

AGROMETEOROLOGICAL BULLETIN

December 2011
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
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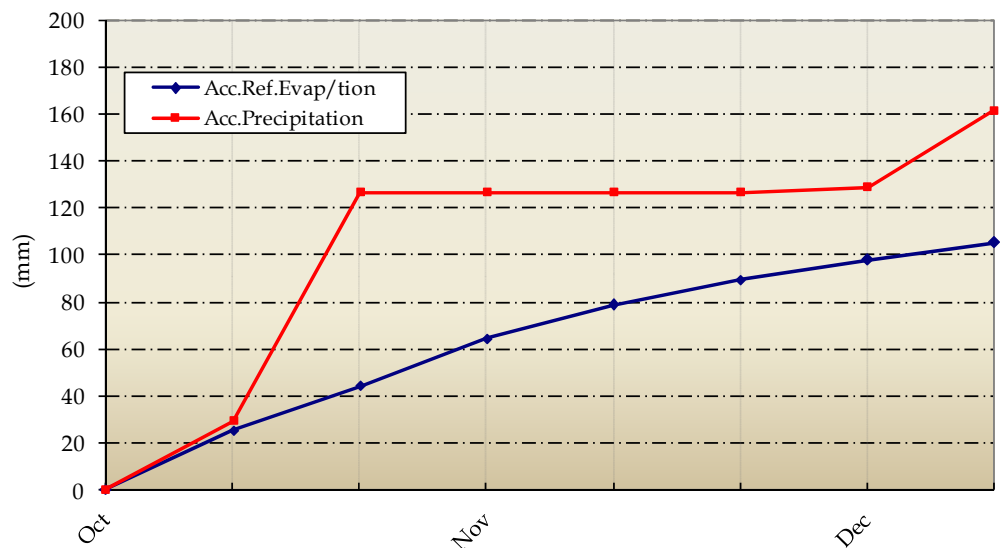
Web addresses of HNMS
www.hnms.gr
www.emy.gov.gr
www.meteo.gov.gr
www.meteohellas.gr

Agrinio

1st 10-day period (1-10/12/2011)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	19.2	18.4	18.8	18.4	17.2	19.0	16.4	17.0	17.2	14.2	17.6	19.8	15.5
	Min	-0.6	-1.6	3.0	5.0	9.8	13.4	9.6	1.0	0.6	1.0	4.1	9.7	5.0
Relative Humidity	Max	93	96	97	97	98	93	98	97	100	93	96	97	-
	Min	45	41	46	61	85	63	72	64	40	57	57	58	-
Soil Temperature at 10 cm	06 UTC	8.8	6.4	9.2	10.2	12.0	13.0	13.2	10.6	9.8	9.0	10.2	14.6	9.1
	12 UTC	10.6	10.2	11.4	11.8	13.0	14.0	13.2	11.2	11.0	10.2	11.7	15.2	10.9
Sunshine Duration		7.8	7.8	6.7	5.0	3.2	3.0	2.6	8.0	8.5	1.6	5.4	3.9	4.0
Precipitation					2.2	23.7	2.9	4.0				32.8	22.0	44.2
Evaporation		2.0	1.6	3.2	2.1	1.2	3.2	1.5	1.2	1.0	0.2	17.2	12.0	14.2
Growing Degrees	5	4.3	3.4	5.9	6.7	8.5	11.2	8.0	4.0	3.9	2.6	58.5	97.2	53.0
	10	0.0	0.0	0.9	1.7	3.5	6.2	3.0	0.0	0.0	0.0	15.3	47.4	12.3

1st 10-day period (1-10/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.3	9.5	8.7
Precipitation - Reference Evapotranspiration	25.5	12.5	35.5
Number of Rainy Days	4.0	5.0	4.5
Number of Dry Days	10.0	3.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

