

AGROMETEOROLOGICAL BULLETIN

December 2009
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



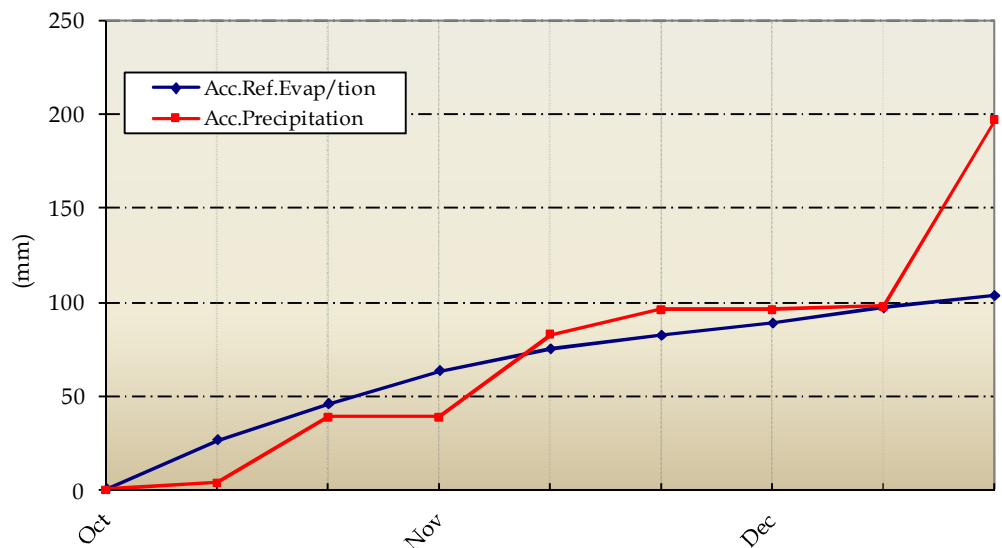
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www.hnms.gr
www.emy.gov.gr
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www.meteohellas.gr

2nd 10-day period (11-20/12/2009)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	7.2	4.8	4.2	6.8	10.6	11.4	7.4	10.8	7.4	17.8	8.8	-	10.6
	Min	4.0	3.2	0.8	0.2	4.0	7.4	4.8	4.4	-0.6	6.6	3.5	-	3.1
Relative Humidity	Max	100	89	93	88	100	97	100	100	92	94	95	-	-
	Min	62	70	70	69	76	82	82	89	65	58	72	-	-
Soil Temperature at 10 cm	06 UTC	9.0	7.0	6.6	5.0	6.4	8.8	8.2	7.6	6.2	10.2	7.5	-	6.3
	12 UTC	8.6	6.8	7.2	6.4	7.2	9.4	8.4	9.0	7.0	11.4	8.1	-	7.5
Sunshine Duration		0.0	0.0	0.0	4.6	0.6	1.3	0.0	1.9	5.5	0.0	1.4	-	2.5
Precipitation		2.0	2.1	1.2		35.5	23.7	1.5	14.5	4.7	14.1	99.3	-	23.7
Evaporation		0.7	0.0	0.0	0.0	0.8	0.7	3.2	0.3	0.8	0.8	7.3	-	11.7
Growing Degrees	5	0.6	0.0	0.0	0.0	2.3	4.4	1.1	2.6	0.0	7.2	18.2	-	26.7
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	2.2	-	5.3

2nd 10-day period (11-20/12/2009)	Previous Year Value	Past Years Mean Value	
Reference Evapotranspiration	6.6	-	8.1
Precipitation - Reference Evapotranspiration	92.7	-	15.6
Number of Rainy Days	9.0	-	2.9
Number of Dry Days	0.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

