



AGROMETEOROLOGICAL BULLETIN

September 2011
3rd 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

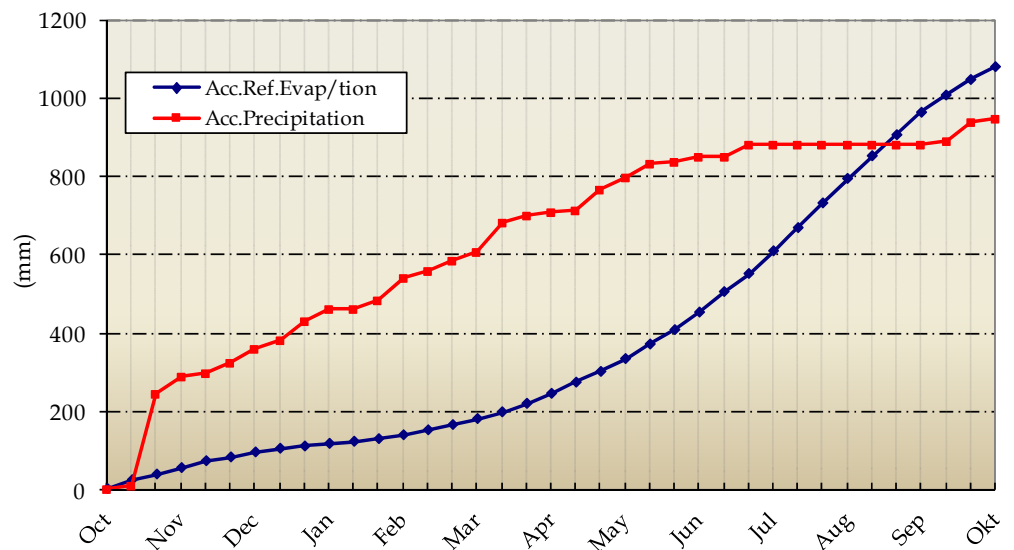
Web addresses of HNMS
www.hnms.gr
www.emy.gov.gr
www.meteo.gov.gr
www.meteohellas.gr

Agrinio

3rd 10-day period (21-30/09/2011)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	25.4	27.4	30.0	30.0	31.2	30.0	28.6	27.4	29.5	29.8	28.9	-	28.4
	Min	15.2	14.0	13.8	14.8	15.2	15.0	15.0	12.2	12.2	9.0	13.6	-	13.9
Relative Humidity	Max	98	98	98	98	93	80	74	93	86	92	91	-	-
	Min	52	44	31	26	28	33	28	30	25	26	32	-	-
Soil Temperature at 10 cm	06 UTC	21.6	21.4	21.2	22.2	22.4	21.6	21.2	20.4	20.0	19.6	21.2	-	20.7
	12 UTC	24.0	24.6	24.8	25.6	24.6	24.8	23.8	23.4	23.8	23.2	24.3	-	24.9
Sunshine Duration		7.4	8.0	10.0	10.3	9.9	9.8	10.7	10.7	10.5	10.3	9.8	-	7.7
Precipitation		3.9	3.2									7.1	-	17.6
Evaporation		13.0	4.4	4.5	4.0	6.7	5.4	7.6	11.0	2.8	3.2	62.6	-	47.0
Growing Degrees	5	15.3	15.7	16.9	17.4	18.2	17.5	16.8	14.8	15.9	14.4	162.9	-	161.3
	10	10.3	10.7	11.9	12.4	13.2	12.5	11.8	9.8	10.9	9.4	112.9	-	111.3

3rd 10-day period (21-30/09/2011)	Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	32.9	- 31.0
Precipitation - Reference Evapotranspiration	-25.8	- -13.4
Number of Rainy Days	2.0	- 1.7
Number of Dry Days	0.0	- -

