



# AGROMETEOROLOGICAL BULLETIN

*December 2011*  
*3rd 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



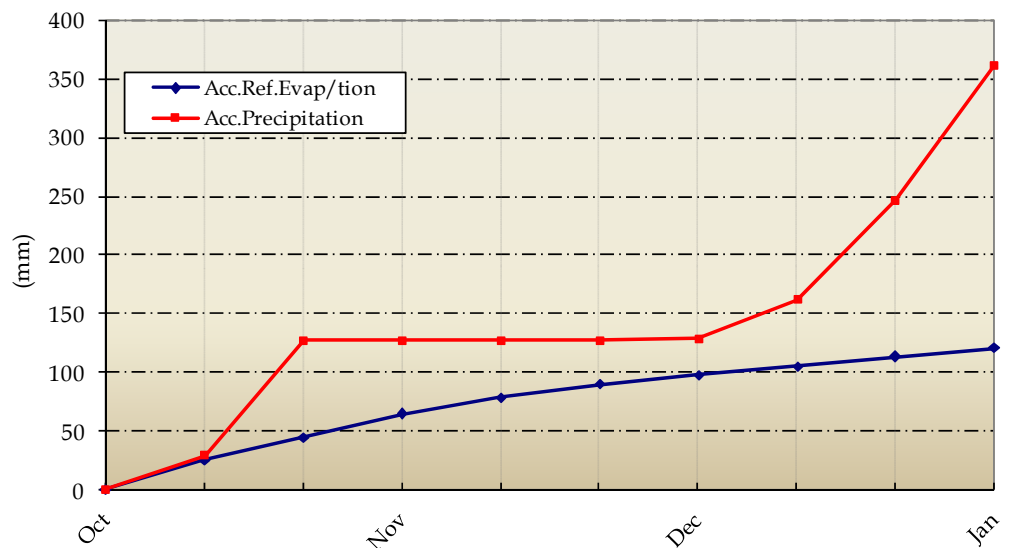
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3rd 10-day period (21-31/12/2011)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	11.0	8.0	12.0	14.4	11.2	12.6	12.8	14.0	14.4	12.4	13.6	12.4	16.7	14.0
	Min	2.2	6.6	4.6	1.4	4.2	5.6	0.0	-1.0	-0.8	7.0	3.8	3.1	5.9	3.8
Relative Humidity	Max	97	97	97	93	71	77	86	96	96	95	100	91	97	-
	Min	66	88	52	52	56	43	38	47	50	76	72	58	64	-
Soil Temperature at 10 cm	06 UTC	9.0	9.4	8.4	7.6	8.2	8.2	6.8	6.6	6.2	8.2	8.6	7.9	10.3	7.7
	12 UTC	9.6	9.0	8.8	8.6	8.6	9.0	7.6	7.6	7.4	9.0	10.4	8.7	11.8	9.5
Sunshine Duration		0.7	0.0	4.1	7.0	0.0	8.0	7.9	7.5	5.3	0.0	5.2	4.2	3.5	3.3
Precipitation		24.7	80.2				1.8				0.8	8.1	115.6	31.5	49.6
Evaporation		2.0	0.7	1.8	1.0	1.1	1.0	2.9	0.7	0.5	-	0.8	-	11.7	14.2
Growing Degrees	5	1.6	2.3	3.3	2.9	2.7	4.1	1.4	1.5	1.8	4.7	3.7	30.0	69.0	43.3
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.6	7.7

3rd 10-day period (21-31/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.8	6.8	8.7
Precipitation - Reference Evapotranspiration	107.8	24.7	40.9
Number of Rainy Days	5.0	4.0	4.2
Number of Dry Days	0.0	5.0	-