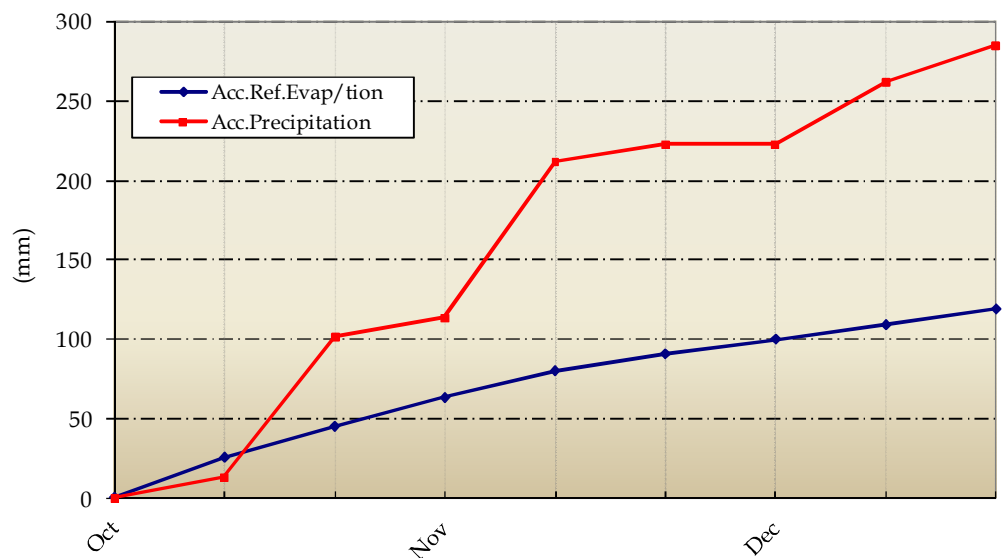


Andravida

2nd 10-day period (11-20/12/2009)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	15.8	10.6	14.4	18.0	19.0	16.4	16.4	17.0	17.8	17.8	16.3	-	15.1
	Min	7.6	4.8	4.8	7.6	12.6	9.8	10.2	11.4	6.6	11.2	8.7	-	6.8
Relative Humidity	Max	88	94	97	94	90	97	95	89	94	92	93	-	-
	Min	47	82	59	45	62	63	58	55	55	65	59	-	-
Soil Temperature at 10 cm	06 UTC	11.6	11.2	10.0	10.8	12.4	12.4	12.6	13.4	11.6	14.4	12.0	-	9.7
	12 UTC	13.4	11.8	13.4	12.2	13.6	14.0	14.0	14.4	12.2	14.6	13.4	-	11.2
Sunshine Duration		8.0	0.0	4.4	1.6	4.0	3.9	2.7	5.5	0.7	0.0	3.1	-	4.1
Precipitation			1.3	0.2		2.0	13.3	4.6	0.2	0.1	1.4	23.1	-	43.9
Evaporation		3.9	0.6	1.4	2.2	0.0	1.4	2.9	0.0	0.6	1.2	14.2	-	19.6
Growing Degrees	5	6.7	2.7	4.6	7.8	10.8	8.1	8.3	9.2	7.2	9.5	74.9	-	59.8
	10	1.7	0.0	0.0	2.8	5.8	3.1	3.3	4.2	2.2	4.5	27.6	-	16.6

2nd 10-day period (11-20/12/2009)	Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	10.0	- 9.0
Precipitation - Reference Evapotranspiration	13.1	- 34.9
Number of Rainy Days	8.0	- 4.7
Number of Dry Days	1.0	- -