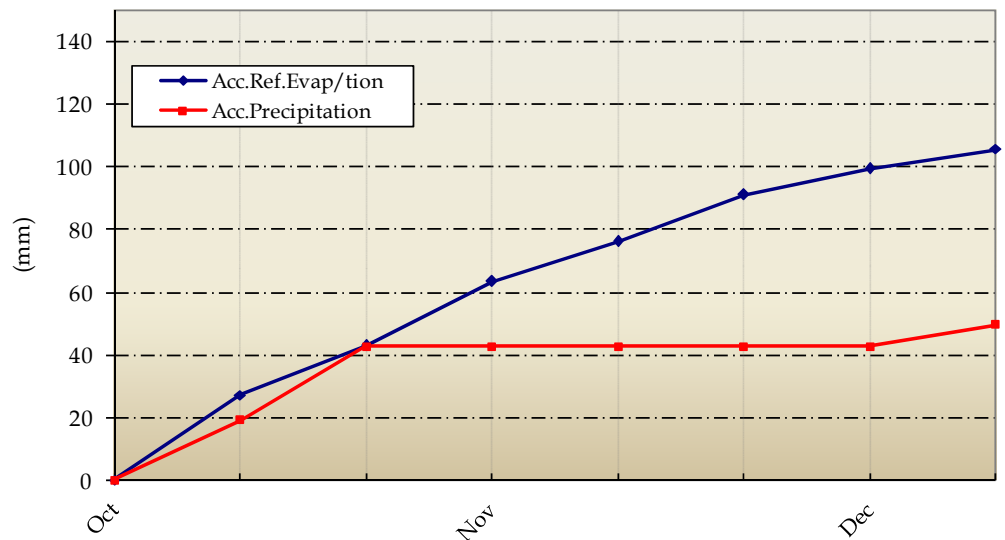


Alexandroupoli

1st 10-day period (1-10/12/2011)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	13.2	12.2	12.6	15.4	16.0	15.8	15.0	13.0	12.2	14.4	14.0	17.9	11.0
	Min	-3.4	-2.4	-3.0	6.8	7.0	13.0	6.8	-0.4	0.2	3.4	2.8	11.6	3.3
Relative Humidity	Max	93	92	94	87	94	89	100	96	83	85	91	90	-
	Min	47	58	71	65	71	81	66	73	42	59	63	64	-
Soil Temperature at 10 cm	06 UTC	5.6	5.4	5.4	8.2	9.0	11.0	11.0	8.0	6.8	6.4	7.7	13.6	7.1
	12 UTC	6.8	6.6	6.4	9.6	10.6	11.4	11.4	9.0	7.8	8.0	8.8	13.9	8.4
Sunshine Duration		7.2	6.7	6.6	6.8	6.7	1.5	0.2	6.6	8.4	8.1	5.9	2.4	2.7
Precipitation							0.0	7.0	0.1			7.1	21.0	30.2
Evaporation		0.0	0.0	0.0	1.0	1.0	0.2	0.5	0.6	1.1	6.0	10.4	18.2	14.9
Growing Degrees	5	0.0	0.0	0.0	6.1	6.5	9.4	5.9	1.3	1.2	3.9	34.3	97.7	28.2
	10	0.0	0.0	0.0	1.1	1.5	4.4	0.9	0.0	0.0	0.0	7.9	51.7	5.3

1st 10-day period (1-10/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.2	11.0	9.7
Precipitation - Reference Evapotranspiration	0.9	10.0	20.5
Number of Rainy Days	2.0	2.0	3.2
Number of Dry Days	50.0	6.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

