



# AGROMETEOROLOGICAL BULLETIN

*April 2013*  
*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



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

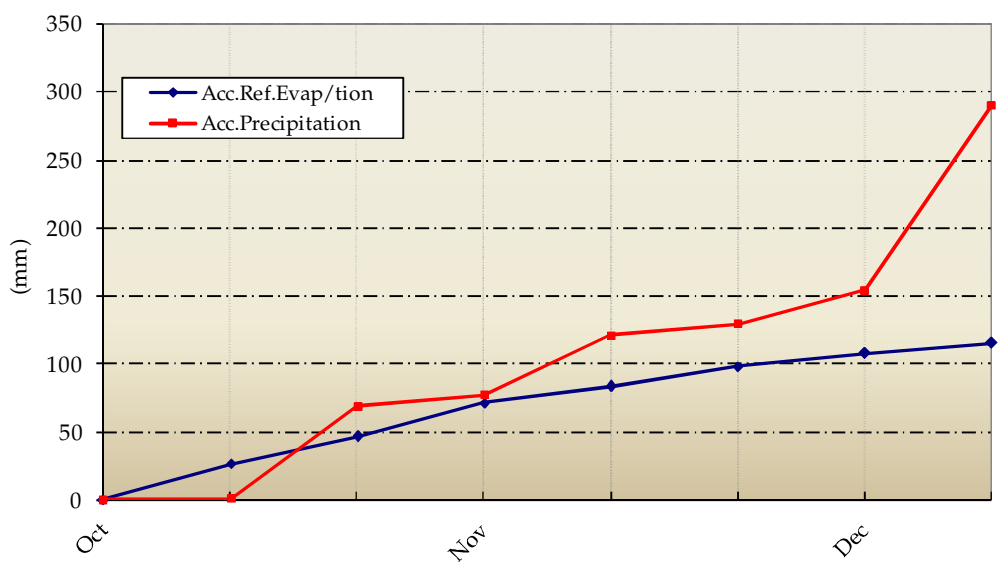
*Web addresses of HNMS*  
[www.hnms.gr](http://www.hnms.gr)  
[www.emy.gov.gr](http://www.emy.gov.gr)  
[www.meteo.gov.gr](http://www.meteo.gov.gr)  
[www.meteohellas.gr](http://www.meteohellas.gr)

Agrinio

2nd 10-day period (11-20/04/2013)		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	19.5
	Min	7.4	7.4	-	-	10.0	5.6	7.2	6.6	7.6	-	7.4	10.2	7.7
Relative Humidity	Max	97	-	-	95	93	83	87	86	-	-	90	88	-
	Min	50	-	-	42	26	34	35	26	-	-	36	59	-
Soil Temperature at 10 cm	06 UTC	13.0	13.4	-	-	15.2	13.0	13.6	13.6	14.6	-	13.8	14.8	13.0
	12 UTC	15.6	-	-	-	17.2	17.6	18.6	-	-	-	17.2	16.9	17.5
Sunshine Duration		11.5	-	-	0.0	8.0	11.9	11.7	10.7	-	-	9.0	5.4	6.3
Precipitation												-	24.1	28.9
Evaporation		4.5	-	-	4.5	2.7	5.3	3.5	3.6	-	-	-	32.3	38.3
Growing Degrees	5	-	-	-	-	-	-	-	-	-	-	-	96.6	86.2
	10	-	-	-	-	-	-	-	-	-	-	-	46.8	36.9

2nd 10-day period (11-20/04/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	28.4	28.5
Precipitation - Reference Evapotranspiration	-	-4.3	0.4
Number of Rainy Days	0.0	6.0	3.9
Number of Dry Days	12.0	3.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