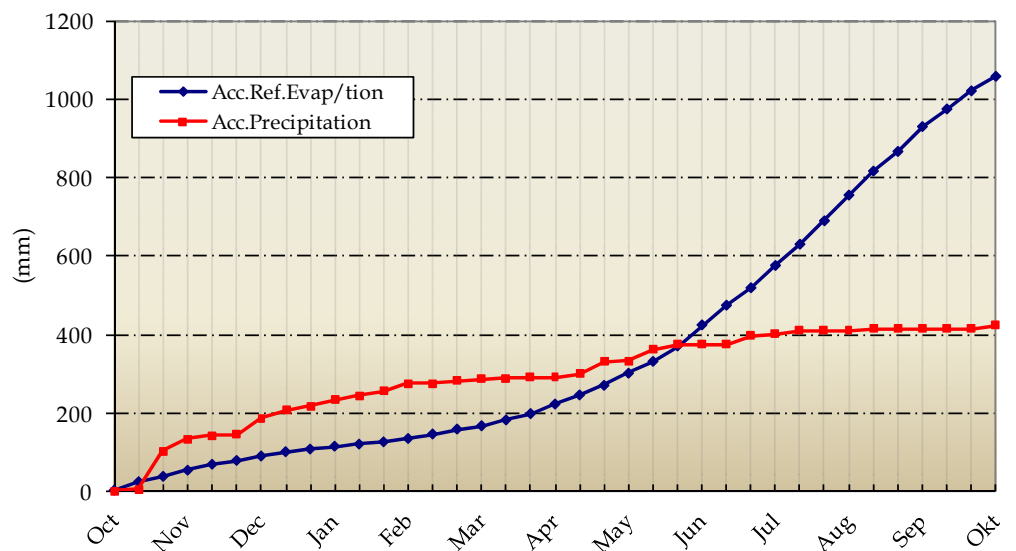
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-30/09/2011)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	23.8	24.0	28.6	28.8	28.6	26.0	25.4	25.6	27.4	24.2	26.2	25.3	24.9
	Min	19.8	17.8	14.8	11.4	12.0	17.6	15.2	17.2	14.6	15.6	15.6	17.6	13.0
Relative Humidity	Max	92	92	72	78	78	82	74	74	77	81	80	85	-
	Min	59	51	21	26	25	30	35	39	28	31	34	50	-
Soil Temperature at 10 cm	06 UTC	24.8	22.2	19.4	21.0	19.2	20.0	19.8	19.8	21.4	21.8	20.9	22.6	19.0
	12 UTC	24.4	21.4	25.0	26.8	22.0	22.8	22.0	24.0	23.6	24.0	23.6	24.1	22.4
Sunshine Duration		1.7	1.6	9.8	10.2	9.6	11.0	10.6	10.2	10.1	8.4	8.3	7.6	7.5
Precipitation		0.7	9.0									9.7	38.8	12.3
Evaporation		2.3	1.6	4.6	6.3	7.1	7.5	8.9	13.9	6.1	7.0	65.3	47.2	59.3
Growing Degrees	5	16.8	15.9	16.7	15.1	15.3	16.8	15.3	16.4	16.0	14.9	159.2	164.2	139.4
	10	11.8	10.9	11.7	10.1	10.3	11.8	10.3	11.4	11.0	9.9	109.2	114.2	89.4

3rd 10-day period (21-30/09/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	37.4	33.3	31.9
Precipitation - Reference Evapotranspiration	-27.7	5.5	-19.6
Number of Rainy Days	2.0	3.0	1.1
Number of Dry Days	40.0	24.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