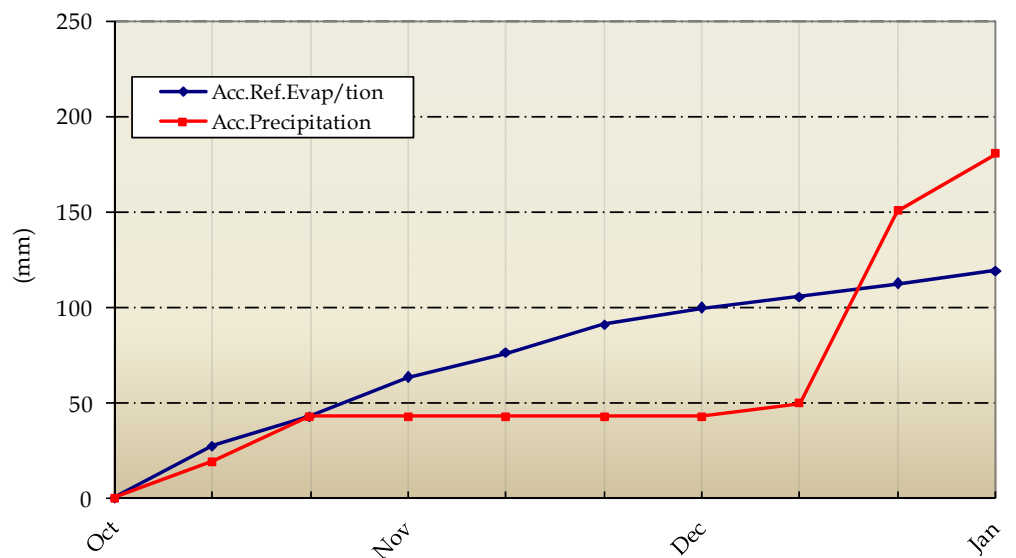
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-31/12/2011)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	10.0	8.0	5.8	3.6	3.6	4.6	8.6	7.6	6.2	6.8	7.2	6.5	12.9	9.8
	Min	3.2	5.0	3.4	-0.8	-3.6	-5.0	1.6	-3.4	-1.8	-1.0	5.2	0.3	7.3	2.4
Relative Humidity	Max	97	100	71	88	87	90	83	96	96	93	97	91	91	-
	Min	67	88	52	61	54	59	55	64	73	84	69	66	66	-
Soil Temperature at 10 cm	06 UTC	9.0	8.0	7.2	5.4	3.4	3.0	4.0	3.6	3.4	3.8	5.4	5.1	9.2	6.0
	12 UTC	9.2	8.2	7.0	5.4	3.6	3.6	5.2	4.0	3.8	4.4	6.2	5.5	9.7	7.2
Sunshine Duration		6.8	0.0	0.0	0.0	7.8	3.5	6.0	6.5	1.2	0.0	0.0	2.9	2.2	2.6
Precipitation		0.5	22.6	0.2								6.3	29.6	16.8	24.7
Evaporation		-	3.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.0	-	9.8	12.0
Growing Degrees	5	1.6	1.5	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	1.2	4.4	64.4	24.9
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.5	4.2

3rd 10-day period (21-31/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.1	7.2	8.4
Precipitation - Reference Evapotranspiration	22.5	9.6	16.3
Number of Rainy Days	4.0	4.0	2.9
Number of Dry Days	0.0	5.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