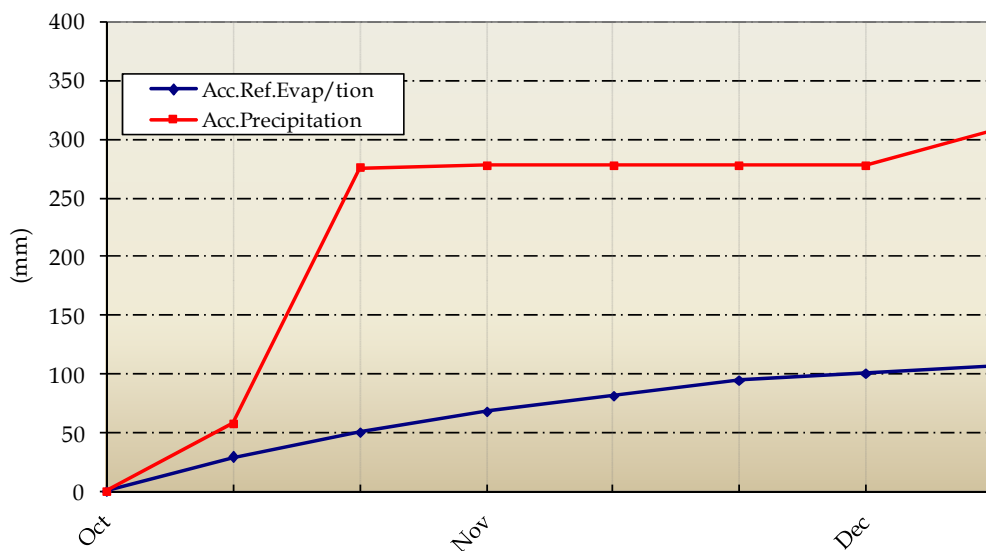


Andravida

1st 10-day period (1-10/12/2011)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	18.2	17.6	18.0	19.0	20.0	18.0	16.4	17.0	16.6	17.8	17.9	19.7	15.9
	Min	2.4	5.4	7.4	8.6	11.0	14.0	11.0	4.6	3.0	4.2	7.2	13.0	7.3
Relative Humidity	Max	93	95	95	100	95	82	95	94	94	90	93	89	-
	Min	42	65	59	65	64	69	45	49	40	53	55	58	-
Soil Temperature at 10 cm	06 UTC	8.6	9.0	10.6	11.6	12.8	13.2	13.4	10.2	9.2	9.0	10.8	14.9	10.4
	12 UTC	13.0	13.4	13.2	14.8	15.2	14.8	14.0	13.4	13.2	13.0	13.8	16.5	12.0
Sunshine Duration		8.0	7.9	10.0	3.6	3.5	2.0	1.3	5.9	8.1	5.1	5.5	3.6	4.3
Precipitation					1.2	11.1	1.7	15.6				29.6	19.9	41.8
Evaporation		0.2	0.2	1.1	2.0	0.1	2.0	2.7	1.3	0.9	0.9	11.4	15.5	19.4
Growing Degrees	5	5.3	6.5	7.7	8.8	10.5	11.0	8.7	5.8	4.8	6.0	75.1	113.5	66.0
	10	0.3	1.5	2.7	3.8	5.5	6.0	3.7	0.8	0.0	1.0	25.3	63.5	20.7

1st 10-day period (1-10/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.0	14.4	9.1
Precipitation - Reference Evapotranspiration	23.6	5.5	32.7
Number of Rainy Days	4.0	4.0	4.6
Number of Dry Days	41.0	4.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

