



AGROMETEOROLOGICAL BULLETIN

November 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



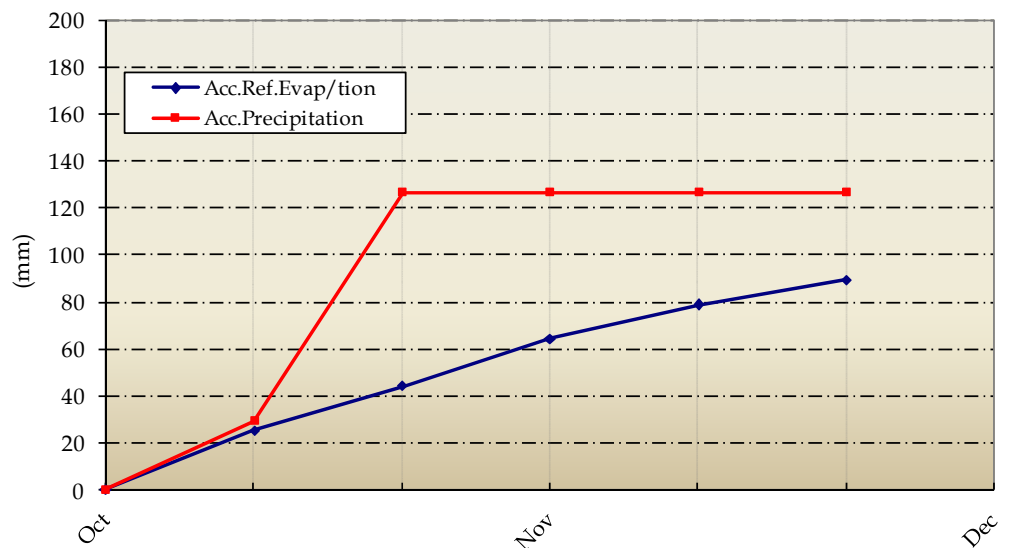
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Web addresses of HNMS
www.hnms.gr
www.emy.gov.gr
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2nd 10-day period (11-20/11/2011)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	21.5	16.8	15.6	14.4	15.0	17.2	17.0	16.4	18.0	17.8	17.0	22.0	18.6
	Min	8.8	8.6	4.5	4.4	0.2	2.0	1.4	-1.0	-1.4	-1.0	2.6	10.4	7.7
Relative Humidity	Max	92	67	53	57	82	83	79	88	92	97	79	96	-
	Min	47	39	33	31	34	37	30	34	33	37	36	59	-
Soil Temperature at 10 cm	06 UTC	15.0	14.2	12.4	11.6	10.6	10.2	10.0	10.0	9.2	9.2	11.2	15.5	12.0
	12 UTC	16.4	15.4	13.4	13.0	12.4	12.0	12.0	11.8	11.0	11.5	12.9	16.6	14.1
Sunshine Duration		6.4	8.7	5.6	9.2	8.7	8.6	9.0	8.2	8.2	7.8	8.0	5.8	4.4
Precipitation													25.6	53.7
Evaporation		3.5	5.5	3.2	3.8	-	1.8	3.2	2.0	1.9	1.9	-	12.3	17.2
Growing Degrees	5	10.2	7.7	5.1	4.4	2.6	4.6	4.2	2.7	3.3	3.4	48.1	111.9	81.2
	10	5.2	2.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.9	61.9	33.0

2nd 10-day period (11-20/11/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	11.0	9.6	11.3
Precipitation - Reference Evapotranspiration	-11.0	16.0	42.4
Number of Rainy Days	0.0	5.0	4.4
Number of Dry Days	35.0	2.0	-