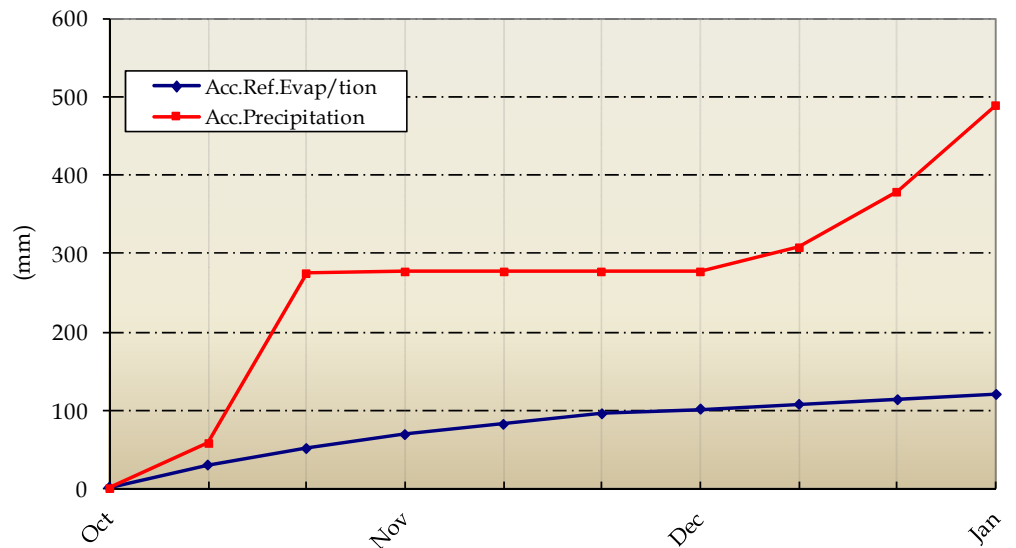


Andravida

3rd 10-day period (21-31/12/2011)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	13.6	12.8	12.6	13.6	12.2	11.0	13.2	14.0	14.0	11.4	11.8	12.7	16.9	14.4
	Min	5.0	8.8	7.4	1.6	7.6	6.0	1.4	3.0	1.8	6.4	7.0	5.1	8.2	6.0
Relative Humidity	Max	93	97	89	91	94	94	97	97	97	100	92	95	94	-
	Min	57	77	54	50	56	73	45	55	57	85	74	62	59	-
Soil Temperature at 10 cm	06 UTC	9.0	10.8	9.4	7.8	9.8	9.6	7.0	8.0	7.4	9.4	9.0	8.8	11.2	9.0
	12 UTC	11.0	11.6	10.6	10.8	10.6	10.8	10.0	10.4	10.8	10.0	10.2	10.6	12.8	10.5
Sunshine Duration		2.3	0.7	3.7	5.3	0.0	0.0	7.0	7.0	6.6	0.3	0.2	3.0	3.0	4.0
Precipitation		19.4	52.5	0.4		4.1	2.4				6.8	24.1	109.7	4.9	44.5
Evaporation		-	0.3	3.8	0.4	-	1.0	0.8	0.7	1.2	-	-	-	14.9	21.9
Growing Degrees	5	4.3	5.8	5.0	2.6	4.9	3.5	2.3	3.5	2.9	3.9	4.4	43.1	83.2	57.7
	10	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	31.8	13.8

3rd 10-day period (21-31/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.8	10.2	9.5
Precipitation - Reference Evapotranspiration	102.9	-5.3	35.0
Number of Rainy Days	7.0	4.0	4.8
Number of Dry Days	0.0	6.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