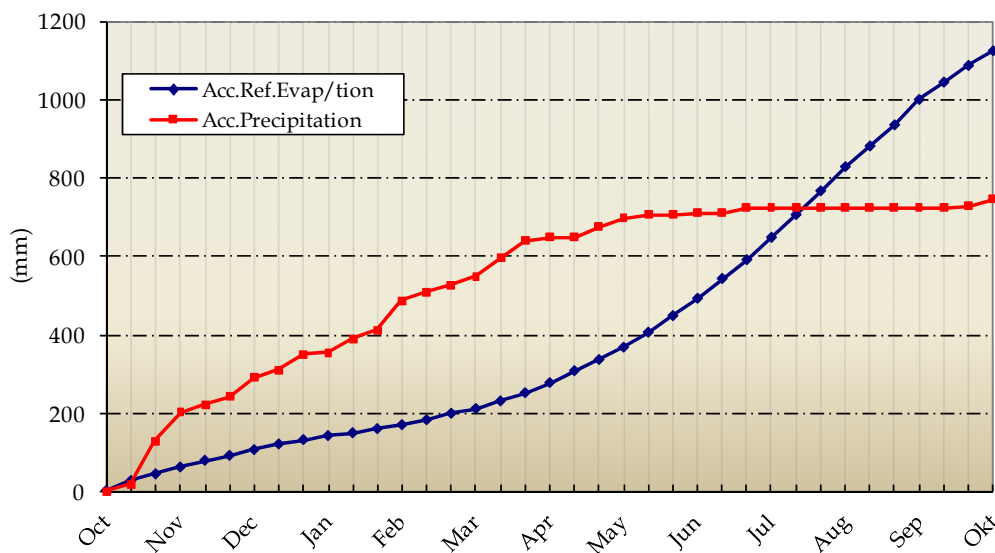


Andravida

3rd 10-day period (21-30/09/2011)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	24.4	29.0	28.6	28.2	30.2	31.0	30.0	28.8	29.4	28.0	28.8	27.2	27.0
	Min	16.2	15.2	16.4	15.8	15.6	14.2	13.0	12.4	12.8	11.2	14.3	18.7	15.6
Relative Humidity	Max	94	91	90	89	89	80	93	84	79	81	87	94	-
	Min	44	30	32	37	31	21	21	25	20	32	29	47	-
Soil Temperature at 10 cm	06 UTC	21.0	20.4	21.0	21.8	22.2	21.6	21.6	20.8	20.8	19.4	21.1	22.8	22.0
	12 UTC	26.4	26.4	27.8	29.2	29.8	29.2	29.2	29.0	27.4	26.6	28.1	27.6	25.5
Sunshine Duration		7.7	9.9	9.8	9.4	9.3	7.8	9.6	9.6	9.8	9.9	9.3	5.8	8.1
Precipitation		18.7										18.7	19.0	16.0
Evaporation		3.5	6.5	7.1	5.4	5.2	3.2	8.8	7.3	7.6	5.0	59.6	49.0	48.4
Growing Degrees	5	15.3	17.1	17.5	17.0	17.9	17.6	16.5	15.6	16.1	14.6	165.2	179.6	162.7
	10	10.3	12.1	12.5	12.0	12.9	12.6	11.5	10.6	11.1	9.6	115.2	129.6	112.7

3rd 10-day period (21-30/09/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	37.4	30.8	30.8
Precipitation - Reference Evapotranspiration	-18.7	-11.8	-14.8
Number of Rainy Days	1.0	5.0	1.5
Number of Dry Days	0.0	9.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

