



AGROMETEOROLOGICAL BULLETIN

*January 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
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Helliniko, Athens

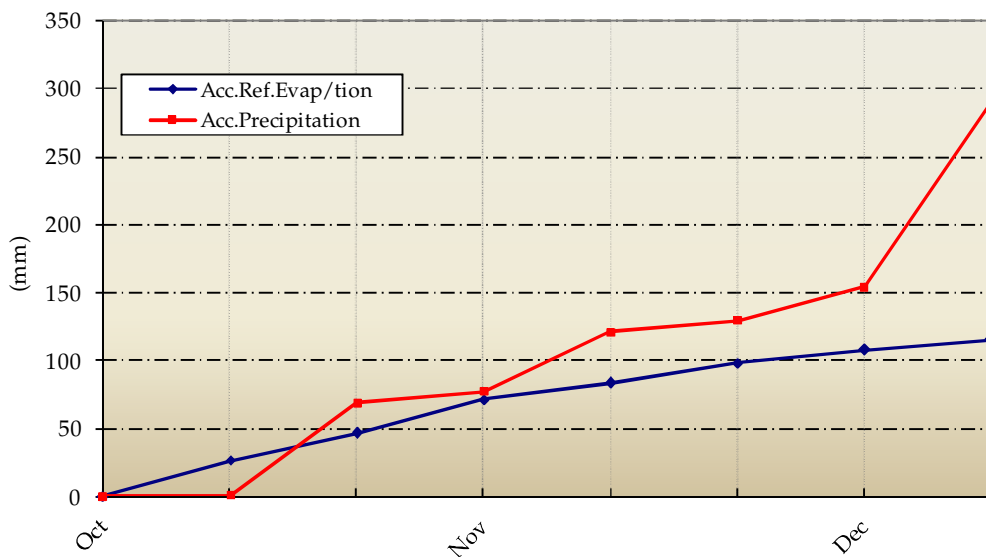
Web addresses of HNMS
www.hnms.gr
www.emy.gov.gr
www.meteo.gov.gr
www.meteohellas.gr

1st 10-day period (1-10/01/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	-	-	-	-	-	-	-	-	-	-		13.4	13.3
	Min	-	1.6	2.0	2.4	-	-	-3.0	-2.4	-5.6	-2.4	-1.1	0.7	3.1
Relative Humidity	Max	96	97	97	-	-	96	96	60	95	92	91	94	-
	Min	40	78	62	-	-	36	55	22	28	51	46	48	-
Soil Temperature at 10 cm	06 UTC	-	7.4	7.4	7.6	-	-	5.2	4.4	3.6	4.4	5.7	6.7	7.4
	12 UTC	-	9.2	8.8	-	-	-	6.2	5.6	5.4	5.4	6.8	7.8	9.1
Sunshine Duration		7.7	0.0	6.4	-	-	8.6	7.1	8.9	6.3	0.0	5.6	6.2	3.9
Precipitation													25.0	32.5
Evaporation		2.0	0.4	0.4	-	-	1.2	3.8	2.0	3.2	2.1	-	10.2	13.9
Growing Degrees	5	-	-	-	-	-	-	-	-	-	-	-	20.8	34.7
	10	-	-	-	-	-	-	-	-	-	-	-	1.1	5.2

1st 10-day period (1-10/01/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	7.7	8.0
Precipitation - Reference Evapotranspiration	-	17.3	24.5
Number of Rainy Days	0.0	3.0	3.8
Number of Dry Days	10.0	4.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