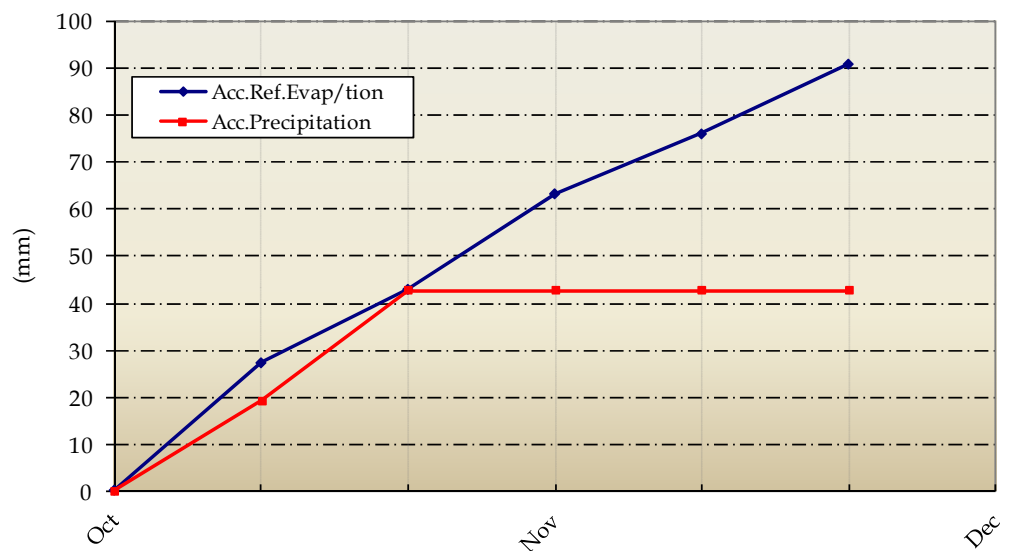
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



2nd 10-day period (11-20/11/2011)		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	7.4	8.4	9.6	9.6	12.4	10.4	10.6	11.6	12.4	10.3	20.3	14.4
	Min	5.4	4.0	5.4	6.0	6.4	2.2	3.2	-2.4	-4.0	-3.4	2.3	12.3	6.2
Relative Humidity	Max	79	80	61	71	62	79	79	80	92	83	77	95	-
	Min	44	40	46	50	46	37	39	37	39	40	42	67	-
Soil Temperature at 10 cm	06 UTC	11.4	9.4	9.4	9.4	10.0	9.2	8.4	7.2	6.4	6.2	8.7	14.4	9.7
	12 UTC	11.6	10.0	10.6	10.4	11.0	10.4	9.8	9.0	8.0	8.0	9.9	15.5	11.5
Sunshine Duration		3.0	0.0	2.1	5.3	2.2	8.7	6.6	8.9	7.6	8.8	5.3	5.3	3.9
Precipitation					0.0							0.0	3.3	29.1
Evaporation		2.0	2.9	5.0	1.0	3.0	0.2	0.0	0.0	0.0	0.0	14.1	20.4	18.6
Growing Degrees	5	2.9	0.7	1.9	2.8	3.0	2.3	1.8	0.0	0.0	0.0	15.4	113.2	54.2
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	63.2	17.6

2nd 10-day period (11-20/11/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	14.9	10.0	11.3
Precipitation - Reference Evapotranspiration	-14.9	-6.7	17.8
Number of Rainy Days	0.0	3.0	2.9
Number of Dry Days	34.0	2.0	-

