

# AGROMETEOROLOGICAL BULLETIN

*October 2011  
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

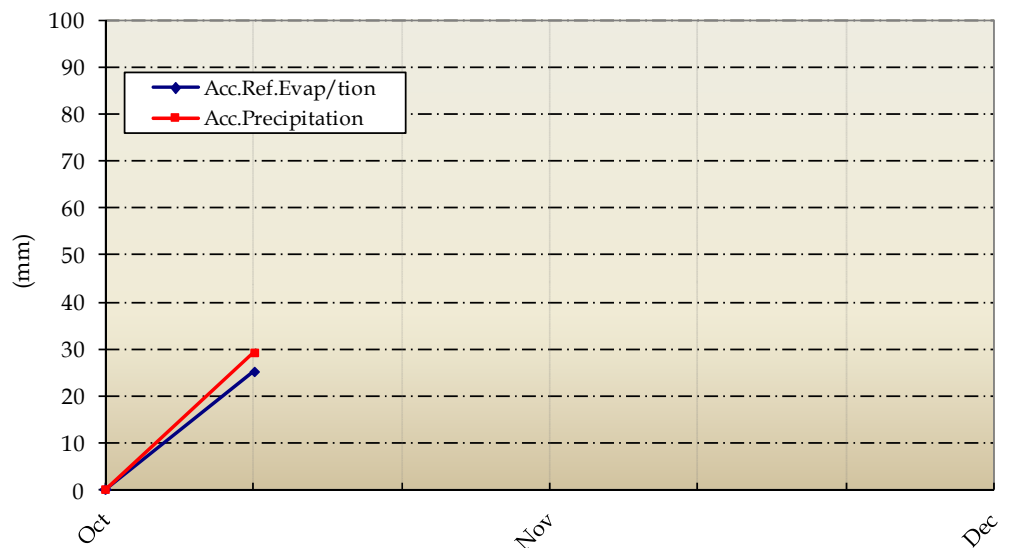
*Web addresses of HNMS  
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Agrinio

1st 10-day period (1-10/10/2011)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	27.2	28.0	28.0	28.4	28.4	28.6	26.0	24.6	20.4	18.6	25.8	24.7	26.7
	Min	13.0	12.2	13.6	11.4	11.6	11.6	12.8	15.6	14.0	11.4	12.7	12.9	12.6
Relative Humidity	Max	88	81	85	93	95	95	95	96	98	78	90	94	-
	Min	34	38	35	28	33	26	54	69	62	46	42	46	-
Soil Temperature at 10 cm	06 UTC	20.6	20.6	20.6	20.4	20.6	20.6	21.0	21.8	20.8	18.5	20.6	20.2	19.3
	12 UTC	23.6	23.2	23.6	23.4	23.2	23.4	23.6	22.8	21.4	19.6	22.8	22.3	23.5
Sunshine Duration		8.2	7.2	9.1	9.0	9.2	9.6	7.0	2.6	3.3	5.8	7.1	7.2	7.4
Precipitation									3.3	21.2	4.6	29.1	9.2	23.3
Evaporation		5.0	4.4	3.7	3.8	2.7	4.5	3.5	1.9	2.7	2.5	34.7	29.6	41.8
Growing Degrees	5	15.1	15.1	15.8	14.9	15.0	15.1	14.4	15.1	12.2	10.0	142.7	138.1	146.6
	10	10.1	10.1	10.8	9.9	10.0	10.1	9.4	10.1	7.2	5.0	92.7	88.1	96.6

1st 10-day period (1-10/10/2011)	Previous Year Value	Past Years Mean Value	
Reference Evapotranspiration	25.1	22.7	26.9
Precipitation - Reference Evapotranspiration	4.0	-13.5	-3.6
Number of Rainy Days	3.0	5.0	2.3
Number of Dry Days	15.0	6.0	-