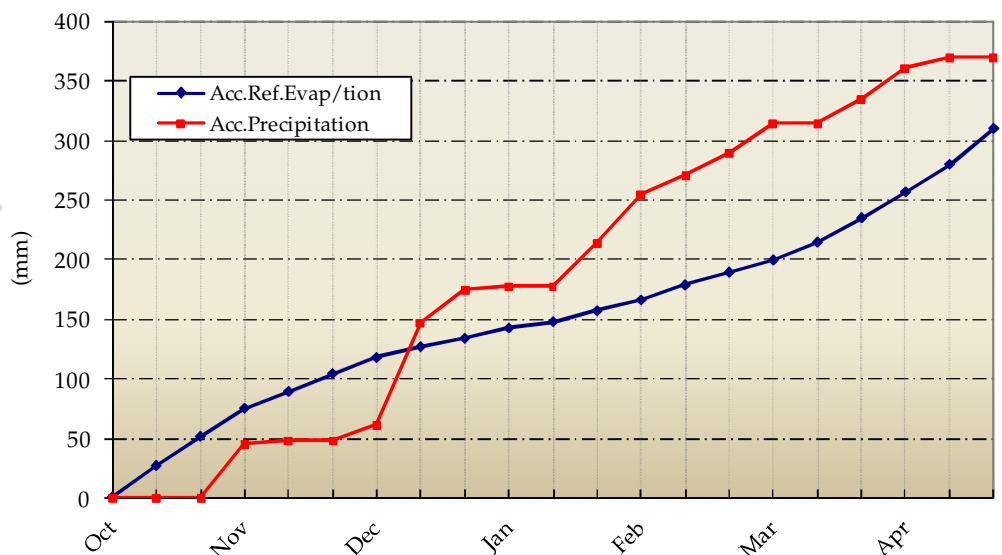


This station is not fully operated

2nd 10-day period (11-20/04/2013)		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	19.2	20.4	20.6	16.2	15.6	21.0	18.2	17.0	18.4	18.5	17.7	16.6
	Min	7.0	8.0	8.5	13.0	9.2	9.8	11.0	6.0	9.0	6.6	8.8	10.9	7.0
Relative Humidity	Max	94	90	91	90	90	79	59	65	72	88	82	90	-
	Min	56	53	56	47	52	44	18	21	43	37	43	56	-
Soil Temperature at 10 cm	06 UTC	12.4	13.4	14.2	16.2	13.8	12.8	12.2	12.6	12.6	12.6	13.3	14.0	11.5
	12 UTC	16.8	18.6	19.4	17.4	15.2	13.8	17.0	16.6	15.8	15.0	16.6	16.7	14.7
Sunshine Duration		7.4	4.9	12.1	1.4	3.1	0.0	12.4	8.8	3.0	3.0	5.6	6.7	5.9
Precipitation					0.4	0.1	0.0					0.5	6.1	15.2
Evaporation		2.7	5.4	4.4	0.9	1.5	3.9	8.1	4.8	3.9	3.8	39.4	30.3	38.8
Growing Degrees	5	7.8	8.6	9.5	11.8	7.7	7.7	11.0	7.1	8.0	7.5	86.7	92.9	67.9
	10	2.8	3.6	4.5	6.8	2.7	2.7	6.0	2.1	3.0	2.5	36.7	45.8	22.8

2nd 10-day period (11-20/04/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	30.0	28.4	26.7
Precipitation - Reference Evapotranspiration	-29.5	-22.3	-11.5
Number of Rainy Days	2.0	4.0	2.8
Number of Dry Days	5.0	5.0	-