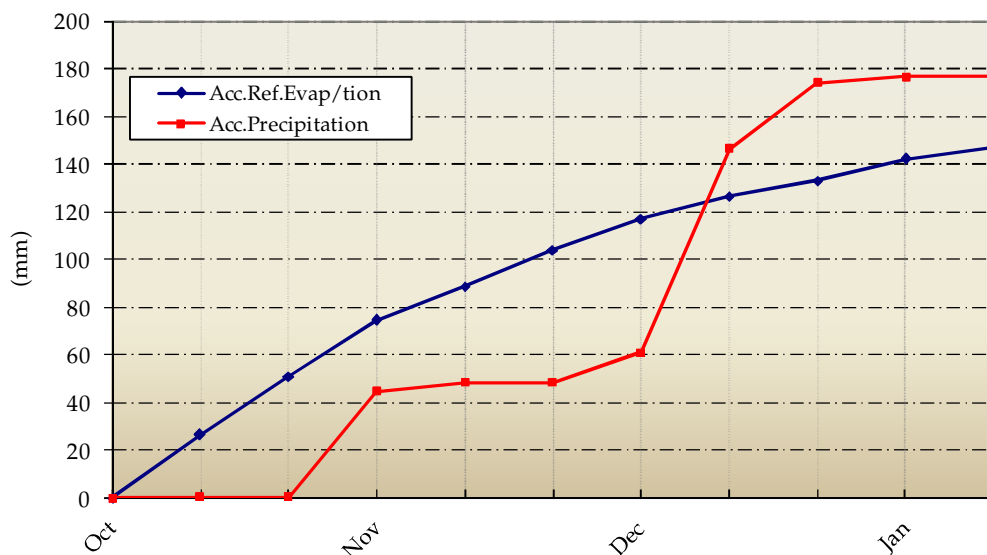
This station is not fully operated



1st 10-day period (1-10/01/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	8.4	10.6	9.0	11.0	9.2	7.4	6.2	2.4	2.6	7.4	7.4	9.7	8.9
	Min	3.6	3.0	2.4	1.4	3.0	3.8	-2.0	-6.0	-6.8	-7.0	-0.5	1.3	1.5
Relative Humidity	Max	93	94	93	96	94	94	92	77	85	92	91	90	-
	Min	51	72	76	78	54	51	39	38	46	51	56	61	-
Soil Temperature at 10 cm	06 UTC	6.8	0.4	7.4	6.2	6.0	7.0	5.0	3.0	2.4	2.2	4.6	5.2	5.6
	12 UTC	7.2	7.2	8.0	7.2	7.0	7.0	5.6	3.6	2.2	2.8	5.8	6.4	6.6
Sunshine Duration		5.1	2.4	5.7	3.1	4.0	2.8	1.4	4.5	4.0	1.8	3.5	3.9	2.7
Precipitation						0.0						0.0	7.4	17.5
Evaporation		0.4	2.1	0.8	1.2	0.1	0.6	0.0	0.0	0.0	0.0	5.2	6.9	8.4
Growing Degrees	5	1.0	1.8	0.7	1.2	1.1	0.6	0.0	0.0	0.0	0.0	6.4	14.1	17.3
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	2.8

1st 10-day period (1-10/01/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	5.4	7.7	7.7
Precipitation - Reference Evapotranspiration	-5.4	-0.3	9.8
Number of Rainy Days	0.0	2.0	2.8
Number of Dry Days	12.0	5.0	-

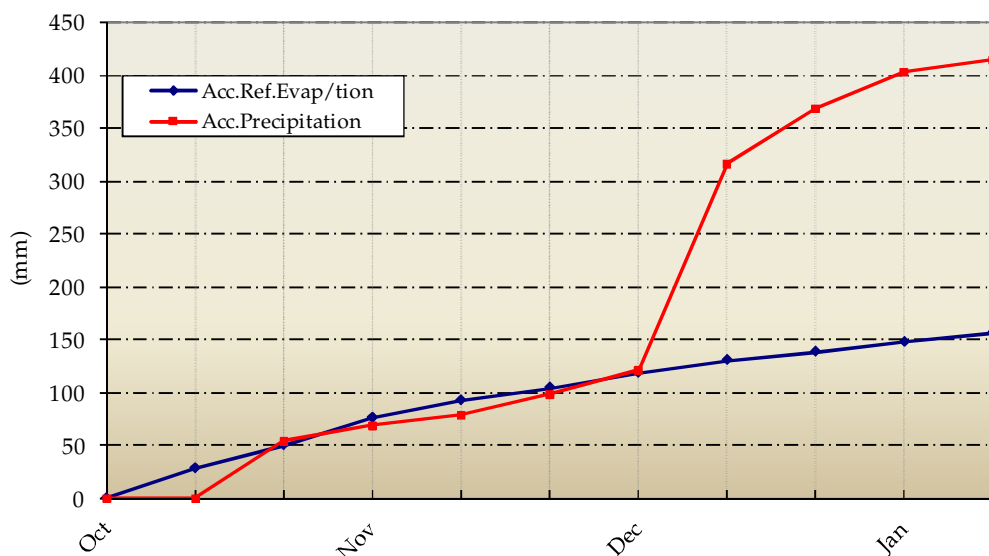
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