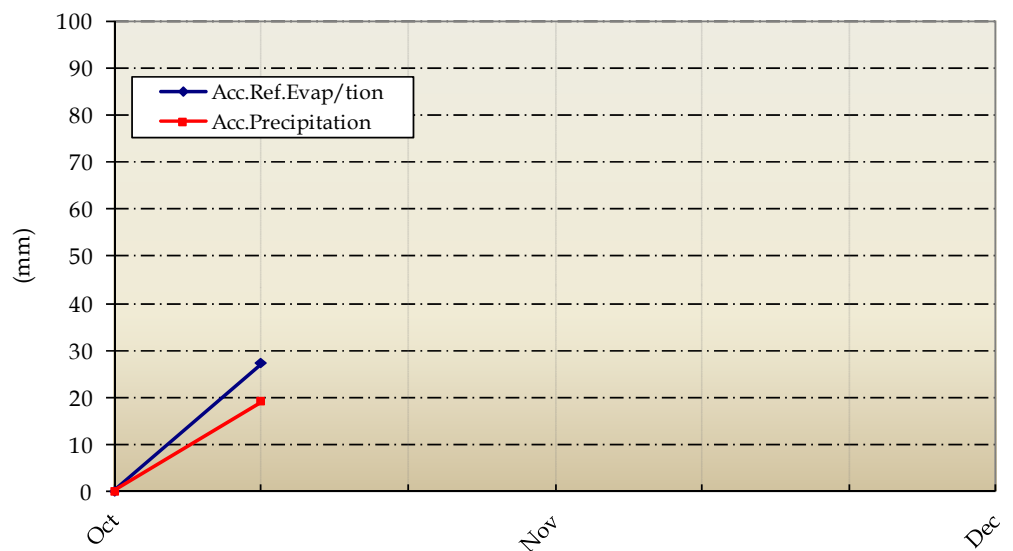
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



1st 10-day period (1-10/10/2011)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	24.6	25.6	25.4	24.6	27.0	28.0	24.0	25.0	22.2	15.0	24.1	18.8	22.8
	Min	11.4	11.0	16.8	9.6	9.6	7.4	11.0	17.0	14.8	8.8	11.7	10.9	11.7
Relative Humidity	Max	88	93	88	88	86	89	88	82	91	97	89	83	-
	Min	37	42	38	31	46	37	61	58	68	71	49	46	-
Soil Temperature at 10 cm	06 UTC	20.8	20.4	21.6	20.4	20.4	20.2	20.4	21.4	22.6	15.6	20.4	17.0	17.4
	12 UTC	22.4	22.6	23.2	22.4	22.2	22.0	22.0	23.0	22.4	16.8	21.9	18.7	20.5
Sunshine Duration		6.3	10.3	9.2	10.2	10.1	10.2	9.4	8.9	2.4	0.0	7.7	5.2	6.7
Precipitation										0.9	18.2	19.1	2.7	17.2
Evaporation		5.0	6.0	2.7	4.3	6.5	2.4	6.0	7.2	1.1	0.1	41.3	32.9	48.1
Growing Degrees	5	13.0	13.3	16.1	12.1	13.3	12.7	12.5	16.0	13.5	6.9	129.4	98.5	122.8
	10	8.0	8.3	11.1	7.1	8.3	7.7	7.5	11.0	8.5	1.9	79.4	49.2	73.0

1st 10-day period (1-10/10/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	27.2	21.9	27.4
Precipitation - Reference Evapotranspiration	-8.1	-19.2	-10.2
Number of Rainy Days	2.0	3.0	1.6
Number of Dry Days	16.0	5.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

