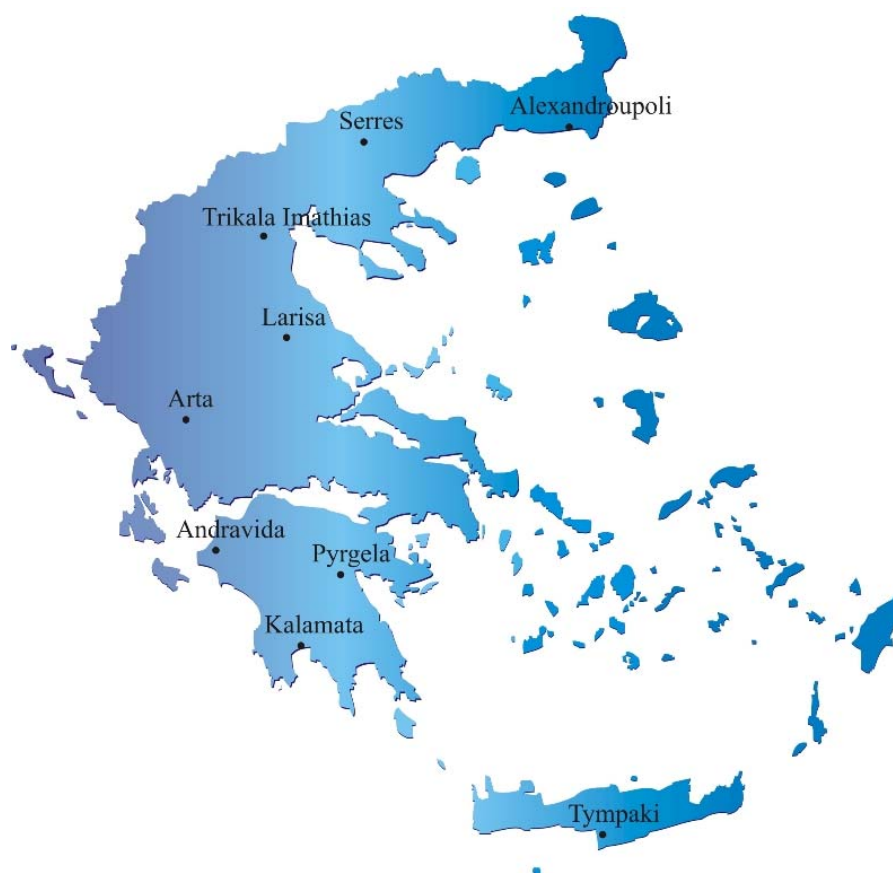


# AGROMETEOROLOGICAL BULLETIN

*November 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



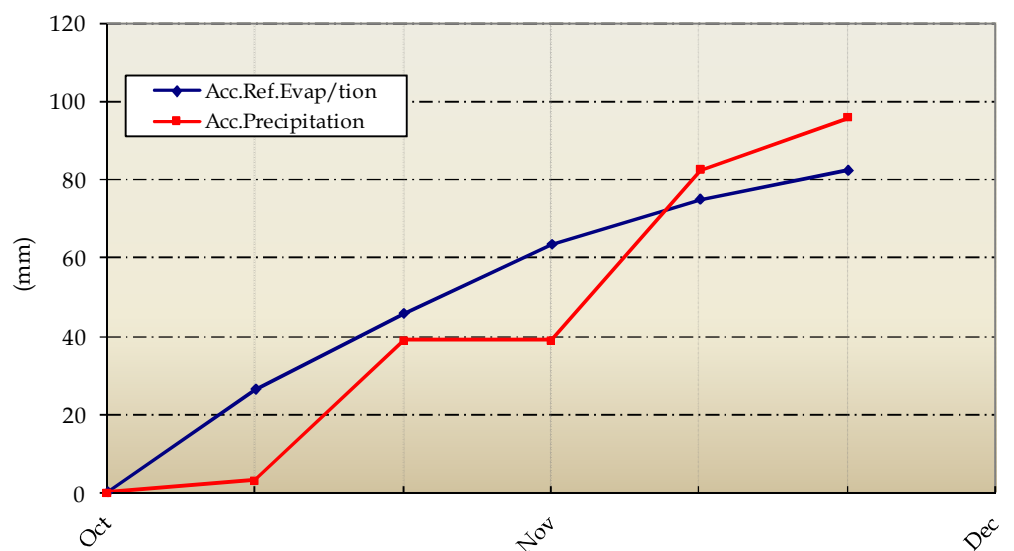
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*Web addresses of HNMS*  
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2nd 10-day period (11-20/11/2009)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	16.4	15.8	13.2	14.4	15.4	15.2	17.0	14.0	16.0	17.0	15.4	-	14.4
	Min	11.8	8.8	6.8	2.6	5.8	7.2	7.6	7.2	4.6	5.0	6.7	-	6.2
Relative Humidity	Max	98	97	97	97	97	97	94	97	97	97	97	-	-
	Min	78	61	64	62	76	64	72	82	79	64	70	-	-
Soil Temperature at 10 cm	06 UTC	14.6	12.2	12.8	10.4	10.8	11.4	11.4	11.8	10.4	10.8	11.7	-	9.7
	12 UTC	15.4	14.4	13.0	11.6	12.6	12.4	13.4	12.6	12.4	12.6	13.0	-	11.5
Sunshine Duration		2.5	4.9	2.2	5.8	0.9	2.8	3.6	0.0	7.1	8.9	3.9	-	3.9
Precipitation		11.8	1.1	0.5								13.4	-	29.1
Evaporation		2.0	0.3	0.2	0.1	0.5	5.6	3.2	1.2	1.0	0.4	14.5	-	18.6
Growing Degrees	5	9.1	7.3	5.0	3.5	5.6	6.2	7.3	5.6	5.3	6.0	60.9	-	54.2
	10	4.1	2.3	0.0	0.0	0.6	1.2	2.3	0.6	0.3	1.0	12.4	-	17.6

2nd 10-day period (11-20/11/2009)	Previous Year Value	Past Years Mean Value	
Reference Evapotranspiration	7.4	-	11.3
Precipitation - Reference Evapotranspiration	6.0	-	17.8
Number of Rainy Days	3.0	-	2.9
Number of Dry Days	0.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