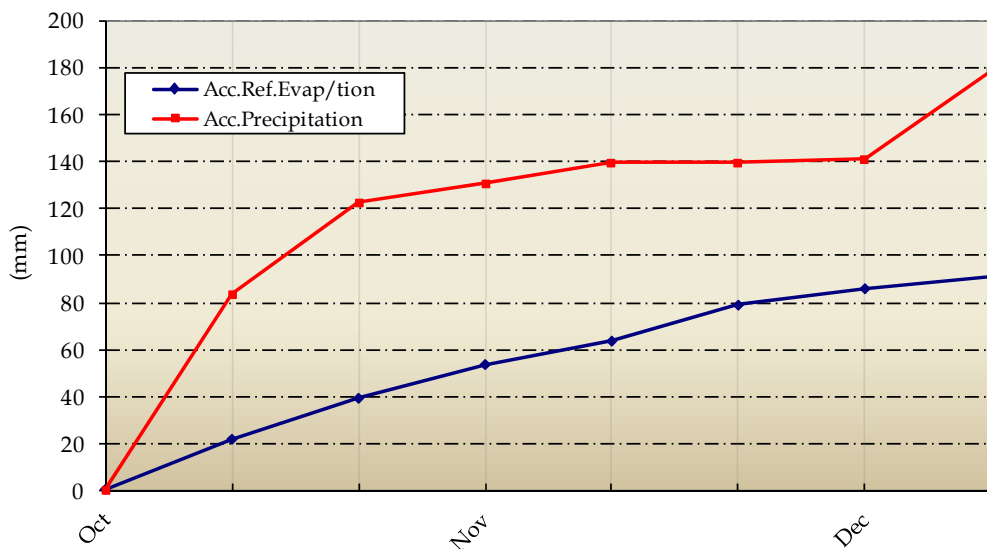


Ioannina

1st 10-day period (1-10/12/2011)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	12.6	12.8	12.0	9.0	11.6	11.4	11.0	9.0	10.0	6.8	10.6	-	10.3
	Min	-3.0	-5.0	-1.4	4.2	6.0	10.0	6.6	-1.6	-2.0	1.0	1.5	-	1.9
Relative Humidity	Max	100	100	100	100	97	97	97	96	96	97	98	-	-
	Min	54	32	63	84	90	93	54	61	52	76	66	-	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	5.5
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	6.5
Sunshine Duration		4.4	5.0	3.9	0.0	0.0	0.0	2.2	3.7	5.5	0.0	2.5	-	2.5
Precipitation					2.2	9.2	23.8	1.5			1.0	37.7	-	51.5
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	10.5
Growing Degrees	5	0.0	0.0	0.3	1.6	3.8	5.7	3.8	0.0	0.0	0.0	15.2	-	17.8
	10	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.7	-	0.9

1st 10-day period (1-10/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	5.1	-	6.1
Precipitation - Reference Evapotranspiration	32.6	-	45.4
Number of Rainy Days	5.0	-	4.2
Number of Dry Days	10.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