1st 10-day period (1-10/01/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	15.6	16.8	14.7	14.6	14.0	12.4	13.2	11.6	9.6	11.4	13.4	13.1	13.8
	Min	2.2	6.4	5.0	4.5	2.2	4.2	-0.2	1.6	-2.6	1.5	2.5	3.6	5.4
Relative Humidity	Max	92	92	92	92	90	90	80	82	87	98	90	94	-
	Min	49	51	64	55	59	34	45	30	29	28	44	52	-
Soil Temperature at 10 cm	06 UTC	8.6	9.4	9.8	9.2	8.8	9.4	7.2	7.2	5.6	6.6	8.2	7.4	8.9
	12 UTC	11.2	11.8	11.6	11.4	11.0	10.6	8.6	8.4	8.0	8.0	10.1	9.9	10.3
Sunshine Duration		7.9	5.4	5.3	7.6	5.3	7.7	4.0	8.4	8.2	0.1	6.0	6.0	4.5
Precipitation			9.8				0.7				0.5	11.0	22.8	38.0
Evaporation		0.9	0.0	1.0	0.8	1.4	-	1.4	0.4	-	0.3	-	13.5	17.8
Growing Degrees	5	3.9	6.6	4.9	4.6	3.1	3.3	1.5	1.6	0.0	1.5	30.9	33.7	46.8
	10	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	3.3	10.2

1st 10-day period (1-10/01/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	9.0	9.8	9.2
Precipitation - Reference Evapotranspiration	2.0	13.0	28.8
Number of Rainy Days	3.0	3.0	4.0
Number of Dry Days	2.0	5.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

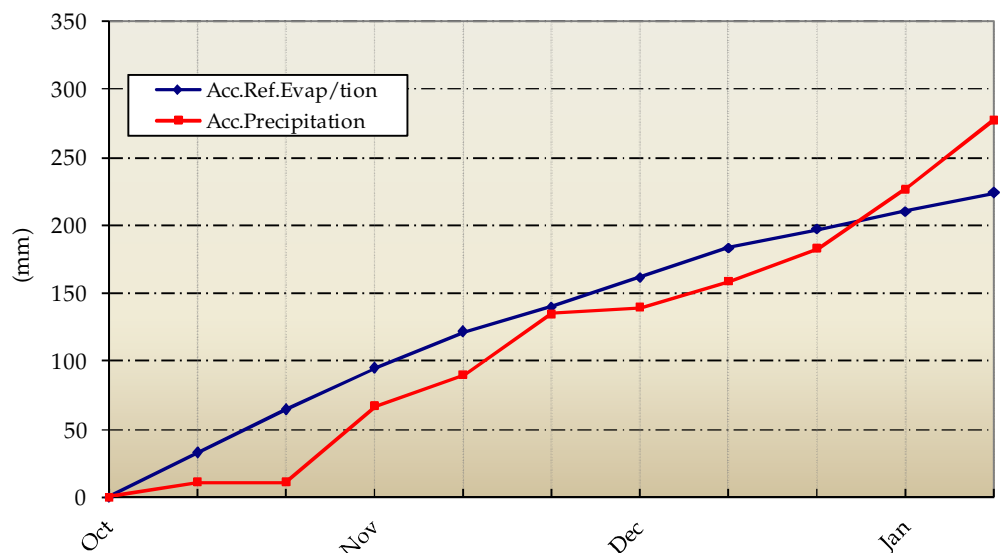


Iraklio

1st 10-day period (1-10/01/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	14.6	16.4	16.0	13.0	15.0	11.4	12.6	7.6	8.0	12.8	12.7	-	15.3
	Min	11.0	13.4	8.2	9.6	8.6	7.2	8.8	7.4	4.2	4.4	8.3	-	9.3
Relative Humidity	Max	95	90	92	95	84	89	91	91	87	84	90	-	-
	Min	78	71	71	76	60	64	57	62	70	54	66	-	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		0.0	3.4	6.7	0.0	4.1	0.2	7.4	0.0	0.6	7.0	2.9	-	4.0
Precipitation		9.5	2.7		11.1		10.7	0.9	12.0	3.7		50.6	-	27.8
Evaporation		1.6	2.6	0.2	0.6	-	0.0	11.0	-	-	2.0	-	-	23.8
Growing Degrees	5	7.8	9.9	7.1	6.3	6.8	4.3	5.7	2.5	1.1	3.6	55.1	-	73.0
	10	2.8	4.9	2.1	1.3	1.8	0.0	0.7	0.0	0.0	0.0	13.6	-	25.4

