

AGROMETEOROLOGICAL BULLETIN

December 2011
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



Hellenic National Meteorological Service
Division of Climatology-Applications
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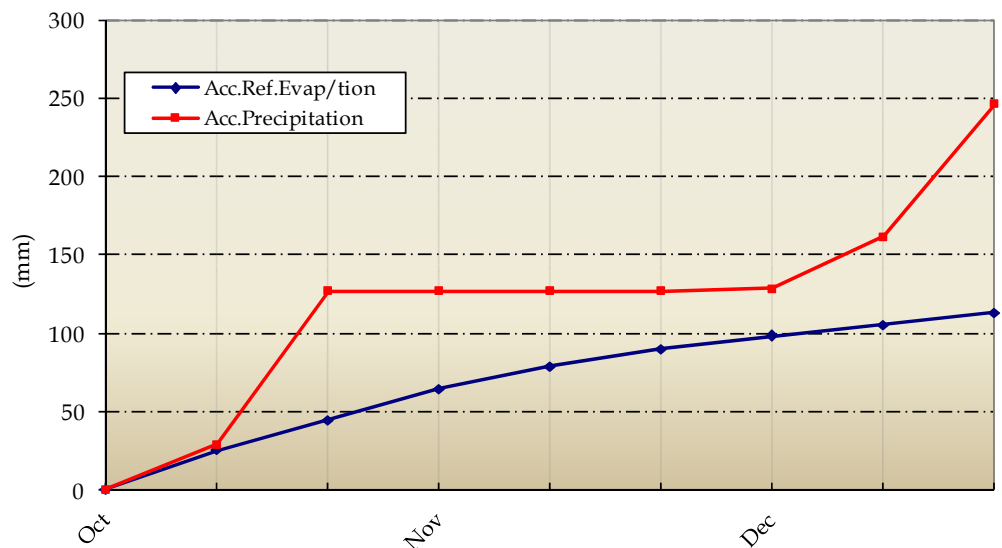
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www.hnms.gr
www.emy.gov.gr
www.meteo.gov.gr
www.meteohellas.gr

Agrinio

2nd 10-day period (11-20/12/2011)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	18.0	16.6	16.2	18.2	15.0	17.6	-	13.8	13.0	10.4	15.4	12.3	14.6
	Min	7.2	10.4	10.6	4.2	2.6	8.4	6.8	5.4	8.4	6.2	7.0	1.2	4.3
Relative Humidity	Max	98	98	97	100	97	97	93	97	95	100	97	97	-
	Min	76	89	74	64	67	48	71	68	79	87	72	65	-
Soil Temperature at 10 cm	06 UTC	10.8	12.2	12.8	11.6	10.4	11.2	11.4	12.6	11.2	10.6	11.5	8.5	8.3
	12 UTC	12.0	12.8	13.4	12.4	11.0	12.2	12.4	11.8	11.8	10.8	12.1	9.2	10.0
Sunshine Duration		4.2	1.7	2.3	6.0	3.6	3.6	0.1	0.1	0.2	0.2	2.2	3.2	3.5
Precipitation			10.8	16.3	0.7		8.0	10.3		16.5	22.2	84.8	49.2	49.2
Evaporation		0.2	2.0	1.5	0.8	2.4	0.6	1.7	0.2	4.0	1.2	14.6	10.6	13.6
Growing Degrees	5	7.6	8.5	8.4	6.2	3.8	8.0	-	4.6	5.7	3.3	-	20.0	45.7
	10	2.6	3.5	3.4	1.2	0.0	3.0	-	0.0	0.7	0.0	-	2.3	9.2

2nd 10-day period (11-20/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.6	5.6	7.4
Precipitation - Reference Evapotranspiration	77.2	43.6	41.8
Number of Rainy Days	7.0	5.0	4.5
Number of Dry Days	4.0	7.0	-

