

AGROMETEOROLOGICAL BULLETIN

November 2012
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



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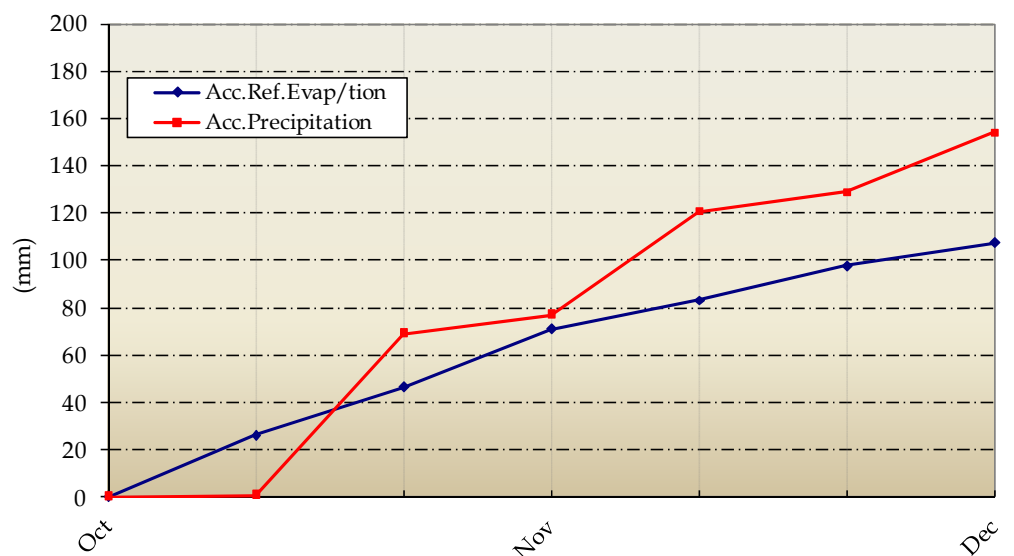
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www.hnms.gr
www.emy.gov.gr
www.meteo.gov.gr
www.meteohellas.gr

Agrinio

3rd 10-day period (21-30/11/2012)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	21.8	20.6	19.6	19.6	20.0	20.4	16.2	20.6	20.4	20.4	20.0	17.3	16.7
	Min	8.8	8.4	4.8	7.2	5.0	5.6	5.2	12.4	14.4	8.6	8.0	2.4	6.4
Relative Humidity	Max	95	94	94	97	94	97	97	98	96	95	96	90	-
	Min	55	47	49	59	53	56	59	68	52	48	55	46	-
Soil Temperature at 10 cm	06 UTC	14.4	14.4	12.6	13.6	12.4	12.2	12.2	14.0	14.8	14.0	13.5	10.0	10.6
	12 UTC	15.0	15.4	14.0	14.6	13.6	13.4	13.4	14.4	15.0	14.6	14.3	11.5	12.7
Sunshine Duration		7.2	7.8	7.6	8.2	7.6	8.2	1.1	1.2	0.0	6.2	5.5	5.5	4.2
Precipitation									4.7	20.0	0.5	25.2	2.0	63.5
Evaporation		1.2	1.2	1.1	2.7	1.0	0.3	0.7	1.1	5.9	1.0	16.2	22.7	15.9
Growing Degrees	5	10.3	9.5	7.2	8.4	7.5	8.0	5.7	11.5	12.4	9.5	90.0	48.7	65.9
	10	5.3	4.5	2.2	3.4	2.5	3.0	0.7	6.5	7.4	4.5	40.0	6.4	21.3

3rd 10-day period (21-30/11/2012)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	9.8	8.3	9.9
Precipitation - Reference Evapotranspiration	15.4	-6.3	53.6
Number of Rainy Days	3.0	1.0	4.9
Number of Dry Days	7.0	37.0	-

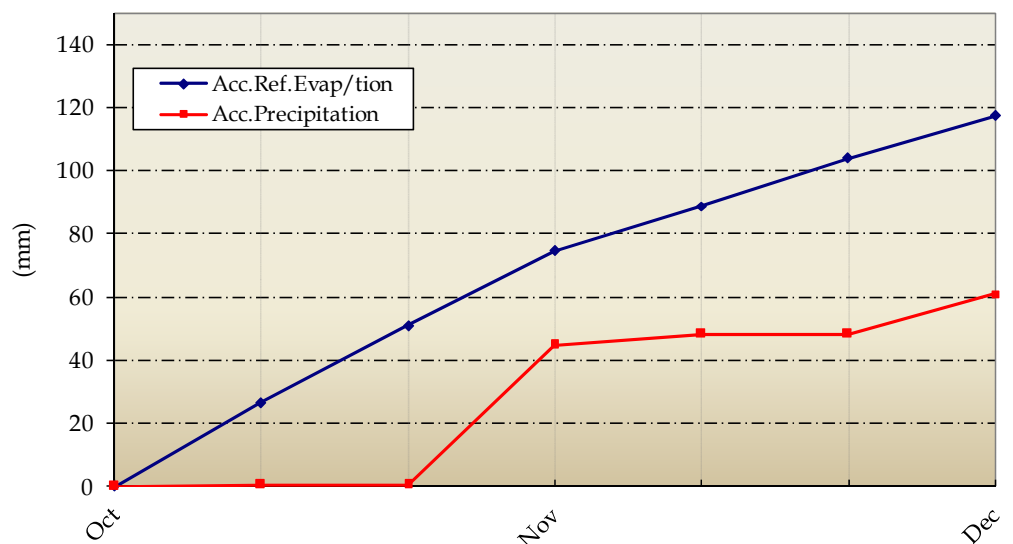
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-30/11/2012)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	15.6	17.0	14.6	14.4	14.2	14.0	14.2	17.2	19.2	18.4	15.9	11.4	12.8
	Min	12.6	10.8	7.8	4.0	5.0	3.8	0.4	11.0	16.4	15.0	8.7	0.2	5.0
Relative Humidity	Max	77	76	78	76	87	93	88	86	90	98	85	87	-
	Min	55	44	40	44	49	47	65	78	69	82	57	53	-
Soil Temperature at 10 cm	06 UTC	14.6	12.8	13.0	11.0	10.4	9.8	8.0	12.4	14.2	14.4	12.1	6.7	8.6
	12 UTC	15.0	14.2	14.0	12.0	11.8	11.0	10.0	13.4	15.2	15.6	13.2	7.9	10.3
Sunshine Duration		5.5	2.1	8.4	6.2	3.8	8.3	5.3	0.0	0.9	1.5	4.2	5.6	3.2
Precipitation										4.2	8.5	12.7		32.9
Evaporation		3.0	1.9	2.0	4.1	2.1	1.4	1.3	2.7	0.2	0.5	19.2	4.7	16.3
Growing Degrees	5	9.1	8.9	6.2	4.2	4.6	3.9	2.3	9.1	12.8	11.7	72.8	11.4	42.5
	10	4.1	3.9	1.2	0.0	0.0	0.0	0.0	4.1	7.8	6.7	27.8	0.0	11.5