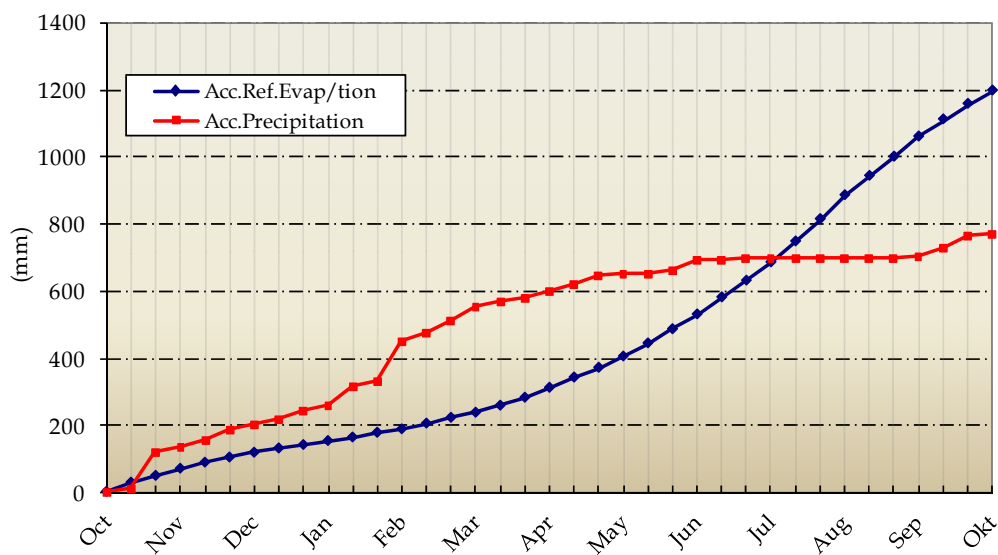


Kalamata

3rd 10-day period (21-30/09/2011)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	26.4	27.8	29.2	28.4	28.8	29.0	28.8	28.6	28.4	28.0	28.3	27.5	27.6
	Min	16.6	13.8	16.6	15.6	16.8	15.4	18.4	17.2	16.8	13.0	16.0	17.6	15.0
Relative Humidity	Max	98	95	92	90	88	75	63	64	64	69	80	94	-
	Min	41	40	35	32	33	35	32	32	32	30	34	51	-
Soil Temperature at 10 cm	06 UTC	22.0	21.8	21.6	22.0	22.0	21.6	21.6	21.4	21.4	20.6	21.6	23.4	21.4
	12 UTC	23.2	23.0	21.6	23.8	23.8	23.6	23.4	23.0	23.0	23.4	23.2	24.1	24.4
Sunshine Duration		6.9	6.5	10.7	10.7	10.4	10.0	10.2	10.3	10.8	10.4	9.7	5.8	7.7
Precipitation		2.8										2.8	23.4	12.3
Evaporation		6.3	3.4	7.8	4.4	6.1	5.3	6.4	5.6	6.0	5.0	56.3	36.1	51.4
Growing Degrees	5	16.5	15.8	17.9	17.0	17.8	17.2	18.6	17.9	17.6	15.5	171.8	175.4	162.8
	10	11.5	10.8	12.9	12.0	12.8	12.2	13.6	12.9	12.6	10.5	121.8	125.4	112.8

3rd 10-day period (21-30/09/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	39.7	30.1	32.9
Precipitation - Reference Evapotranspiration	-36.9	-6.7	-20.6
Number of Rainy Days	1.0	6.0	1.7
Number of Dry Days	0.0	7.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