1st 10-day period (1-10/01/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	13.0	-	-
Precipitation - Reference Evapotranspiration	37.6	-	27.8
Number of Rainy Days	7.0	-	4.3
Number of Dry Days	1.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

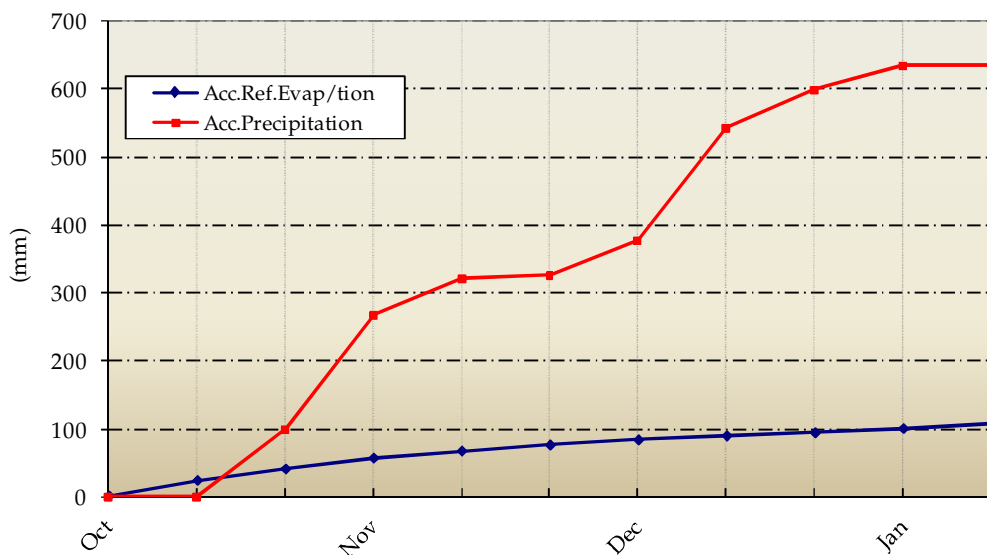


Ioannina

1st 10-day period (1-10/01/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	11.0	10.6	11.4	12.4	11.6	8.4	9.0	5.2	5.0	4.4	8.9	7.7	8.6
	Min	-2.8	2.4	2.8	0.4	-1.6	2.8	-3.0	-1.8	-8.0	-2.8	-1.2	-2.2	0.3
Relative Humidity	Max	96	93	97	100	88	58	80	-	69	97	86	92	-
	Min	73	68	67	40	77	30	42	-	28	49	53	48	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	3.4
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	4.3
Sunshine Duration		3.6	1.9	2.7	4.5	0.3	5.0	6.0	6.0	3.6	0.0	3.4	3.6	2.9
Precipitation											0.2	0.2	53.1	36.2
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	0.6
Growing Degrees	5	0.0	1.5	2.1	1.4	0.0	0.6	0.0	0.0	0.0	0.0	5.6	1.5	11.8
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3

1st 10-day period (1-10/01/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.9	6.3	6.1
Precipitation - Reference Evapotranspiration	-6.7	46.8	30.1
Number of Rainy Days	1.0	3.0	4.0
Number of Dry Days	11.0	4.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

