



# AGROMETEOROLOGICAL BULLETIN

*July 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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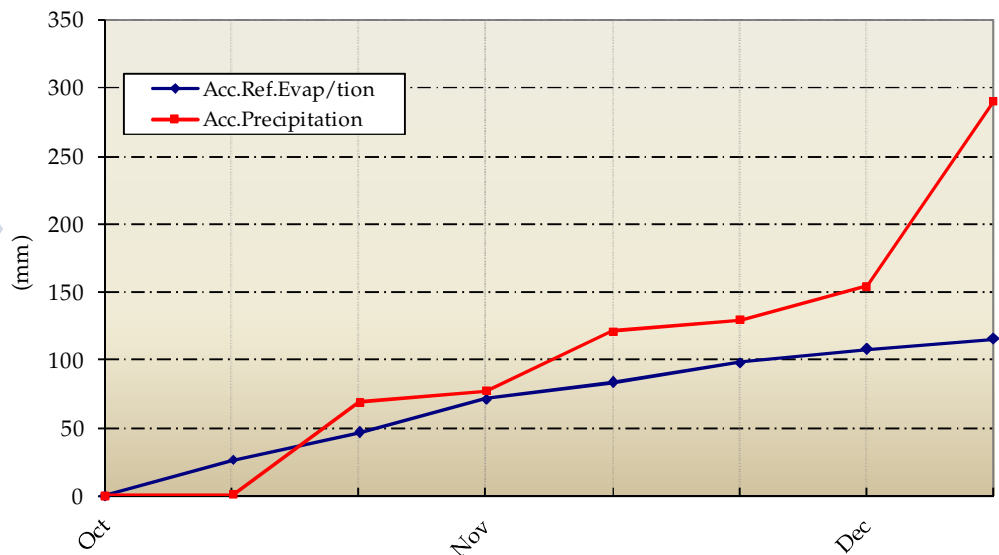
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Agrinio

1st 10-day period (1-10/07/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	30.0	31.4	32.6	31.8	32.4	33.0	34.2	34.6	35.2	32.8	32.8	36.3	32.4
	Min	15.2	15.4	15.4	18.0	20.0	18.0	19.0	20.0	16.8	18.0	17.6	19.5	16.9
Relative Humidity	Max	83	83	86	82	87	91	82	81	84	79	84	63	-
	Min	31	34	32	35	32	34	27	27	29	36	32	28	-
Soil Temperature at 10 cm	06 UTC	28.4	28.6	28.4	29.0	30.0	29.0	28.0	29.0	29.6	30.4	29.0	31.8	27.2
	12 UTC	33.0	33.0	32.0	33.0	34.0	32.0	33.0	36.0	33.2	34.6	33.4	38.6	33.2
Sunshine Duration		13.4	13.6	13.7	13.6	7.3	6.8	12.2	10.8	11.6	11.6	11.5	13.5	11.6
Precipitation											6.5	6.5		8.3
Evaporation		10.0	9.6	10.4	7.6	10.4	7.4	12.0	6.8	10.0	8.0	92.2	102.1	82.3
Growing Degrees	5	17.6	18.4	19.0	19.9	21.2	20.5	21.6	22.3	21.0	20.4	201.9	228.7	196.6
	10	12.6	13.4	14.0	14.9	16.2	15.5	16.6	17.3	16.0	15.4	151.9	178.7	146.6

1st 10-day period (1-10/07/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	54.9	64.0	56.1
Precipitation - Reference Evapotranspiration	-48.4	-64.0	-47.8
Number of Rainy Days	1.0	0.0	1.0
Number of Dry Days	27.0	41.0	-