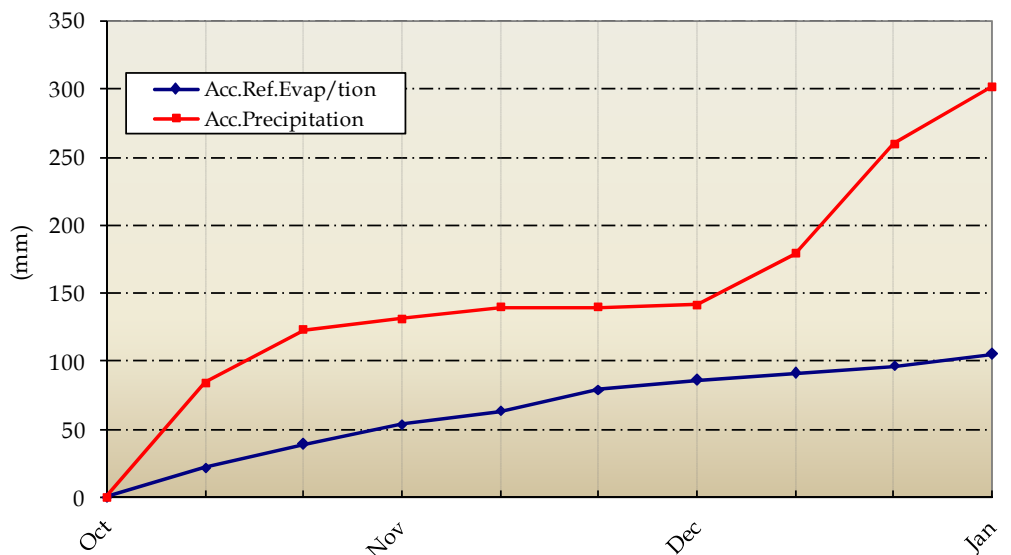


Ioannina

3rd 10-day period (21-31/12/2011)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	2.4	4.2	10.6	8.0	9.2	7.6	8.8	7.0	5.0	5.6	6.4	6.8	-	8.8
	Min	-0.2	1.4	2.8	-3.0	-4.0	4.4	2.0	-4.8	-6.0	3.0	2.8	-0.1	-	0.9
Relative Humidity	Max	100	97	86	100	96	54	67	95	90	97	97	89	-	-
	Min	93	54	34	49	28	33	26	39	44	90	84	52	-	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	4.0
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	4.7
Sunshine Duration		0.0	0.0	5.0	3.8	4.0	8.5	4.8	6.1	0.7	0.0	0.0	3.0	-	2.4
Precipitation		9.4	16.0							0.0	3.9	12.9	42.2	-	50.6
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	-	9.0
Growing Degrees	5	0.0	0.0	1.7	0.0	0.0	1.0	0.4	0.0	0.0	0.0	0.0	3.1	-	14.1
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.9

3rd 10-day period (21-31/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	8.6	-	6.2
Precipitation - Reference Evapotranspiration	33.6	-	44.4
Number of Rainy Days	4.0	-	4.3
Number of Dry Days	0.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

