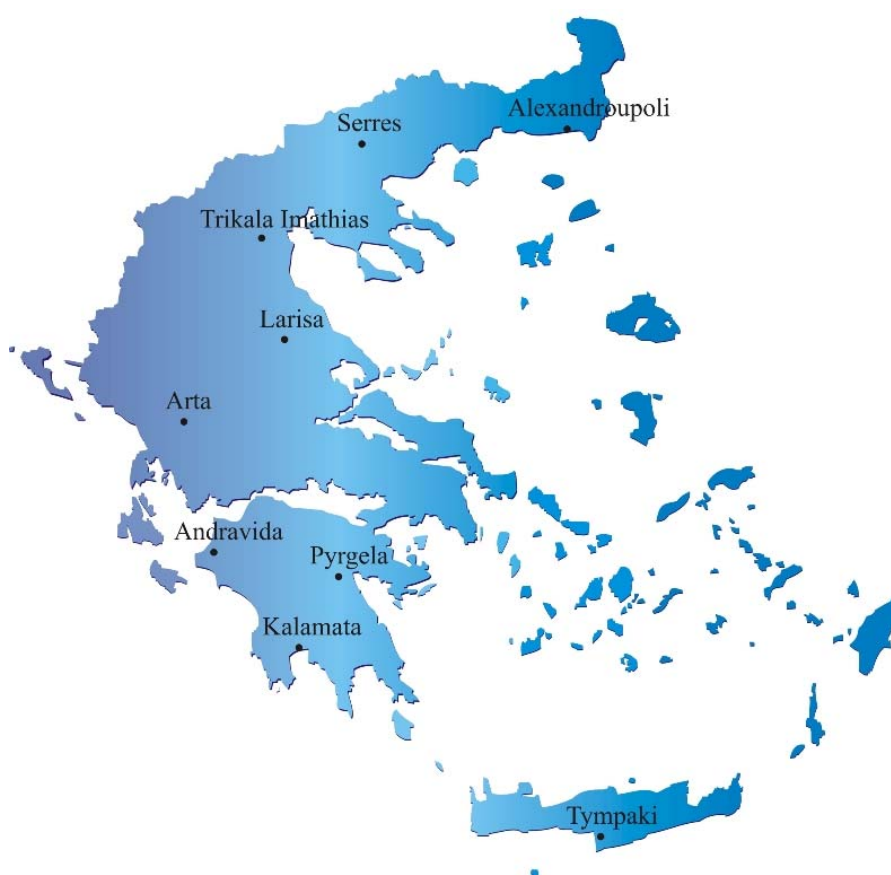




AGROMETEOROLOGICAL BULLETIN

December 2009
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



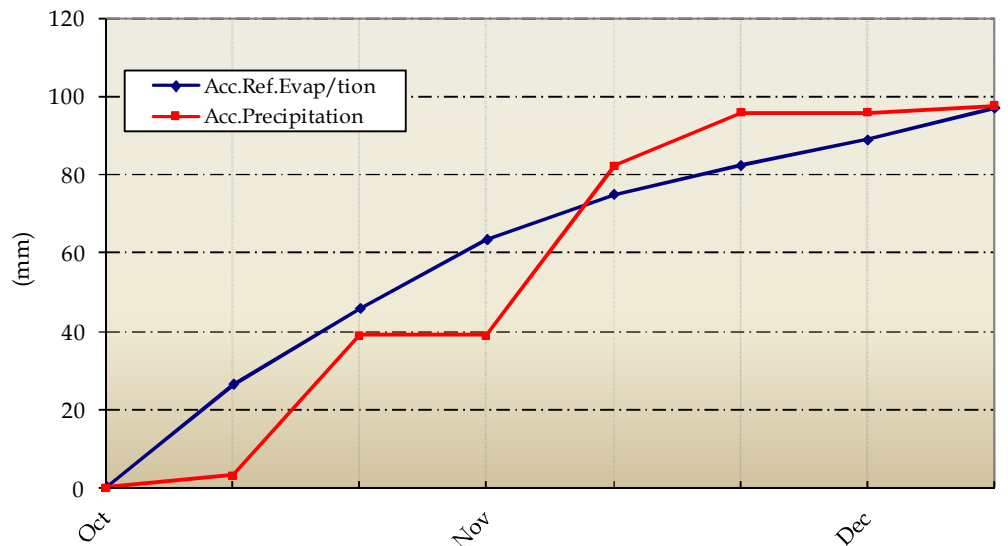
Hellenic National Meteorological Service
Division of Climatology-Applications
El. Venizelou Street 14, 16777
Helliniko, Athens