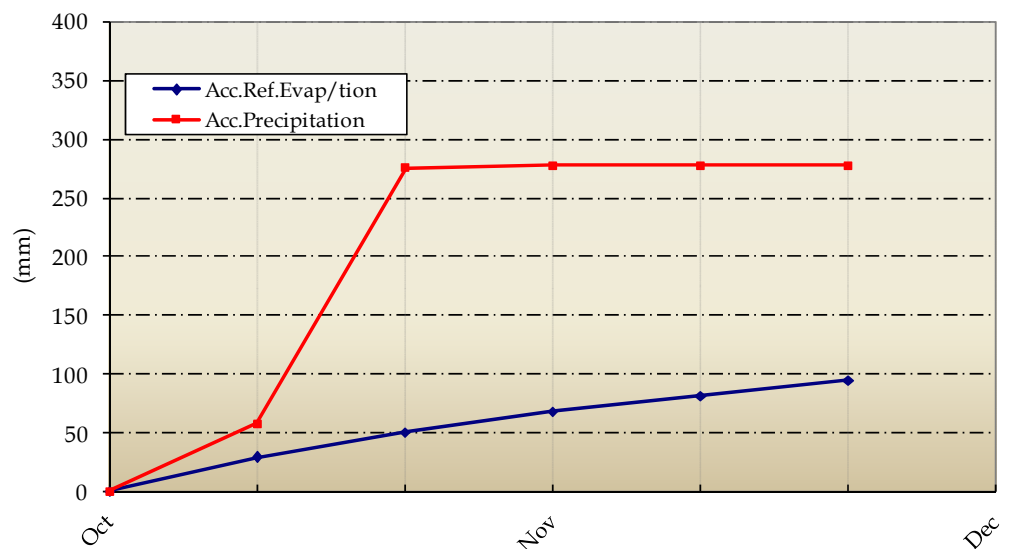
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



2nd 10-day period (11-20/11/2011)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	19.2	16.8	13.0	15.2	16.0	16.8	17.4	15.4	16.4	17.0	16.3	22.1	18.6
	Min	10.8	8.6	7.2	6.8	5.4	1.2	7.4	0.8	2.4	1.8	5.2	12.6	9.7
Relative Humidity	Max	90	92	60	71	84	89	86	89	94	93	85	94	-
	Min	56	33	35	32	31	36	36	37	40	50	39	57	-
Soil Temperature at 10 cm	06 UTC	14.4	13.6	11.2	10.0	9.8	8.6	11.4	9.2	8.4	8.8	10.5	15.9	13.2
	12 UTC	17.0	16.4	16.4	13.8	14.2	13.2	15.4	13.2	13.0	13.0	14.6	18.7	15.2
Sunshine Duration		2.0	6.4	5.9	8.6	8.6	7.2	8.3	8.1	8.1	7.3	7.0	5.9	4.9
Precipitation													20.2	50.9
Evaporation		0.6	3.5	2.0	3.4	3.5	2.4	2.3	1.3	2.8	1.0	22.8	22.4	21.4
Growing Degrees	5	10.0	7.7	5.1	6.0	5.7	4.0	7.4	3.1	4.4	4.4	57.8	123.3	91.7
	10	5.0	2.7	0.1	1.0	0.7	0.0	2.4	0.0	0.0	0.0	11.9	73.3	42.4

2nd 10-day period (11-20/11/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	13.5	12.7	11.8
Precipitation - Reference Evapotranspiration	-13.5	7.5	39.1
Number of Rainy Days	0.0	2.0	4.2
Number of Dry Days	28.0	8.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