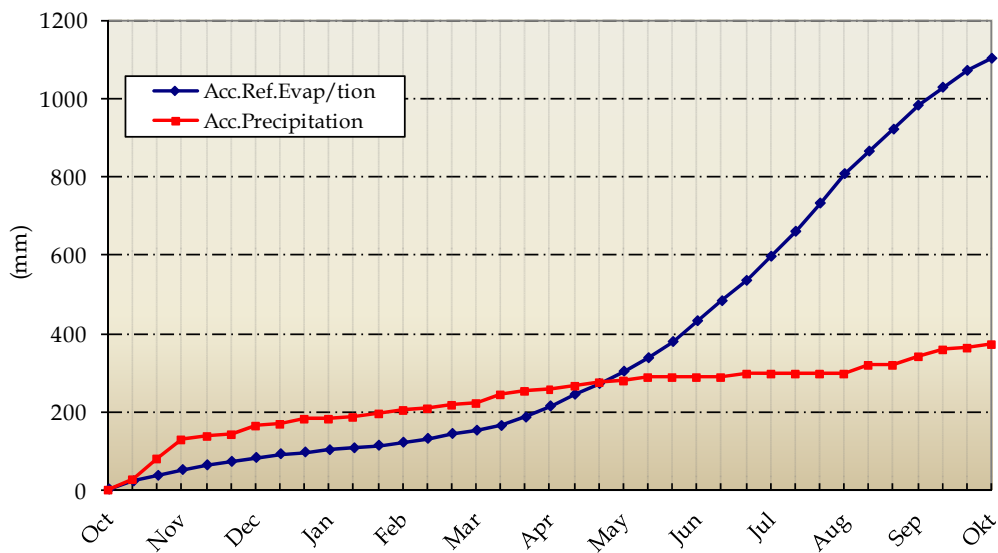


Larisa

3rd 10-day period (21-30/09/2011)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	22.6	24.8	29.2	29.6	29.0	25.2	24.6	23.8	27.4	27.0	26.3	26.1	27.3
	Min	14.0	16.0	12.4	12.6	12.4	14.8	12.0	13.0	9.4	9.6	12.6	16.2	13.0
Relative Humidity	Max	96	91	95	91	88	91	91	84	90	79	90	88	-
	Min	52	49	30	26	32	48	35	40	23	28	36	43	-
Soil Temperature at 10 cm	06 UTC	22.4	21.0	21.0	21.2	21.8	21.0	20.8	20.4	19.8	19.8	20.9	22.0	20.9
	12 UTC	24.2	22.6	23.2	24.0	24.6	22.6	21.8	22.0	23.0	23.0	23.1	23.5	22.7
Sunshine Duration		3.0	4.1	8.7	8.6	8.3	8.3	5.1	7.3	8.3	8.0	7.0	5.2	7.0
Precipitation		7.9	1.0									8.9	13.5	7.0
Evaporation		7.2	0.7	4.3	4.0	9.5	2.9	5.6	2.4	7.0	15.0	58.6	40.9	51.2
Growing Degrees	5	13.3	15.4	15.8	16.1	15.7	15.0	13.3	13.4	13.4	13.3	144.7	161.8	151.5
	10	8.3	10.4	10.8	11.1	10.7	10.0	8.3	8.4	8.4	8.3	94.7	111.8	101.5

3rd 10-day period (21-30/09/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	31.1	29.4	31.7
Precipitation - Reference Evapotranspiration	-22.2	-15.9	-24.7
Number of Rainy Days	2.0	4.0	1.7
Number of Dry Days	0.0	11.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