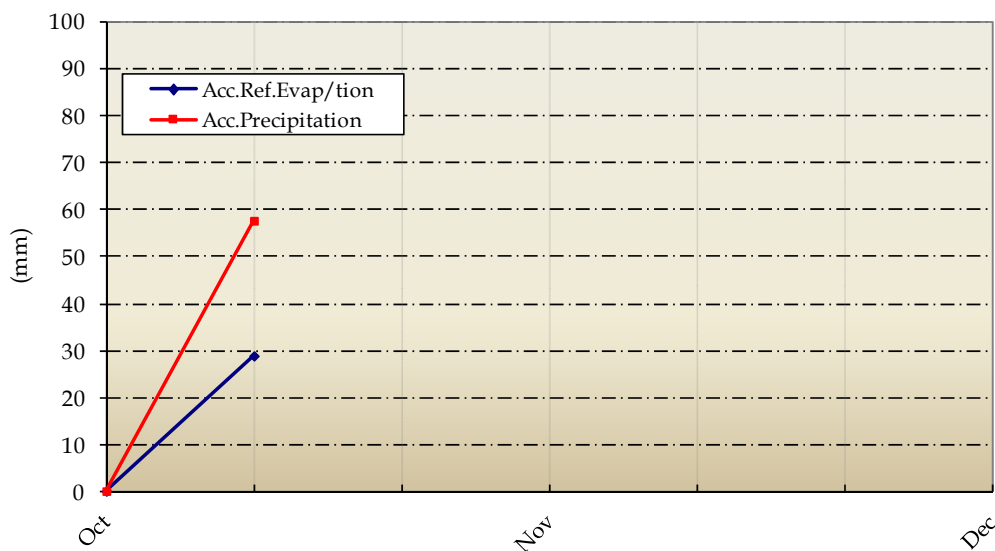


Andravida

1st 10-day period (1-10/10/2011)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	27.8	26.4	29.2	27.8	26.8	25.8	26.0	26.0	22.0	18.8	25.7	24.1	25.6
	Min	13.4	12.4	13.2	11.6	16.2	16.0	16.4	17.6	15.0	13.0	14.5	14.9	14.3
Relative Humidity	Max	85	83	84	93	82	90	94	96	95	95	90	91	-
	Min	26	37	25	26	42	58	53	54	57	52	43	49	-
Soil Temperature at 10 cm	06 UTC	20.6	20.4	19.8	20.0	21.0	21.4	21.6	20.6	19.8	18.0	20.3	19.5	20.5
	12 UTC	26.5	26.2	26.2	26.4	26.6	27.2	27.2	24.5	23.4	18.6	25.3	24.6	23.8
Sunshine Duration		9.1	8.0	7.6	9.2	8.3	8.5	6.5	4.8	3.5	3.4	6.9	6.9	7.7
Precipitation								5.5	1.4	46.6	4.1	57.6	17.9	23.2
Evaporation		5.0	5.6	7.6	4.8	6.5	10.1	9.8	3.4	3.7	3.2	59.7	31.1	42.9
Growing Degrees	5	15.6	14.4	16.2	14.7	16.5	15.9	16.2	16.8	13.5	10.9	150.7	145.1	149.6
	10	10.6	9.4	11.2	9.7	11.5	10.9	11.2	11.8	8.5	5.9	100.7	95.1	99.6

1st 10-day period (1-10/10/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	28.8	25.2	26.8
Precipitation - Reference Evapotranspiration	28.8	-7.3	-3.6
Number of Rainy Days	4.0	5.0	2.2
Number of Dry Days	15.0	6.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