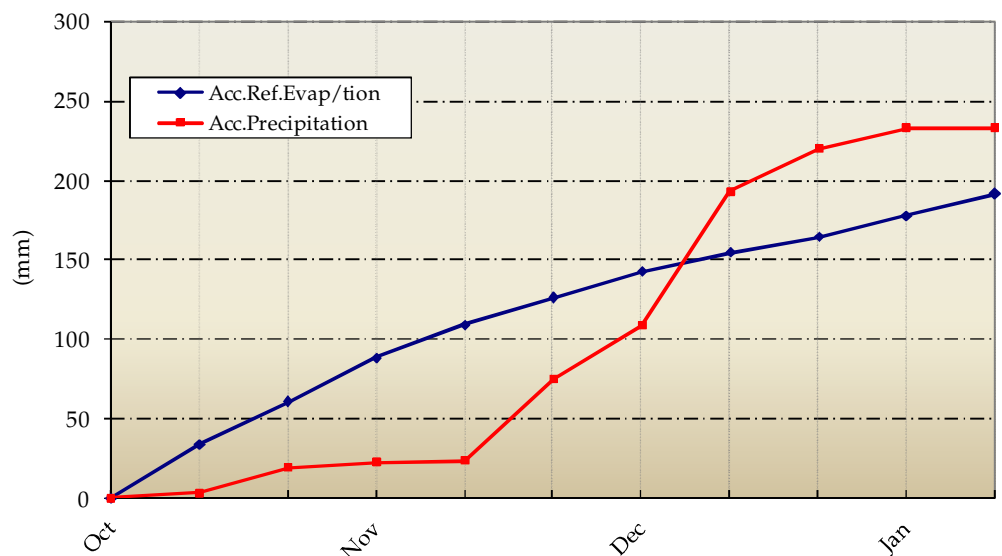


Kalamata

1st 10-day period (1-10/01/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	17.2	17.1	16.2	18.2	17.0	14.2	13.9	11.2	11.3	12.8	14.9	14.1	14.7
	Min	5.3	4.1	5.4	5.1	3.2	3.6	-0.8	1.8	1.2	0.2	2.9	3.5	5.3
Relative Humidity	Max	91	94	94	92	88	82	84	70	82	92	87	95	-
	Min	50	47	50	37	32	33	34	27	24	41	38	50	-
Soil Temperature at 10 cm	06 UTC	11.2	10.6	10.2	10.8	9.8	10.0	9.0	9.0	8.0	7.8	9.6	9.1	9.3
	12 UTC	12.0	11.4	11.4	11.4	11.0	10.8	9.6	9.4	8.6	8.6	10.4	10.0	10.4
Sunshine Duration		7.7	7.7	1.3	6.8	5.9	7.8	6.6	10.9	8.1	0.0	6.3	6.2	4.5
Precipitation													30.5	30.6
Evaporation		3.8	2.3	1.1	3.8	3.2	1.0	3.6	5.0	6.0	0.3	30.1	14.5	22.0
Growing Degrees	5	6.3	5.6	5.8	6.7	5.1	3.9	1.6	1.5	1.3	1.5	39.1	37.9	49.2
	10	1.3	0.6	0.8	1.7	0.1	0.0	0.0	0.0	0.0	0.0	4.4	1.9	10.6

1st 10-day period (1-10/01/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	13.5	11.6	11.0
Precipitation - Reference Evapotranspiration	-13.5	18.9	19.6
Number of Rainy Days	0.0	3.0	4.0
Number of Dry Days	12.0	5.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