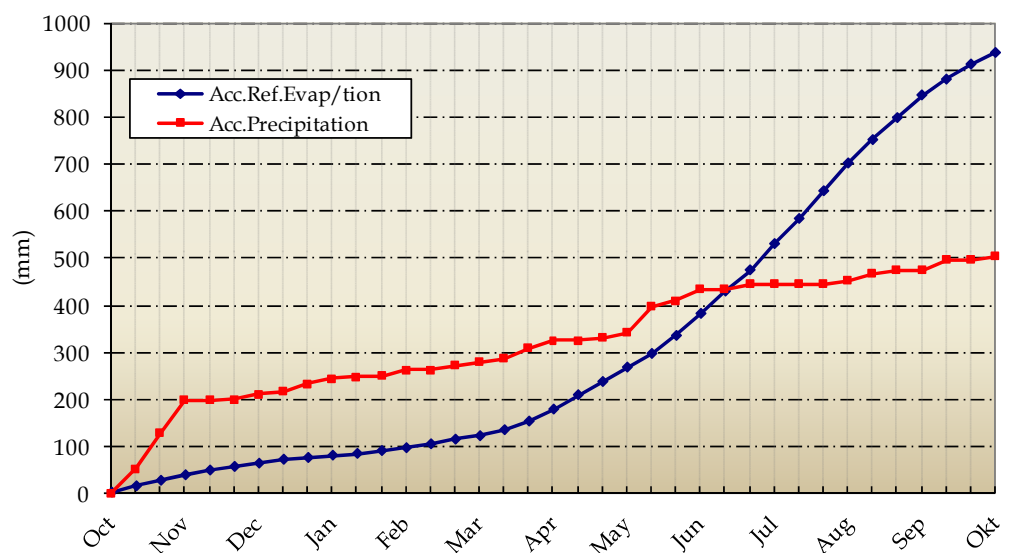


3rd 10-day period (21-30/09/2011)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	26.6	29.2	30.1	30.5	30.1	28.1	26.8	27.1	28.9	20.4	27.8	28.0	26.8
	Min	16.4	15.4	12.8	12.4	13.9	14.8	12.4	10.8	9.6	11.6	13.0	15.7	13.1
Relative Humidity	Max	96	95	93	-	88	90	92	92	92	81	91	73	-
	Min	77	34	19	-	26	38	30	27	19	20	32	34	-
Soil Temperature at 10 cm	06 UTC	24.2	21.2	20.8	20.6	-	21.4	20.8	20.0	19.8	20.0	21.0	23.1	19.3
	12 UTC	22.8	23.4	-	22.8	-	22.8	22.4	22.2	21.2	21.4	22.4	24.2	22.2
Sunshine Duration		0.0	7.7	9.9	-	9.7	6.6	9.4	9.3	9.3	8.9	7.9	6.2	7.2
Precipitation		5.1	0.7									5.8	14.1	6.6
Evaporation		0.0	3.6	5.6	-	3.2	3.2	2.9	3.2	3.2	3.7	-	32.3	38.3
Growing Degrees	5	16.5	17.3	16.5	16.5	17.0	16.5	14.6	14.0	14.3	11.0	154.0	168.3	147.0
	10	11.5	12.3	11.5	11.5	12.0	11.5	9.6	9.0	9.3	6.0	104.0	118.3	97.8

Series

3rd 10-day period (21-30/09/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	24.7	26.6	24.2
Precipitation - Reference Evapotranspiration	-18.9	-12.5	-17.6
Number of Rainy Days	2.0	3.0	1.7
Number of Dry Days	13.0	13.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



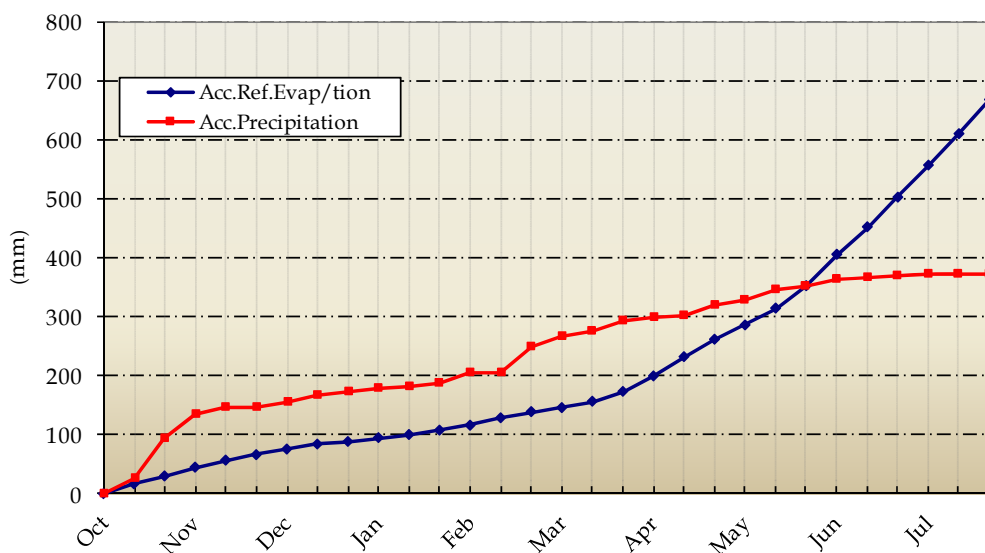
Trikala Imathias

3rd 10-day period (21-30/09/2011)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	-	-	-	-	-	-	-	-	-	-	-	26.4	26.5
	Min	-	-	-	-	-	-	-	-	-	-	-	15.2	13.4
Relative Humidity	Max	-	-	-	-	-	-	-	-	-	-	-	95	-
	Min	-	-	-	-	-	-	-	-	-	-	-	45	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	21.1	20.5
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	22.7	21.6
Sunshine Duration		-	-	-	-	-	-	-	-	-	-	-	5.9	6.8
Precipitation		-	-	-	-	-	-	-	-	-	-	-	60.1	6.9
Evaporation		-	-	-	-	-	-	-	-	-	-	-	28.8	34.1
Growing Degrees	5	-	-	-	-	-	-	-	-	-	-	-	157.9	149.0
	10	-	-	-	-	-	-	-	-	-	-	-	107.9	99.2