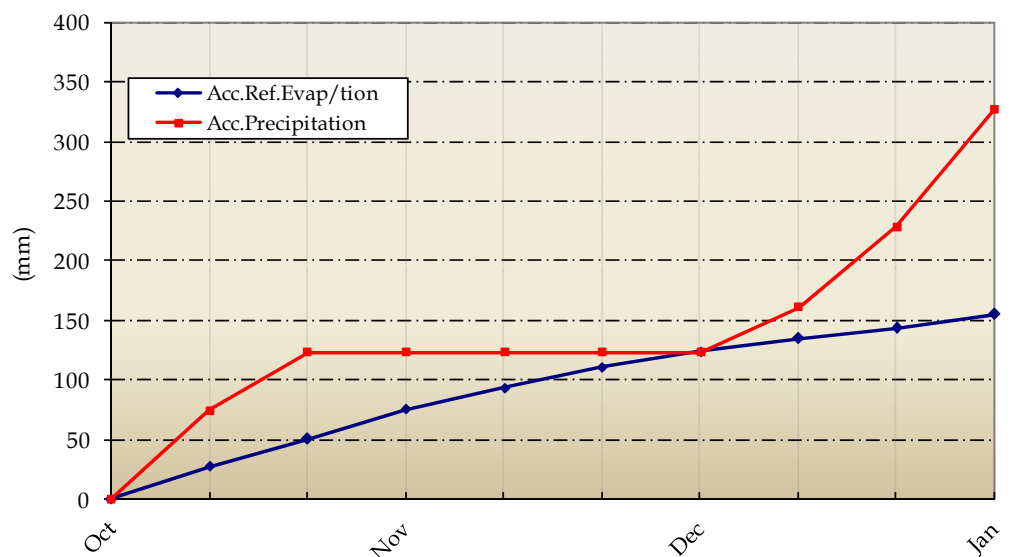


Kalamata

3rd 10-day period (21-31/12/2011)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	15.0	14.4	13.4	13.8	14.2	12.0	14.0	15.4	15.0	14.0	13.8	14.1	17.1	15.2
	Min	4.0	8.4	4.6	4.6	8.0	7.4	6.2	6.6	3.4	7.6	6.6	6.1	9.1	6.1
Relative Humidity	Max	100	97	93	94	97	90	69	94	94	97	97	93	95	-
	Min	61	74	52	52	67	50	45	53	60	61	65	58	66	-
Soil Temperature at 10 cm	06 UTC	11.0	11.6	10.2	9.8	10.6	10.4	9.6	10.2	9.6	10.6	10.4	10.4	13.3	10.0
	12 UTC	11.6	11.8	11.0	11.2	11.2	10.8	10.6	10.6	10.6	11.2	11.4	11.1	13.7	10.9
Sunshine Duration		5.8	0.0	4.2	4.2	2.3	0.0	3.7	4.5	7.1	1.3	3.7	3.3	3.8	3.9
Precipitation		13.0	41.3			1.7	28.0				7.4	7.7	99.1	11.5	41.5
Evaporation		4.8	2.9	2.4	0.4	1.8	2.2	2.3	0.5	2.4	0.7	0.8	21.2	15.4	22.7
Growing Degrees	5	4.5	6.4	4.0	4.2	6.1	4.7	5.1	6.0	4.2	5.8	5.2	56.2	89.1	62.1
	10	0.0	1.4	0.0	0.0	1.1	0.0	0.1	1.0	0.0	0.8	0.2	4.6	34.1	14.5

3rd 10-day period (21-31/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	11.7	11.9	11.8
Precipitation - Reference Evapotranspiration	87.4	-0.4	29.7
Number of Rainy Days	6.0	4.0	4.8
Number of Dry Days	0.0	7.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