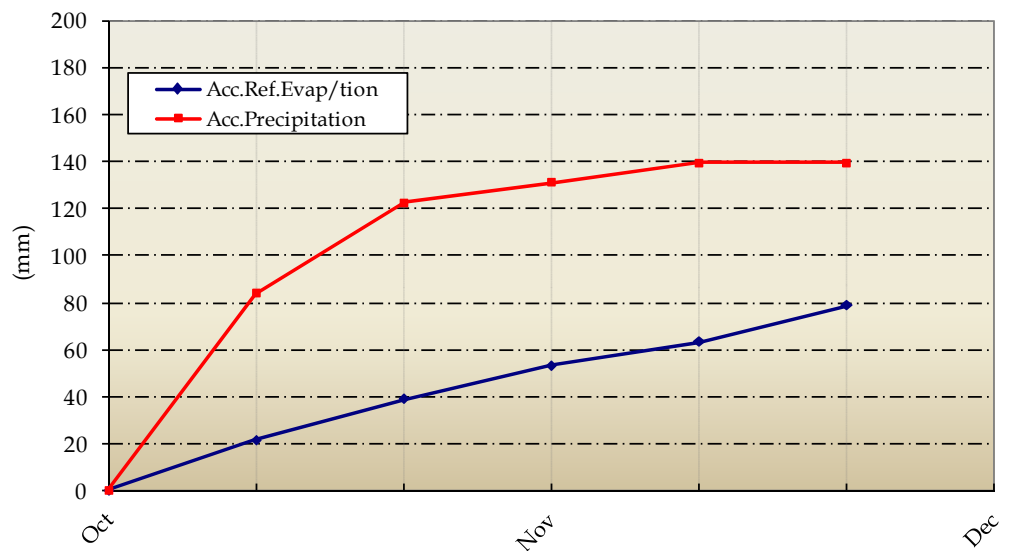


Ioannina

2nd 10-day period (11-20/11/2011)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	17.2	12.2	8.6	8.8	11.6	11.2	12.0	12.2	12.8	12.2	11.9	-	13.9
	Min	9.0	5.4	5.4	5.6	-1.0	-5.2	-5.5	-5.2	-5.0	-5.8	-0.2	-	4.6
Relative Humidity	Max	97	73	39	52	81	96	100	96	91	95	82	-	-
	Min	45	38	30	30	30	32	25	36	42	42	35	-	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	8.9
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	10.1
Sunshine Duration		4.2	6.7	2.9	6.9	5.2	6.1	6.1	5.9	4.8	4.8	5.4	-	3.0
Precipitation													-	63.6
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	13.4
Growing Degrees	5	8.1	3.8	2.0	2.2	0.3	0.0	0.0	0.0	0.0	0.0	16.4	-	44.8
	10	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	-	8.8

2nd 10-day period (11-20/11/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	15.4	-	7.9
Precipitation - Reference Evapotranspiration	-15.4	-	55.7
Number of Rainy Days	0.0	-	4.4
Number of Dry Days	10.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