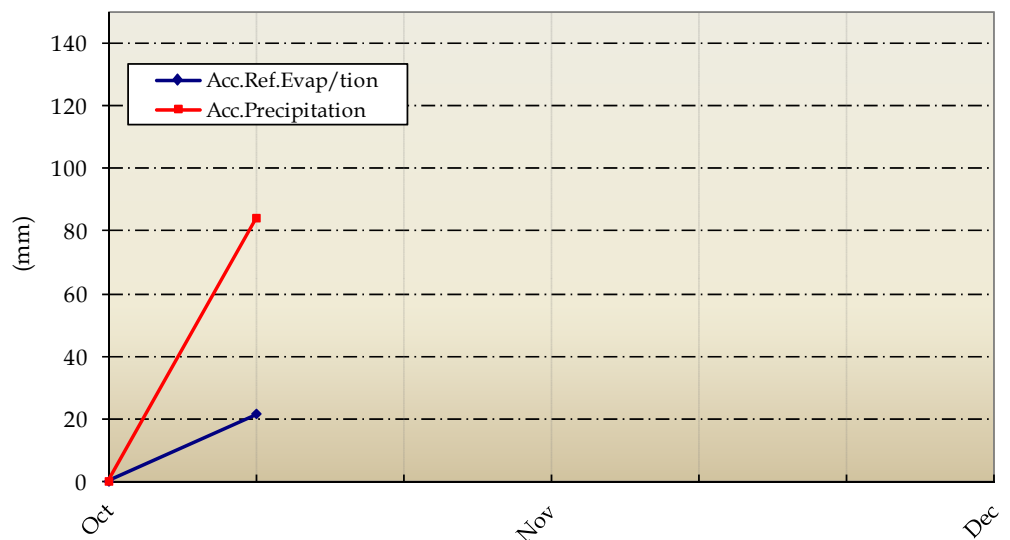


Ioannina

1st 10-day period (1-10/10/2011)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	24.0	25.0	25.4	24.6	25.0	25.0	22.4	18.0	16.0	15.0	22.0	-	22.8
	Min	15.0	-	9.0	8.6	8.6	9.0	9.6	11.0	10.8	7.8	9.9	-	10.0
Relative Humidity	Max	90	83	87	90	98	97	97	95	74	74	88	-	-
	Min	35	40	43	40	45	38	51	83	40	40	46	-	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	15.6
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	18.3
Sunshine Duration		-	7.7	5.7	8.0	7.8	7.3	5.0	0.3	6.4	6.4	6.1	-	5.7
Precipitation								0.3	79.0	4.5		83.8	-	25.8
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	32.1
Growing Degrees	5	14.5	-	12.2	11.6	11.8	12.0	11.0	9.5	8.4	6.4	-	-	114.5
	10	9.5	-	7.2	6.6	6.8	7.0	6.0	4.5	3.4	1.4	-	-	64.7

1st 10-day period (1-10/10/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	21.4	-	21.0
Precipitation - Reference Evapotranspiration	62.4	-	4.8
Number of Rainy Days	3.0	-	2.6
Number of Dry Days	13.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