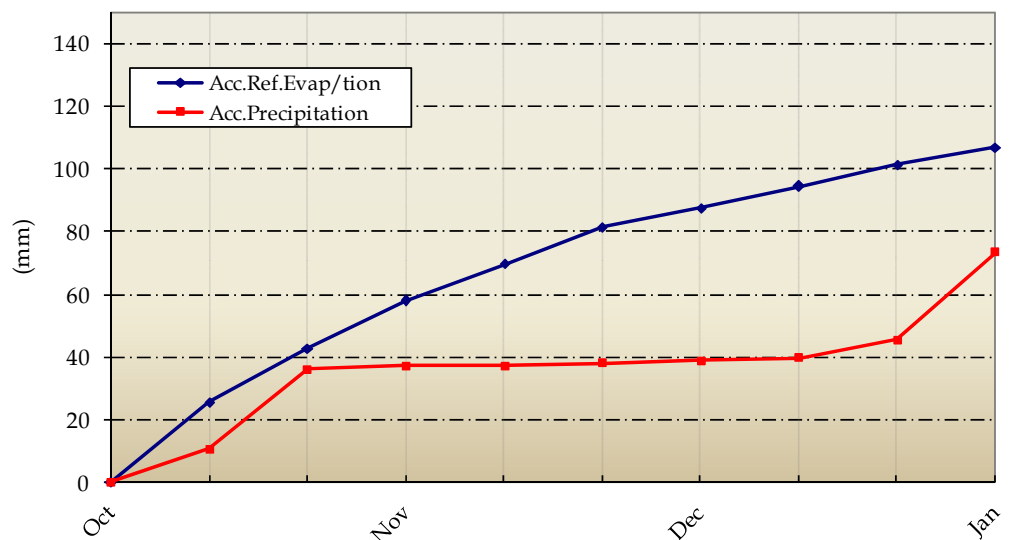


Larisa

3rd 10-day period (21-31/12/2011)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	8.0	6.2	7.6	8.0	8.6	6.0	6.4	7.4	8.2	5.6	7.0	7.2	11.7	10.0
	Min	-1.0	2.4	2.6	2.0	1.6	2.0	3.6	-1.6	-5.0	-1.6	3.8	0.8	4.4	1.1
Relative Humidity	Max	97	97	93	89	93	89	89	96	96	97	97	94	95	-
	Min	59	84	62	59	63	66	56	62	59	78	69	65	70	-
Soil Temperature at 10 cm	06 UTC	6.8	6.4	6.8	7.2	6.8	6.8	6.4	6.6	6.0	4.2	5.6	6.3	8.0	5.7
	12 UTC	7.6	7.0	7.4	7.8	7.4	6.6	7.0	7.6	7.8	4.4	6.2	7.0	8.9	6.1
Sunshine Duration		1.9	0.0	0.0	5.4	5.1	0.1	0.0	7.0	6.3	0.0	0.0	2.3	2.7	3.0
Precipitation		0.5	19.5	6.5								1.4	27.9	2.4	14.0
Evaporation		1.6	0.5	0.0	2.2	2.1	1.1	0.6	0.3	0.7	2.8	0.0	11.9	8.4	7.2
Growing Degrees	5	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.4	0.6	35.2	18.9
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.2

3rd 10-day period (21-31/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	5.6	5.8	6.4
Precipitation - Reference Evapotranspiration	22.3	-3.4	7.6
Number of Rainy Days	4.0	2.0	3.0
Number of Dry Days	1.0	8.0	-

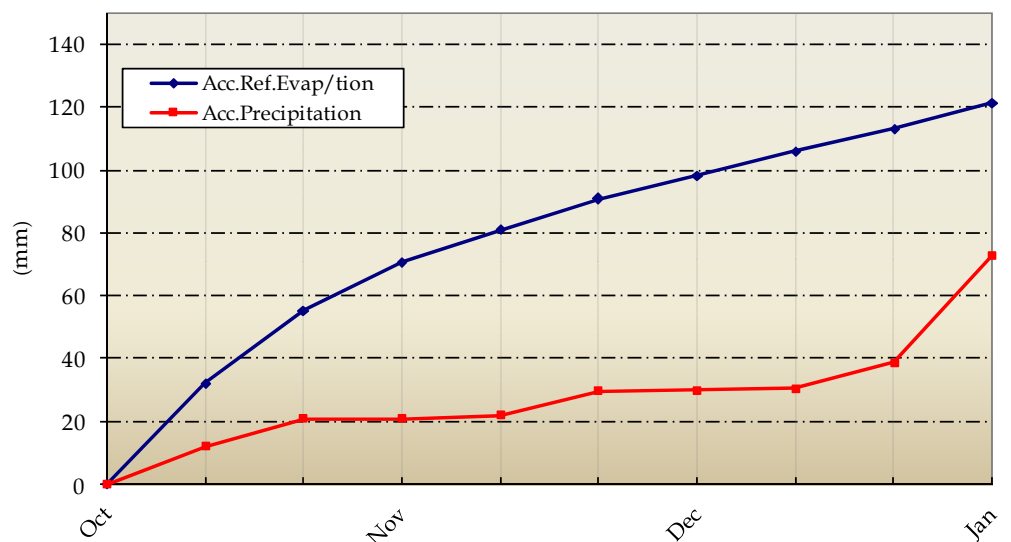
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-31/12/2011)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	8.6	7.2	4.8	4.8	6.6	7.6	7.4	6.8	6.0	5.0	5.8	6.4	-	10.2
	Min	-0.6	2.0	2.8	0.8	-3.6	-1.0	-3.0	-3.2	-2.4	-1.0	3.4	-0.5	-	2.2
Relative Humidity	Max	92	100	93	92	96	92	96	96	100	100	94	96	-	-
	Min	53	87	62	52	44	53	55	60	70	80	60	61	-	-
Soil Temperature at 10 cm	06 UTC	6.6	6.4	5.6	4.8	3.4	4.0	4.0	2.2	4.0	4.4	5.6	4.6	-	5.3
	12 UTC	8.0	-	6.0	6.0	5.6	5.8	5.2	4.5	5.0	5.4	6.0	5.8	-	6.8
Sunshine Duration		4.5	0.0	0.0	7.0	6.3	5.9	8.0	7.8	5.4	0.0	0.0	4.1	-	3.0
Precipitation			20.1	4.5								9.5	34.1	-	14.9
Evaporation		-	-	1.4	0.8	1.0	0.7	0.3	3.4	0.3	-	2.5	-	-	13.5
Growing Degrees	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	22.3
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	3.0