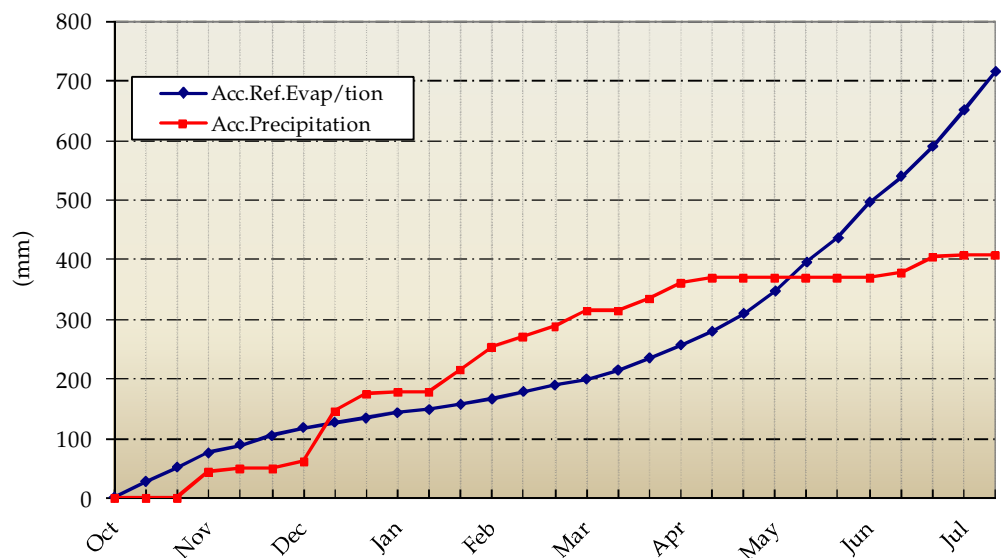
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



1st 10-day period (1-10/07/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	28.2	28.0	29.4	30.2	29.6	32.4	32.8	33.8	33.4	32.2	31.0	33.1	29.3
	Min	18.0	17.6	16.6	16.5	19.4	22.2	21.6	22.0	21.0	22.0	19.7	20.9	17.0
Relative Humidity	Max	77	77	80	75	80	70	69	67	73	62	73	69	-
	Min	37	36	39	25	42	30	26	26	33	31	32	32	-
Soil Temperature at 10 cm	06 UTC	26.0	26.0	25.4	25.4	26.0	26.6	27.0	27.4	27.6	27.8	26.5	28.4	23.7
	12 UTC	29.8	29.6	28.4	29.4	29.0	30.0	30.6	31.0	31.6	30.8	30.0	31.4	28.2
Sunshine Duration		10.7	11.1	12.2	13.4	9.7	13.3	13.1	13.3	13.3	13.3	12.3	12.1	10.3
Precipitation		0.1										0.1	0.0	12.1
Evaporation		7.6	8.0	7.1	7.0	5.8	11.2	8.8	11.0	15.7	13.0	95.2	98.4	85.9
Growing Degrees	5	18.1	17.8	18.0	18.4	19.5	22.3	22.2	22.9	22.2	22.1	203.5	219.9	181.3
	10	13.1	12.8	13.0	13.4	14.5	17.3	17.2	17.9	17.2	17.1	153.5	169.9	131.3

1st 10-day period (1-10/07/2013)	Previous Year Value	Past Years Mean Value	
Reference Evapotranspiration	64.9	63.2	56.1
Precipitation - Reference Evapotranspiration	-64.8	-63.2	-44.0
Number of Rainy Days	1.0	0.0	2.2
Number of Dry Days	0.0	34.0	-

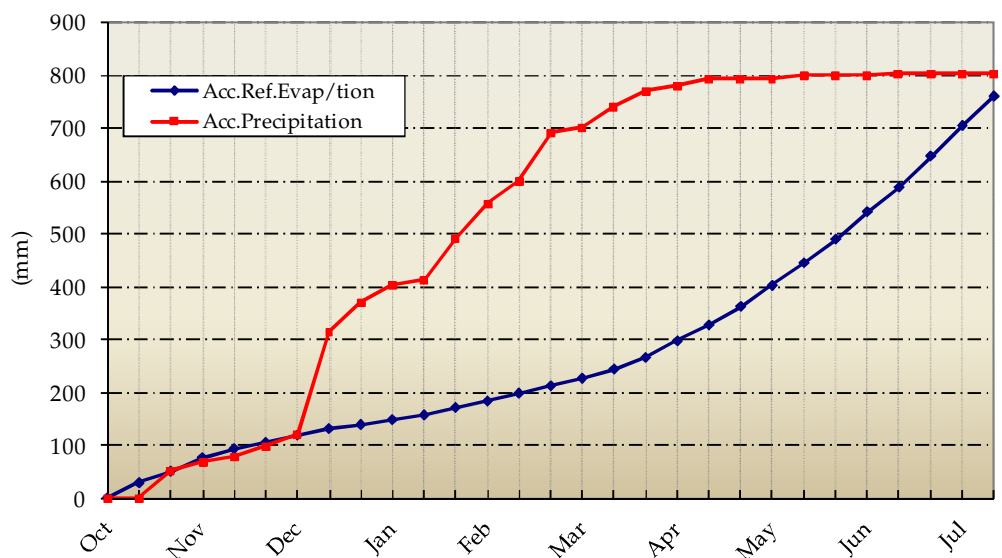
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