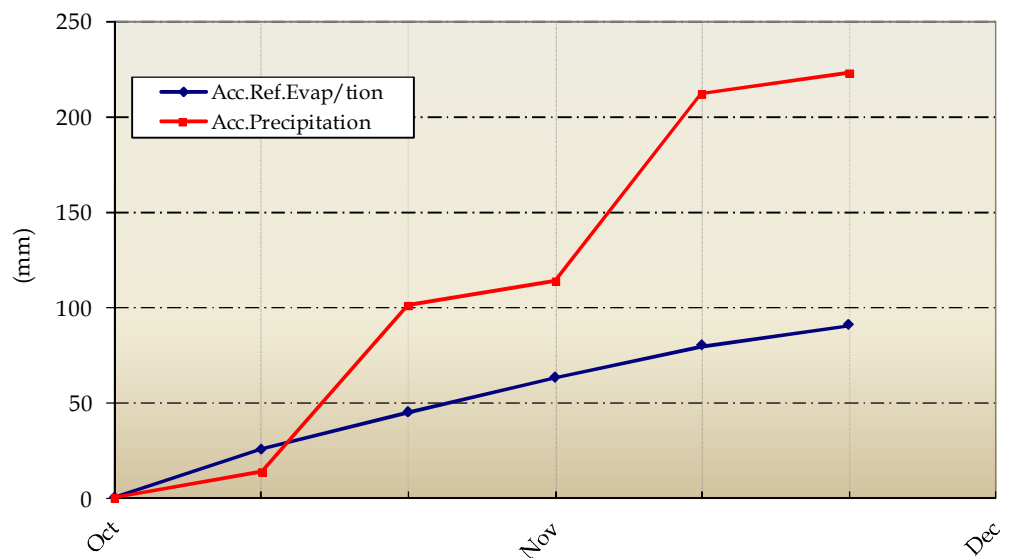


Andravida

2nd 10-day period (11-20/11/2009)		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	17.0	17.4	19.0	18.2	18.8	19.2	19.2	21.2	19.4	18.6	-	18.6
	Min	11.6	10.6	7.6	5.6	8.4	10.0	8.4	8.6	8.2	6.8	8.6	-	9.7
Relative Humidity	Max	95	97	97	94	95	97	100	98	98	97	97	-	-
	Min	68	64	50	52	59	68	68	68	63	62	62	-	-
Soil Temperature at 10 cm	06 UTC	15.0	14.4	13.6	12.4	13.4	14.6	14.0	13.8	13.8	13.8	13.9	-	13.2
	12 UTC	16.2	17.6	16.6	16.4	16.4	17.2	17.0	17.4	16.8	17.0	16.9	-	15.2
Sunshine Duration		3.4	4.9	7.6	7.7	5.9	7.0	7.7	7.4	6.8	7.6	6.6	-	4.9
Precipitation		1.9	9.1									11.0	-	50.9
Evaporation		0.1	1.4	0.8	1.4	1.8	1.4	0.6	1.2	0.8	0.4	9.9	-	21.4
Growing Degrees	5	9.3	8.8	7.5	7.3	8.3	9.4	8.8	8.9	9.7	8.1	86.1	-	91.7
	10	4.3	3.8	2.5	2.3	3.3	4.4	3.8	3.9	4.7	3.1	36.1	-	42.4

2nd 10-day period (11-20/11/2009)	Previous Year Value	Past Years Mean Value	
Reference Evapotranspiration	10.6	-	11.8