3rd 10-day period (21-31/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	8.3	-	8.7
Precipitation - Reference Evapotranspiration	25.8	-	6.2
Number of Rainy Days	3.0	-	3.0
Number of Dry Days	2.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



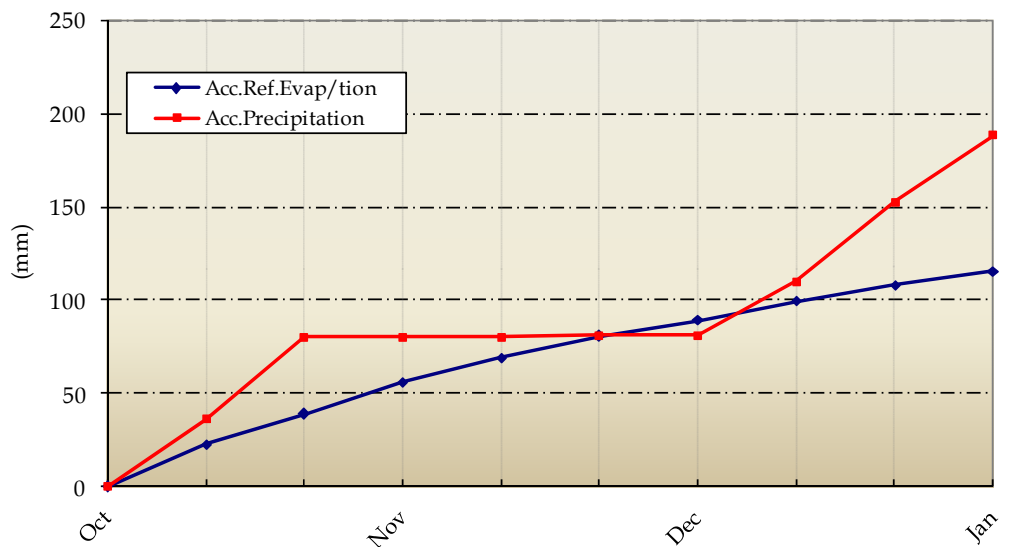


Tripoli

3rd 10-day period (21-31/12/2011)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	8.1	8.5	8.4	8.6	4.1	6.6	5.9	10.7	7.4	9.0	9.9	7.9	12.8	9.8
	Min	0.2	5.1	1.3	0.4	0.8	0.6	0.1	-0.1	-3.4	2.9	1.6	0.9	5.6	1.5
Relative Humidity	Max	95	95	95	93	93	82	-	-	96	95	-	93	95	-
	Min	60	72	57	55	-	44	52	44	72	72	58	59	67	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	7.8	5.3
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	9.7	6.0
Sunshine Duration		-	-	-	-	-	-	-	-	-	-	-	-	2.9	3.7
Precipitation		6.4	23.9	0.3	0.0	0.1	1.7			0.0	1.0	2.2	35.6	14.6	36.8
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	6.5	9.0
Growing Degrees	5	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.3	0.0	1.0	0.8	3.8	46.1	18.6
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	1.8

3rd 10-day period (21-31/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.4	7.0	8.4
Precipitation - Reference Evapotranspiration	28.2	7.6	28.4
Number of Rainy Days	7.0	3.0	4.5
Number of Dry Days	0.0	5.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