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

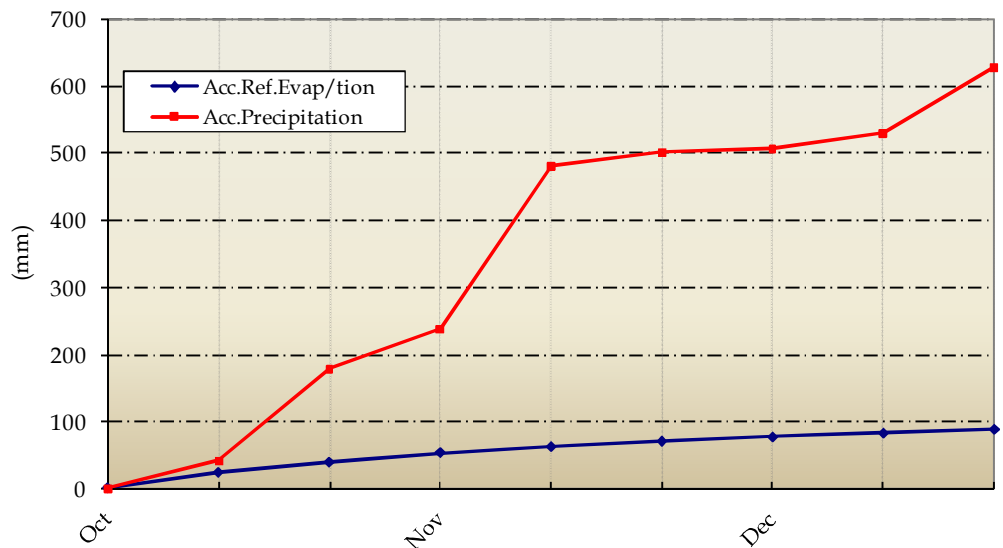


Arta

2nd 10-day period (11-20/12/2009)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	17.0	12.0	13.6	11.6	14.8	16.6	13.0	14.6	11.0	16.2	14.0	-	14.7
	Min	8.6	5.0	6.6	3.6	9.8	8.0	6.0	6.6	2.0	8.0	6.4	-	5.0
Relative Humidity	Max	78	97	89	94	100	100	100	97	99	99	95	-	-
	Min	44	75	45	73	86	51	73	45	76	76	64	-	-
Soil Temperature at 10 cm	06 UTC	11.0	10.2	10.4	9.0	10.4	10.4	10.4	11.2	9.6	10.8	10.3	-	8.1
	12 UTC	11.4	10.8	11.0	9.4	10.4	11.0	10.6	11.4	9.4	11.0	10.6	-	9.3
Sunshine Duration		6.8	-	3.0	0.0	0.5	3.5	0.7	2.2	0.0	0.0	1.9	-	3.6
Precipitation			1.8	4.8	0.4	37.4	8.2	13.5	6.4	9.6	17.3	99.4	-	54.0
Evaporation		0.9	0.4	0.5	1.7	0.1	0.9	0.4	1.4	1.1	1.1	8.5	-	-
Growing Degrees	5	7.8	3.5	5.1	2.6	7.3	7.3	4.5	5.6	1.5	7.1	52.3	-	49.3
	10	2.8	0.0	0.1	0.0	2.3	2.3	0.0	0.6	0.0	2.1	10.2	-	11.4

2nd 10-day period (11-20/12/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	5.8	-	6.1
Precipitation - Reference Evapotranspiration	93.6	-	47.9
Number of Rainy Days	9.0	-	4.3
Number of Dry Days	1.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