Precipitation - Reference Evapotranspiration	0.4	-	39.1
Number of Rainy Days	2.0	-	4.2
Number of Dry Days	0.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

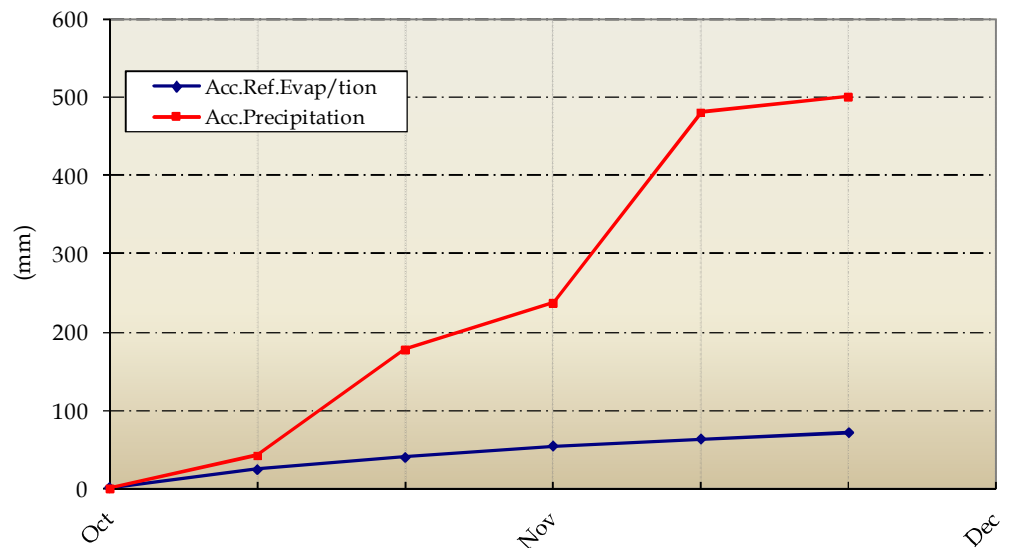




2nd 10-day period (11-20/11/2009)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	14.4	18.0	18.0	20.0	19.0	19.8	21.0	21.6	22.0	22.0	19.6	-	18.1
	Min	10.4	7.0	4.6	4.6	5.0	7.8	6.6	7.2	6.6	6.4	6.6	-	8.0
Relative Humidity	Max	98	97	97	97	97	97	97	96	97	97	97	-	-
	Min	83	66	35	28	50	57	45	42	57	45	51	-	-
Soil Temperature at 10 cm	06 UTC	13.8	13.0	12.0	14.2	11.4	12.0	12.0	12.2	12.2	11.6	12.4	-	11.8
	12 UTC	14.0	13.6	13.0	12.6	12.4	13.0	13.0	13.2	13.4	13.0	13.1	-	13.7
Sunshine Duration		0.0	8.0	8.4	7.6	6.1	6.5	8.7	8.1	7.6	8.7	7.0	-	4.2
Precipitation		18.9										18.9	-	83.0
Evaporation		1.0	1.7	1.5	2.2	0.8	0.1	0.8	1.7	1.6	0.5	11.9	-	-
Growing Degrees	5	7.4	7.5	6.3	7.3	7.0	8.8	8.8	9.4	9.3	9.2	81.0	-	80.5
	10	2.4	2.5	1.3	2.3	2.0	3.8	3.8	4.4	4.3	4.2	31.0	-	32.3