1st 10-day period (1-10/07/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	26.4	27.4	28.6	28.0	29.2	29.8	30.4	31.4	31.6	30.1	29.3	32.5	29.5
	Min	15.6	15.9	16.2	15.9	16.7	18.1	17.4	18.4	17.8	18.8	17.1	19.0	17.7
Relative Humidity	Max	87	85	89	87	88	86	85	83	86	85	86	83	-
	Min	42	42	38	37	40	39	37	32	31	41	38	36	-
Soil Temperature at 10 cm	06 UTC	26.0	26.0	26.2	26.2	26.6	27.6	27.4	27.8	28.2	28.4	27.0	28.2	26.9
	12 UTC	32.8	33.4	33.8	34.0	33.8	33.8	34.2	35.0	35.2	35.2	34.1	35.7	31.6
Sunshine Duration		13.1	13.3	12.8	12.9	11.7	13.2	12.8	13.3	13.2	13.0	12.9	12.6	12.0
Precipitation														0.7
Evaporation		11.5	5.7	7.8	8.4	9.1	8.0	9.3	8.8	13.2	9.7	91.5	86.1	75.0
Growing Degrees	5	16.0	16.7	17.4	17.0	18.0	19.0	18.9	19.9	19.7	19.5	181.9	207.3	186.1
	10	11.0	11.7	12.4	12.0	13.0	14.0	13.9	14.9	14.7	14.5	131.9	157.3	136.1

1st 10-day period (1-10/07/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	55.6	58.0	53.6
Precipitation - Reference Evapotranspiration	-55.6	-58.0	-52.9
Number of Rainy Days	0.0	0.0	0.3
Number of Dry Days	30.0	42.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

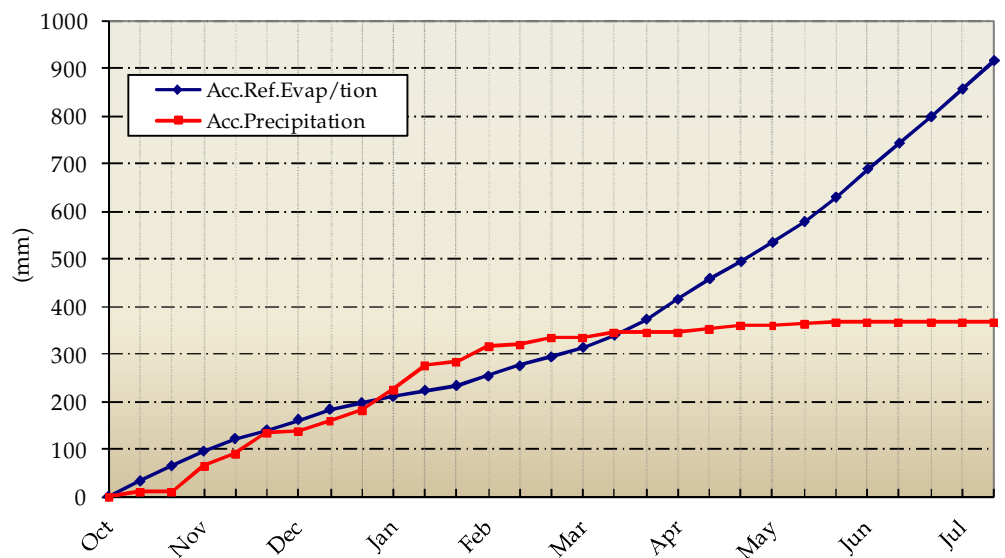


Iraklio

1st 10-day period (1-10/07/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	26.4	27.4	27.6	28.0	28.0	28.2	28.0	27.6	28.5	29.5	27.9	-	28.4
	Min	18.8	20.0	22.8	23.4	21.2	23.8	24.4	22.2	21.8	22.5	22.1	-	21.3
Relative Humidity	Max	83	81	78	78	83	83	82	82	81	79	81	-	-
	Min	58	66	57	61	62	64	68	67	51	54	61	-	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		13.0	12.8	13.0	12.9	12.9	12.1	12.8	12.2	12.7	12.8	12.7	-	12.1
Precipitation													-	0.7
Evaporation		6.0	7.2	9.3	6.0	9.1	9.1	5.1	2.8	0.2	6.1	60.9	-	92.1
Growing Degrees	5	17.6	18.7	20.2	20.7	19.6	21.0	21.2	19.9	20.2	21.0	200.1	-	198.6
	10	12.6	13.7	15.2	15.7	14.6	16.0	16.2	14.9	15.2	16.0	150.1	-	148.6