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

1st 10-day period (1-10/12/2009)		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	17.2	17.2	14.4	15.0	14.2	12.8	12.6	11.0	11.0	14.4	-	11.0
	Min	12.0	14.4	10.6	8.6	11.0	9.0	5.6	1.6	7.4	7.2	8.7	-	3.3
Relative Humidity	Max	96	89	92	95	95	88	97	96	92	89	93	-	-
	Min	75	66	52	72	72	67	63	70	75	72	68	-	-
Soil Temperature at 10 cm	06 UTC	13.4	13.8	13.0	12.4	12.6	12.0	10.2	8.8	10.0	10.4	11.7	-	7.1
	12 UTC	14.2	14.6	13.8	13.2	13.0	13.0	11.2	9.8	10.6	10.6	12.4	-	8.4
Sunshine Duration		1.0	0.5	4.4	3.0	0.3	1.9	3.0	1.3	0.0	0.0	1.5	-	2.7
Precipitation			0.0	0.8	0.8					0.0	0.3	1.9	-	30.2
Evaporation		0.3	2.1	0.8	0.3	1.1	1.5	0.4	1.6	0.7	0.9	9.7	-	14.9
Growing Degrees	5	10.3	10.8	8.9	6.5	8.0	6.6	4.2	2.1	4.2	4.1	65.7	-	28.2
	10	5.3	5.8	3.9	1.5	3.0	1.6	0.0	0.0	0.0	0.0	21.1	-	5.3

1st 10-day period (1-10/12/2009)	Previous Year Value	Past Years Mean Value	
Reference Evapotranspiration	8.2	-	9.7
Precipitation - Reference Evapotranspiration	-6.3	-	20.5
Number of Rainy Days	3.0	-	3.2
Number of Dry Days	19.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