2nd 10-day period (11-20/11/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	8.1	-	9.1
Precipitation - Reference Evapotranspiration	10.8	-	73.9
Number of Rainy Days	1.0	-	4.4
Number of Dry Days	0.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

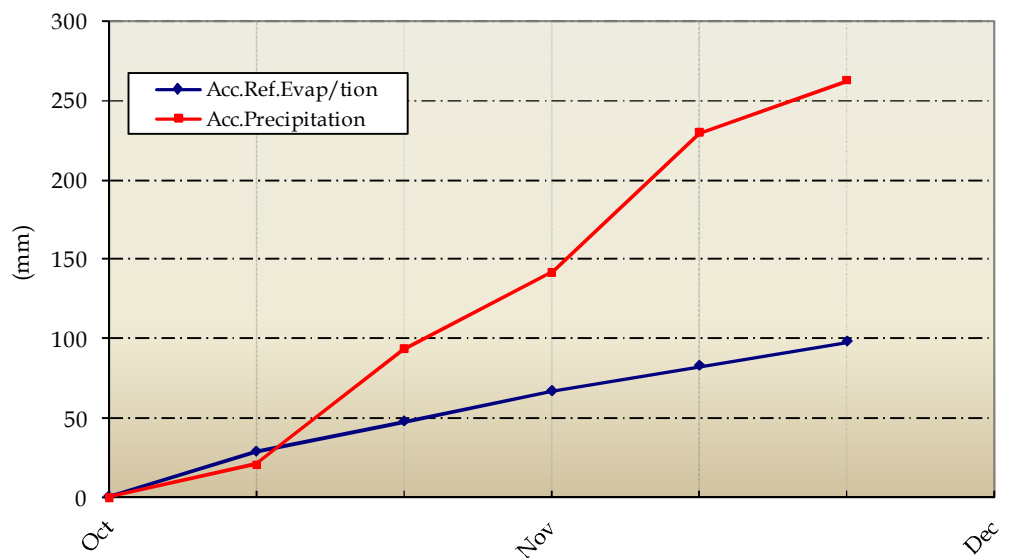


Kalamata

2nd 10-day period (11-20/11/2009)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	17.4	18.2	19.4	20.4	19.0	20.4	22.0	22.2	20.8	21.4	20.1	-	19.5
	Min	10.4	9.6	7.8	6.6	8.2	10.2	9.2	7.4	7.4	7.8	8.5	-	9.3
Relative Humidity	Max	95	97	95	94	95	95	97	97	98	98	96	-	-
	Min	75	53	41	52	57	56	57	56	67	52	57	-	-
Soil Temperature at 10 cm	06 UTC	16.0	15.2	14.4	13.8	14.0	14.4	14.4	14.2	14.6	14.4	14.5	-	14.0
	12 UTC	16.0	15.4	15.2	15.0	14.8	-	15.6	15.2	15.2	15.4	15.3	-	15.4
Sunshine Duration		2.7	7.8	9.1	9.0	8.1	8.1	9.2	8.6	7.3	8.6	7.8	-	4.6
Precipitation		25.7	6.9									32.6	-	55.3
Evaporation		1.4	2.0	3.6	1.1	1.2	2.1	1.8	2.6	0.5	0.9	17.2	-	22.8
Growing Degrees	5	8.9	8.9	8.6	8.5	8.6	10.3	10.6	9.8	9.1	9.6	92.9	-	93.9
	10	3.9	3.9	3.6	3.5	3.6	5.3	5.6	4.8	4.1	4.6	42.9	-	44.2

2nd 10-day period (11-20/11/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	15.1	-	13.4
Precipitation - Reference Evapotranspiration	17.5	-	41.9
Number of Rainy Days	2.0	-	3.8
Number of Dry Days	0.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