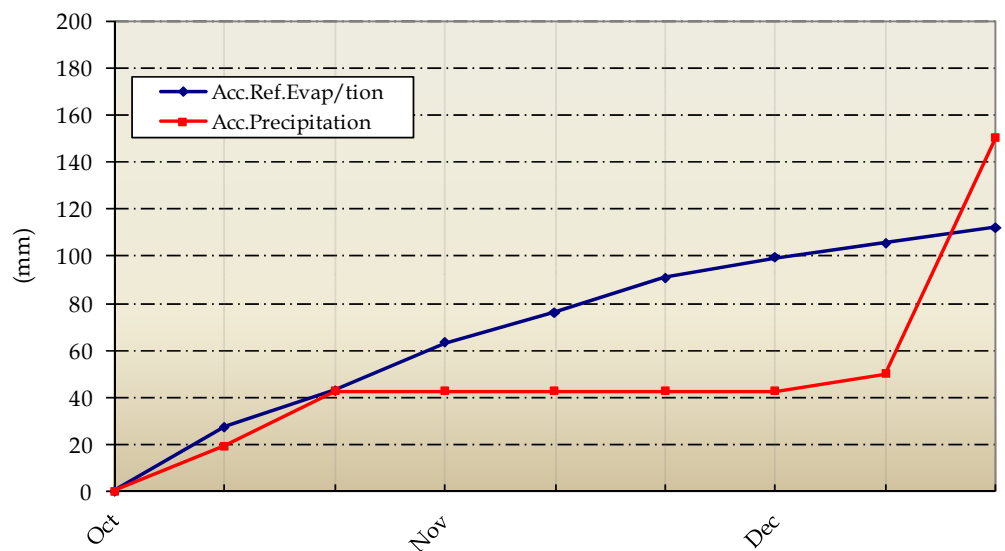
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



2nd 10-day period (11-20/12/2011)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	15.0	15.6	15.2	14.8	15.0	13.4	16.8	15.8	12.0	13.2	14.7	7.1	10.6
	Min	7.4	10.4	11.4	9.4	8.0	7.0	5.4	8.0	7.0	8.4	8.2	0.2	3.1
Relative Humidity	Max	97	98	95	100	93	97	93	78	100	98	95	91	-
	Min	85	70	80	74	73	82	66	47	94	83	75	60	-
Soil Temperature at 10 cm	06 UTC	8.0	9.8	11.0	11.4	11.2	11.2	10.0	11.6	9.8	10.2	10.4	5.8	6.3
	12 UTC	9.0	11.2	11.6	12.2	12.2	11.6	11.2	11.2	9.6	11.2	11.1	5.9	7.5
Sunshine Duration		1.5	4.0	0.4	2.0	3.3	5.0	5.2	0.0	0.0	4.6	2.6	2.6	2.5
Precipitation				0.0			7.9	0.0		65.9	27.2	101.0	10.6	23.7
Evaporation		0.1	0.3	0.1	1.9	0.8	0.0	0.1	0.0	0.0	0.6	3.9	2.4	11.7
Growing Degrees	5	6.2	8.0	8.3	7.1	6.5	5.2	6.1	6.9	4.5	5.8	64.6	7.0	26.7
	10	1.2	3.0	3.3	2.1	1.5	0.2	1.1	1.9	0.0	0.8	15.1	0.4	5.3

2nd 10-day period (11-20/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.5	6.9	8.1
Precipitation - Reference Evapotranspiration	94.5	3.7	15.6
Number of Rainy Days	3.0	5.0	2.9
Number of Dry Days	7.0	2.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