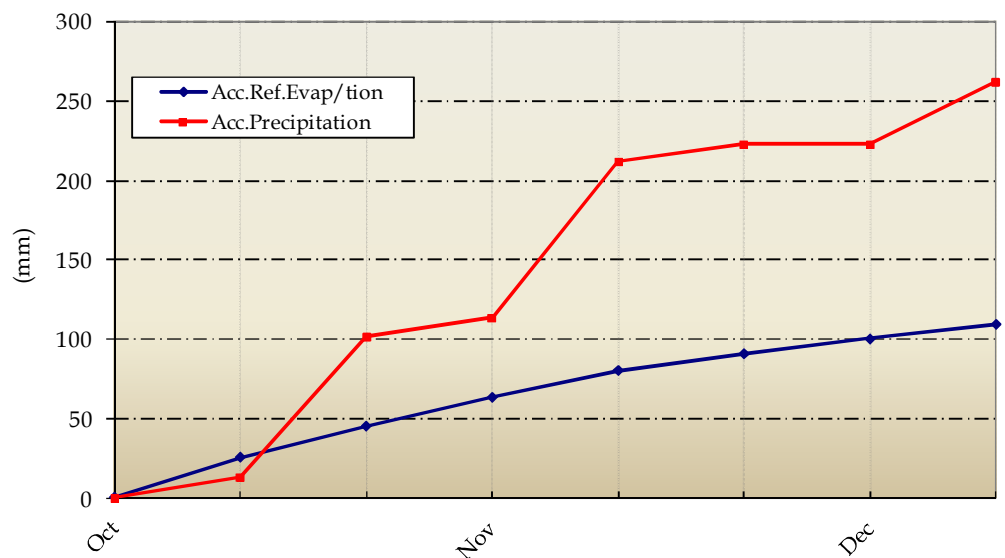


Andravida

1st 10-day period (1-10/12/2009)		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	15.8	17.0	17.0	14.4	18.2	16.2	16.8	18.2	14.0	16.8	-	15.9
	Min	14.6	11.8	10.6	8.2	11.6	10.4	7.0	8.0	10.0	6.8	9.9	-	7.3
Relative Humidity	Max	89	98	98	95	98	95	97	97	97	97	96	-	-
	Min	53	68	68	59	85	59	66	66	68	55	65	-	-
Soil Temperature at 10 cm	06 UTC	14.6	14.4	14.0	13.8	13.8	12.8	12.4	12.2	13.2	12.4	13.4	-	10.4
	12 UTC	16.2	14.4	16.0	16.2	16.0	15.0	14.0	14.6	14.8	13.8	15.1	-	12.0
Sunshine Duration		3.3	0.0	3.4	5.0	0.0	8.0	4.4	6.6	0.6	6.6	3.8	-	4.3
Precipitation			8.8	8.1		14.6	0.4	0.2			7.0	39.1	-	41.8
Evaporation		3.4	0.1	4.4	0.1	0.7	2.3	3.9	1.4	2.6	3.1	22.0	-	19.4
Growing Degrees	5	12.3	8.8	8.8	7.6	8.0	9.3	6.6	7.4	9.1	5.4	83.3	-	66.0
	10	7.3	3.8	3.8	2.6	3.0	4.3	1.6	2.4	4.1	0.4	33.3	-	20.7

1st 10-day period (1-10/12/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	9.2	-	9.1
Precipitation - Reference Evapotranspiration	29.9	-	32.7
Number of Rainy Days	6.0	-	4.6
Number of Dry Days	19.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

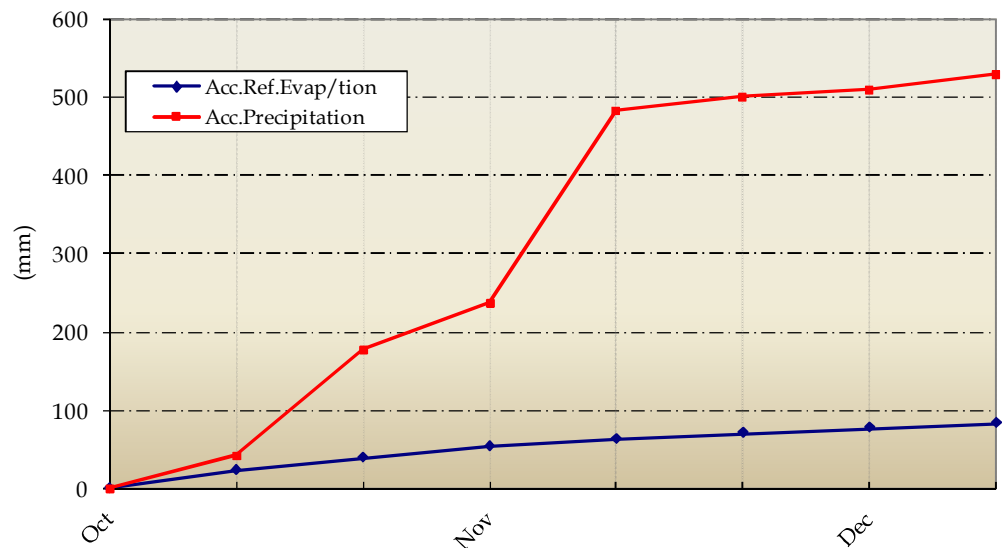




1st 10-day period (1-10/12/2009)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	20.2	17.4	19.0	15.4	15.2	20.6	18.0	18.0	15.0	13.0	17.2	-	15.4
	Min	13.0	12.0	8.2	7.0	10.6	6.4	5.4	5.4	10.4	7.6	8.6	-	5.5
Relative Humidity	Max	96	99	100	100	98	94	100	94	98	89	97	-	-
	Min	55	55	60	77	70	48	49	65	91	69	64	-	-
Soil Temperature at 10 cm	06 UTC	12.8	13.6	13.0	12.6	13.0	11.2	10.6	10.2	11.6	12.0	12.1	-	9.0
	12 UTC	13.6	13.8	13.4	13.0	13.2	12.0	11.6	10.8	12.4	12.0	12.6	-	10.4
Sunshine Duration		0.7	0.0	6.2	2.0	0.6	8.0	7.2	5.3	0.0	0.9	3.1	-	4.0
Precipitation			3.7	5.9	1.1	3.1				4.7	2.5	21.0	-	68.5
Evaporation		0.6	0.1	1.7	0.3	1.3	1.2	0.9	0.6	0.3	1.0	8.0	-	-
Growing Degrees	5	11.6	9.7	8.6	6.2	7.9	8.5	6.7	6.7	7.7	5.3	78.9	-	54.3
	10	6.6	4.7	3.6	1.2	2.9	3.5	1.7	1.7	2.7	0.3	28.9	-	13.5