1st 10-day period (1-10/07/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	59.9	-	-
Precipitation - Reference Evapotranspiration	-59.9	-	0.7
Number of Rainy Days	0.0	-	0.1
Number of Dry Days	53.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

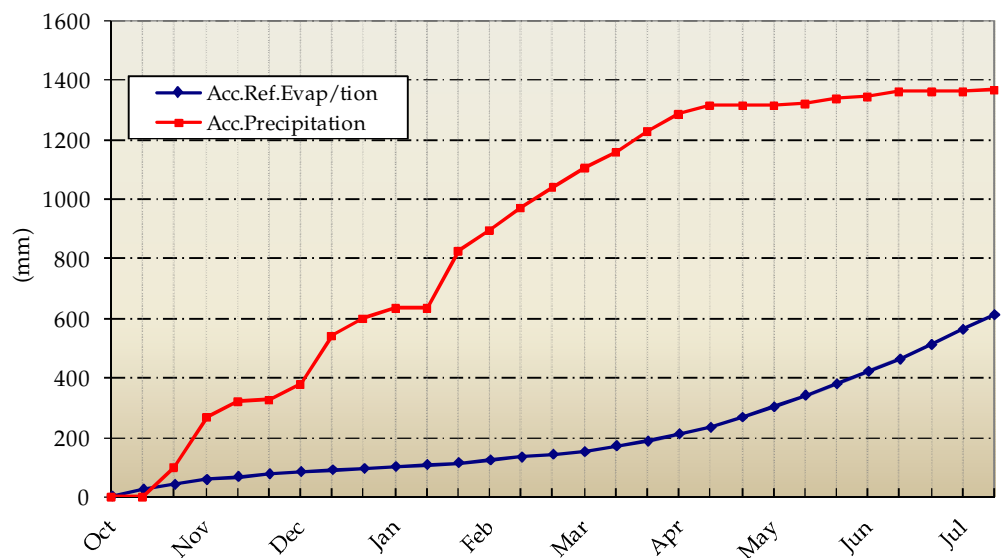


Ioannina

1st 10-day period (1-10/07/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	28.0	29.9	29.8	29.6	29.6	30.3	30.8	32.4	31.1	30.4	30.2	34.1	30.4
	Min	9.8	10.3	12.2	13.1	16.2	13.7	20.4	15.6	12.0	13.4	13.7	18.4	14.5
Relative Humidity	Max	64	86	84	62	90	65	39	84	71	74	72	72	-
	Min	25	25	26	30	27	36	26	22	33	25	28	28	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	22.7
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	27.2
Sunshine Duration		10.8	12.8	12.6	6.2	5.5	7.4	7.6	9.3	9.0	7.6	8.9	12.4	10.5
Precipitation						0.0	0.0			3.2		3.2		6.6
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	72.0
Growing Degrees	5	13.9	15.1	16.0	16.4	17.9	17.0	20.6	19.0	16.6	16.9	169.3	212.3	168.8
	10	8.9	10.1	11.0	11.4	12.9	12.0	15.6	14.0	11.6	11.9	119.3	162.3	120.3

1st 10-day period (1-10/07/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	48.9	61.3	51.3
Precipitation - Reference Evapotranspiration	-45.7	-61.3	-44.7
Number of Rainy Days	1.0	0.0	1.5
Number of Dry Days	16.0	35.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