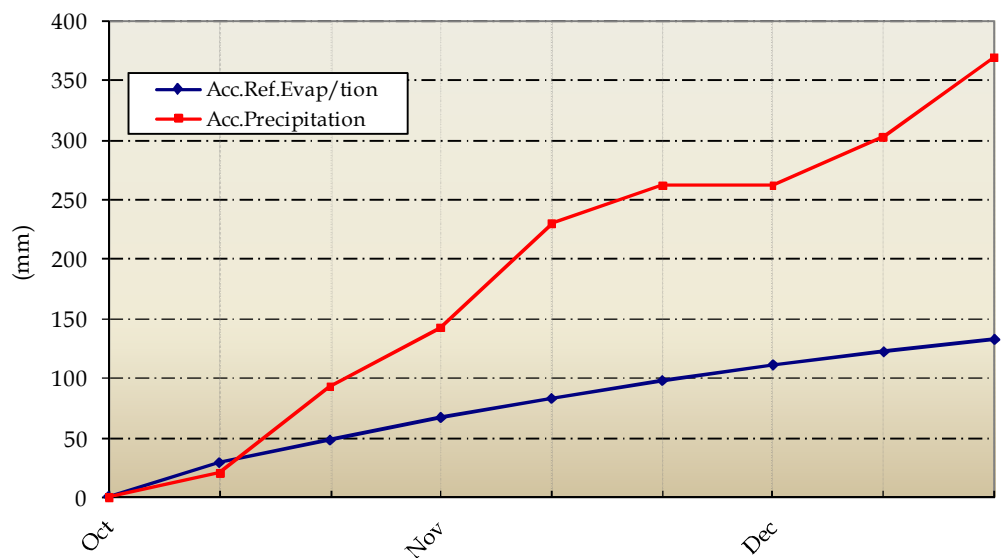


Kalamata

2nd 10-day period (11-20/12/2009)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	18.2	11.6	16.0	18.2	19.0	15.8	14.6	16.2	17.6	18.6	16.6	-	15.9
	Min	7.8	7.6	3.4	6.2	11.4	8.2	8.6	10.4	4.0	11.4	7.9	-	6.6
Relative Humidity	Max	89	95	94	94	95	95	95	95	97	92	94	-	-
	Min	45	85	50	55	61	71	72	71	75	75	66	-	-
Soil Temperature at 10 cm	06 UTC	12.4	12.6	11.0	11.4	13.0	13.0	13.0	13.6	12.0	14.0	12.6	-	10.6
	12 UTC	13.2	12.6	11.6	12.4	14.0	13.4	13.4	13.8	12.4	14.6	13.1	-	11.5
Sunshine Duration		8.1	0.0	6.7	3.8	0.0	3.2	3.3	1.5	0.0	1.1	2.8	-	3.9
Precipitation			8.3			0.6	9.1	5.1	40.3	0.5	2.9	66.8	-	53.6
Evaporation		2.2	1.1	1.4	1.7	0.0	2.3	0.9	6.2	0.5	1.0	17.3	-	23.9
Growing Degrees	5	8.0	4.6	4.7	7.2	10.2	7.0	6.6	8.3	5.8	10.0	72.4	-	62.3
	10	3.0	0.0	0.0	2.2	5.2	2.0	1.6	3.3	0.8	5.0	23.1	-	17.2

2nd 10-day period (11-20/12/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	10.5	-	10.5
Precipitation - Reference Evapotranspiration	56.3	-	43.1
Number of Rainy Days	7.0	-	4.7
Number of Dry Days	1.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