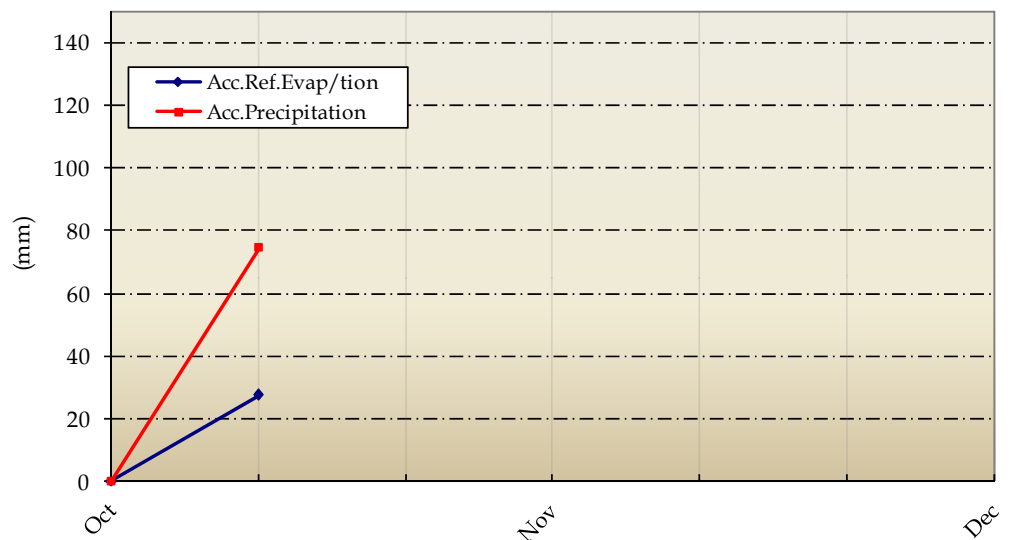


Kalamata

1st 10-day period (1-10/10/2011)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	27.2	26.4	26.8	25.2	26.2	26.0	24.8	23.6	23.4	20.2	25.0	24.8	26.1
	Min	16.0	15.0	13.0	16.0	13.0	13.4	13.6	16.0	15.4	13.0	14.4	14.5	13.8
Relative Humidity	Max	68	93	89	87	95	95	94	98	96	95	91	93	-
	Min	29	41	43	46	46	50	57	75	57	59	50	48	-
Soil Temperature at 10 cm	06 UTC	21.2	20.6	19.8	20.2	19.8	20.0	20.2	20.4	20.4	19.4	20.2	20.8	20.0
	12 UTC	22.6	21.6	21.4	21.4	21.4	21.4	21.6	21.4	21.0	20.4	21.4	21.9	22.6
Sunshine Duration		10.0	6.2	7.8	6.5	7.8	6.3	6.5	2.9	6.6	3.8	6.4	5.9	7.4
Precipitation			3.2				0.0	0.8	31.7	32.3	6.6	74.6	9.6	17.8
Evaporation		5.6	2.4	3.8	3.4	2.2	1.4	3.2	1.5	2.8	4.4	30.7	34.7	46.9
Growing Degrees	5	16.6	15.7	14.9	15.6	14.6	14.7	14.2	14.8	14.4	11.6	147.1	146.9	149.4
	10	11.6	10.7	9.9	10.6	9.6	9.7	9.2	9.8	9.4	6.6	97.1	96.9	99.4

1st 10-day period (1-10/10/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	27.3	27.4	28.3
Precipitation - Reference Evapotranspiration	47.3	-17.8	-10.5
Number of Rainy Days	5.0	5.0	2.3
Number of Dry Days	10.0	3.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