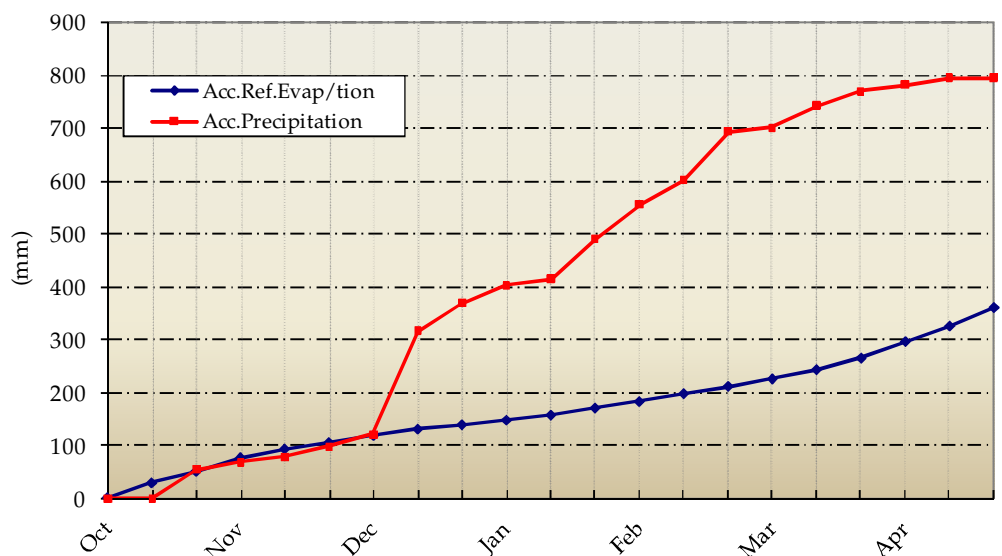
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



2nd 10-day period (11-20/04/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	20.4	20.8	21.8	20.9	20.0	19.0	20.5	21.7	19.6	19.4	20.4	18.6	18.4
	Min	8.7	9.3	10.2	9.7	11.0	8.4	7.4	5.7	10.6	8.0	8.9	11.1	9.1
Relative Humidity	Max	91	90	90	90	90	85	88	88	87	90	89	97	-
	Min	37	47	47	61	60	37	35	22	35	54	44	64	-
Soil Temperature at 10 cm	06 UTC	15.0	15.6	16.0	16.3	16.4	15.0	15.0	14.4	16.0	15.2	15.5	14.6	13.7
	12 UTC	19.8	20.2	20.0	20.0	-	19.4	20.0	20.0	19.6	19.4	19.8	17.1	16.7
Sunshine Duration		11.1	11.9	11.1	9.5	11.5	12.1	12.0	10.6	11.3	10.4	11.2	5.7	7.2
Precipitation													21.0	25.7
Evaporation		3.9	4.7	11.2	0.8	-	4.2	3.9	9.2	3.5	3.3	-	28.8	37.7
Growing Degrees	5	9.6	10.1	11.0	10.3	10.5	8.7	9.0	8.7	10.1	8.7	96.6	-	87.1
	10	4.6	5.1	6.0	5.3	5.5	3.7	4.0	3.7	5.1	3.7	46.6	-	37.4

2nd 10-day period (11-20/04/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	35.3	27.2	28.0
Precipitation - Reference Evapotranspiration	-35.3	-6.2	-2.3
Number of Rainy Days	0.0	4.0	3.3
Number of Dry Days	12.0	0.0	-

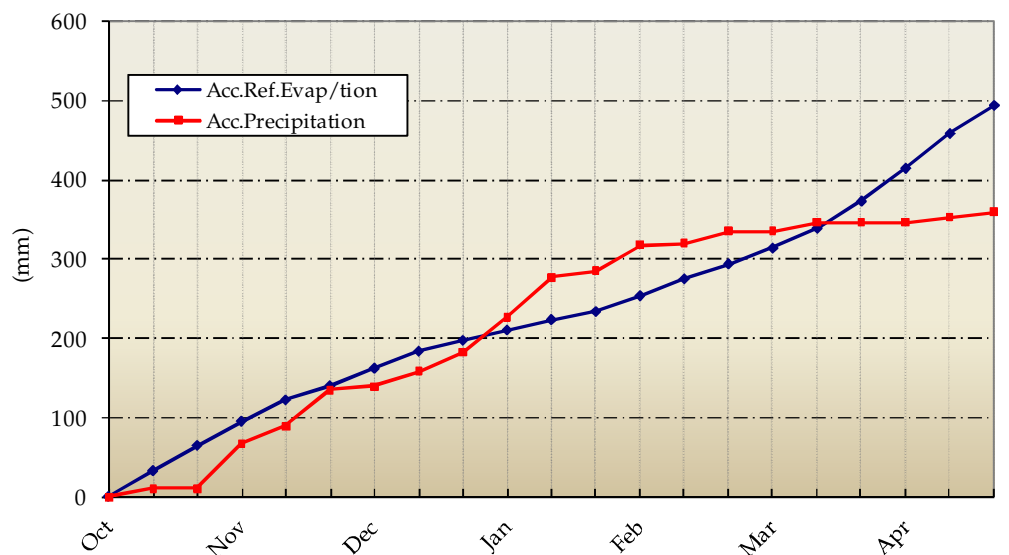
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