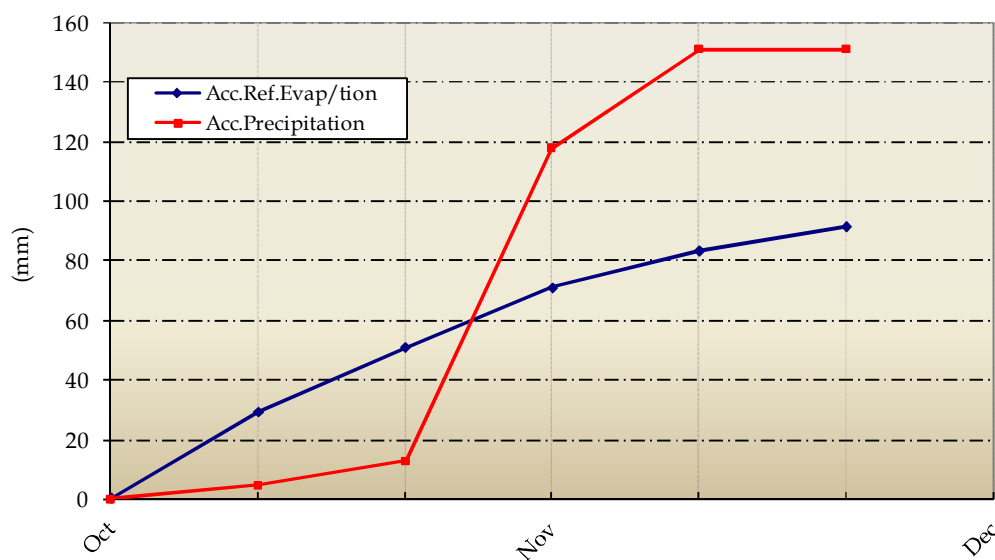


Larisa

2nd 10-day period (11-20/11/2009)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	14.6	18.0	17.8	16.0	15.6	19.0	20.0	18.6	18.6	19.6	17.8	-	15.3
	Min	6.8	4.4	3.0	3.2	3.2	7.0	6.0	5.8	5.8	4.8	5.0	-	5.5
Relative Humidity	Max	97	97	97	97	97	97	97	97	100	100	98	-	-
	Min	70	56	45	58	58	55	56	61	66	59	58	-	-
Soil Temperature at 10 cm	06 UTC	13.6	12.4	12.0	11.8	11.0	11.8	12.0	11.8	12.0	11.6	12.0	-	10.9
	12 UTC	14.4	13.6	13.8	13.6	12.2	13.2	13.0	13.2	13.0	12.8	13.3	-	11.6
Sunshine Duration		1.3	8.3	7.8	5.9	4.8	5.8	7.5	5.1	4.8	6.8	5.8	-	3.5
Precipitation		0.1										0.1	-	21.2
Evaporation		0.5	1.6	0.7	2.6	0.7	0.4	1.3	0.5	1.7	1.0	11.0	-	13.7
Growing Degrees	5	5.7	6.2	5.4	4.6	4.4	8.0	8.0	7.2	7.2	7.2	63.9	-	54.7
	10	0.7	1.2	0.4	0.0	0.0	3.0	3.0	2.2	2.2	2.2	14.9	-	14.5

2nd 10-day period (11-20/11/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	8.2	-	8.8
Precipitation - Reference Evapotranspiration	-8.1	-	12.4
Number of Rainy Days	1.0	-	3.4
Number of Dry Days	0.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