1st 10-day period (1-10/12/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.0	-	7.3
Precipitation - Reference Evapotranspiration	15.0	-	61.2
Number of Rainy Days	6.0	-	4.6
Number of Dry Days	2.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

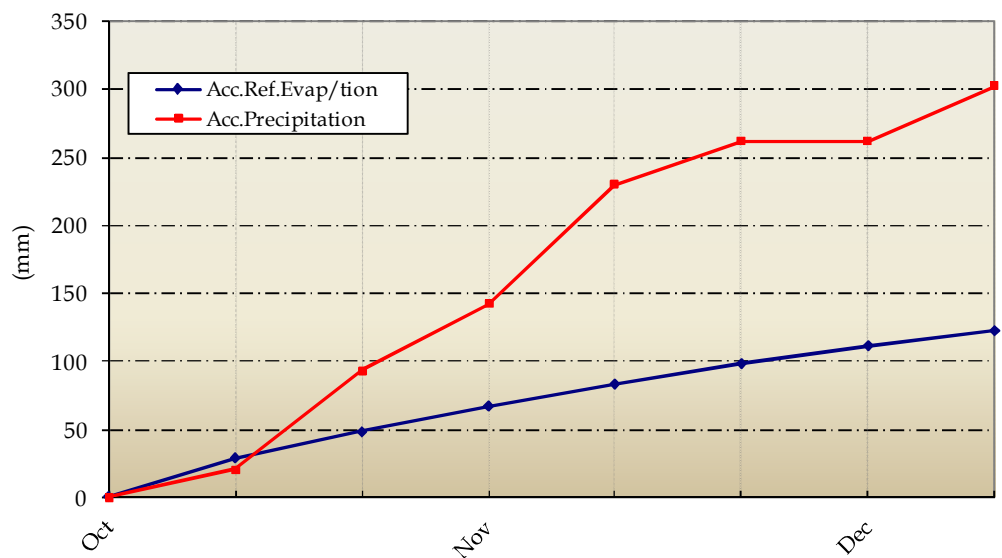


Kalamata

1st 10-day period (1-10/12/2009)		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	18.2	17.4	16.4	14.6	20.4	18.4	18.4	17.8	13.4	17.5	-	16.9
	Min	12.0	11.6	10.0	9.6	10.2	10.6	7.6	6.0	7.8	6.0	9.1	-	7.2
Relative Humidity	Max	93	95	97	97	95	97	97	94	97	97	96	-	-
	Min	63	64	67	65	85	53	52	59	68	68	64	-	-
Soil Temperature at 10 cm	06 UTC	15.0	15.4	14.0	14.4	14.0	14.0	12.2	12.8	13.0	13.0	13.8	-	11.5
	12 UTC	15.4	15.4	15.0	14.8	14.4	14.4	14.0	13.6	14.0	13.2	14.4	-	12.5
Sunshine Duration		3.7	0.0	4.1	2.6	0.0	7.0	6.9	6.6	3.2	1.8	3.6	-	4.0
Precipitation		4.4	7.2	1.1		18.6	1.0			0.0	8.0	40.3	-	45.8
Evaporation		3.0	1.2	1.5	0.3	2.0	3.0	2.8	0.9	1.1	0.2	16.0	-	26.7
Growing Degrees	5	11.1	9.9	8.7	8.0	7.4	10.5	8.0	7.2	7.8	4.7	83.3	-	70.4
	10	6.1	4.9	3.7	3.0	2.4	5.5	3.0	2.2	2.8	0.0	33.6	-	22.7

1st 10-day period (1-10/12/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	11.0	-	10.9
Precipitation - Reference Evapotranspiration	29.3	-	34.9
Number of Rainy Days	6.0	-	4.7
Number of Dry Days	18.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