2nd 10-day period (11-20/04/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	20.0	20.0	21.2	23.0	19.2	16.6	16.0	16.6	15.8	17.0	18.5	-	19.9
	Min	10.8	10.6	11.4	13.6	15.2	14.8	13.0	14.4	11.2	11.4	12.6	-	12.0
Relative Humidity	Max	91	88	76	89	87	80	82	81	83	75	83	-	-
	Min	63	57	53	48	57	61	58	53	55	60	56	-	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		11.5	12.0	11.9	10.4	10.2	3.1	1.4	10.6	2.5	3.8	7.7	-	7.4
Precipitation							1.9	2.1		1.9	1.0	6.9	-	11.4
Evaporation		3.7	1.7	3.5	3.6	-	6.7	3.3	-	8.8	4.7	-	-	52.7
Growing Degrees	5	10.4	10.3	11.3	13.3	12.2	10.7	9.5	10.5	8.5	9.2	105.9	-	109.6
	10	5.4	5.3	6.3	8.3	7.2	5.7	4.5	5.5	3.5	4.2	55.9	-	59.7

2nd 10-day period (11-20/04/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	35.5	-	-
Precipitation - Reference Evapotranspiration	-28.6	-	11.4
Number of Rainy Days	4.0	-	2.0
Number of Dry Days	7.0	-	-

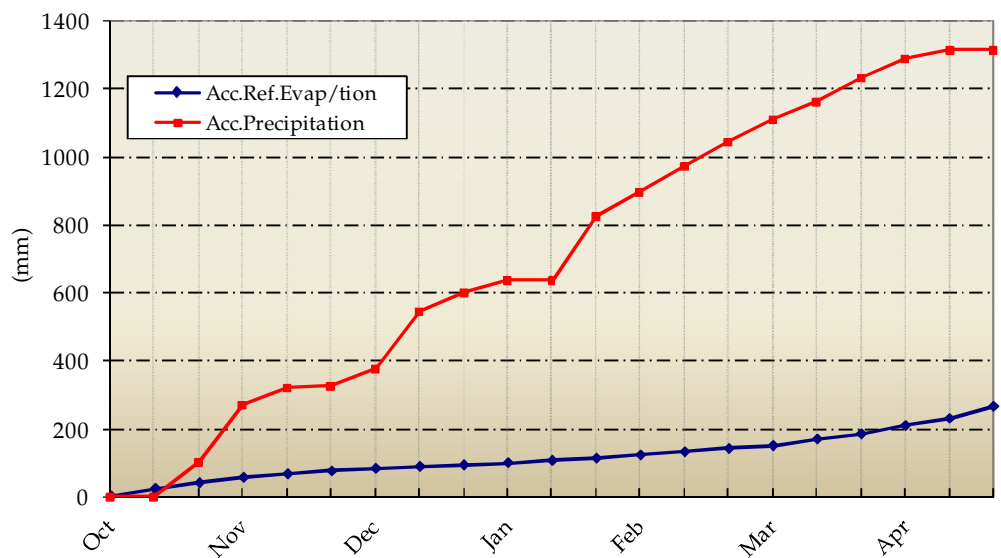
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