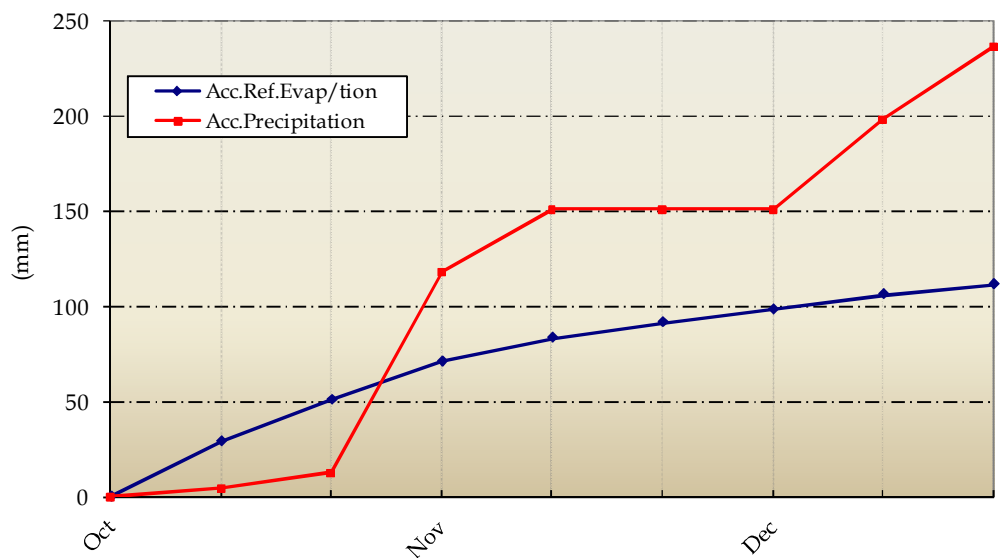


Larisa

2nd 10-day period (11-20/12/2009)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	10.4	7.8	9.0	8.4	11.4	13.2	12.4	13.4	8.2	11.6	10.6	-	11.0
	Min	7.8	6.2	4.0	5.8	7.4	5.4	6.8	5.4	1.0	4.2	5.4	-	1.7
Relative Humidity	Max	94	97	97	97	97	100	100	100	97	100	98	-	-
	Min	60	94	78	81	83	82	81	73	70	69	77	-	-
Soil Temperature at 10 cm	06 UTC	10.0	9.8	8.6	9.4	9.6	9.4	10.0	10.2	8.0	8.0	9.3	-	6.9
	12 UTC	10.2	10.0	9.4	9.8	10.2	10.2	10.2	10.2	8.0	8.6	9.7	-	7.3
Sunshine Duration		0.0	0.0	0.4	0.0	0.0	1.1	1.9	3.8	0.0	0.4	0.8	-	3.1
Precipitation		1.0	11.1	2.4		7.0			7.7	1.0	7.7	37.9	-	14.0
Evaporation		0.1	0.2	1.4	0.0	0.2	2.3	0.0	0.0	0.3	0.0	4.5	-	6.0
Growing Degrees	5	4.1	2.0	1.5	2.1	4.4	4.3	4.6	4.4	0.0	2.9	30.3	-	20.8
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	2.1

2nd 10-day period (11-20/12/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	5.2	-	5.8
Precipitation - Reference Evapotranspiration	32.7	-	8.2
Number of Rainy Days	7.0	-	3.3
Number of Dry Days	0.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