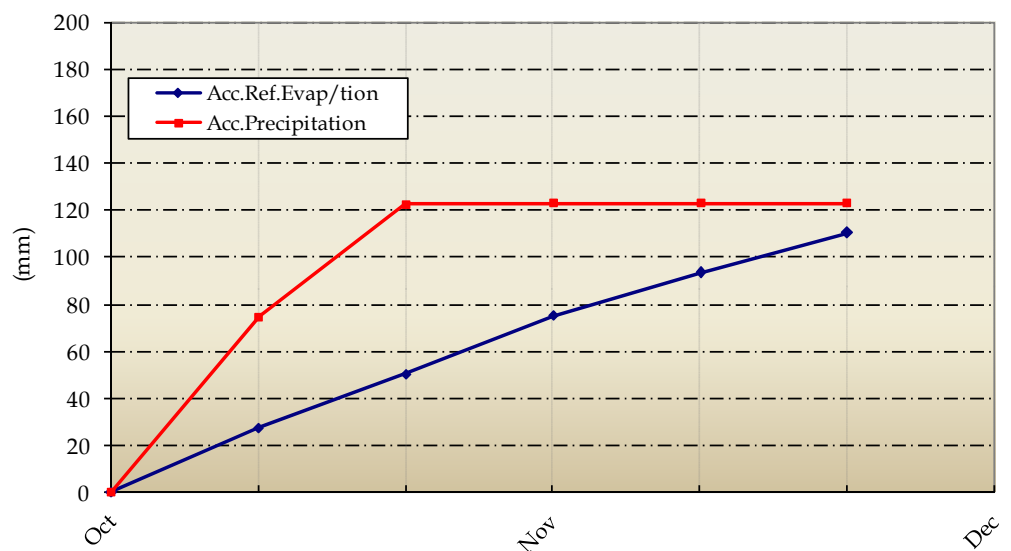


Kalamata

2nd 10-day period (11-20/11/2011)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	22.0	17.0	15.0	15.4	17.0	17.8	15.6	17.0	17.0	18.0	17.2	22.3	19.5
	Min	11.0	11.0	10.0	8.6	5.8	5.8	9.0	4.8	2.8	2.6	7.1	12.1	9.3
Relative Humidity	Max	97	63	68	65	76	90	92	87	93	97	83	94	-
	Min	51	41	41	39	35	47	50	35	37	46	42	60	-
Soil Temperature at 10 cm	06 UTC	16.0	16.0	14.0	13.4	13.0	12.8	13.6	12.6	12.0	11.4	13.5	17.3	14.0
	12 UTC	17.0	16.8	14.8	14.6	14.2	14.0	14.2	13.8	14.0	13.0	14.6	17.9	15.4
Sunshine Duration		3.2	4.3	8.5	9.0	6.8	5.6	0.0	8.8	8.8	6.1	6.1	6.0	4.6
Precipitation								0.1				0.1	27.9	55.3
Evaporation		3.4	1.8	5.5	3.7	2.8	1.9	1.0	1.4	2.4	0.2	24.1	23.4	22.8
Growing Degrees	5	11.5	9.0	7.5	7.0	6.4	6.8	7.3	5.9	4.9	5.3	71.6	121.9	93.9
	10	6.5	4.0	2.5	2.0	1.4	1.8	2.3	0.9	0.0	0.3	21.7	71.9	44.2

2nd 10-day period (11-20/11/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	17.0	15.3	13.4
Precipitation - Reference Evapotranspiration	-16.9	12.6	41.9
Number of Rainy Days	1.0	2.0	3.8
Number of Dry Days	24.0	5.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