2nd 10-day period (11-20/04/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	21.0	21.8	23.1	22.2	18.0	20.0	21.0	20.0	18.0	-	20.6	14.0	16.1
	Min	4.0	8.8	4.0	11.4	10.2	4.5	10.0	3.5	5.2	4.5	6.6	7.6	5.7
Relative Humidity	Max	97	76	79	85	39	70	74	86	75	86	77	94	-
	Min	35	43	32	28	22	26	26	22	25	30	29	66	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	10.1
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	12.9
Sunshine Duration		7.7	8.2	9.8	7.6	9.0	8.8	10.1	9.6	8.3	7.0	8.6	1.8	4.9
Precipitation													95.5	35.1
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	28.5
Growing Degrees	5	7.5	10.3	8.6	11.8	9.1	7.3	10.5	6.8	6.6	-	-	58.2	58.8
	10	2.5	5.3	3.6	6.8	4.1	2.3	5.5	1.8	1.6	-	-	11.3	15.8

2nd 10-day period (11-20/04/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	34.9	18.4	24.2
Precipitation - Reference Evapotranspiration	-34.9	77.1	10.9
Number of Rainy Days	0.0	8.0	4.7
Number of Dry Days	12.0	1.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

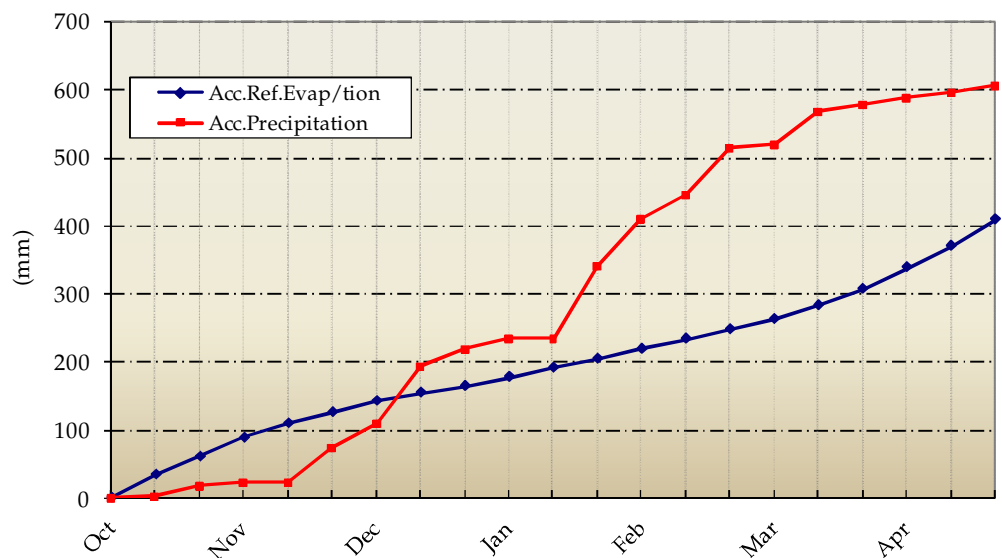


Kalamata

2nd 10-day period (11-20/04/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	23.6	21.2	24.0	25.4	20.2	21.4	19.5	21.0	18.4	20.2	21.5	19.1	19.2
	Min	8.4	7.7	7.4	8.6	10.4	6.7	7.0	7.6	8.6	5.4	7.8	10.0	8.4
Relative Humidity	Max	90	92	90	90	94	88	92	89	91	92	91	94	-
	Min	27	46	35	27	49	32	35	28	50	34	36	58	-
Soil Temperature at 10 cm	06 UTC	14.6	15.0	15.4	15.4	16.2	14.6	15.4	14.8	15.4	14.4	15.1	14.8	13.9