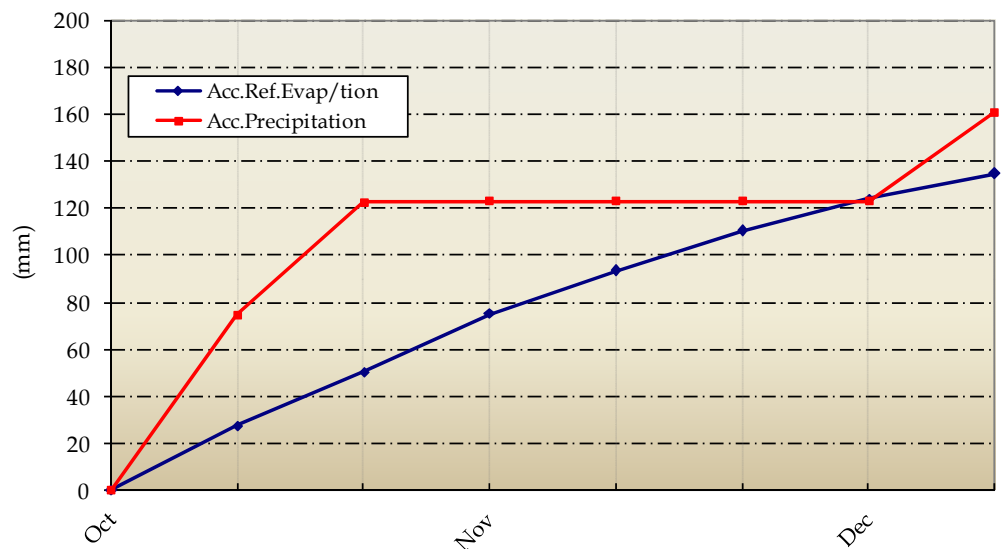


Kalamata

1st 10-day period (1-10/12/2011)		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	18.6	20.4	17.0	18.4	19.2	16.6	17.0	17.2	19.0	18.2	20.2	16.9
	Min	3.8	4.8	4.8	5.8	5.0	6.6	11.0	4.8	6.6	4.0	5.7	9.6	7.2
Relative Humidity	Max	-	100	94	100	100	100	98	97	95	100	98	96	-
	Min	59	44	52	69	69	65	85	50	56	55	60	62	-
Soil Temperature at 10 cm	06 UTC	11.4	11.6	11.2	11.8	11.8	12.0	13.4	12.0	11.4	11.0	11.8	15.3	11.5
	12 UTC	13.2	13.6	12.4	13.0	12.8	12.8	14.0	12.6	12.6	12.0	12.9	16.0	12.5
Sunshine Duration		7.6	10.8	7.0	2.4	6.6	4.7	1.4	9.5	6.9	7.5	6.4	5.2	4.0
Precipitation					0.0	0.3	1.5	36.1				37.9	14.1	45.8
Evaporation		1.0	0.8	1.6	0.6	1.5	0.8	1.2	1.2	1.8	1.0	11.5	13.0	26.7
Growing Degrees	5	6.2	6.7	7.6	6.4	6.7	7.9	8.8	5.9	6.9	6.5	69.6	98.8	70.4
	10	1.2	1.7	2.6	1.4	1.7	2.9	3.8	0.9	1.9	1.5	19.6	48.8	22.7

1st 10-day period (1-10/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	10.8	12.8	10.9
Precipitation - Reference Evapotranspiration	27.1	1.3	34.9
Number of Rainy Days	3.0	3.0	4.7
Number of Dry Days	8.0	5.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