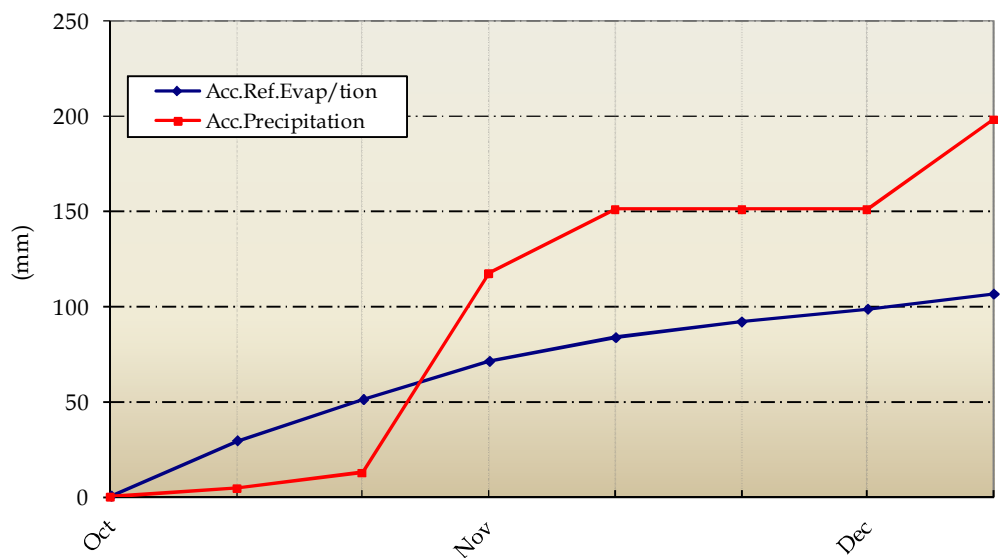


Larisa

1st 10-day period (1-10/12/2009)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	16.0	16.2	16.4	16.0	15.0	16.4	15.2	12.8	12.2	10.6	14.7	-	11.5
	Min	4.8	10.2	10.0	4.0	7.6	10.0	5.2	2.2	7.4	8.0	6.9	-	2.7
Relative Humidity	Max	97	98	97	100	97	94	97	100	100	97	98	-	-
	Min	68	75	63	63	72	56	62	70	83	68	68	-	-
Soil Temperature at 10 cm	06 UTC	10.2	11.6	11.8	11.0	11.0	12.0	11.2	9.8	10.8	10.2	11.0	-	8.1
	12 UTC	11.4	12.0	12.0	11.8	12.0	12.8	12.0	10.6	10.3	10.8	11.6	-	8.8
Sunshine Duration		0.0	0.0	2.5	5.1	0.0	4.2	5.4	1.3	0.5	0.0	1.9	-	2.9
Precipitation			5.3	10.3		2.6	0.1			2.1	27.1	47.5	-	18.5
Evaporation		0.9	0.0	0.0	0.6	1.0	2.2	0.2	1.7	0.6	0.5	7.7	-	7.8
Growing Degrees	5	5.4	8.2	8.2	5.0	6.3	8.2	5.2	2.5	4.8	4.3	58.1	-	25.6
	10	0.4	3.2	3.2	0.0	1.3	3.2	0.2	0.0	0.0	0.0	11.5	-	2.3

1st 10-day period (1-10/12/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	8.0	-	6.7
Precipitation - Reference Evapotranspiration	39.5	-	11.8
Number of Rainy Days	6.0	-	3.6
Number of Dry Days	20.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