	12 UTC	18.2	19.0	19.4	19.4	19.2	18.4	19.8	18.0	18.8	17.6	18.8	15.9	16.9
Sunshine Duration		11.8	11.6	11.9	10.2	9.0	10.9	10.7	9.0	8.3	7.0	10.0	6.4	7.1
Precipitation						9.2			0.3	1.0		10.5	32.4	25.5
Evaporation		8.1	9.3	2.6	11.0	2.4	5.8	3.8	3.7	6.1	3.0	55.8	22.7	41.0
Growing Degrees	5	11.0	9.5	10.7	12.0	10.3	9.1	8.3	9.3	8.5	7.8	96.4	95.3	88.0
	10	6.0	4.5	5.7	7.0	5.3	4.1	3.3	4.3	3.5	2.8	46.4	45.3	38.2

2nd 10-day period (11-20/04/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	38.8	29.0	28.5
Precipitation - Reference Evapotranspiration	-28.3	3.4	-3.0
Number of Rainy Days	3.0	3.0	4.1
Number of Dry Days	6.0	3.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



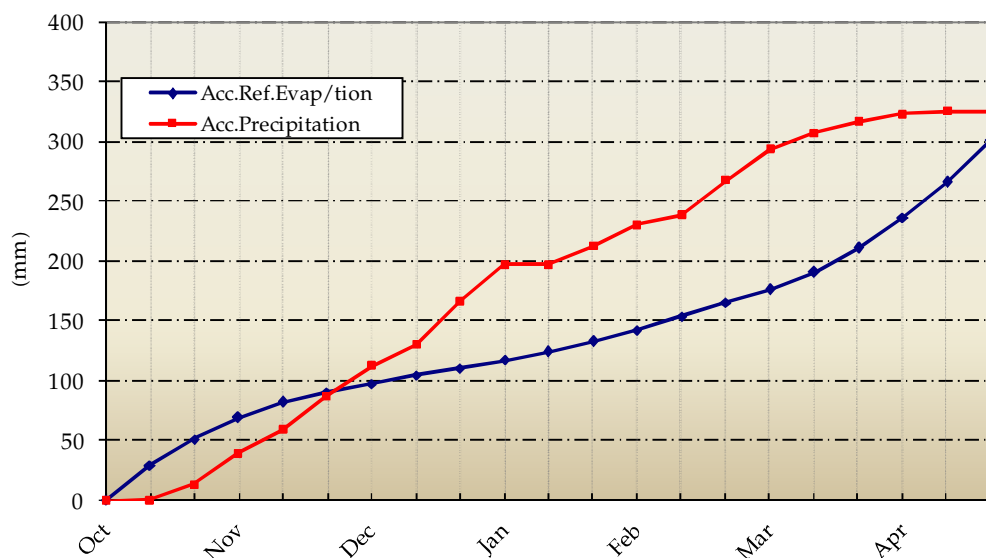


Larisa

2nd 10-day period (11-20/04/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	22.2	23.5	27.6	23.2	19.9	19.7	21.8	20.1	18.8	20.2	21.7	19.7	19.0
	Min	5.6	5.0	6.6	11.2	9.2	4.0	9.2	2.8	6.0	4.0	6.4	8.1	6.4
Relative Humidity	Max	92	98	100	83	91	92	83	77	82	94	89	93	-
	Min	30	40	24	30	29	29	21	28	24	34	29	44	-
Soil Temperature at 10 cm	06 UTC	12.8	13.0	13.6	15.0	14.2	13.2	14.2	13.6	14.2	13.6	13.7	13.0	12.8
	12 UTC	15.2	15.4	16.2	22.4	15.2	15.0	15.8	15.2	15.8	13.8	16.0	13.9	14.4
Sunshine Duration		11.0	9.5	8.7	6.8	3.5	6.7	11.5	10.5	7.3	10.2	8.6	5.8	6.4
Precipitation													18.9	13.6
Evaporation		-	5.0	7.6	5.8	3.7	8.5	6.1	5.5	4.3	4.3	-	25.6	36.9
Growing Degrees	5	8.9	9.3	12.1	12.2	9.6	6.9	10.5	6.5	7.4	7.1	90.3	89.0	77.0
	10	3.9	4.3	7.1	7.2	4.6	1.9	5.5	1.5	2.4	2.1	40.3	40.0	28.8