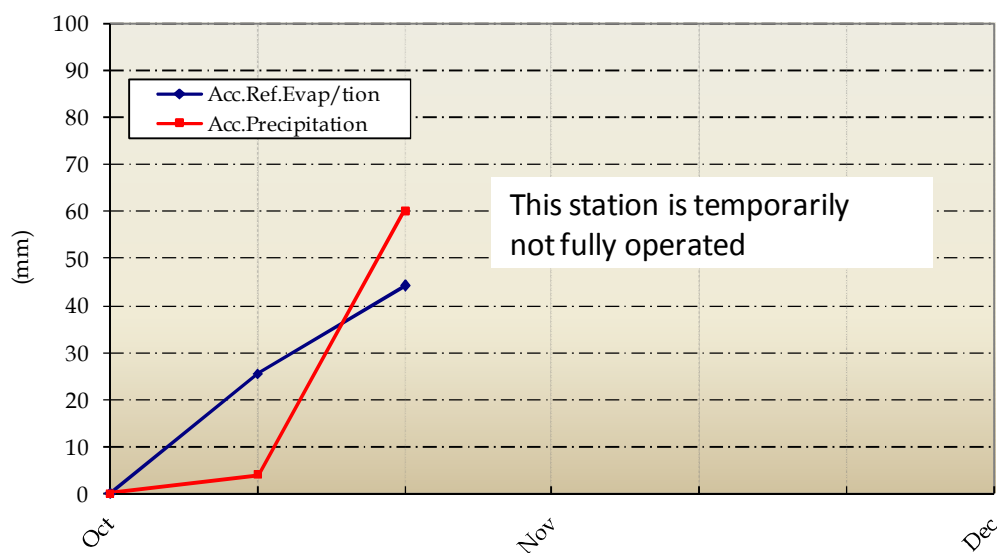


Pyrgela

2nd 10-day period (11-20/12/2009)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	-	-	-	-	-	-	-	-	-	-	-	-	15.8
	Min	-	-	-	2.2	10.6	6.2	6.0	12.8	2.2	8.0	6.9	-	4.4
Relative Humidity	Max	-	-	93	94	92	90	91	65	89	68	85	-	-
	Min	-	-	33	71	72	50	33	38	49	38	48	-	-
Soil Temperature at 10 cm	06 UTC	-	-	-	8.4	10.6	10.0	9.0	11.0	8.0	10.4	9.6	-	7.9
	12 UTC	-	-	-	10.6	13.0	12.4	10.6	13.0	10.6	13.4	11.9	-	10.7
Sunshine Duration		-	-	-	1.0	1.2	0.4	4.4	4.4	1.1	4.0	2.4	-	3.5
Precipitation		-	-	-	1.2	3.1			0.2		0.5	-	-	18.2
Evaporation		-	-	-	0.4	0.8	0.0	1.8	0.6	1.0	0.7	-	-	8.6
Growing Degrees	5	-	-	-	-	-	-	-	-	-	-	-	-	50.8
	10	-	-	-	-	-	-	-	-	-	-	-	-	11.0

2nd 10-day period (11-20/12/2009)	Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	6.8
Precipitation - Reference Evapotranspiration	-	11.4
Number of Rainy Days	-	3.5
Number of Dry Days	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

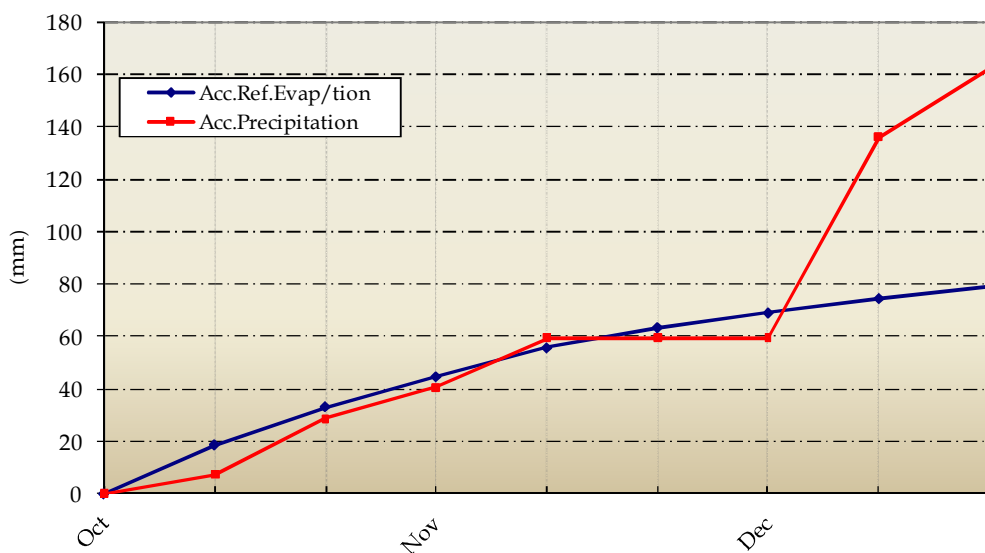


Series

2nd 10-day period (11-20/12/2009)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	9.8	8.8	6.2	6.0	10.0	12.0	12.0	11.2	4.4	9.6	9.0	-	8.9
	Min	5.2	4.8	4.0	4.0	3.6	6.0	6.0	8.0	-1.4	-1.0	3.9	-	1.0
Relative Humidity	Max	91	97	88	94	94	97	91	94	93	94	93	-	-
	Min	71	65	76	85	87	78	73	70	70	91	77	-	-
Soil Temperature at 10 cm	06 UTC	9.2	8.6	7.8	7.8	8.4	8.6	9.2	9.4	6.6	7.2	8.3	-	4.7
	12 UTC	9.2	9.2	8.2	-	8.4	-	-	9.8	7.0	8.8	8.7	-	5.3
Sunshine Duration		0.2	0.0	0.0	0.0	0.0	0.2	0.4	0.2	0.8	0.0	0.2	-	2.5
Precipitation				0.2	3.4	5.1			6.4	2.7	8.3	26.1	-	14.9
Evaporation		1.0	1.0	1.0	2.0	0.0	0.0	0.2	0.0	0.0	0.6	5.8	-	4.2
Growing Degrees	5	2.5	1.8	0.1	0.0	1.8	4.0	4.0	4.6	0.0	0.0	18.8	-	12.7
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.6