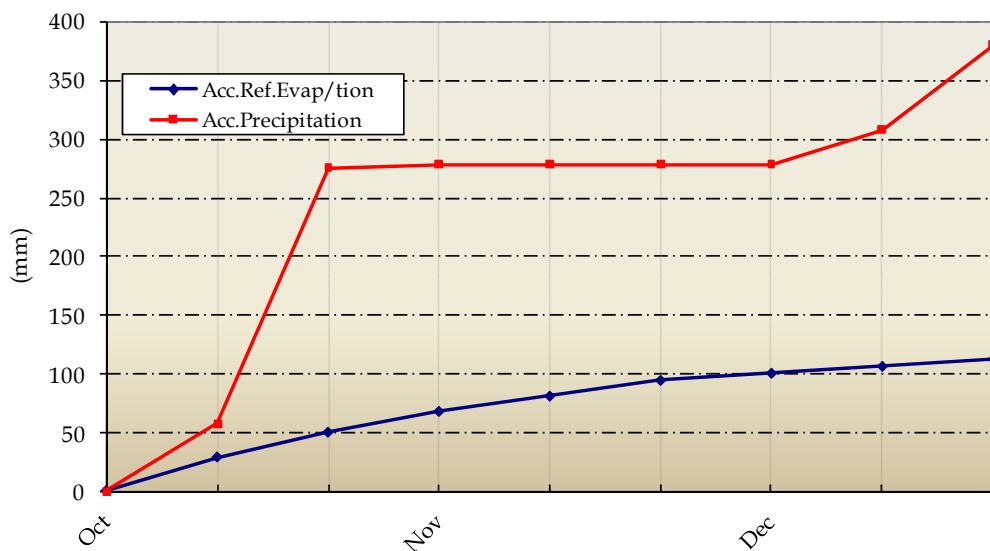


Andravida

2nd 10-day period (11-20/12/2011)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	19.4	18.0	16.8	17.2	18.2	18.8	18.0	15.6	16.2	12.0	17.0	13.9	15.1
	Min	10.8	12.8	12.8	6.2	8.0	11.2	10.4	9.0	9.2	6.0	9.6	5.5	6.8
Relative Humidity	Max	93	98	100	100	94	89	93	95	97	94	95	87	-
	Min	71	71	80	65	59	45	61	65	69	68	65	55	-
Soil Temperature at 10 cm	06 UTC	11.6	13.0	13.4	11.0	10.8	13.2	13.2	12.4	12.0	11.4	12.2	9.0	9.7
	12 UTC	13.8	15.0	14.4	14.0	14.0	15.2	15.4	13.2	13.8	11.4	14.0	10.8	11.2
Sunshine Duration		3.0	3.8	0.8	7.7	6.0	6.5	2.0	0.0	0.3	1.5	3.2	4.2	4.1
Precipitation			8.2	30.7			6.0	4.6		12.7	10.1	72.3	39.0	43.9
Evaporation		0.3	4.0	1.5	2.5	6.7	2.2	2.2	0.4	-	0.2	-	15.5	19.6
Growing Degrees	5	10.1	10.4	9.8	6.7	8.1	10.0	9.2	7.3	7.7	4.0	83.3	46.6	59.8
	10	5.1	5.4	4.8	1.7	3.1	5.0	4.2	2.3	2.7	0.0	34.3	9.3	16.6

2nd 10-day period (11-20/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.1	11.2	9.0
Precipitation - Reference Evapotranspiration	66.2	27.8	34.9
Number of Rainy Days	6.0	5.0	4.7
Number of Dry Days	4.0	7.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