2nd 10-day period (11-20/04/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	35.5	29.5	28.6
Precipitation - Reference Evapotranspiration	-35.5	-10.6	-15.0
Number of Rainy Days	0.0	5.0	3.4
Number of Dry Days	11.0	1.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



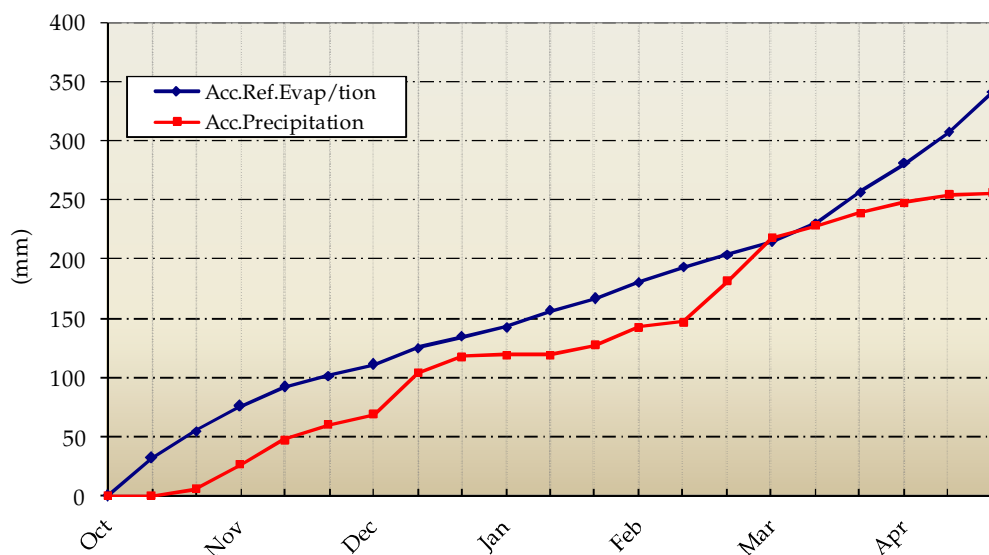


Mikra

2nd 10-day period (11-20/04/2013)		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	20.0	21.6	18.8	19.2	18.6	21.0	19.4	18.0	19.4	19.8	19.0	18.2
	Min	6.1	7.4	7.6	12.2	9.2	5.9	5.5	7.5	5.2	6.7	7.3	9.6	7.7
Relative Humidity	Max	93	86	92	85	87	91	90	85	88	84	88	87	-
	Min	30	52	51	38	29	38	24	33	40	43	38	47	-
Soil Temperature at 10 cm	06 UTC	13.3	13.8	14.2	15.2	14.2	13.0	13.0	14.0	14.2	14.4	13.9	13.3	12.6
	12 UTC	16.0	16.4	16.0	16.3	19.0	16.4	19.0	20.4	18.2	18.2	17.6	16.5	16.4
Sunshine Duration		10.3	10.0	8.2	4.9	6.0	4.1	11.2	8.8	6.7	9.2	7.9	5.3	6.1
Precipitation					1.1	0.1			0.3			1.5	12.3	14.5
Evaporation		2.6	4.0	8.0	1.5	3.1	2.5	4.1	6.3	3.6	3.8	39.5	28.2	39.8
Growing Degrees	5	9.1	8.7	9.6	10.5	9.2	7.3	8.3	8.5	6.6	8.1	85.7	92.8	79.5
	10	4.1	3.7	4.6	5.5	4.2	2.3	3.3	3.5	1.6	3.1	35.7	43.0	31.0