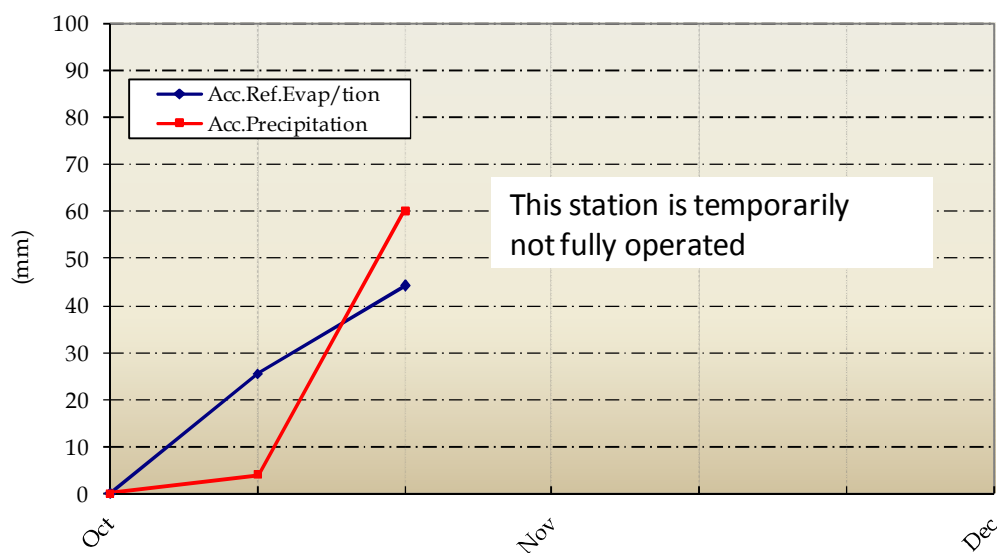


Pyrgela

1st 10-day period (1-10/12/2009)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	-	-	-	-	-	-	-	-	-	-	-	-	16.2
	Min	5.8	13.2	7.2	7.4	7.8	-	4.6	4.6	4.2	-	6.8	-	5.5
Relative Humidity	Max	91	93	91	89	-	-	93	91	-	-	91	-	-
	Min	48	64	33	21	-	-	36	37	-	-	40	-	-
Soil Temperature at 10 cm	06 UTC	10.4	13.0	11.8	11.4	11.2	-	9.8	11.0	10.6	-	11.2	-	8.9
	12 UTC	14.4	13.6	14.6	14.0	14.0	-	13.4	14.0	13.0	-	13.9	-	11.8
Sunshine Duration		3.7	0.2	6.9	6.8	-	4.7	6.8	6.0	-	-	5.0	-	3.5
Precipitation			8.5	9.1		0.3	-				-	-	-	24.7
Evaporation		1.0	0.6	1.4	0.8	-	-	2.0	1.0	-	-	-	-	9.3
Growing Degrees	5	-	-	-	-	-	-	-	-	-	-	-	-	58.8
	10	-	-	-	-	-	-	-	-	-	-	-	-	16.5

1st 10-day period (1-10/12/2009)	Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	7.6
Precipitation - Reference Evapotranspiration	-	17.1
Number of Rainy Days	-	3.9
Number of Dry Days	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