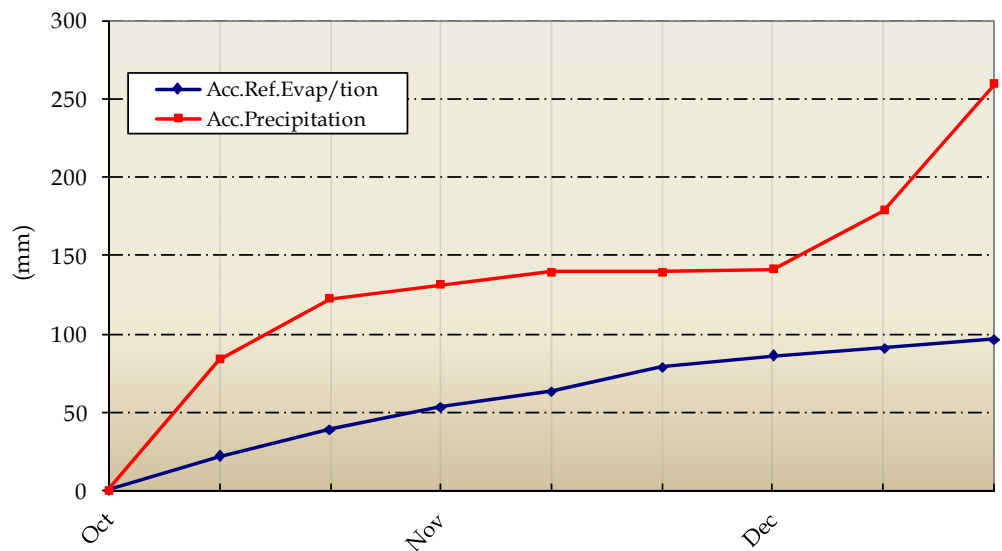


Ioannina

2nd 10-day period (11-20/12/2011)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	13.8	13.6	13.6	8.0	9.8	11.0	11.4	9.4	6.0	5.2	10.2	-	9.6
	Min	6.6	9.0	7.8	1.6	1.6	6.0	5.4	2.0	4.0	1.2	4.5	-	1.6
Relative Humidity	Max	97	97	97	100	100	85	97	93	94	97	96	-	-
	Min	80	82	73	83	67	64	80	54	88	84	76	-	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	4.9
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	5.7
Sunshine Duration		0.2	1.6	2.3	0.6	0.3	5.8	0.0	2.6	0.0	0.0	1.3	-	2.5
Precipitation		1.1	2.3	26.1			9.8	14.5		8.7	18.2	80.7	-	54.5
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	5.5
Growing Degrees	5	5.2	6.3	5.7	0.0	0.7	3.5	3.4	0.7	0.0	0.0	25.5	-	16.0
	10	0.2	1.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	-	0.8

2nd 10-day period (11-20/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	5.5	-	5.7
Precipitation - Reference Evapotranspiration	75.2	-	48.8
Number of Rainy Days	7.0	-	4.4
Number of Dry Days	0.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