2nd 10-day period (11-20/04/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	34.1	30.6	29.0
Precipitation - Reference Evapotranspiration	-32.6	-18.3	-14.5
Number of Rainy Days	3.0	6.0	3.4
Number of Dry Days	4.0	2.0	-

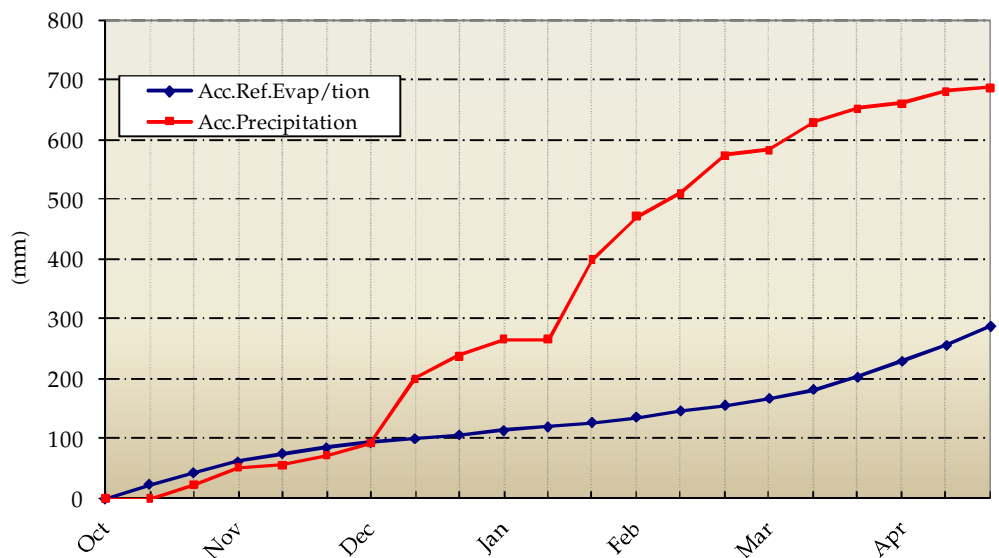
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



2nd 10-day period (11-20/04/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	20.2	21.4	25.4	22.1	16.3	18.1	18.1	16.6	16.0	16.2	19.0	15.9	16.3
	Min	1.3	3.0	3.9	7.0	6.4	4.2	5.0	1.1	2.5	-0.2	3.4	6.7	4.8
Relative Humidity	Max	93	94	93	81	92	74	74	66	81	76	82	86	-
	Min	28	28	27	25	51	28	27	27	26	32	30	46	-
Soil Temperature at 10 cm	06 UTC	10.2	11.6	12.6	14.0	14.4	11.0	12.6	10.4	12.4	10.4	12.0	10.8	10.9
	12 UTC	17.6	18.4	20.4	20.8	16.6	18.4	18.4	17.8	18.0	15.0	18.1	-	12.7
Sunshine Duration		9.8	11.2	11.1	7.1	5.3	9.4	11.9	11.2	7.5	6.1	9.1	6.4	6.7
Precipitation					1.2	3.2				0.0		4.4	34.1	30.8
Evaporation		4.7	3.8	4.5	3.1	2.9	4.6	4.4	3.4	4.3	2.1	37.8	-	29.8
Growing Degrees	5	5.8	7.2	9.7	9.6	6.4	6.2	6.6	3.9	4.3	3.0	62.3	63.1	55.6
	10	0.8	2.2	4.7	4.6	1.4	1.2	1.6	0.0	0.0	0.0	16.2	16.8	14.5

2nd 10-day period (11-20/04/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	32.0	30.4	28.5
Precipitation - Reference Evapotranspiration	-27.6	3.7	2.3
Number of Rainy Days	2.0	6.0	4.5
Number of Dry Days	5.0	3.0	-

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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