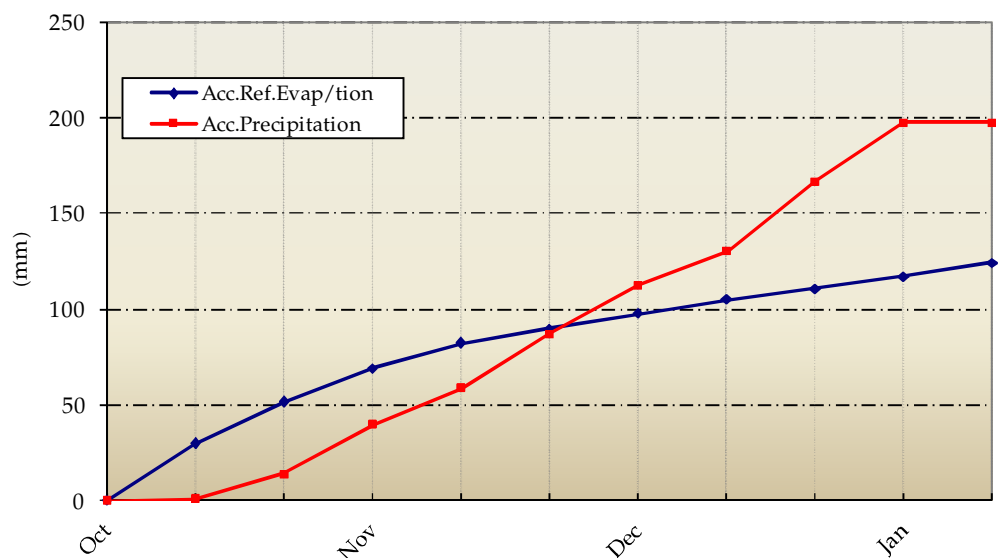


Larisa

1st 10-day period (1-10/01/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	13.0	13.1	11.6	9.6	9.2	9.3	10.4	5.2	3.5	8.8	9.4	9.8	9.7
	Min	5.0	0.2	0.2	0.4	-0.4	3.0	-3.2	-1.5	-7.6	-6.2	-1.0	-0.9	0.5
Relative Humidity	Max	100	100	100	100	100	74	91	77	87	91	92	92	-
	Min	52	62	74	72	38	33	28	25	37	32	45	52	-
Soil Temperature at 10 cm	06 UTC	8.6	7.8	7.4	7.4	7.0	7.2	5.2	5.2	4.2	3.2	6.3	5.6	5.3
	12 UTC	8.8	8.0	8.0	7.4	7.0	7.2	6.4	5.2	4.4	4.4	6.7	7.1	5.9
Sunshine Duration		4.7	6.3	2.4	3.5	0.4	6.0	6.6	7.5	3.1	7.5	4.8	5.2	3.9
Precipitation													12.0	11.6
Evaporation		0.3	2.0	0.7	0.8	4.3	0.0	0.0	0.0	0.0	0.0	8.1	6.1	5.2
Growing Degrees	5	4.0	1.7	0.9	0.0	0.0	1.2	0.0	0.0	0.0	0.0	7.7	4.8	13.7
	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	1.0

1st 10-day period (1-10/01/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.1	6.8	6.2
Precipitation - Reference Evapotranspiration	-7.1	5.2	5.4
Number of Rainy Days	0.0	2.0	2.5
Number of Dry Days	11.0	5.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