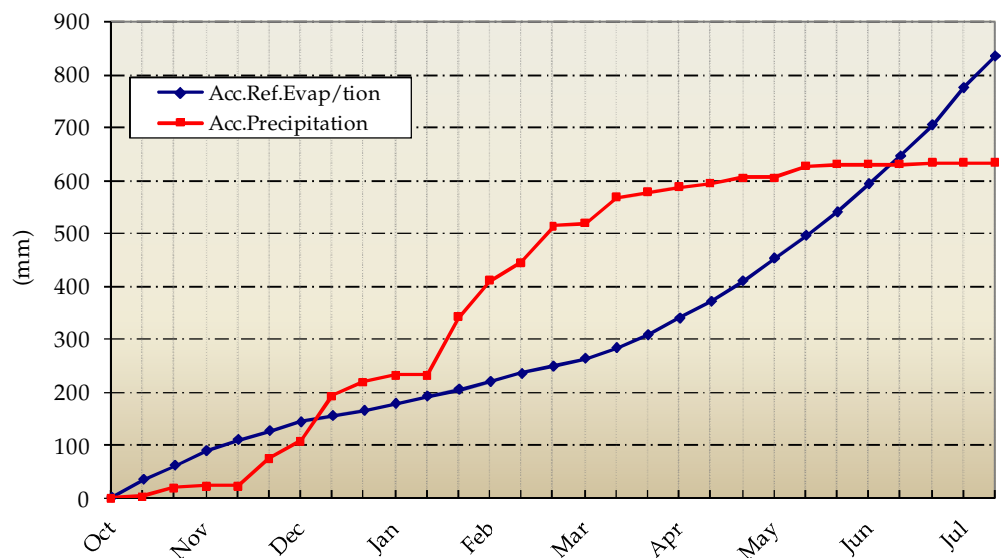


Kalamata

1st 10-day period (1-10/07/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	29.1	29.1	28.5	28.8	29.9	30.4	31.1	31.9	30.8	32.1	30.2	32.5	30.8
	Min	16.6	15.5	15.3	16.4	15.8	17.8	18.5	16.8	16.6	17.8	16.7	18.5	17.6
Relative Humidity	Max	82	84	91	83	79	76	86	89	84	86	84	84	-
	Min	30	32	34	27	30	34	34	31	34	29	32	32	-
Soil Temperature at 10 cm	06 UTC	24.0	24.0	24.2	24.6	24.0	24.4	24.4	24.4	25.0	24.6	24.4	26.2	25.3
	12 UTC	27.6	27.6	27.6	27.8	27.8	27.4	27.8	28.0	25.0	25.0	27.2	28.9	29.5
Sunshine Duration		11.9	12.5	12.4	12.7	12.5	8.0	11.5	11.5	12.3	12.7	11.8	12.2	11.4
Precipitation														1.0
Evaporation		12.6	7.8	8.8	8.8	11.2	2.4	7.5	7.9	9.2	8.0	84.2	-	89.7
Growing Degrees	5	17.9	17.3	16.9	17.6	17.9	19.1	19.8	19.4	18.7	20.0	184.4	204.9	191.7
	10	12.9	12.3	11.9	12.6	12.9	14.1	14.8	14.4	13.7	15.0	134.4	154.9	141.7

1st 10-day period (1-10/07/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	59.9	63.4	56.4
Precipitation - Reference Evapotranspiration	-59.9	-63.4	-55.4
Number of Rainy Days	0.0	0.0	0.3
Number of Dry Days	26.0	47.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