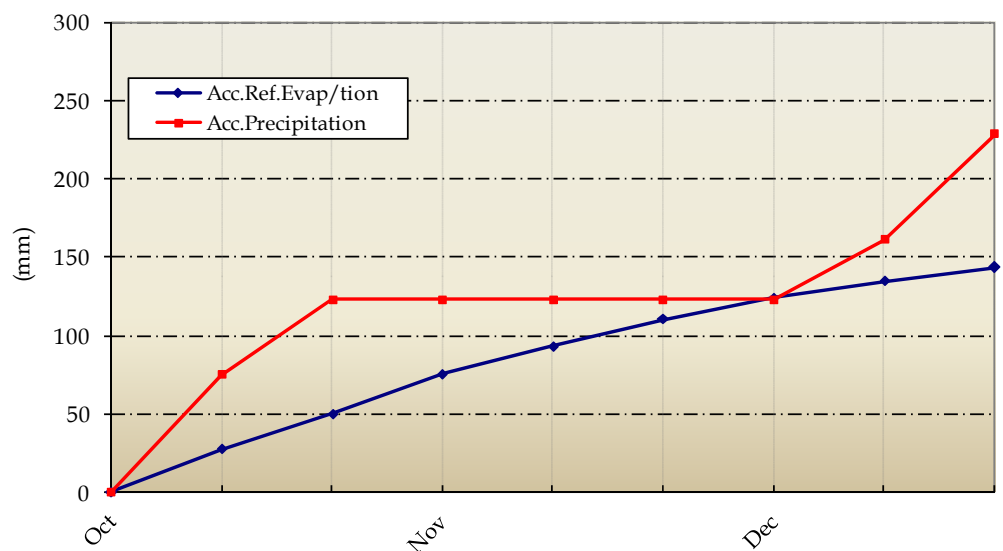


Kalamata

2nd 10-day period (11-20/12/2011)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	19.0	18.2	15.0	19.6	17.6	19.0	-	16.4	16.2	12.6	17.1	14.3	15.9
	Min	8.0	11.0	10.2	7.0	6.2	8.8	8.0	7.6	10.6	8.0	8.5	4.0	6.6
Relative Humidity	Max	100	100	100	100	98	98	95	97	100	97	98	92	-
	Min	66	74	87	59	63	55	70	82	83	72	71	57	-
Soil Temperature at 10 cm	06 UTC	12.0	13.0	13.4	12.4	12.0	13.0	13.4	12.8	12.6	12.8	12.7	11.2	10.6
	12 UTC	12.2	13.6	13.4	13.4	12.8	13.6	13.6	13.0	13.4	12.4	13.1	11.6	11.5
Sunshine Duration		2.6	0.7	0.5	7.0	5.9	8.1	2.1	0.0	0.1	3.0	3.0	3.6	3.9
Precipitation				19.6	0.7		0.9	2.1	5.1	26.6	12.6	67.6	28.7	53.6
Evaporation		1.0	0.0	4.5	1.8	1.7	1.2	0.6	0.2	0.0	0.2	11.2	6.2	23.9
Growing Degrees	5	8.5	9.6	7.6	8.3	6.9	8.9	-	7.0	8.4	5.3	-	41.8	62.3
	10	3.5	4.6	2.6	3.3	1.9	3.9	-	2.0	3.4	0.3	-	9.6	17.2

2nd 10-day period (11-20/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	8.6	10.3	10.5
Precipitation - Reference Evapotranspiration	59.0	18.4	43.1
Number of Rainy Days	7.0	5.0	4.7
Number of Dry Days	5.0	7.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

