3.8	4.3
Precipitation		2.7	1.3	28.3	1.2			0.7				34.2	194.4	41.8
Evaporation		0.3	2.1	2.4	0.8	1.0	0.3	2.0	2.8	0.6	1.6	13.9	-	19.4
Growing Degrees	5	12.1	11.1	6.7	4.4	3.2	4.5	8.5	4.1	3.8	6.6	64.8	65.1	66.0
	10	7.1	6.1	1.7	0.0	0.0	0.0	3.5	0.0	0.0	1.6	19.9	16.8	20.7

1st 10-day period (1-10/12/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	11.7	12.3	9.1
Precipitation - Reference Evapotranspiration	22.5	182.1	32.7
Number of Rainy Days	5.0	10.0	4.6
Number of Dry Days	0.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

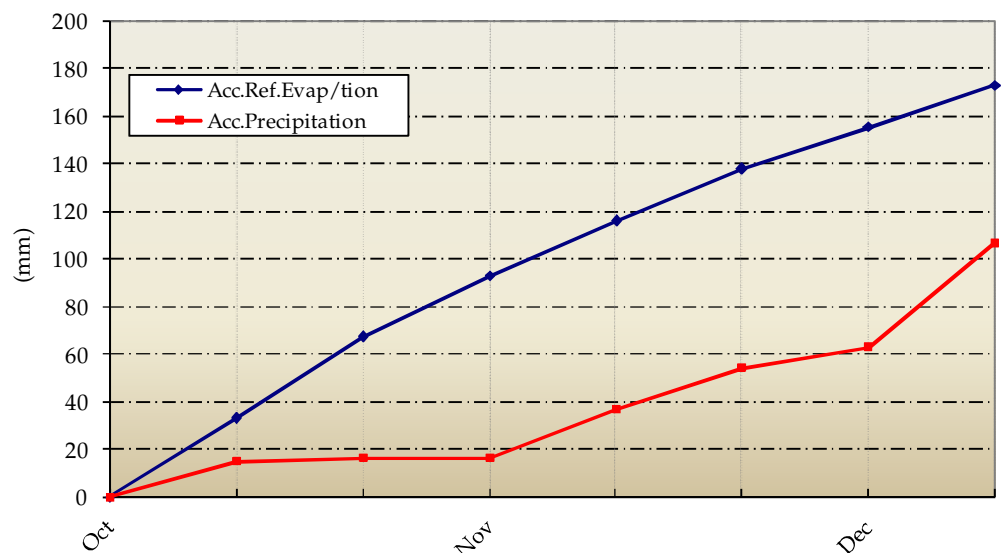


Iraklio

1st 10-day period (1-10/12/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	23.8	22.0	17.6	12.6	14.5	17.0	19.2	13.6	14.6	18.0	17.3	19.0	17.3
	Min	14.5	16.5	17.0	11.6	11.8	10.8	11.0	12.0	10.0	8.0	12.3	12.3	11.5
Relative Humidity	Max	80	94	92	86	86	83	83	72	71	88	84	84	-
	Min	46	65	73	68	55	55	55	54	52	48	57	51	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		1.4	1.2	0.0	0.0	0.0	7.2	3.5	3.4	8.1	6.4	3.1	5.1	3.5
Precipitation			0.0	26.2	12.0	4.2		0.5	1.0		0.0	43.9	19.4	24.2
Evaporation		2.4	2.7	0.0	26.7	2.2	1.8	1.5	1.3	2.5	3.0	44.1	-	28.3
Growing Degrees	5	14.2	14.3	12.3	7.1	8.2	8.9	10.1	7.8	7.3	8.0	98.1	106.7	94.2
	10	9.2	9.3	7.3	2.1	3.2	3.9	5.1	2.8	2.3	3.0	48.1	56.7	44.6

1st 10-day period (1-10/12/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	17.7	20.4	-
Precipitation - Reference Evapotranspiration	26.2	-1.0	24.2
Number of Rainy Days	5.0	6.0	3.7
Number of Dry Days	4.0	10.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