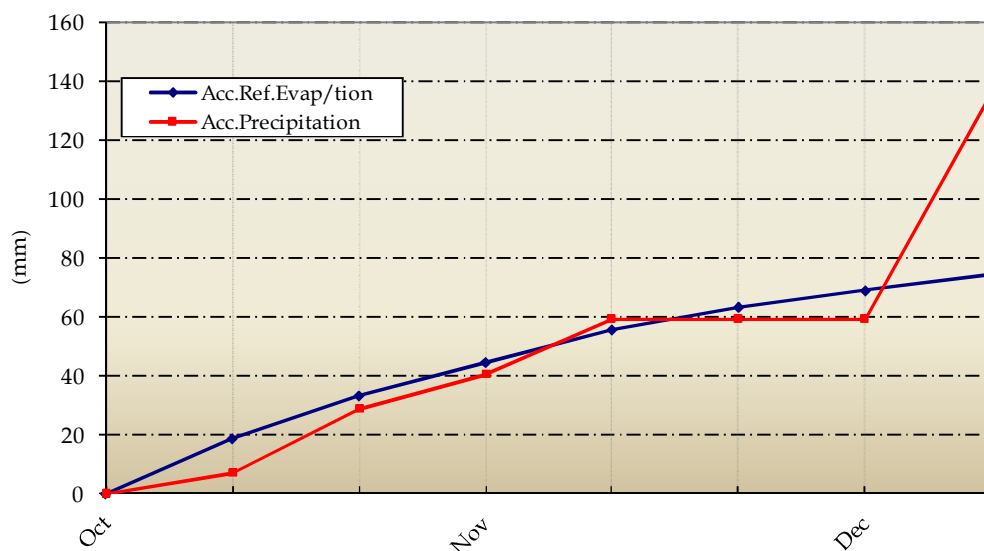


Series

1st 10-day period (1-10/12/2009)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	16.4	16.8	15.6	14.8	14.4	15.4	14.4	11.0	11.0	10.0	14.0	-	9.8
	Min	5.6	11.4	10.4	8.0	6.6	6.0	5.4	5.2	5.0	6.0	7.0	-	1.6
Relative Humidity	Max	91	95	95	95	95	91	94	94	95	94	94	-	-
	Min	65	75	78	70	70	63	60	78	83	73	72	-	-
Soil Temperature at 10 cm	06 UTC	8.6	11.0	11.4	11.0	10.0	9.3	9.2	8.4	9.8	9.6	9.8	-	6.2
	12 UTC	8.0	12.2	-	-	12.0	12.2	-	9.0	9.4	9.6	10.3	-	6.9
Sunshine Duration		0.0	0.0	0.6	0.8	0.5	2.4	2.5	0.0	0.0	0.0	0.7	-	2.9
Precipitation			47.4	6.7	0.0					9.6	13.1	76.8	-	19.3
Evaporation		1.2	0.0	0.5	0.3	0.1	1.0	0.5	0.0	0.0	0.5	4.1	-	5.2
Growing Degrees	5	6.0	9.1	8.0	6.4	5.5	5.7	4.9	3.1	3.0	3.0	54.7	-	16.0
	10	1.0	4.1	3.0	1.4	0.5	0.7	0.0	0.0	0.0	0.0	10.7	-	1.1

1st 10-day period (1-10/12/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	5.5	-	4.2
Precipitation - Reference Evapotranspiration	71.3	-	15.1
Number of Rainy Days	4.0	-	3.2
Number of Dry Days	21.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

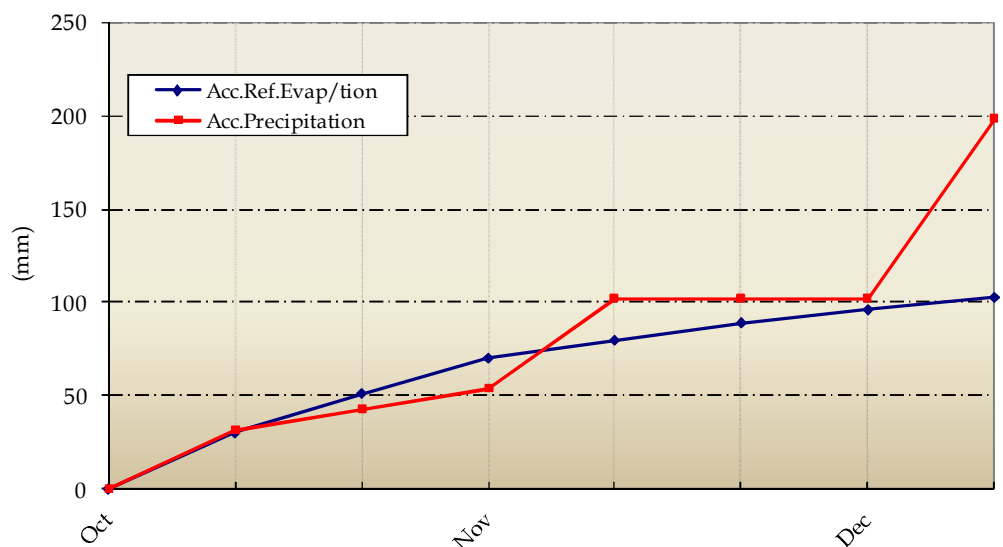


Trikala Imathias

1st 10-day period (1-10/12/2009)		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	16.6	15.6	16.0	15.2	15.4	15.4	13.4	11.2	10.4	14.5	-	10.6
	Min	11.0	10.6	11.0	7.6	9.0	9.0	6.8	6.0	8.8	6.4	8.6	-	2.3
Relative Humidity	Max	98	95	93	97	95	92	97	95	98	97	96	-	-
	Min	85	65	66	70	81	47	50	74	92	91	72	-	-
Soil Temperature at 10 cm	06 UTC	11.2	12.0	12.0	11.0	11.0	11.0	10.4	10.0	11.0	6.8	10.6	-	7.8
	12 UTC	12.4	12.2	12.8	12.6	13.0	11.8	11.2	11.0	11.0	9.4	11.7	-	8.0
Sunshine Duration		0.0	0.0	0.1	4.0	0.0	2.3	7.6	0.3	0.0	0.0	1.4	-	3.4
Precipitation			6.0	12.9		1.6				12.4	63.4	96.3	-	32.7
Evaporation		1.5	0.7	0.5	1.0	1.0	0.8	1.0	0.8	0.4	0.2	7.9	-	6.5
Growing Degrees	5	8.3	8.6	8.3	6.8	7.1	7.2	6.1	4.7	5.0	3.4	65.5	-	20.1
	10	3.3	3.6	3.3	1.8	2.1	2.2	1.1	0.0	0.0	0.0	17.4	-	1.5