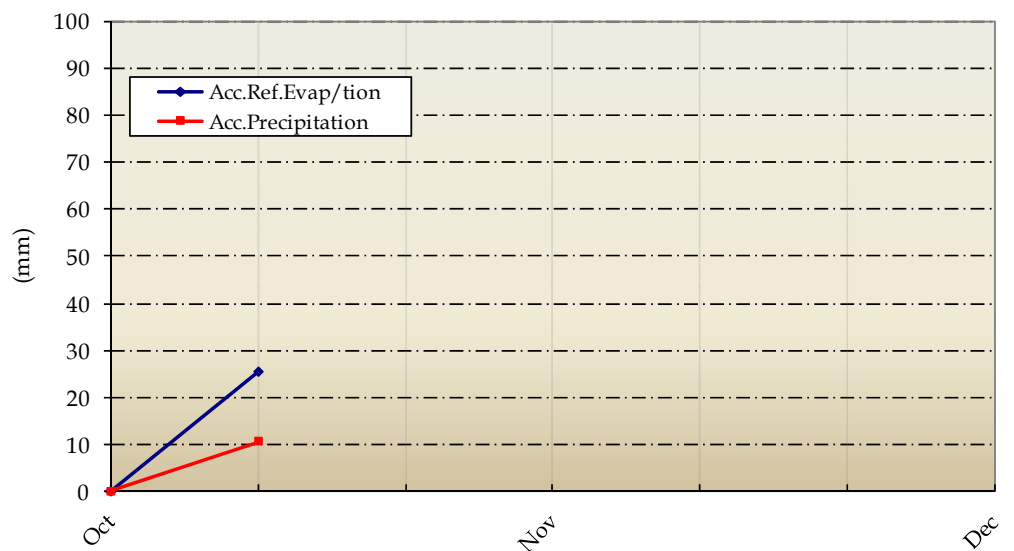


Larisa

1st 10-day period (1-10/10/2011)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	24.8	27.4	24.8	27.0	27.4	29.0	28.8	24.4	22.0	14.4	25.0	20.1	25.0
	Min	16.0	12.0	13.4	11.0	10.0	9.0	10.6	13.4	12.4	10.0	11.8	12.3	11.6
Relative Humidity	Max	79	83	86	93	92	87	85	92	96	90	88	91	-
	Min	40	30	49	34	35	25	26	46	64	52	40	56	-
Soil Temperature at 10 cm	06 UTC	20.8	20.4	20.6	20.0	20.0	20.0	19.8	21.0	20.6	17.0	20.0	18.4	19.3
	12 UTC	22.0	22.0	22.2	22.4	22.6	21.4	26.8	21.4	21.4	18.0	22.0	19.4	20.9
Sunshine Duration		7.5	8.7	5.2	8.1	8.1	8.1	8.0	2.5	2.8	2.4	6.1	4.4	6.2
Precipitation				0.6					0.0	7.9	2.0	10.5	27.7	10.5
Evaporation		5.3	5.5	3.2	4.3	5.7	3.0	3.8	5.2	3.5	2.0	41.5	-	41.2
Growing Degrees	5	15.4	14.7	14.1	14.0	13.7	14.0	14.7	13.9	12.2	7.2	133.9	112.0	133.0
	10	10.4	9.7	9.1	9.0	8.7	9.0	9.7	8.9	7.2	2.2	83.9	62.0	83.0

1st 10-day period (1-10/10/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	25.5	20.9	26.4
Precipitation - Reference Evapotranspiration	-15.0	6.8	-15.9
Number of Rainy Days	3.0	3.0	2.1
Number of Dry Days	10.0	6.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



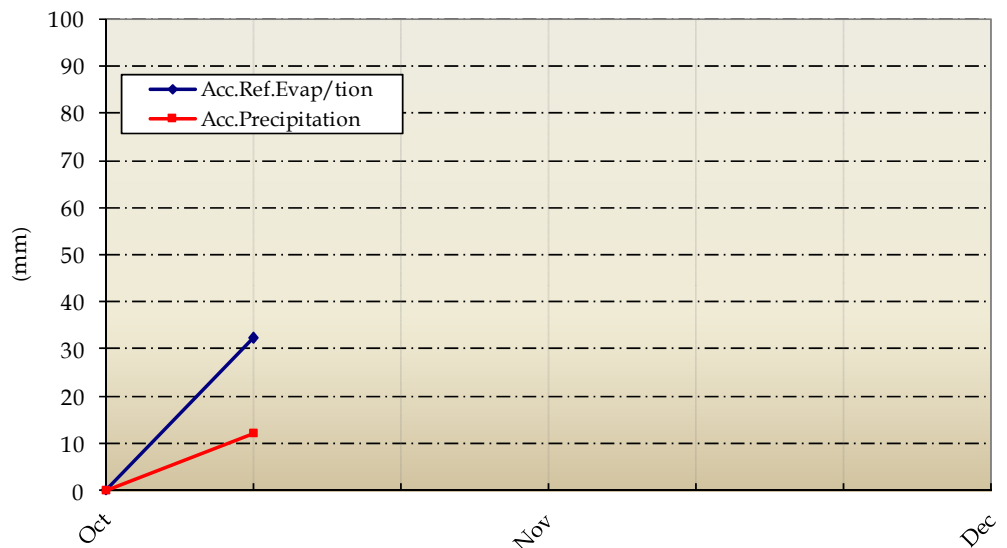


Mikra

1st 10-day period (1-10/10/2011)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	25.2	26.8	24.0	25.2	26.2	26.6	26.8	24.8	22.6	13.0	24.1	-	23.5
	Min	18.0	14.2	16.2	14.6	14.0	13.2	13.6	15.8	12.0	10.2	14.2	-	12.8
Relative Humidity	Max	74	81	83	85	93	75	73	93	87	85	83	-	-
	Min	36	32	53	41	29	32	45	42	49	60	42	-	-
Soil Temperature at 10 cm	06 UTC	22.0	21.2	21.4	19.0	21.0	20.6	20.6	21.2	19.0	15.2	20.1	-	18.4
	12 UTC	24.8	24.2	24.8	24.4	24.2	23.6	23.6	23.2	19.8	10.6	22.3	-	21.9
Sunshine Duration		8.7	9.6	8.0	9.7	9.8	9.9	9.0	3.7	5.9	0.0	7.4	-	6.2
Precipitation									0.0	3.6	8.5	12.1	-	9.7
Evaporation		6.8	5.6	3.0	5.4	5.8	6.0	5.9	4.6	0.9	3.4	47.4	-	40.2
Growing Degrees	5	16.6	15.5	15.1	14.9	15.1	14.9	15.2	15.3	12.3	6.6	141.5	-	131.6
	10	11.6	10.5	10.1	9.9	10.1	9.9	10.2	10.3	7.3	1.6	91.5	-	81.6