3rd 10-day period (21-30/09/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	24.9	25.6
Precipitation - Reference Evapotranspiration	-	35.2	-18.7
Number of Rainy Days	-	4.0	1.6
Number of Dry Days	-	20.0	-

The station is temporarily closed

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

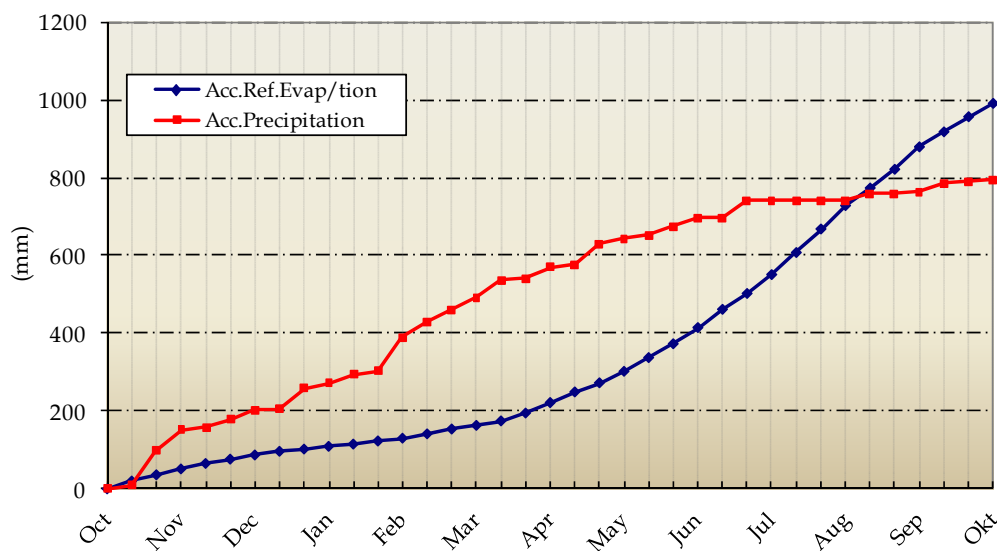


Tripoli

3rd 10-day period (21-30/09/2011)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	22.8	20.4	25.8	26.8	26.0	24.6	22.2	21.8	22.4	23.8	23.7	-	25.0
	Min	13.4	11.8	12.4	8.6	8.8	10.4	14.8	14.2	14.8	8.6	11.8	-	10.2
Relative Humidity	Max	95	93	86	94	92	82	68	74	66	73	82	-	-
	Min	41	55	30	23	25	35	39	39	35	30	35	-	-
Soil Temperature at 10 cm	06 UTC	19.0	17.8	17.2	17.0	17.4	17.6	18.4	18.0	17.8	16.6	17.7	-	18.9
	12 UTC	22.6	20.6	22.4	22.8	22.6	22.8	22.4	22.0	22.2	22.0	22.2	-	21.1
Sunshine Duration		7.7	3.1	10.2	10.2	10.1	9.2	10.4	12.3	12.3	10.2	9.6	-	7.8
Precipitation		3.6										3.6	-	11.6
Evaporation		1.9	1.6	3.6	5.0	5.8	6.5	4.3	6.2	4.7	4.1	43.7	-	36.1
Growing Degrees	5	13.1	11.1	14.1	12.7	12.4	12.5	13.5	13.0	13.6	11.2	127.2	-	126.3
	10	8.1	6.1	9.1	7.7	7.4	7.5	8.5	8.0	8.6	6.2	77.2	-	76.4

3rd 10-day period (21-30/09/2011)	Previous Year Value	Past Years Mean Value	
Reference Evapotranspiration	34.3	-	29.5
Precipitation - Reference Evapotranspiration	-30.7	-	-17.9
Number of Rainy Days	1.0	-	1.5
Number of Dry Days	0.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