2nd 10-day period (11-20/12/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	4.5	-	4.2
Precipitation - Reference Evapotranspiration	21.6	-	10.7
Number of Rainy Days	6.0	-	3.0
Number of Dry Days	2.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

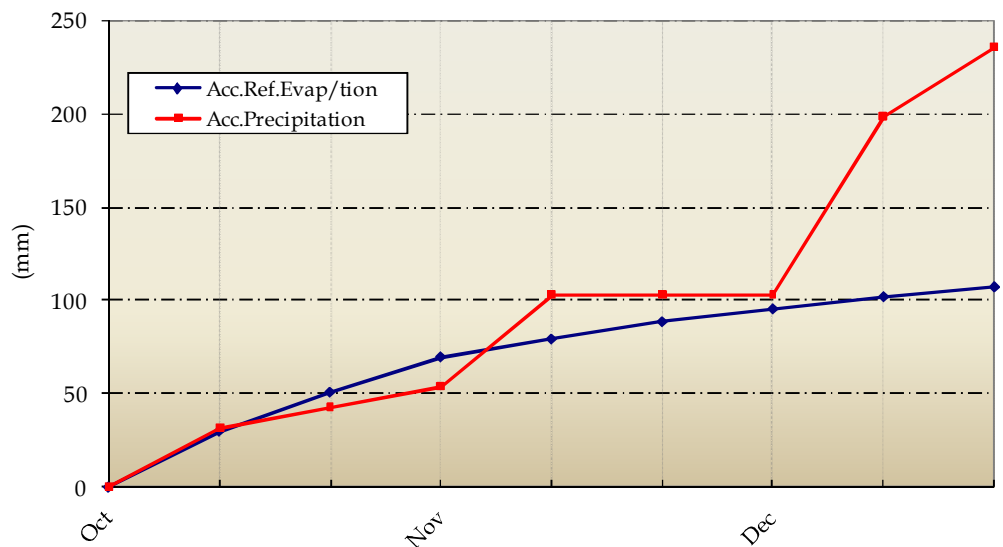


Trikala Imathias

2nd 10-day period (11-20/12/2009)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	10.0	7.4	7.0	5.8	9.2	12.4	10.8	8.8	2.6	10.2	8.4	-	10.4
	Min	6.0	5.2	4.0	2.6	5.4	7.0	5.2	1.8	-2.0	2.0	3.7	-	2.2
Relative Humidity	Max	85	96	99	97	98	98	94	94	99	97	96	-	-
	Min	60	88	62	91	94	76	80	59	87	58	76	-	-
Soil Temperature at 10 cm	06 UTC	9.0	8.8	8.0	6.6	8.8	8.4	8.4	8.0	5.4	6.0	7.7	-	6.6
	12 UTC	9.4	8.8	8.6	7.4	8.0	9.4	8.6	8.4	5.4	7.0	8.1	-	6.8
Sunshine Duration		0.1	0.0	0.7	0.0	0.0	2.0	1.0	3.1	0.5	0.1	0.8	-	3.2
Precipitation		1.7	7.0	3.4	2.1	10.8			6.2	0.8	4.7	36.7	-	15.2
Evaporation		0.6	0.4	0.3	0.4	0.5	0.3	0.6	1.5	0.5	0.8	5.9	-	4.7
Growing Degrees	5	3.0	1.3	0.5	0.0	2.3	4.7	3.0	0.3	0.0	1.1	16.2	-	21.4
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	1.9