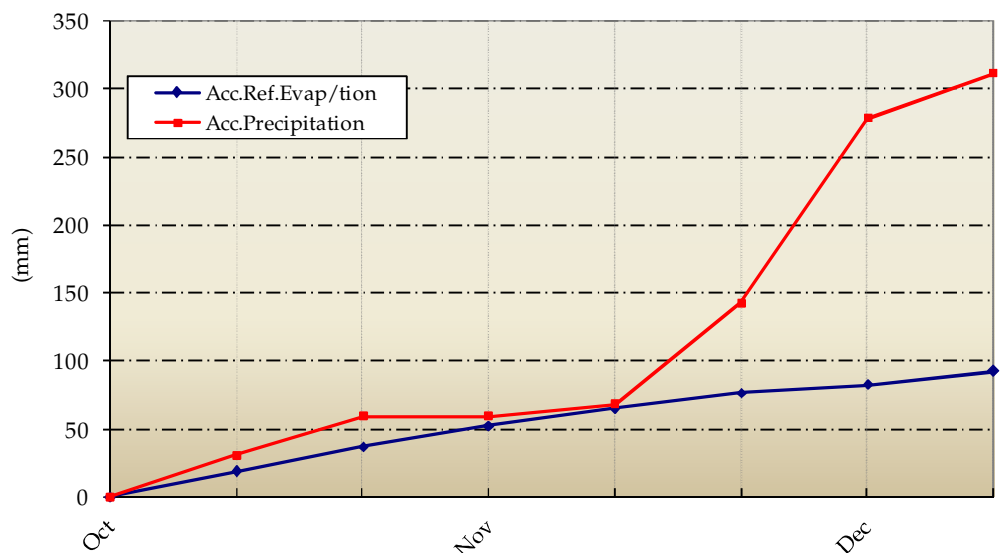


Ioannina

1st 10-day period (1-10/12/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	17.1	12.2	11.0	7.6	4.0	8.0	11.9	9.8	9.8	13.8	10.5	8.5	10.3
	Min	5.0	6.0	8.9	-1.8	-5.6	-5.0	3.0	-5.3	-6.4	-2.2	-0.3	2.5	1.9
Relative Humidity	Max	97	96	70	46	90	96	97	92	93	94	87	94	-
	Min	44	88	22	40	52	47	34	27	30	30	41	71	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	5.5
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	6.5
Sunshine Duration		1.1	0.0	1.8	6.0	6.0	2.4	4.8	5.5	5.1	6.2	3.9	2.0	2.5
Precipitation		12.4	16.1	0.0		2.0		2.3				32.8	164.5	51.5
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	10.5
Growing Degrees	5	6.1	4.1	5.0	0.0	0.0	0.0	2.5	0.0	0.0	0.8	18.4	10.1	17.8
	10	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.9

1st 10-day period (1-10/12/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	9.8	5.8	6.1
Precipitation - Reference Evapotranspiration	23.0	158.7	45.4
Number of Rainy Days	4.0	9.0	4.2
Number of Dry Days	0.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