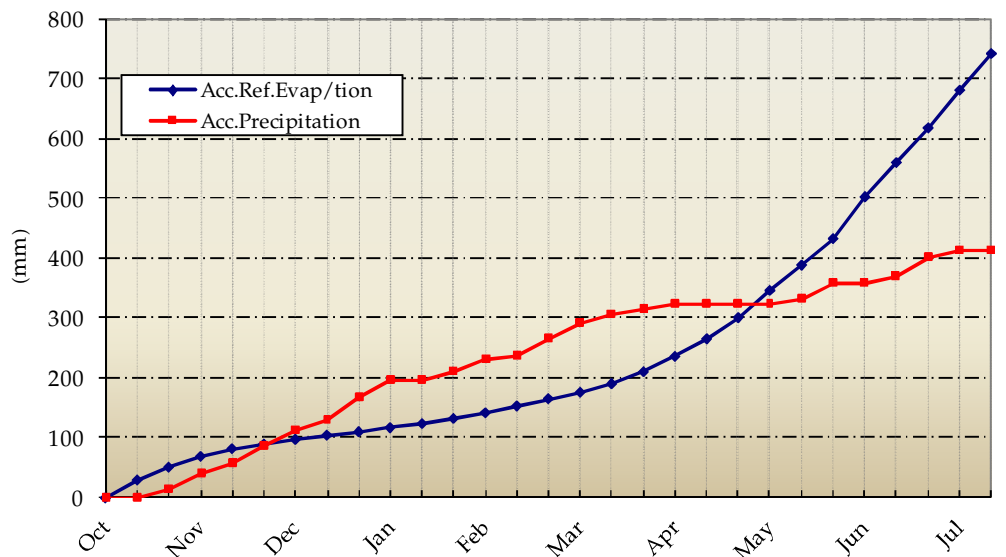


Larisa

1st 10-day period (1-10/07/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	30.8	31.2	31.6	31.8	29.9	32.6	32.2	33.8	33.8	32.4	32.0	36.0	32.9
	Min	15.1	18.2	17.0	16.2	21.0	21.0	21.4	20.4	19.6	19.4	18.9	19.1	17.5
Relative Humidity	Max	75	72	84	80	65	60	59	61	57	75	69	63	-
	Min	23	22	25	22	30	25	23	20	20	23	23	19	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	27.3	26.1
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	29.2	28.7
Sunshine Duration		12.5	12.7	12.5	11.6	7.2	7.4	12.2	12.7	12.5	8.8	11.0	12.8	10.7
Precipitation						0.0						0.0	0.0	5.5
Evaporation		11.1	11.2	10.7	8.7	7.6	6.3	13.1	10.7	14.3	9.7	103.4	113.9	95.9
Growing Degrees	5	18.0	19.7	19.3	19.0	20.5	21.8	21.8	22.1	21.7	20.9	204.7	225.2	202.1
	10	13.0	14.7	14.3	14.0	15.5	16.8	16.8	17.1	16.7	15.9	154.7	175.2	152.1

1st 10-day period (1-10/07/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	61.5	72.4	62.4
Precipitation - Reference Evapotranspiration	-61.5	-72.4	-56.9
Number of Rainy Days	0.0	0.0	1.4
Number of Dry Days	11.0	15.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



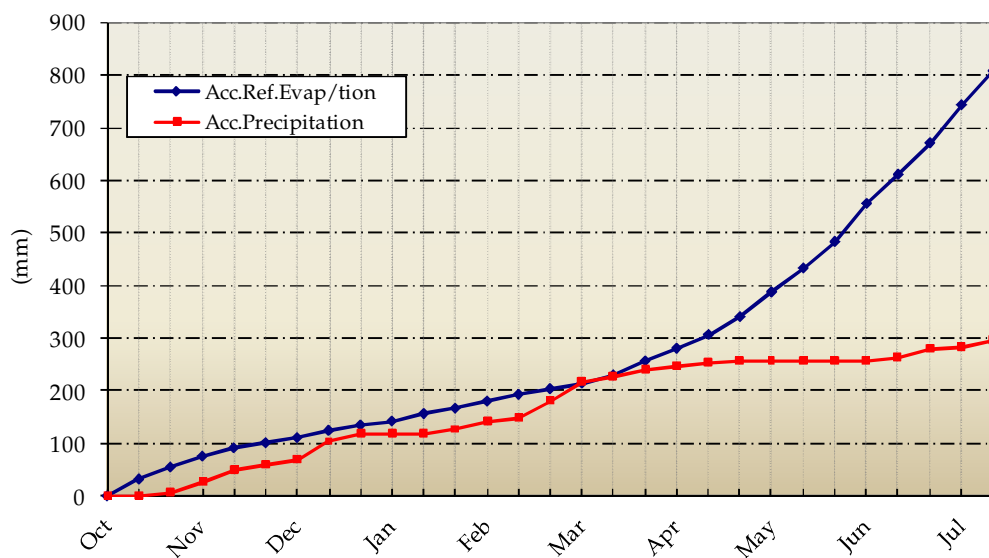


Mikra

1st 10-day period (1-10/07/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	28.6	29.4	30.8	29.8	30.6	29.0	31.6	32.0	31.6	30.8	30.4	34.3	31.1
	Min	21.6	16.2	16.6	17.6	20.8	22.2	22.2	20.6	22.0	21.8	20.2	21.1	18.5
Relative Humidity	Max	52	77	76	78	85	69	81	81	74	73	75	65	-
	Min	31	26	25	34	34	39	29	24	39	34	32	24	-
Soil Temperature at 10 cm	06 UTC	25.6	26.0	37.2	28.0	28.4	29.0	25.4	25.6	26.8	27.0	27.9	29.5	26.2
	12 UTC	32.8	32.8	33.4	33.4	32.4	30.8	29.8	31.2	31.0	31.6	31.9	33.7	30.9
Sunshine Duration		12.9	12.7	13.0	13.0	8.9	1.0	9.4	12.6	9.0	12.0	10.4	13.2	10.7
Precipitation						0.8	8.1	3.9		1.8		14.6		8.7
Evaporation		9.0	11.6	7.8	9.4	9.8	7.9	10.6	8.9	6.2	5.6	86.8	108.3	95.7
Growing Degrees	5	20.1	17.8	18.7	18.7	20.7	20.6	21.9	21.3	21.8	21.3	202.9	227.1	198.0
	10	15.1	12.8	13.7	13.7	15.7	15.6	16.9	16.3	16.8	16.3	152.9	177.1	148.0