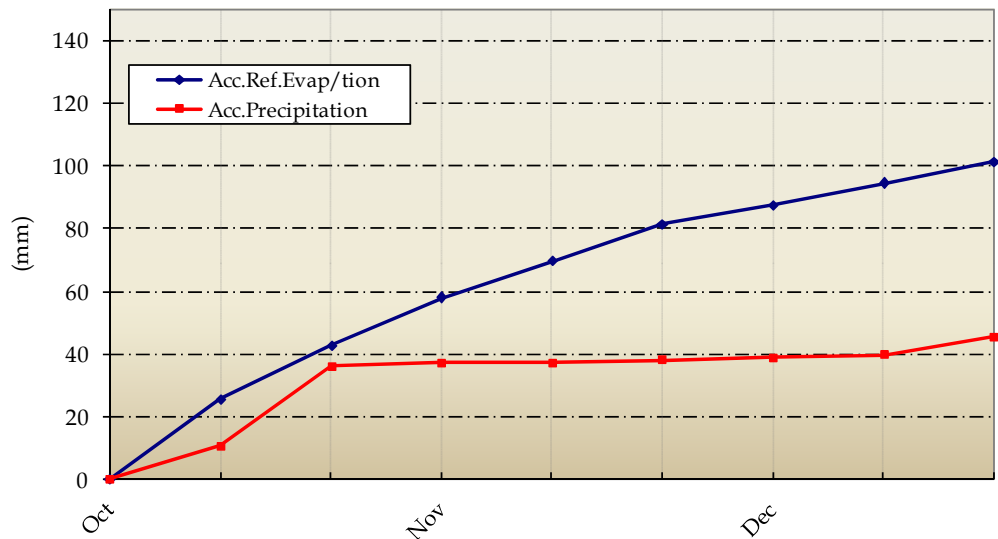


Larisa

2nd 10-day period (11-20/12/2011)		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	16.6	16.6	16.0	14.4	17.2	-	13.2	9.2	11.0	14.2	5.2	11.0
	Min	4.8	5.8	4.6	0.4	-1.4	4.6	5.2	3.8	6.0	5.6	3.9	-3.4	1.7
Relative Humidity	Max	-	91	97	97	96	94	84	78	94	97	92	93	-
	Min	-	49	58	56	60	33	50	44	89	66	56	58	-
Soil Temperature at 10 cm	06 UTC	7.8	-	7.6	6.8	6.0	8.4	8.0	8.6	7.0	7.4	7.5	4.3	6.9
	12 UTC	8.4	11.0	9.0	9.4	8.6	9.4	9.6	9.2	7.8	8.6	9.1	5.4	7.3
Sunshine Duration		-	4.2	3.5	4.9	5.2	6.6	2.3	2.0	0.0	2.3	3.4	3.1	3.1
Precipitation				0.0			1.6			4.3	0.0	5.9	9.4	14.0
Evaporation		-	0.7	0.2	1.2	0.0	0.8	0.6	4.3	0.2	0.0	-	0.2	6.0
Growing Degrees	5	4.2	6.2	5.6	3.2	1.5	5.9	-	3.5	2.6	3.3	-	0.0	20.8
	10	0.0	1.2	0.6	0.0	0.0	0.9	-	0.0	0.0	0.0	-	0.0	2.1

2nd 10-day period (11-20/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.8	4.4	5.8
Precipitation - Reference Evapotranspiration	-0.9	5.0	8.2
Number of Rainy Days	2.0	1.0	3.3
Number of Dry Days	8.0	5.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