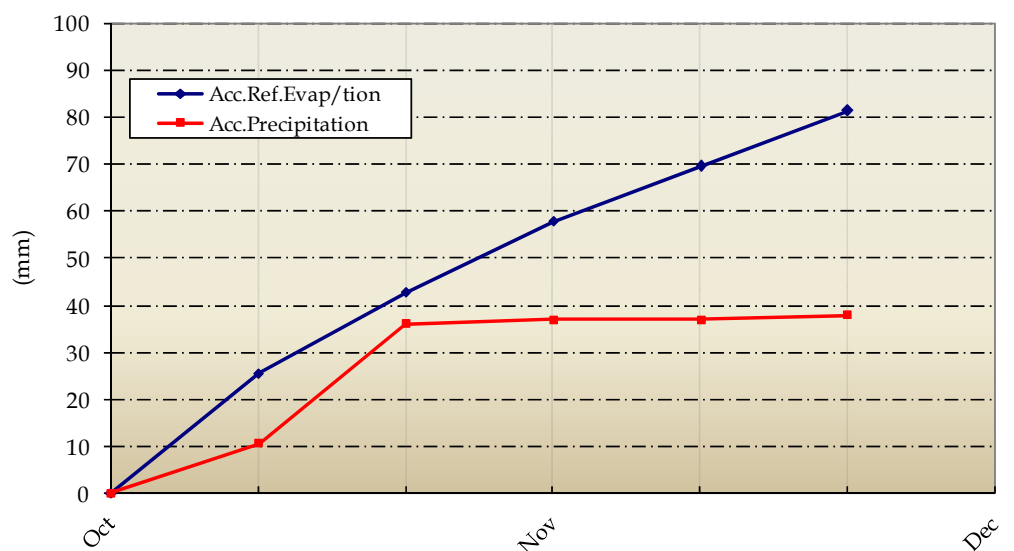


Larisa

2nd 10-day period (11-20/11/2011)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	15.4	9.8	9.0	10.0	12.2	13.4	11.8	12.8	13.0	13.2	12.1	19.5	15.3
	Min	9.6	7.2	6.6	7.8	3.4	-3.0	-3.2	-1.6	-3.4	-3.6	2.0	8.2	5.5
Relative Humidity	Max	90	81	57	55	79	92	92	96	92	96	83	97	-
	Min	77	51	38	37	34	34	43	50	47	50	46	64	-
Soil Temperature at 10 cm	06 UTC	14.0	13.0	11.6	11.0	10.4	9.0	8.0	8.2	7.2	7.0	9.9	13.8	10.9
	12 UTC	14.5	12.8	11.2	11.0	11.4	10.0	9.2	10.4	8.8	9.4	10.9	15.1	11.6
Sunshine Duration		0.0	0.5	0.0	0.0	7.3	7.3	5.9	6.7	7.2	6.6	4.2	4.4	3.5
Precipitation		0.7		0.2	0.0							0.9	3.5	21.2
Evaporation		4.7	0.8	2.4	3.3	1.6	1.0	1.6	0.7	1.2	1.0	18.3	10.7	13.7
Growing Degrees	5	7.5	3.5	2.8	3.9	2.8	0.2	0.0	0.6	0.0	0.0	21.3	88.8	54.7
	10	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	38.8	14.5

2nd 10-day period (11-20/11/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	11.8	8.9	8.8
Precipitation - Reference Evapotranspiration	-10.9	-5.4	12.4
Number of Rainy Days	2.0	1.0	3.4
Number of Dry Days	18.0	7.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

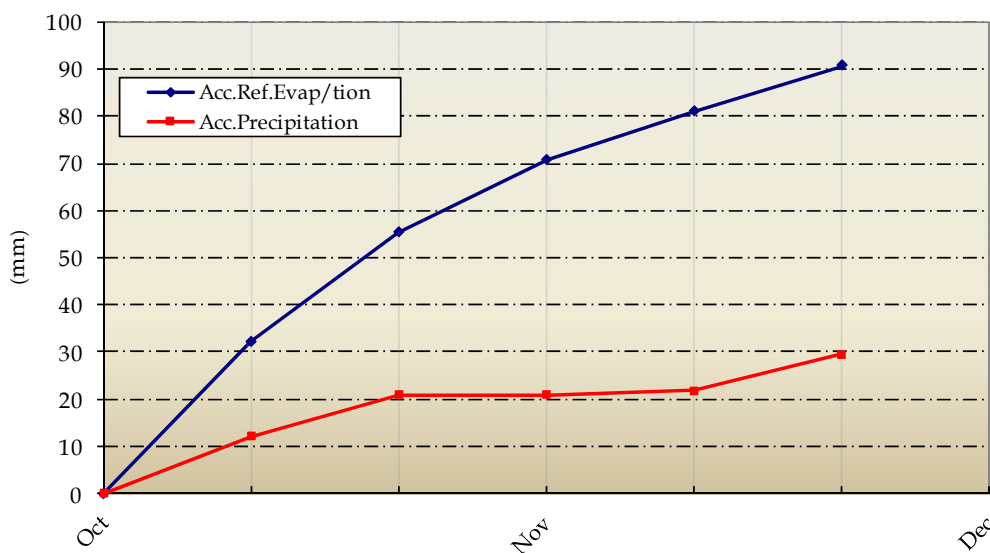


Mikra

2nd 10-day period (11-20/11/2011)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	13.2	8.8	9.0	11.4	10.0	10.6	11.0	11.0	12.0	10.8	10.8	-	14.7
	Min	10.6	5.4	1.0	5.8	-1.0	-1.6	-1.4	0.6	-1.2	-0.6	1.8	-	6.8
Relative Humidity	Max	95	85	82	70	82	88	84	88	88	92	85	-	-
	Min	64	42	38	36	41	45	50	46	45	56	46	-	-
Soil Temperature at 10 cm	06 UTC	14.2	11.6	9.0	9.2	7.0	6.6	6.0	7.0	6.4	6.2	8.3	-	10.3
	12 UTC	14.0	12.0	10.0	10.0	11.0	12.4	12.8	8.6	8.0	8.0	10.7	-	12.2
Sunshine Duration		0.0	0.1	1.0	0.9	8.7	7.6	7.1	7.6	7.9	7.6	4.8	-	3.5
Precipitation		7.6	0.1									7.7	-	21.1
Evaporation		1.0	1.1	1.1	1.2	1.9	0.9	1.1	1.3	0.4	0.8	10.8	-	18.7
Growing Degrees	5	6.9	2.1	0.0	3.6	0.0	0.0	0.0	0.8	0.4	0.1	13.9	-	57.6
	10	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	-	17.1