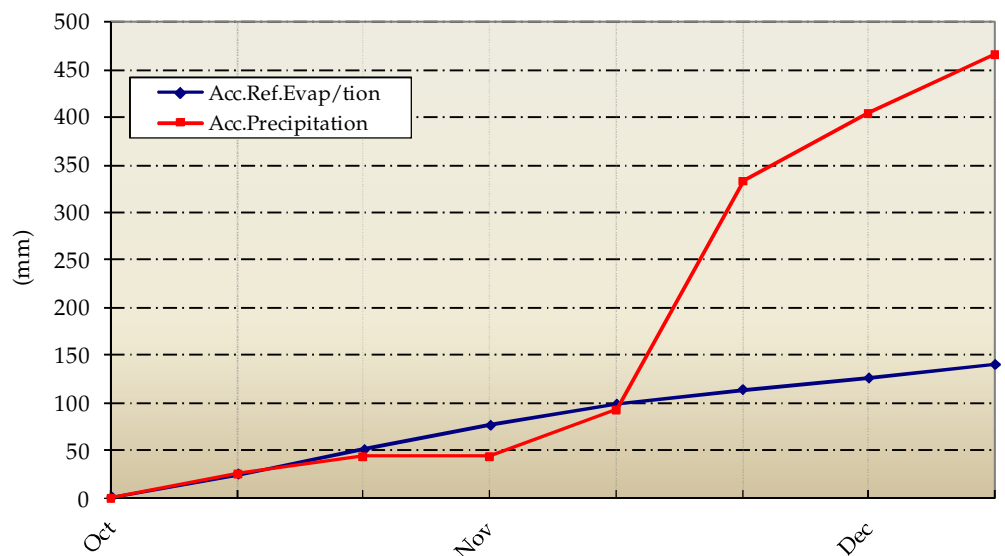


Kalamata

1st 10-day period (1-10/12/2013)		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	22.5	16.8	14.1	15.8	17.9	19.6	16.8	17.0	17.9	18.2	16.0	16.9
	Min	12.3	10.5	7.6	6.8	2.5	2.3	6.1	6.0	3.1	5.9	6.3	7.5	7.2
Relative Humidity	Max	94	95	82	88	92	93	94	91	91	92	91	93	-
	Min	45	54	63	56	47	33	45	56	30	35	46	60	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	13.5	11.5
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	14.1	12.5
Sunshine Duration		0.4	7.0	0.0	1.4	8.5	5.6	7.0	4.4	8.4	7.4	5.0	3.5	4.0
Precipitation		16.5	12.8	32.2								61.5	84.8	45.8
Evaporation		-	-	-	-	-	-	-	-	-	-	-	20.1	26.7
Growing Degrees	5	12.9	11.5	7.2	5.5	4.2	5.1	7.9	6.4	5.1	6.9	72.5	67.7	70.4
	10	7.9	6.5	2.2	0.5	0.0	0.1	2.9	1.4	0.1	1.9	23.3	20.7	22.7

1st 10-day period (1-10/12/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	14.3	12.0	10.9
Precipitation - Reference Evapotranspiration	47.2	72.8	34.9
Number of Rainy Days	3.0	9.0	4.7
Number of Dry Days	0.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