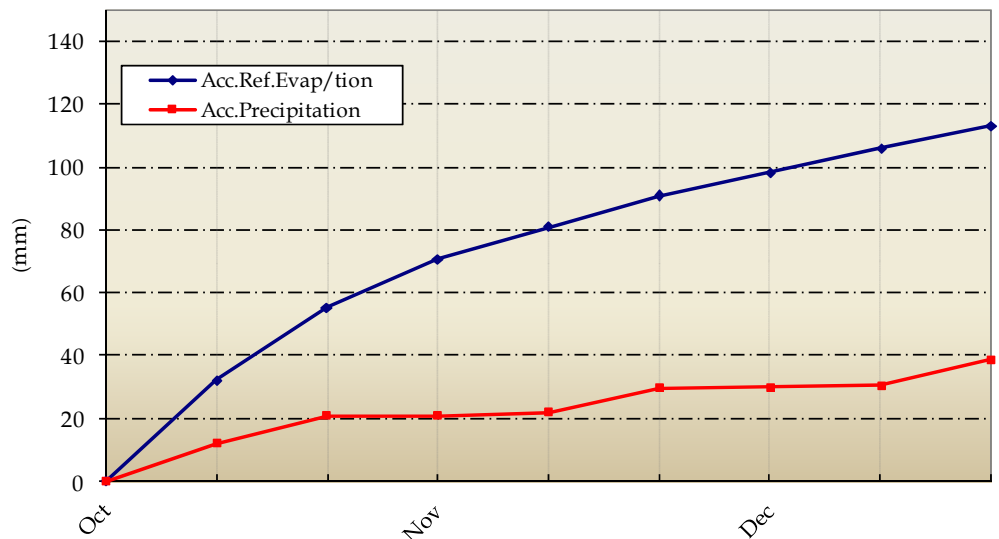


Mikra

2nd 10-day period (11-20/12/2011)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	11.4	12.2	13.4	13.2	12.4	15.2	18.2	14.4	8.4	10.0	12.9	-	10.6
	Min	5.4	6.2	8.8	6.0	5.8	8.0	9.4	7.8	5.0	6.0	6.8	-	3.0
Relative Humidity	Max	100	97	97	100	97	97	90	73	97	100	95	-	-
	Min	73	78	86	75	83	50	49	36	77	60	67	-	-
Soil Temperature at 10 cm	06 UTC	8.2	9.0	10.2	10.6	10.0	10.4	10.2	9.8	9.0	9.2	9.7	-	6.2
	12 UTC	9.6	10.4	11.6	11.4	11.2	11.4	11.6	10.0	9.4	9.0	10.6	-	7.7
Sunshine Duration		2.2	2.5	1.8	2.4	4.0	6.9	2.7	2.5	0.0	1.1	2.6	-	2.8
Precipitation		0.0					4.4	0.2		3.5		8.1	-	12.5
Evaporation		0.9	0.9	0.1	0.5	0.4	1.8	4.2	0.3	1.2	1.5	11.8	-	10.6
Growing Degrees	5	3.4	4.2	6.1	4.6	4.1	6.6	8.8	6.1	1.7	3.0	48.6	-	24.9
	10	0.0	0.0	1.1	0.0	0.0	1.6	3.8	1.1	0.0	0.0	7.6	-	2.8

2nd 10-day period (11-20/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.2	-	8.4
Precipitation - Reference Evapotranspiration	0.9	-	4.1
Number of Rainy Days	3.0	-	2.9
Number of Dry Days	8.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

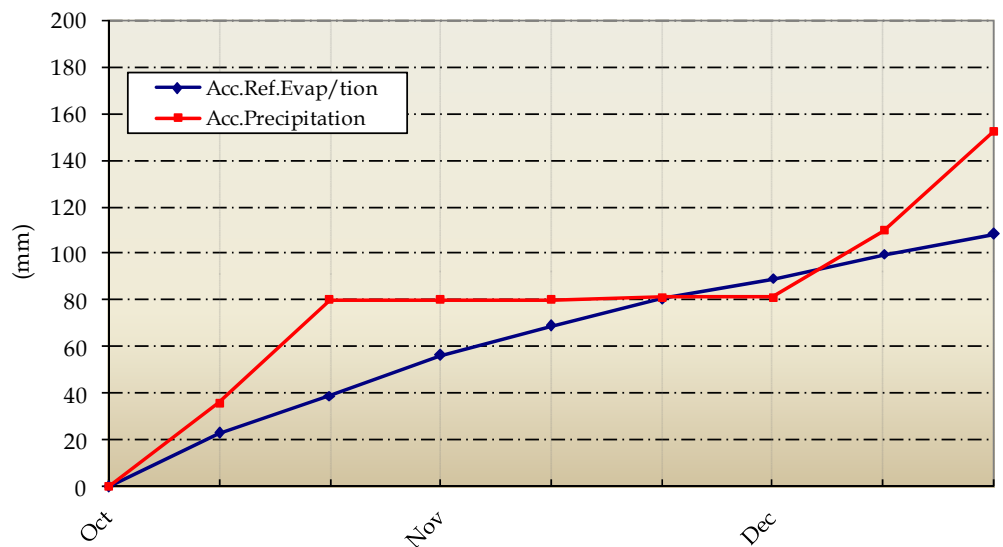


Tripoli

2nd 10-day period (11-20/12/2011)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	14.0	15.3	12.3	15.5	15.9	14.9	12.9	11.9	11.8	8.0	13.2	8.9	10.8
	Min	8.2	5.5	4.6	0.7	-1.0	10.4	6.7	5.2	5.8	5.0	5.1	0.7	1.8
Relative Humidity	Max	-	-	-	96	96	82	83	95	95	91	91	93	-
	Min	59	54	67	51	43	25	54	46	71	61	53	67	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	4.6	6.0
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	6.2	6.7
Sunshine Duration		-	-	-	-	-	-	-	-	-	-	-	3.0	3.6
Precipitation		0.0	0.2	2.2	0.1		0.3	4.4	5.5	22.0	8.0	42.7	52.8	40.9
Evaporation		-	-	-	-	-	-	-	-	-	-	-	2.2	10.0
Growing Degrees	5	6.1	5.4	3.5	3.1	2.5	7.7	4.8	3.6	3.8	1.5	41.8	12.6	19.6
	10	1.1	0.4	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	4.2	1.8	1.5