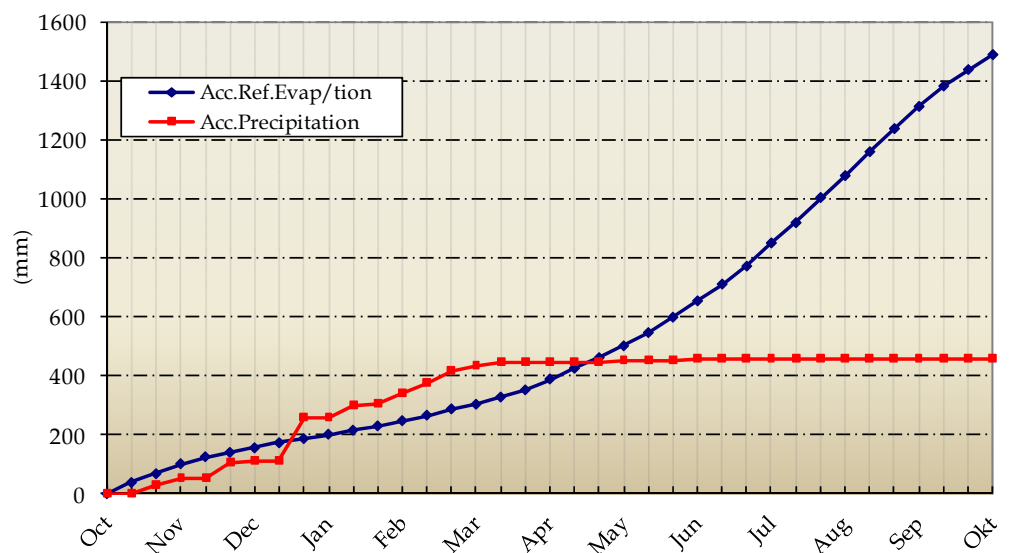


Tympaki

3rd 10-day period (21-30/09/2011)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	27.8	27.6	27.8	29.0	29.4	30.0	28.6	28.0	28.2	29.4	28.6	29.6	27.8
	Min	18.2	19.6	17.0	17.4	14.4	16.0	17.6	15.6	16.6	16.4	16.9	20.1	17.1
Relative Humidity	Max	92	76	91	80	85	92	92	91	92	59	85	95	-
	Min	52	37	50	27	33	33	36	37	42	21	37	46	-
Soil Temperature at 10 cm	06 UTC	28.2	26.6	25.6	25.2	24.8	24.4	25.6	25.2	25.2	25.0	25.6	26.8	25.4
	12 UTC	30.4	30.0	28.8	29.0	29.2	29.4	29.4	29.8	29.0	28.6	29.4	30.6	29.1
Sunshine Duration		7.9	5.8	8.8	10.6	10.5	10.3	10.5	10.4	9.8	10.5	9.5	6.8	8.7
Precipitation		1.2										1.2	1.1	4.2
Evaporation		8.2	7.5	11.1	9.4	8.1	8.8	12.0	6.8	9.3	10.8	92.0	70.9	67.1
Growing Degrees	5	18.0	18.6	17.4	18.2	16.9	18.0	18.1	16.8	17.4	17.9	177.3	198.3	174.3
	10	13.0	13.6	12.4	13.2	11.9	13.0	13.1	11.8	12.4	12.9	127.3	148.3	124.3

3rd 10-day period (21-30/09/2011)	Previous Year Value	Past Years Mean Value	
Reference Evapotranspiration	50.6	39.2	38.0
Precipitation - Reference Evapotranspiration	-49.4	-38.1	-33.8
Number of Rainy Days	1.0	1.0	0.6
Number of Dry Days	115.0	17.0	-

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.

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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Helliniko, Athens



ΕΘΝΙΚΗ
ΜΕΤΕΩΡΟΛΟΓΙΚΗ
ΥΠΗΡΕΣΙΑ

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