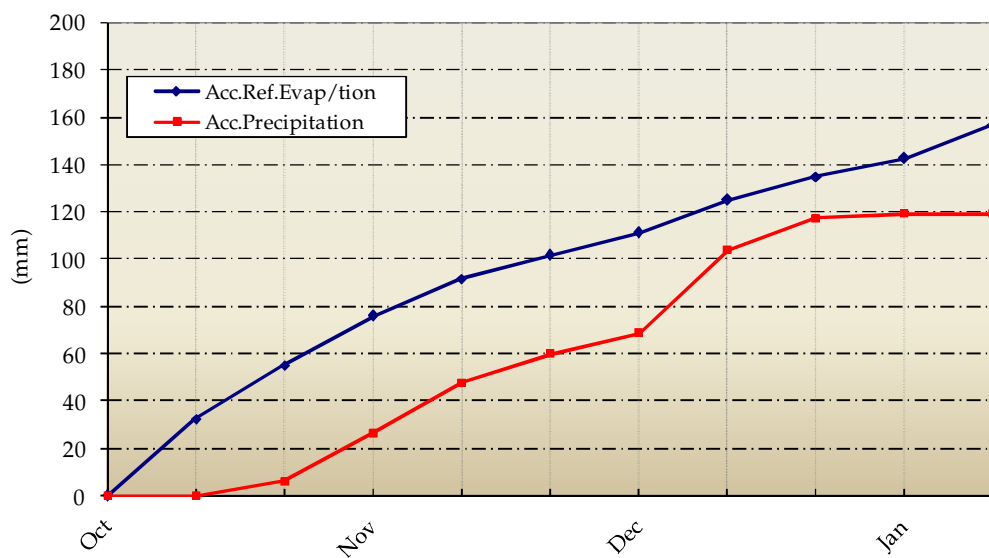


Mikra

1st 10-day period (1-10/01/2013)		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	10.4	13.4	13.6	12.8	11.2	9.0	4.4	3.2	6.7	9.6	8.4	9.2
	Min	4.0	3.8	2.8	-0.6	8.4	6.0	4.2	-1.0	-4.9	-5.3	1.7	0.4	1.5
Relative Humidity	Max	92	92	94	90	68	64	60	56	70	82	77	91	-
	Min	64	71	44	47	45	40	34	38	38	53	47	57	-
Soil Temperature at 10 cm	06 UTC	7.6	7.6	7.8	5.0	8.0	7.2	7.2	4.4	4.0	2.8	6.2	4.3	4.9
	12 UTC	8.8	7.6	8.6	7.8	8.0	8.8	7.4	4.4	3.6	4.0	6.9	6.0	6.2
Sunshine Duration		8.0	2.4	3.5	5.0	4.0	7.2	4.5	7.8	2.4	7.5	5.2	5.4	3.7
Precipitation													20.4	14.1
Evaporation		0.4	0.5	2.5	1.8	1.4	7.0	0.0	0.0	0.0	0.0	13.6	16.8	8.7
Growing Degrees	5	2.6	2.1	3.1	1.5	5.6	3.6	1.6	0.0	0.0	0.0	20.1	4.5	16.0
	10	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.0	1.6

1st 10-day period (1-10/01/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	14.4	9.7	8.8
Precipitation - Reference Evapotranspiration	-14.4	10.7	5.3
Number of Rainy Days	0.0	2.0	2.6
Number of Dry Days	12.0	5.0	-

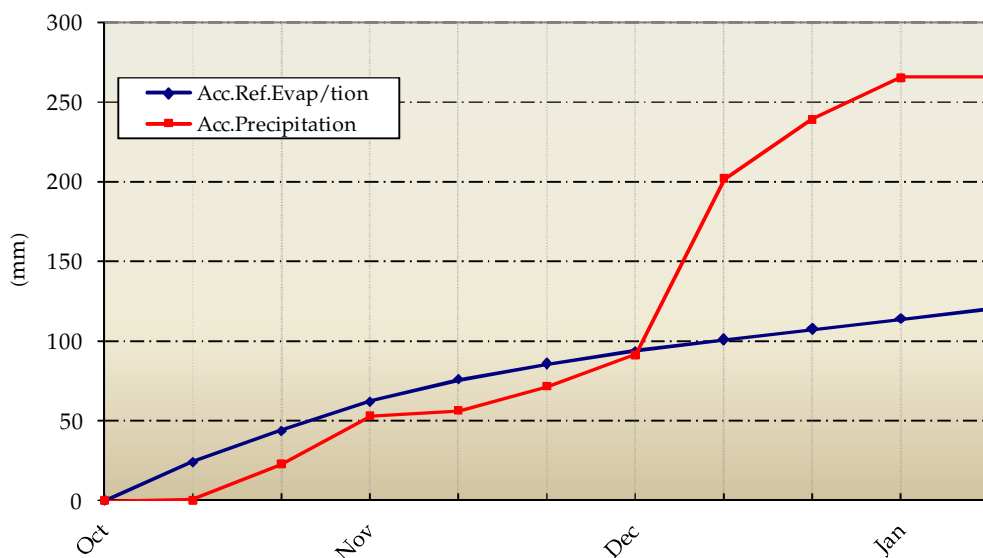
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



1st 10-day period (1-10/01/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	12.3	13.1	12.7	12.1	10.8	8.0	10.0	3.6	6.6	8.0	9.7	9.6	9.6
	Min	-0.5	-2.3	-1.6	-0.2	-3.5	-1.4	-6.1	-3.0	-8.3	-7.2	-3.4	-2.0	0.7
Relative Humidity	Max	100	100	100	100	100	75	80	71	88	81	90	92	-
	Min	77	79	84	73	71	59	70	44	22	29	61	46	-
Soil Temperature at 10 cm	06 UTC	5.2	4.2	4.0	4.8	3.2	3.6	2.0	2.8	1.0	1.2	3.2	-	4.9
	12 UTC	-	-	-	-	-	-	-	4.0	1.8	1.2	2.3	-	5.6
Sunshine Duration		5.8	6.6	5.1	4.8	4.0	4.4	7.2	7.1	6.0	3.7	5.5	-	4.3
Precipitation							0.0				0.0	0.0	54.8	34.2
Evaporation		0.7	0.0	0.0	-	-	-	-	-	0.0	0.1	-	-	7.0
Growing Degrees	5	0.9	0.4	0.6	1.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	3.8	14.2
	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	0.7

1st 10-day period (1-10/01/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.3	8.5	8.3
Precipitation - Reference Evapotranspiration	-6.3	46.3	25.9
Number of Rainy Days	0.0	2.0	3.6
Number of Dry Days	10.0	5.0	-

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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