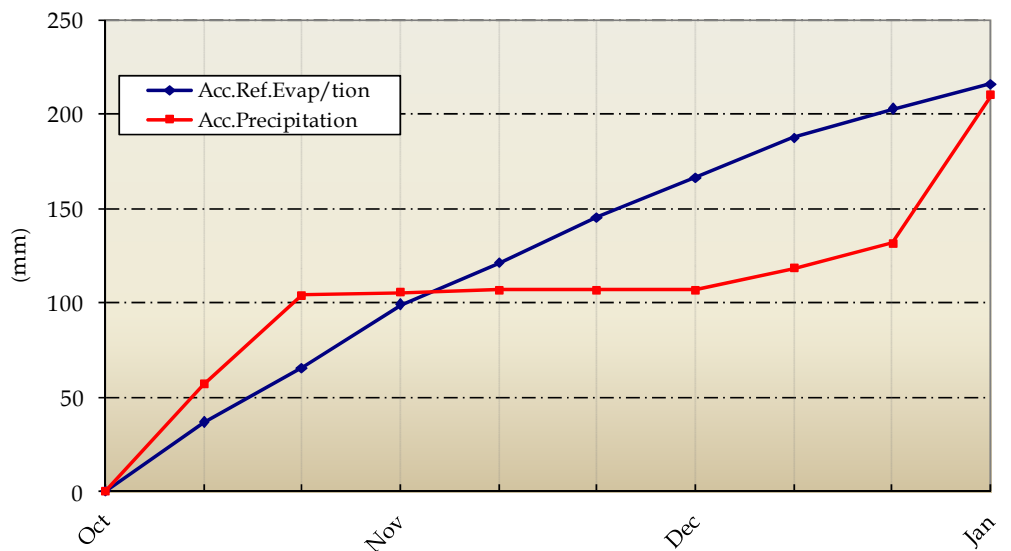


Tympaki

3rd 10-day period (21-31/12/2011)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	17.4	16.0	15.6	17.0	14.6	10.8	14.6	16.6	16.6	16.4	13.0	15.3	19.8	16.4
	Min	10.8	9.4	6.8	8.2	7.6	7.2	7.8	6.8	6.4	7.4	9.8	8.0	10.7	8.1
Relative Humidity	Max	98	100	100	88	100	100	100	100	100	100	100	99	91	-
	Min	49	50	48	40	39	74	56	52	46	49	82	53	46	-
Soil Temperature at 10 cm	06 UTC	13.0	13.2	11.2	15.2	11.0	10.6	10.2	9.8	10.2	11.6	11.8	11.6	13.3	11.9
	12 UTC	15.2	13.4	13.6	12.8	12.6	10.8	12.0	12.8	12.6	13.2	12.4	12.9	15.8	13.5
Sunshine Duration		2.2	0.0	2.7	7.8	3.4	0.0	0.6	8.3	5.5	4.1	0.0	3.1	5.0	4.2
Precipitation		0.6	14.1	6.5	7.6		1.3	4.0			6.5	37.9	78.5		31.9
Evaporation		2.5	0.6	3.8	3.5	3.1	0.6	3.3	2.3	1.3	1.2	9.6	31.8	23.1	30.0
Growing Degrees	5	9.1	7.7	6.2	7.6	6.1	4.0	6.2	6.7	6.5	6.9	6.4	73.4	112.6	79.7
	10	4.1	2.7	1.2	2.6	1.1	0.0	1.2	1.7	1.5	1.9	1.4	19.4	57.6	26.8

3rd 10-day period (21-31/12/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	13.5	15.0	14.3
Precipitation - Reference Evapotranspiration	65.0	-15.0	17.6
Number of Rainy Days	8.0	0.0	4.1
Number of Dry Days	0.0	12.0	-

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.

**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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ΥΠΗΡΕΣΙΑ

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