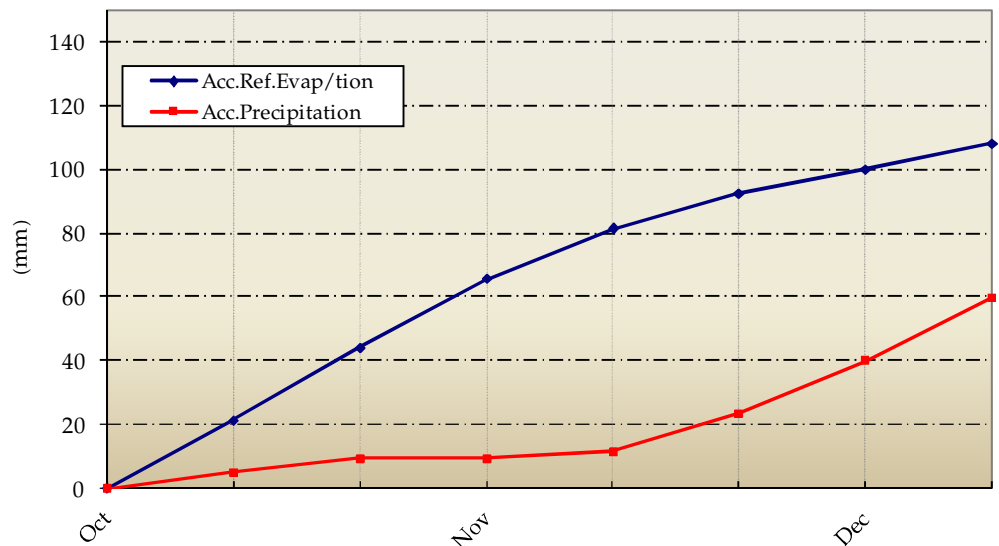


Larisa

1st 10-day period (1-10/12/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	12.8	11.6	10.8	10.4	11.3	12.6	9.8	10.7	10.6	16.2	11.7	12.0	11.5
	Min	5.6	10.0	4.0	1.8	-2.8	-3.6	0.8	-3.6	-4.5	0.5	0.8	2.5	2.7
Relative Humidity	Max	99	100	76	95	99	100	97	89	94	86	94	97	-
	Min	93	76	62	37	42	45	35	27	41	27	48	54	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	9.8	8.1
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	10.6	8.8
Sunshine Duration		0.0	0.0	0.8	8.4	6.9	7.1	2.7	7.4	7.0	7.1	4.7	4.4	2.9
Precipitation		8.0	10.2	0.8				0.7				19.7	17.8	18.5
Evaporation		-	-	2.9	1.1	1.3	0.8	0.6	0.4	2.5	2.6	-	9.2	7.8
Growing Degrees	5	4.2	5.8	2.4	1.1	0.0	0.0	0.3	0.0	0.0	3.4	17.2	23.8	25.6
	10	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	3.4	2.3

1st 10-day period (1-10/12/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	8.2	7.2	6.7
Precipitation - Reference Evapotranspiration	11.5	10.6	11.8
Number of Rainy Days	4.0	6.0	3.6
Number of Dry Days	0.0	1.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

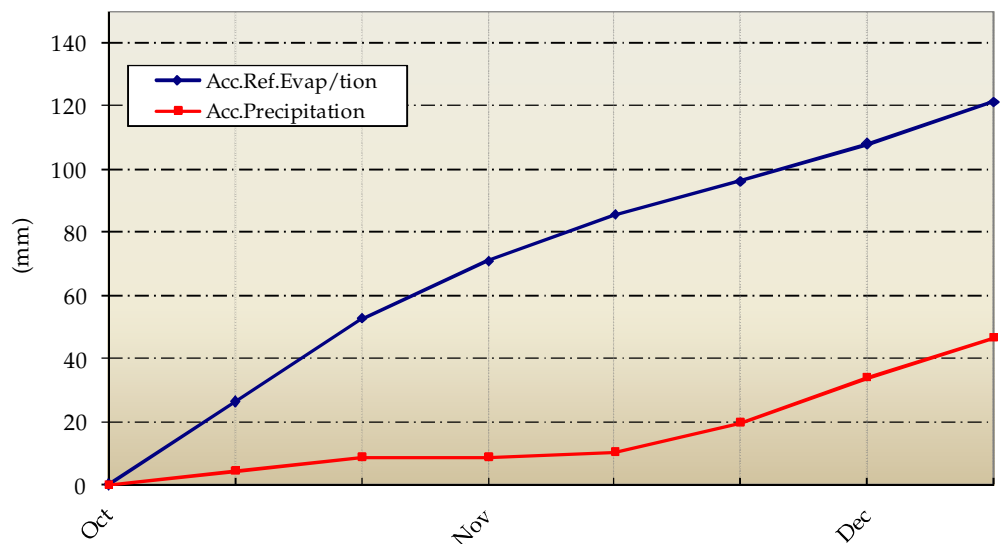


Mikra

1st 10-day period (1-10/12/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	11.9	13.2	11.0	9.5	12.4	11.6	9.9	11.2	11.3	13.8	11.6	11.6	11.5
	Min	6.8	9.6	5.4	-1.6	-2.6	-1.2	2.1	3.4	-0.6	0.2	2.2	4.0	3.4
Relative Humidity	Max	93	93	86	86	89	91	64	62	81	83	83	85	-
	Min	80	70	51	42	34	56	29	28	35	38	46	52	-
Soil Temperature at 10 cm	06 UTC	8.8	10.4	10.0	6.2	4.8	5.4	6.8	5.6	5.7	6.2	7.0	9.3	7.3
	12 UTC	10.0	11.8	10.6	8.0	6.2	7.8	7.6	7.8	7.9	8.7	8.6	11.9	8.9
Sunshine Duration		0.0	0.0	3.3	8.9	8.1	7.2	5.9	5.9	7.3	7.0	5.4	4.1	3.1
Precipitation		3.5	4.2	4.7								12.4	35.0	19.0
Evaporation		2.9	0.0	0.0	0.0	2.5	1.4	6.0	2.3	1.3	4.4	20.8	-	13.0
Growing Degrees	5	4.4	6.4	3.2	0.0	0.0	0.2	1.0	2.3	0.4	2.0	19.8	31.4	28.1
	10	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	7.6	3.2