1st 10-day period (1-10/10/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	32.2	-	25.5
Precipitation - Reference Evapotranspiration	-20.1	-	-15.8
Number of Rainy Days	2.0	-	1.7
Number of Dry Days	17.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



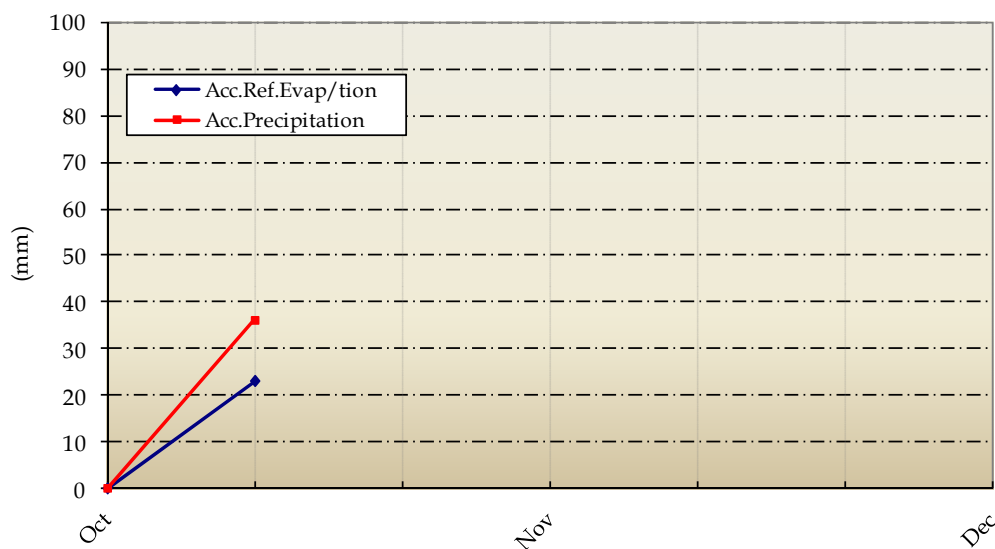


Tripoli

1st 10-day period (1-10/10/2011)		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	19.4	22.4	22.2	24.4	25.4	23.0	22.0	20.0	12.2	21.1	20.1	23.3
	Min	14.6	9.2	15.4	7.2	6.4	7.0	9.2	15.0	11.8	9.2	10.5	10.1	9.0
Relative Humidity	Max	62	90	63	94	94	100	95	96	98	97	89	92	-
	Min	40	48	40	34	32	21	40	57	48	70	43	52	-
Soil Temperature at 10 cm	06 UTC	18.2	17.0	16.6	15.8	18.0	16.4	17.0	17.4	17.0	15.0	16.8	16.8	17.3
	12 UTC	21.4	19.6	20.4	20.8	21.2	21.4	21.6	20.8	20.6	15.0	20.3	20.4	19.3
Sunshine Duration		9.1	5.0	5.6	7.0	8.6	9.0	6.9	5.6	5.8	1.1	6.4	5.1	7.4
Precipitation			1.0	0.1				1.7	2.2	18.3	13.0	36.3	8.2	9.7
Evaporation		3.3	1.9	5.8	2.2	3.6	4.0	2.9	1.0	0.0	0.4	25.1	22.6	32.6
Growing Degrees	5	12.5	9.3	13.9	9.7	10.4	11.2	11.1	13.5	10.9	5.7	108.2	101.0	111.8
	10	7.5	4.3	8.9	4.7	5.4	6.2	6.1	8.5	5.9	0.7	58.2	51.0	62.0