2nd 10-day period (11-20/12/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	5.3	-	5.3
Precipitation - Reference Evapotranspiration	31.4	-	9.9
Number of Rainy Days	8.0	-	3.0
Number of Dry Days	0.0	-	-

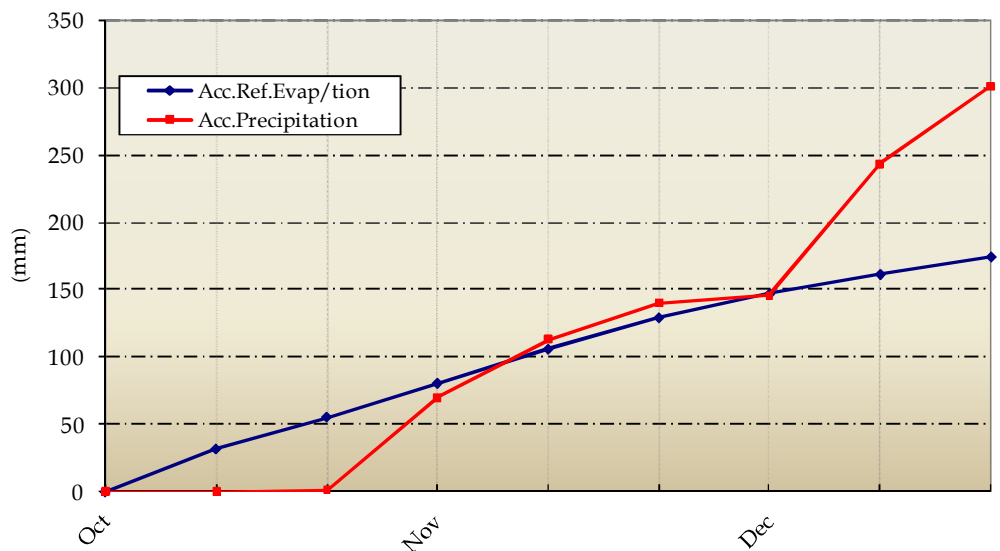
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



2nd 10-day period (11-20/12/2009)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	13.6	18.0	18.4	19.2	21.4	17.2	18.4	19.8	19.8	22.2	18.8	-	17.0
	Min	9.2	8.2	12.0	8.6	12.0	11.6	12.2	13.8	14.4	12.6	11.5	-	8.7
Relative Humidity	Max	99	99	96	90	95	100	99	99	93	99	97	-	-
	Min	63	66	42	49	52	65	44	74	60	51	57	-	-
Soil Temperature at 10 cm	06 UTC	13.0	11.2	12.8	11.8	13.2	12.8	12.6	14.8	14.8	14.2	13.1	-	12.0
	12 UTC	13.4	14.0	15.0	14.8	15.6	14.4	15.0	16.0	16.2	17.2	15.2	-	13.7
Sunshine Duration		0.7	2.6	6.1	5.2	2.9	0.0	4.1	0.2	4.8	2.1	2.9	-	4.3
Precipitation		20.7	6.7	0.6		0.1	21.2		8.6			57.9	-	31.3
Evaporation		0.7	2.2	2.6	2.1	7.1	0.7	2.9	3.7	2.0	2.5	26.5	-	26.9
Growing Degrees	5	6.4	8.1	10.2	8.9	11.7	9.4	10.3	11.8	12.1	12.4	101.3	-	78.9
	10	1.4	3.1	5.2	3.9	6.7	4.4	5.3	6.8	7.1	7.4	51.3	-	30.1

2nd 10-day period (11-20/12/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	12.9	-	13.3
Precipitation - Reference Evapotranspiration	45.0	-	18.0
Number of Rainy Days	6.0	-	3.9
Number of Dry Days	0.0	-	-

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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