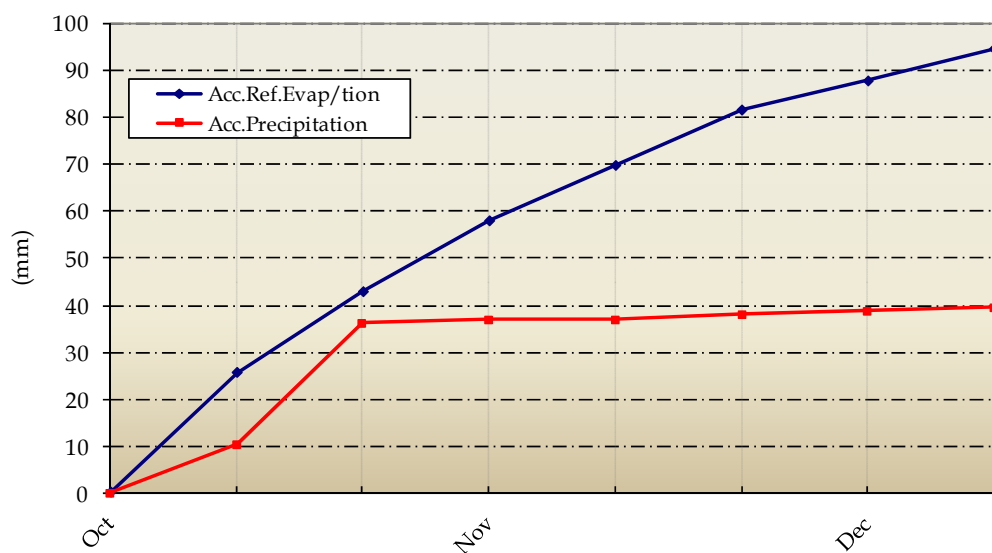


Larisa

1st 10-day period (1-10/12/2011)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	14.2	14.6	13.0	14.6	20.0	17.4	14.0	16.2	13.2	14.0	15.1	17.7	11.5
	Min	-3.2	-3.0	1.0	-3.0	3.4	8.6	4.4	-1.4	-3.2	-3.8	0.0	6.3	2.7
Relative Humidity	Max	96	96	96	96	88	97	97	92	79	91	93	95	-
	Min	55	41	55	50	40	61	69	33	27	31	46	55	-
Soil Temperature at 10 cm	06 UTC	7.0	6.6	7.2	5.4	7.4	9.4	7.6	6.0	5.4	5.4	6.7	11.6	8.1
	12 UTC	8.4	7.6	8.0	8.8	8.8	11.6	11.6	8.6	9.0	6.8	8.9	12.2	8.8
Sunshine Duration		6.0	7.0	4.5	6.4	7.0	3.0	3.1	7.1	7.5	6.4	5.8	4.5	2.9
Precipitation							0.3	0.3				0.6	7.5	18.5
Evaporation		1.6	1.1	0.8	0.9	0.5	0.3	0.3	0.3	1.2	1.0	8.0	12.5	7.8
Growing Degrees	5	0.5	0.8	2.0	0.8	6.7	8.0	4.2	2.4	0.0	0.1	25.5	69.9	25.6
	10	0.0	0.0	0.0	0.0	1.7	3.0	0.0	0.0	0.0	0.0	4.7	25.0	2.3

1st 10-day period (1-10/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.8	9.6	6.7
Precipitation - Reference Evapotranspiration	-6.2	-2.1	11.8
Number of Rainy Days	2.0	4.0	3.6
Number of Dry Days	11.0	4.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

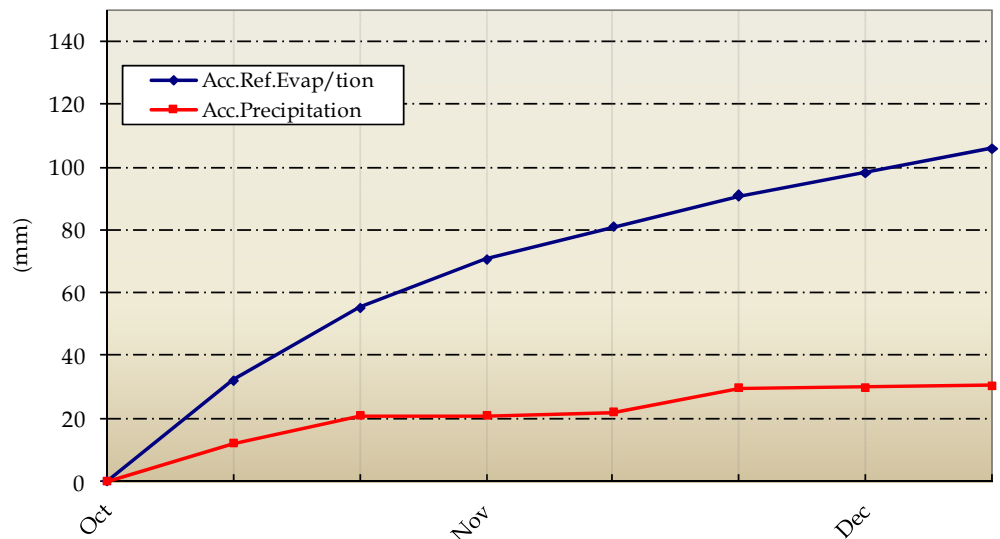


Mikra

1st 10-day period (1-10/12/2011)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	13.2	12.0	12.4	12.0	12.0	16.4	13.0	12.0	11.2	11.2	12.5	-	11.5
	Min	0.2	0.6	3.8	3.0	2.2	8.4	5.0	-0.6	3.2	-1.0	2.5	-	3.4
Relative Humidity	Max	100	97	97	100	100	95	94	92	75	94	94	-	-
	Min	55	75	63	76	90	66	46	46	38	56	61	-	-
Soil Temperature at 10 cm	06 UTC	7.0	6.8	8.4	8.2	8.2	10.2	9.2	4.4	7.2	5.2	7.5	-	7.3
	12 UTC	8.8	8.4	9.4	9.4	9.4	11.4	10.2	10.0	8.2	7.4	9.3	-	8.9
Sunshine Duration		5.3	4.8	9.6	5.3	4.3	0.1	0.0	6.6	8.2	6.2	5.0	-	3.1
Precipitation							0.2	0.5				0.7	-	19.0
Evaporation		1.2	0.4	1.4	0.9	1.3	0.0	1.8	0.9	4.1	0.8	12.8	-	13.0
Growing Degrees	5	1.7	1.3	3.1	2.5	2.1	7.4	4.0	0.7	2.2	0.1	25.1	-	28.1
	10	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	2.4	-	3.2