1st 10-day period (1-10/12/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	13.5	13.9	8.7
Precipitation - Reference Evapotranspiration	-1.1	21.1	10.3
Number of Rainy Days	3.0	5.0	3.0
Number of Dry Days	0.0	2.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

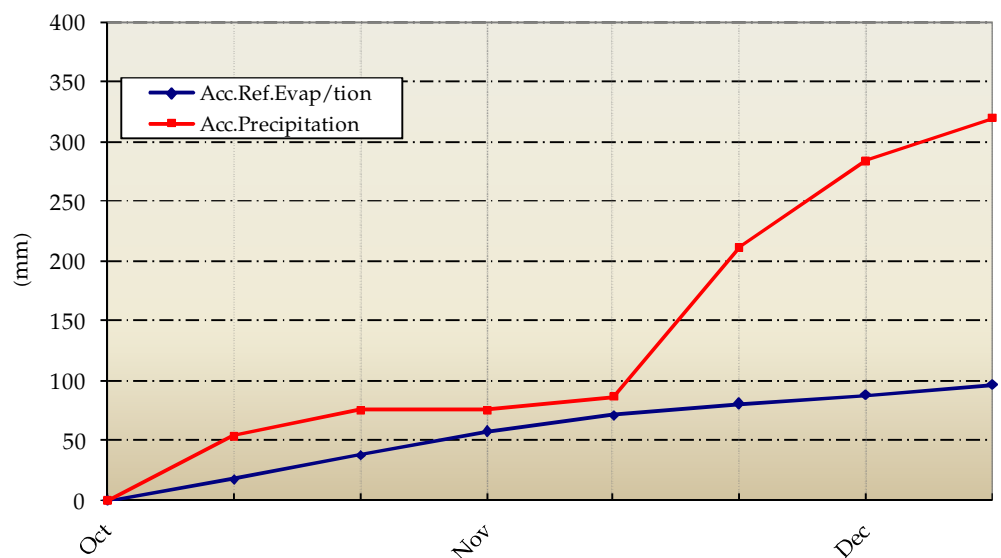


Tripoli

1st 10-day period (1-10/12/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	14.2	17.7	11.6	7.5	13.9	13.3	13.1	9.8	12.6	14.1	12.8	11.0	11.6
	Min	9.1	6.7	1.6	0.2	-5.3	-5.3	5.5	3.3	-3.7	-0.5	1.2	2.2	2.8
Relative Humidity	Max	95	99	99	98	100	99	83	77	100	95	94	93	-
	Min	90	73	76	54	28	29	57	64	36	48	56	66	-
Soil Temperature at 10 cm	06 UTC	9.2	10.0	10.2	5.8	3.4	2.8	6.4	7.2	4.4	4.0	6.3	6.6	7.1
	12 UTC	-	12.4	8.8	7.8	6.0	5.6	8.6	-	6.8	6.8	7.8	9.2	7.9
Sunshine Duration		0.0	3.6	0.0	5.8	6.7	6.0	4.6	5.2	7.2	6.2	4.5	3.9	3.7
Precipitation		16.1	4.6	12.8	1.1			1.0				35.6	110.0	38.8
Evaporation		0.6	0.1	3.8	0.0	0.0	0.0	2.1	0.0	0.0	1.4	8.0	-	9.1
Growing Degrees	5	6.7	7.2	1.6	0.0	0.0	0.0	4.3	1.6	0.0	1.8	23.1	19.2	26.1
	10	1.7	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	2.7	2.6

1st 10-day period (1-10/12/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	8.8	6.9	8.4
Precipitation - Reference Evapotranspiration	26.8	103.1	30.4
Number of Rainy Days	5.0	10.0	4.3
Number of Dry Days	0.0	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_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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ΥΠΗΡΕΣΙΑ

HELLENIC NATIONAL METEOROLOGICAL SERVICE

Division of Climatology-Applications

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