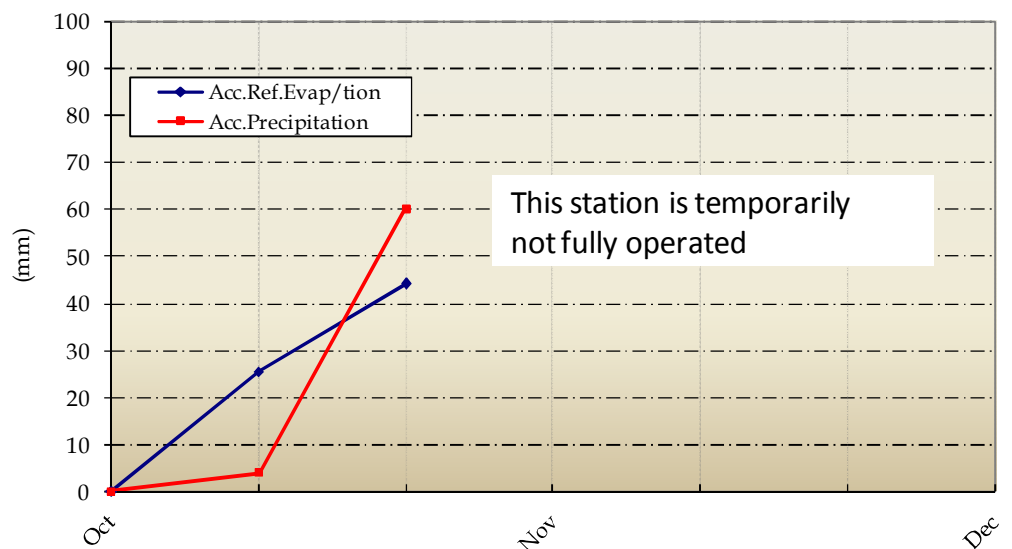


Pyrgela

2nd 10-day period (11-20/11/2009)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	-	-	-	-	-	-	-	-	-	-	-	-	18.7
	Min	8.8	5.0	3.0	3.8	3.8	7.0	6.6	8.2	6.6	6.0	5.9	-	7.6
Relative Humidity	Max	-	94	94	94	94	94	94	94	94	94	94	-	-
	Min	55	-	27	35	41	27	45	57	35	27	39	-	-
Soil Temperature at 10 cm	06 UTC	13.0	11.4	10.4	12.2	10.0	11.0	11.0	12.0	11.8	11.4	11.4	-	11.5
	12 UTC	16.0	15.6	15.0	15.0	14.6	15.2	15.4	16.0	15.4	15.6	15.4	-	15.1
Sunshine Duration		3.0	7.7	7.9	7.4	6.2	7.6	7.5	7.4	7.5	7.4	7.0	-	4.1
Precipitation		0.9	1.8									2.7	-	32.7
Evaporation		0.8	1.2	2.8	0.8	0.6	1.4	0.4	2.4	1.2	2.0	13.6	-	12.8
Growing Degrees	5	-	-	-	-	-	-	-	-	-	-	-	-	81.3
	10	-	-	-	-	-	-	-	-	-	-	-	-	33.1

2nd 10-day period (11-20/11/2009)	Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	9.5
Precipitation - Reference Evapotranspiration	-	23.2
Number of Rainy Days	2.0	3.3
Number of Dry Days	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