2nd 10-day period (11-20/11/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	9.7	-	11.2
Precipitation - Reference Evapotranspiration	-2.0	-	9.9
Number of Rainy Days	2.0	-	3.0
Number of Dry Days	0.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

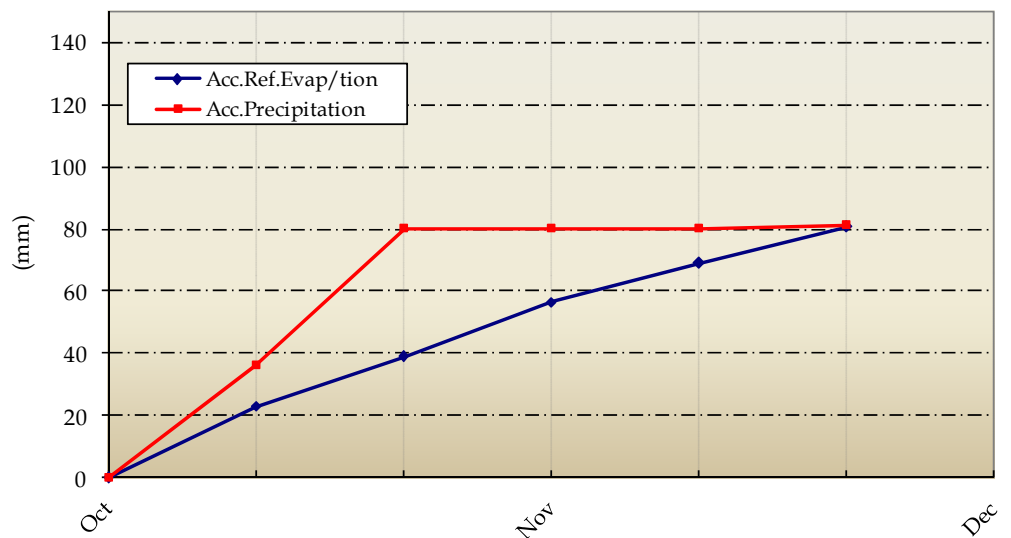


Tripoli

2nd 10-day period (11-20/11/2011)		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	9.8	5.6	7.0	9.0	12.0	9.8	10.2	13.2	15.4	11.1	18.2	14.9
	Min	8.4	4.8	3.6	5.0	2.6	0.4	3.4	-0.2	-3.8	-5.0	1.9	7.9	4.4
Relative Humidity	Max	97	79	84	76	79	92	84	96	100	95	88	95	-
	Min	33	69	61	61	51	48	46	52	31	37	49	59	-
Soil Temperature at 10 cm	06 UTC	11.4	11.0	8.4	7.4	6.6	6.2	7.4	6.4	4.8	4.0	7.4	11.7	9.7
	12 UTC	14.2	10.8	8.6	8.8	9.4	9.6	10.0	9.4	8.0	8.0	9.7	14.3	10.8
Sunshine Duration		1.9	1.0	1.2	3.1	6.8	4.9	6.6	7.7	6.5	6.2	4.6	5.1	4.5
Precipitation			0.0	0.7	0.0			0.3				1.0	19.3	45.7
Evaporation		1.9	2.0	0.9	0.9	1.9	2.8	1.4	0.5	0.0	0.0	12.3	8.3	15.6
Growing Degrees	5	8.6	2.3	0.0	1.0	0.8	1.2	1.6	0.0	0.0	0.2	15.7	80.6	46.8
	10	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	30.6	10.1