1st 10-day period (1-10/12/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.6	-	5.9
Precipitation - Reference Evapotranspiration	89.7	-	26.8
Number of Rainy Days	5.0	-	3.0
Number of Dry Days	21.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

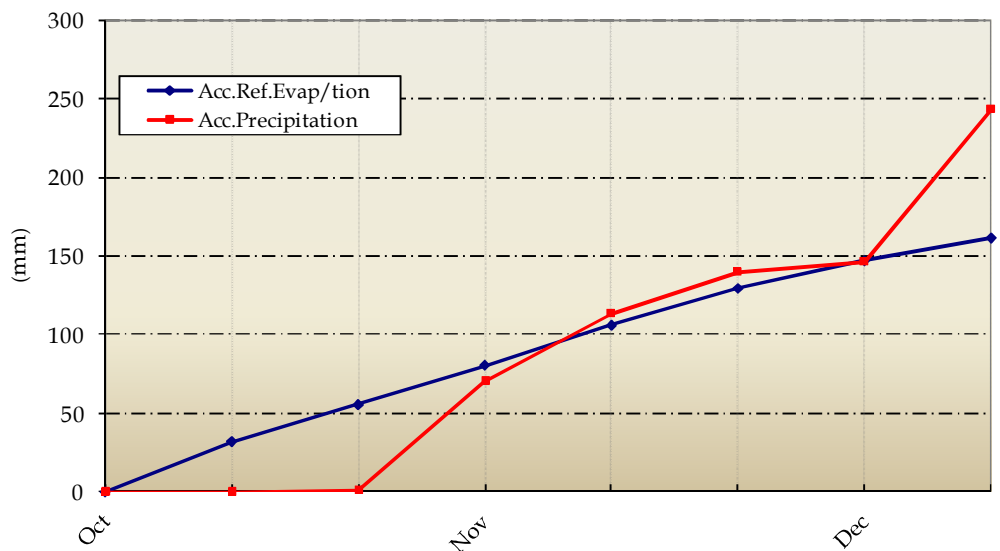


Tympaki

1st 10-day period (1-10/12/2009)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	20.8	19.8	18.4	19.6	19.0	19.8	19.8	19.6	19.4	18.2	19.4	-	17.9
	Min	11.6	13.0	11.0	11.2	11.6	8.4	10.4	9.0	8.6	11.6	10.6	-	9.7
Relative Humidity	Max	97	100	97	99	100	99	92	97	98	100	98	-	-
	Min	52	59	60	49	58	49	41	45	59	51	52	-	-
Soil Temperature at 10 cm	06 UTC	14.8	17.0	13.8	14.6	14.6	13.2	13.0	12.4	12.6	15.0	14.1	-	13.2
	12 UTC	18.6	16.8	15.6	16.8	16.8	15.2	15.8	16.0	15.4	16.4	16.3	-	15.3
Sunshine Duration		5.3	0.5	3.1	7.0	3.4	4.4	5.7	7.0	2.5	2.2	4.1	-	4.4
Precipitation			17.9	41.7	0.9	32.5	1.7			0.6	2.0	97.3	-	32.3
Evaporation		1.9	1.4	2.5	3.4	2.8	1.8	3.5	2.0	0.1	3.4	22.8	-	28.9
Growing Degrees	5	11.2	11.4	9.7	10.4	10.3	9.1	10.1	9.3	9.0	9.9	100.4	-	88.1
	10	6.2	6.4	4.7	5.4	5.3	4.1	5.1	4.3	4.0	4.9	50.4	-	38.8

1st 10-day period (1-10/12/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	14.4	-	14.0
Precipitation - Reference Evapotranspiration	82.9	-	18.3
Number of Rainy Days	7.0	-	3.6
Number of Dry Days	2.0	-	-

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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