1st 10-day period (1-10/07/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	64.7	75.6	61.2
Precipitation - Reference Evapotranspiration	-50.1	-75.6	-52.5
Number of Rainy Days	4.0	0.0	1.7
Number of Dry Days	4.0	15.0	-

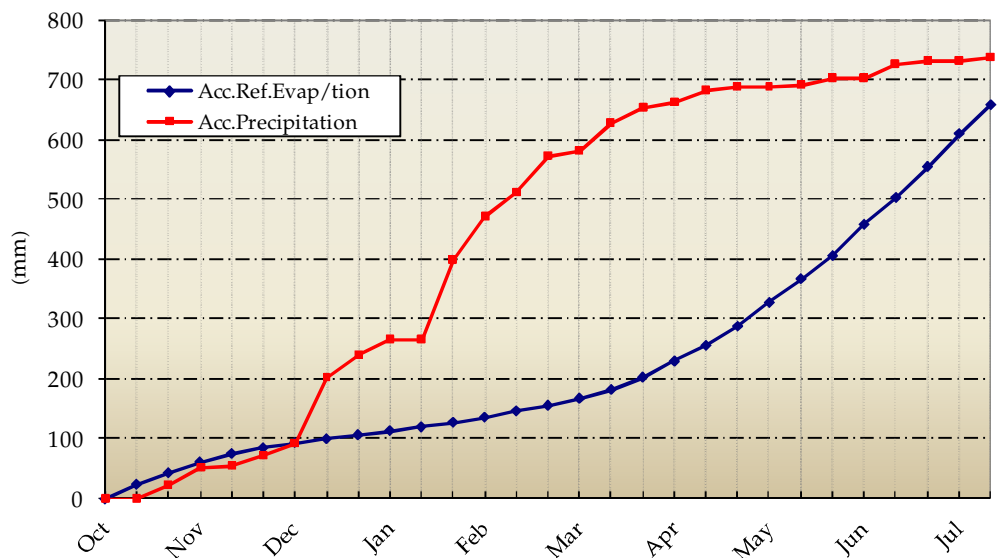
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



1st 10-day period (1-10/07/2013)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	28.9	30.4	29.3	29.4	27.6	29.1	31.1	31.3	31.2	29.0	29.7	33.3	30.2
	Min	10.4	10.5	12.1	12.2	11.9	12.3	14.0	17.7	13.6	13.4	12.8	15.4	13.4
Relative Humidity	Max	79	79	74	65	73	81	41	55	74	66	69	69	-
	Min	20	22	25	21	26	27	25	21	20	31	24	16	-
Soil Temperature at 10 cm	06 UTC	24.6	23.8	26.0	25.4	25.2	24.2	25.0	26.4	26.2	24.2	25.1	-	25.0
	12 UTC	32.0	32.4	33.0	32.4	30.8	31.2	32.0	32.8	33.0	29.4	31.9	-	28.1
Sunshine Duration		11.0	11.0	9.1	7.7	6.3	10.9	10.5	8.9	8.0	7.7	9.1	-	10.6
Precipitation										2.0	4.4	6.4	2.4	7.1
Evaporation		5.9	7.9	6.8	6.6	4.0	8.0	7.7	8.7	5.4	5.1	66.1	-	64.6
Growing Degrees	5	14.7	15.5	15.7	15.8	14.8	15.7	17.6	19.5	17.4	16.2	162.7	193.2	167.9
	10	9.7	10.5	10.7	10.8	9.8	10.7	12.6	14.5	12.4	11.2	112.7	143.2	117.9

1st 10-day period (1-10/07/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	48.0	59.1	53.2
Precipitation - Reference Evapotranspiration	-41.6	-56.7	-46.1
Number of Rainy Days	2.0	1.0	1.3
Number of Dry Days	15.0	38.0	-

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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