1st 10-day period (1-10/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.7	-	8.7
Precipitation - Reference Evapotranspiration	-7.0	-	10.3
Number of Rainy Days	2.0	-	3.0
Number of Dry Days	11.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

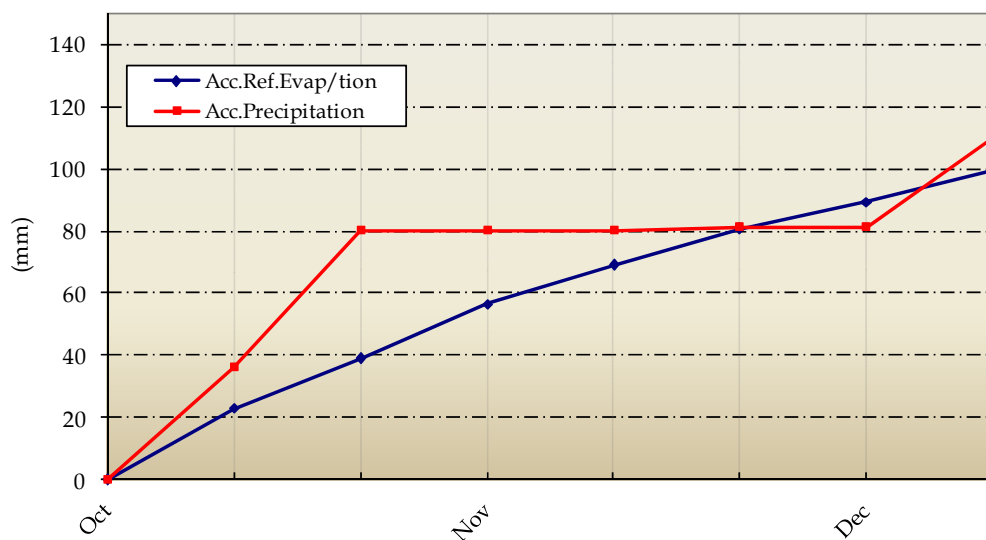


Tripoli

1st 10-day period (1-10/12/2011)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	15.8	16.4	16.1	15.4	13.4	13.5	12.8	14.0	12.8	15.2	14.5	17.3	11.6
	Min	-4.4	-4.6	-5.0	-3.6	3.3	9.2	8.4	-2.1	-2.3	-2.1	-0.3	6.5	2.8
Relative Humidity	Max	96	95	95	95	94	93	-	95	95	91	94	93	-
	Min	35	30	33	52	63	56	57	27	37	34	42	54	-
Soil Temperature at 10 cm	06 UTC	4.2	3.4	3.2	-	-	-	-	-	-	-	3.6	9.1	7.1
	12 UTC	7.4	-	7.0	-	-	-	-	-	-	-	7.2	11.7	7.9
Sunshine Duration		7.2	7.2	-	-	-	-	-	-	-	-	7.2	6.0	3.7
Precipitation		0.1	0.0		0.0	2.9	13.1	12.6				28.7	1.7	38.8
Evaporation		0.0	0.0	-	-	-	-	-	-	-	-	-	7.7	9.1
Growing Degrees	5	0.7	0.9	0.6	0.9	3.4	6.4	5.6	1.0	0.3	1.6	21.1	69.0	26.1
	10	0.0	0.0	0.0	0.0	0.0	1.4	0.6	0.0	0.0	0.0	2.0	25.4	2.6