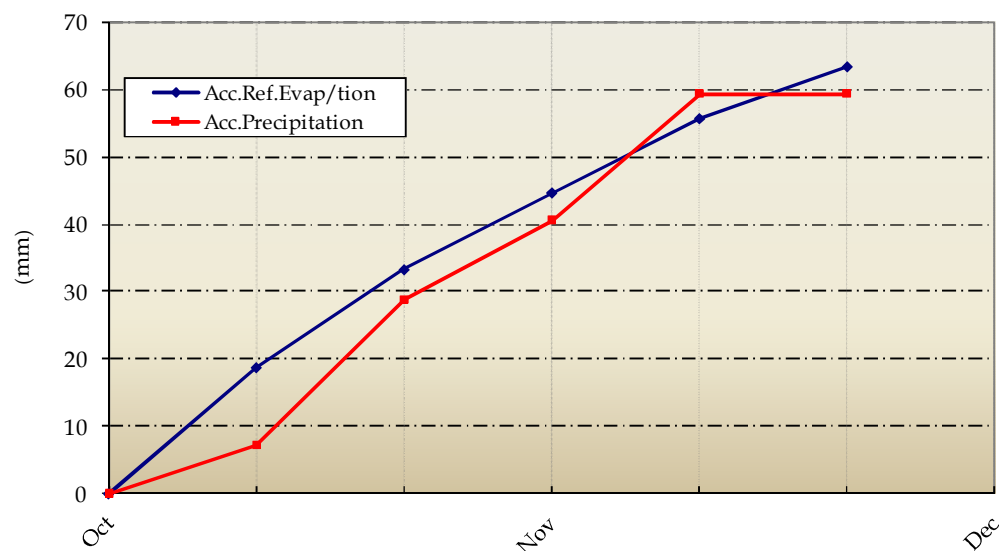


Series

2nd 10-day period (11-20/11/2009)		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	17.0	18.0	15.0	11.8	17.6	19.4	18.4	18.6	20.2	17.3	-	13.7
	Min	5.4	5.2	2.0	3.4	2.4	3.4	4.4	5.2	5.8	3.8	4.1	-	4.7
Relative Humidity	Max	95	91	84	90	93	87	94	92	94	93	91	-	-
	Min	70	35	36	52	69	42	53	59	61	52	53	-	-
Soil Temperature at 10 cm	06 UTC	13.0	11.8	10.8	9.4	9.2	10.2	10.0	10.4	10.0	9.6	10.4	-	8.8
	12 UTC	13.2	13.4	11.6	13.0	11.8	12.0	10.8	11.4	10.6	10.8	11.9	-	10.0
Sunshine Duration		1.1	6.2	6.5	4.7	0.7	2.1	5.1	2.0	4.2	4.5	3.7	-	3.4
Precipitation													-	18.2
Evaporation		2.0	1.0	1.0	1.0	2.0	5.0	1.0	1.4	1.6	1.0	17.0	-	10.3
Growing Degrees	5	6.2	6.1	5.0	4.2	2.1	5.5	6.9	6.8	7.2	7.0	57.0	-	43.2
	10	1.2	1.1	0.0	0.0	0.0	0.5	1.9	1.8	2.2	2.0	10.7	-	10.2

2nd 10-day period (11-20/11/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.7	-	6.6
Precipitation - Reference Evapotranspiration	-7.7	-	11.6
Number of Rainy Days	0.0	-	2.9
Number of Dry Days	10.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



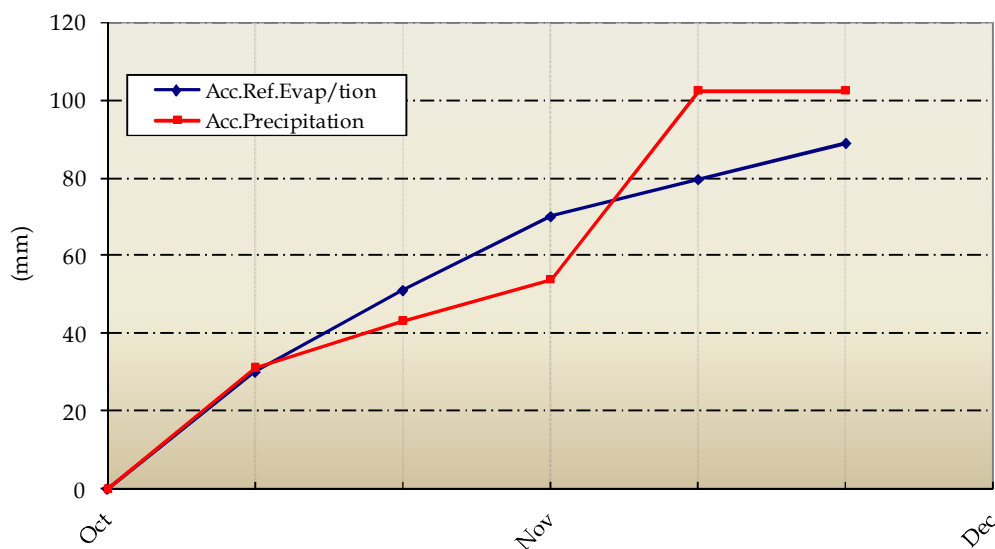


Trikala Imathias

2nd 10-day period (11-20/11/2009)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	16.4	16.6	20.0	18.6	17.0	22.8	25.0	19.6	23.4	23.0	20.2	-	13.9
	Min	7.0	5.4	4.0	3.0	5.4	6.6	7.2	10.2	7.2	6.4	6.2	-	5.4
Relative Humidity	Max	95	94	93	97	94	95	95	96	99	100	96	-	-
	Min	61	33	26	41	62	33	33	59	48	34	43	-	-
Soil Temperature at 10 cm	06 UTC	12.8	11.2	10.4	9.6	10.4	10.2	10.6	12.8	11.4	10.8	11.0	-	10.6
	12 UTC	14.0	14.4	12.8	12.2	11.8	16.6	13.0	13.8	13.8	13.6	13.6	-	10.9
Sunshine Duration		3.3	8.8	8.5	7.6	1.7	5.2	8.6	3.0	7.2	8.4	6.2	-	3.4
Precipitation													-	27.5
Evaporation		0.8	2.0	1.6	1.5	0.5	1.0	1.1	1.4	0.2	1.7	11.8	-	9.6
Growing Degrees	5	6.7	6.0	7.0	5.8	6.2	9.7	11.1	9.9	10.3	9.7	82.4	-	47.4
	10	1.7	1.0	2.0	0.8	1.2	4.7	6.1	4.9	5.3	4.7	32.4	-	11.9