1st 10-day period (1-10/10/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	23.0	20.1	25.4
Precipitation - Reference Evapotranspiration	13.3	-11.9	-15.7
Number of Rainy Days	6.0	4.0	2.0
Number of Dry Days	10.0	3.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

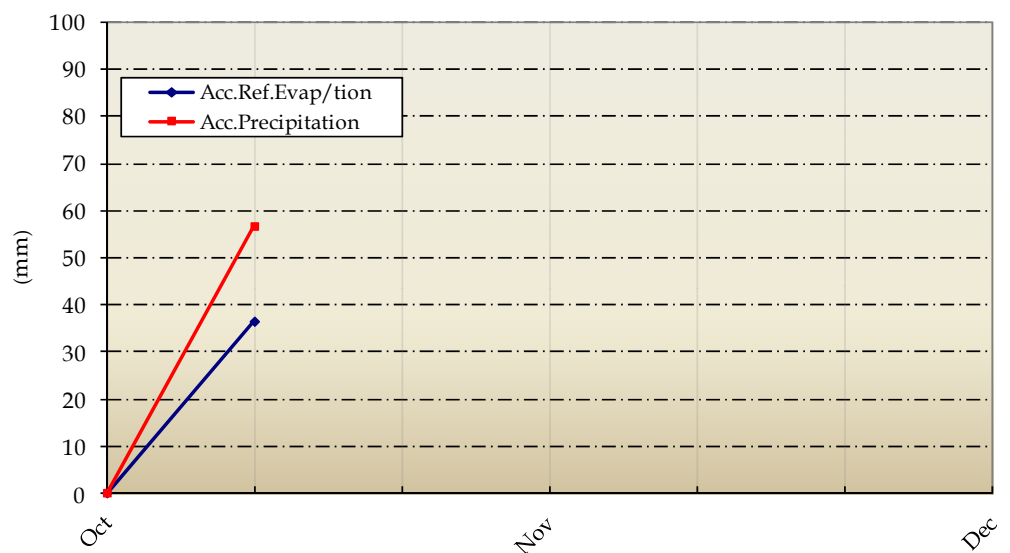


Tympaki

1st 10-day period (1-10/10/2011)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	25.8	26.8	25.2	25.6	25.6	26.4	26.2	25.8	22.6	22.8	25.3	26.3	26.4
	Min	18.0	13.0	14.2	15.2	14.6	15.0	16.4	16.8	19.8	15.2	15.8	17.0	15.7
Relative Humidity	Max	81	85	94	96	93	83	93	99	98	98	92	81	-
	Min	36	37	43	47	30	25	54	63	63	45	44	36	-
Soil Temperature at 10 cm	06 UTC	25.2	23.4	22.8	23.4	23.4	23.4	24.4	24.4	25.8	21.8	23.8	23.8	23.6
	12 UTC	28.6	27.0	26.6	28.2	27.8	28.0	27.6	28.9	26.4	21.6	27.1	28.0	27.5
Sunshine Duration		10.5	9.5	9.6	10.6	10.2	11.7	6.7	7.7	0.9	2.6	8.0	7.8	8.6
Precipitation									1.5	23.8	31.4	56.7	1.2	7.2
Evaporation		10.6	5.0	6.3	7.1	7.0	8.0	5.8	5.4	4.3	8.4	67.9	62.6	61.4
Growing Degrees	5	16.9	14.9	14.7	15.4	15.1	15.7	16.3	16.3	16.2	14.0	155.5	166.5	159.8
	10	11.9	9.9	9.7	10.4	10.1	10.7	11.3	11.3	11.2	9.0	105.5	116.5	110.0

1st 10-day period (1-10/10/2011)	Previous Year Value	Past Years Mean Value	
Reference Evapotranspiration	36.5	38.1	34.5
Precipitation - Reference Evapotranspiration	20.2	-36.9	-27.3
Number of Rainy Days	3.0	1.0	0.7
Number of Dry Days	16.0	6.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration





Note: The Met Stations "Trikala Imathias" and "Serres" have been replaced by "Ioannina" and "Mikra"

◆ 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.

**Mesurements 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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