1st 10-day period (1-10/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	10.3	9.4	8.4
Precipitation - Reference Evapotranspiration	18.4	-7.7	30.4
Number of Rainy Days	4.0	1.0	4.3
Number of Dry Days	13.0	7.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

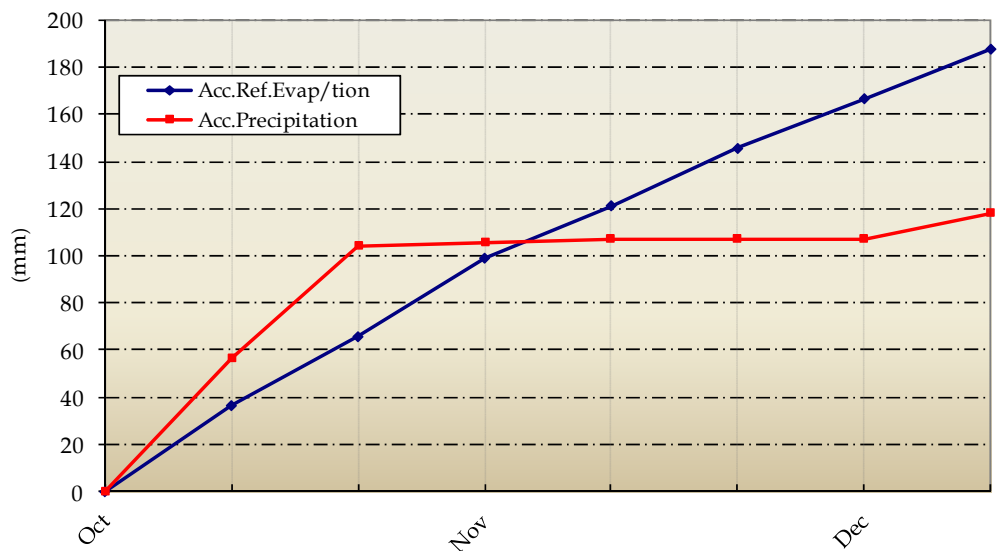


Tympaki

1st 10-day period (1-10/12/2011)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	19.4	20.6	19.4	19.6	19.4	20.8	20.2	19.8	17.8	17.2	19.4	22.3	17.9
	Min	7.4	6.0	3.8	5.4	7.4	12.4	13.6	11.0	7.0	3.2	7.7	12.1	9.7
Relative Humidity	Max	99	97	98	100	100	94	100	100	92	98	98	94	-
	Min	36	22	14	58	51	59	46	24	28	26	36	42	-
Soil Temperature at 10 cm	06 UTC	12.4	11.8	10.8	11.6	12.8	14.8	16.4	13.0	12.4	9.8	12.6	16.2	13.2
	12 UTC	16.2	16.0	15.4	16.2	16.4	17.6	17.8	16.2	15.4	14.0	16.1	19.5	15.3
Sunshine Duration		8.6	8.7	9.0	7.2	6.0	4.6	2.4	8.7	8.6	9.2	7.3	6.0	4.4
Precipitation						0.3	0.9	10.1				11.3	0.8	32.3
Evaporation		2.4	1.8	4.2	1.8	0.1	4.3	3.9	3.2	3.0	2.5	27.2	32.7	28.9
Growing Degrees	5	8.4	8.3	6.6	7.5	8.4	11.6	11.9	10.4	7.4	5.2	85.7	122.1	88.1
	10	3.4	3.3	1.6	2.5	3.4	6.6	6.9	5.4	2.4	0.2	35.7	72.1	38.8

1st 10-day period (1-10/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	21.0	17.4	14.0
Precipitation - Reference Evapotranspiration	-9.7	-16.6	18.3
Number of Rainy Days	3.0	1.0	3.6
Number of Dry Days	32.0	14.0	-

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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