2nd 10-day period (11-20/11/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	9.3	-	8.1
Precipitation - Reference Evapotranspiration	-9.3	-	19.4
Number of Rainy Days	0.0	-	3.5
Number of Dry Days	10.0	-	-

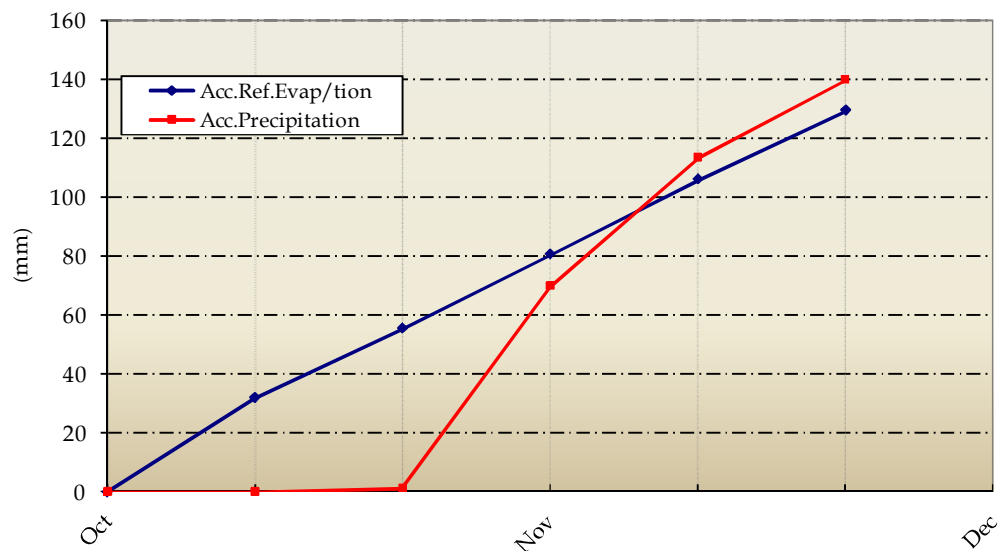
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



2nd 10-day period (11-20/11/2009)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	21.8	20.6	22.0	21.0	21.0	23.0	22.8	23.4	23.4	23.8	22.3	-	20.8
	Min	15.4	13.8	10.0	11.4	8.8	11.6	11.6	13.2	11.0	11.6	11.8	-	11.4
Relative Humidity	Max	98	98	94	94	98	87	94	94	90	96	94	-	-
	Min	52	50	41	32	38	38	44	43	42	45	42	-	-
Soil Temperature at 10 cm	06 UTC	18.2	17.2	14.6	14.8	13.4	16.0	15.4	15.6	15.8	15.4	15.6	-	16.3
	12 UTC	20.8	19.4	18.0	18.2	18.0	19.4	19.8	20.2	20.4	20.2	19.4	-	19.2
Sunshine Duration		5.3	4.4	4.8	5.6	6.3	4.5	6.8	6.1	6.3	6.9	5.7	-	5.7
Precipitation		2.0	24.7									26.7	-	19.0
Evaporation		5.4	5.3	2.5	3.4	2.6	4.0	3.5	2.7	3.7	3.6	36.7	-	31.4
Growing Degrees	5	13.6	12.2	11.0	11.2	9.9	12.3	12.2	13.3	12.2	12.7	120.6	-	110.9
	10	8.6	7.2	6.0	6.2	4.9	7.3	7.2	8.3	7.2	7.7	70.6	-	61.0

2nd 10-day period (11-20/11/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	23.3	-	18.0
Precipitation - Reference Evapotranspiration	3.4	-	1.0
Number of Rainy Days	2.0	-	2.5
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<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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ΕΘΝΙΚΗ  
ΜΕΤΕΩΡΟΛΟΓΙΚΗ  
ΥΠΗΡΕΣΙΑ

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