2nd 10-day period (11-20/11/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	11.6	11.0	10.5
Precipitation - Reference Evapotranspiration	-10.6	8.3	35.2
Number of Rainy Days	2.0	3.0	4.0
Number of Dry Days	26.0	3.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

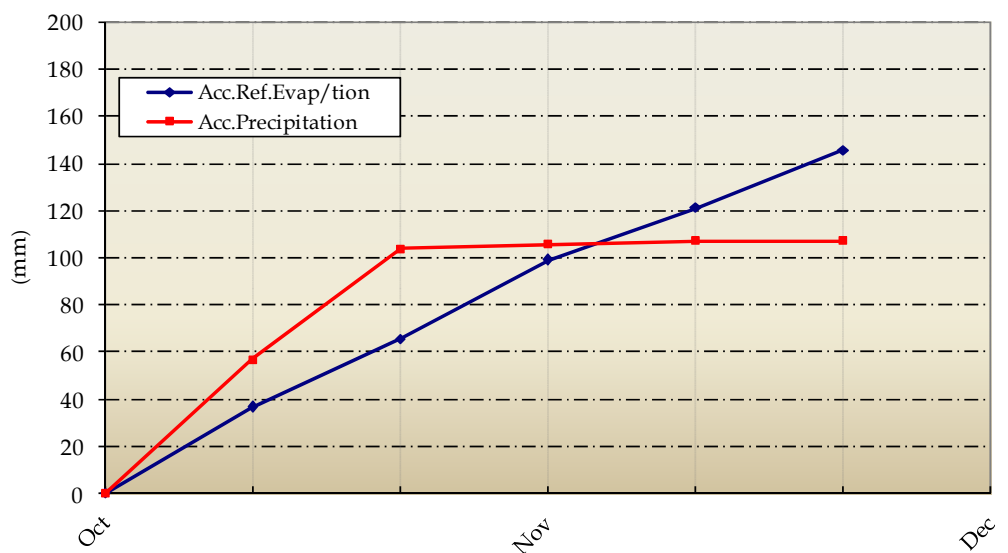


Tympaki

2nd 10-day period (11-20/11/2011)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	23.6	17.2	16.4	16.4	16.4	16.8	17.0	15.8	16.2	19.8	17.6	22.7	20.8
	Min	12.4	12.4	10.8	7.4	9.2	9.0	5.6	7.2	5.0	5.0	8.4	14.0	11.4
Relative Humidity	Max	99	96	99	99	93	99	91	94	93	97	96	96	-
	Min	54	45	49	49	50	37	35	38	39	33	43	63	-
Soil Temperature at 10 cm	06 UTC	17.4	16.2	15.6	13.8	14.2	13.8	12.2	13.0	11.4	11.2	13.9	17.4	16.3
	12 UTC	23.0	18.8	18.0	17.2	16.8	16.6	15.8	16.2	15.2	16.2	17.4	20.4	19.2
Sunshine Duration		8.5	3.2	8.6	9.3	9.3	5.4	8.8	9.2	9.3	8.6	8.0	5.2	5.7
Precipitation													56.8	19.0
Evaporation		1.8	7.0	3.6	4.8	3.6	4.4	3.4	3.7	7.3	2.3	41.9	23.5	31.4
Growing Degrees	5	13.0	9.8	8.6	6.9	7.8	7.9	6.3	6.5	5.6	7.4	79.8	133.7	110.9
	10	8.0	4.8	3.6	1.9	2.8	2.9	1.3	1.5	0.6	2.4	29.8	83.7	61.0

2nd 10-day period (11-20/11/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	24.3	14.6	18.0
Precipitation - Reference Evapotranspiration	-24.3	42.2	1.0
Number of Rainy Days	0.0	4.0	2.5
Number of Dry Days	18.0	13.0	-

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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