2nd 10-day period (11-20/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	8.8	5.8	7.6
Precipitation - Reference Evapotranspiration	33.9	47.0	33.3
Number of Rainy Days	8.0	9.0	4.3
Number of Dry Days	4.0	6.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

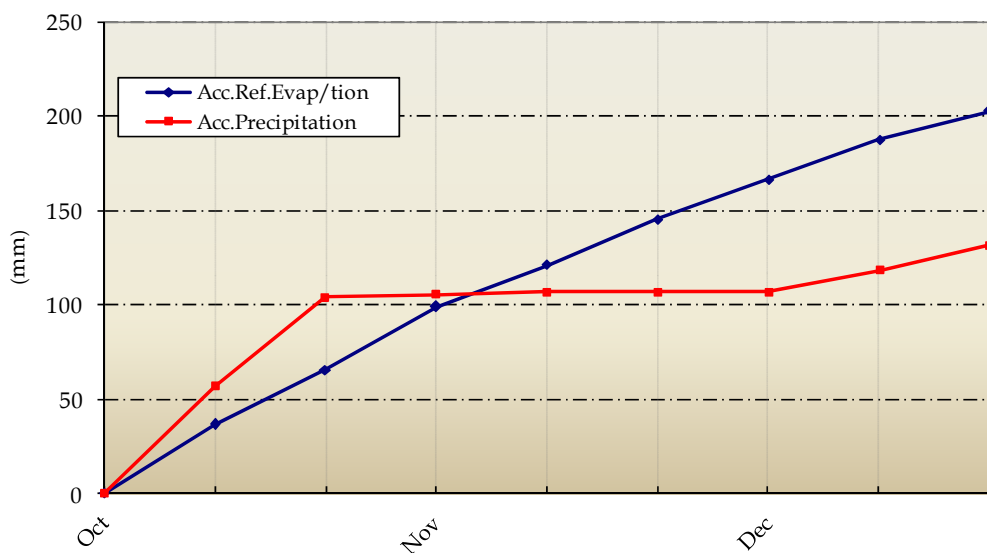


Tympani

2nd 10-day period (11-20/12/2011)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	18.8	18.4	17.4	18.6	19.0	19.6	-	20.4	19.0	17.8	18.8	16.5	17.0
	Min	6.6	9.0	8.2	9.2	6.8	11.6	9.0	14.6	11.4	12.6	9.9	7.0	8.7
Relative Humidity	Max	100	99	100	98	97	100	99	99	100	100	99	96	-
	Min	65	58	67	62	49	67	66	53	48	43	58	47	-
Soil Temperature at 10 cm	06 UTC	11.0	12.6	12.6	11.4	11.4	15.2	14.4	15.4	14.6	15.2	13.4	11.3	12.0
	12 UTC	15.0	15.4	14.4	15.6	15.4	17.2	16.2	17.2	16.6	15.8	15.9	12.9	13.7
Sunshine Duration		6.1	3.9	0.0	8.6	8.7	7.4	1.9	3.7	2.7	3.8	4.7	2.1	4.3
Precipitation					1.6			0.6	0.2		10.7	13.1	150.0	31.3
Evaporation		0.6	1.2	0.8	1.7	2.2	3.7	3.0	4.1	3.8	4.8	25.9	19.1	26.9
Growing Degrees	5	7.7	8.7	7.8	8.9	7.9	10.6	-	12.5	10.2	10.2	-	67.7	78.9
	10	2.7	3.7	2.8	3.9	2.9	5.6	-	7.5	5.2	5.2	-	21.2	30.1

2nd 10-day period (11-20/12/2011)	Previous Year Value	Past Years Mean Value	
Reference Evapotranspiration	15.1	13.9	13.3
Precipitation - Reference Evapotranspiration	-2.0	136.1	18.0
Number of Rainy Days	4.0	9.0	3.9
Number of Dry Days	6.0	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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