3rd 10-day period (21-30/11/2012)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	13.4	8.4	9.6
Precipitation - Reference Evapotranspiration	-0.7	-8.4	23.3
Number of Rainy Days	2.0	0.0	3.3
Number of Dry Days	26.0	44.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

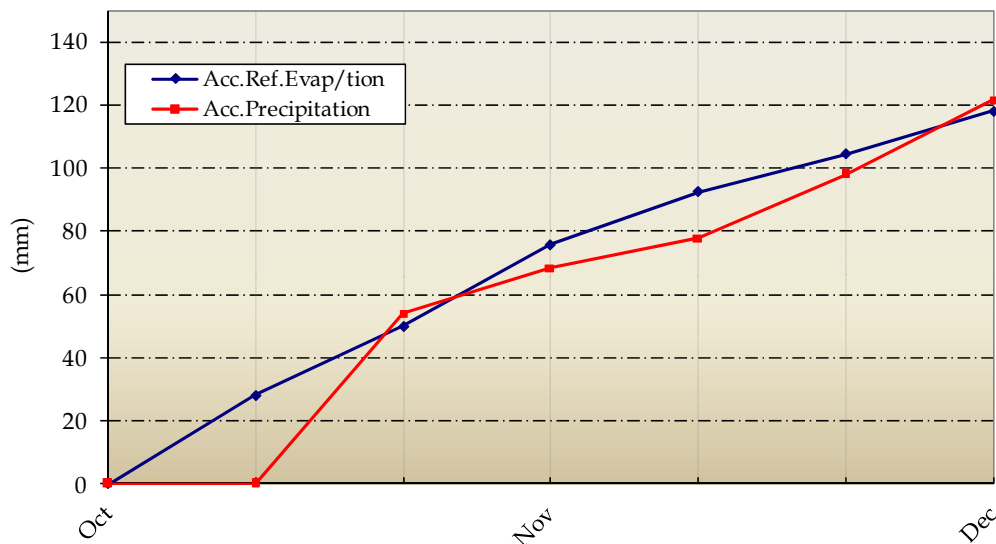


Andravida

3rd 10-day period (21-30/11/2012)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	21.4	20.2	18.7	19.0	19.6	19.8	18.8	20.8	20.1	20.1	19.8	17.6	17.0
	Min	11.7	11.8	6.6	8.9	6.2	7.0	8.3	14.6	14.0	11.6	10.1	4.8	8.6
Relative Humidity	Max	91	88	89	91	92	90	88	86	91	91	90	92	-
	Min	54	47	49	64	54	54	56	62	60	47	55	44	-
Soil Temperature at 10 cm	06 UTC	15.0	15.8	13.4	14.2	13.2	13.2	13.2	15.2	15.8	16.6	14.6	10.0	11.7
	12 UTC	16.8	17.6	16.0	16.4	16.4	16.2	15.8	16.6	16.4	16.2	16.4	13.7	13.4
Sunshine Duration		5.6	8.8	7.8	7.8	8.1	8.2	3.0	3.4	0.8	7.6	6.1	5.6	4.6
Precipitation		6.0			0.2				1.5	10.5	5.3	23.5		62.9
Evaporation		1.3	0.4	1.6	1.2	0.4	2.1	0.1	1.9	1.8	2.8	13.6	18.9	20.2
Growing Degrees	5	11.6	11.0	7.7	9.0	7.9	8.4	8.6	12.7	12.1	10.9	99.6	62.3	78.3
	10	6.6	6.0	2.7	4.0	2.9	3.4	3.6	7.7	7.1	5.9	49.6	13.3	31.1

3rd 10-day period (21-30/11/2012)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	13.6	6.1	10.9
Precipitation - Reference Evapotranspiration	9.9	-6.1	52.0
Number of Rainy Days	5.0	0.0	5.0
Number of Dry Days	0.0	38.0	-

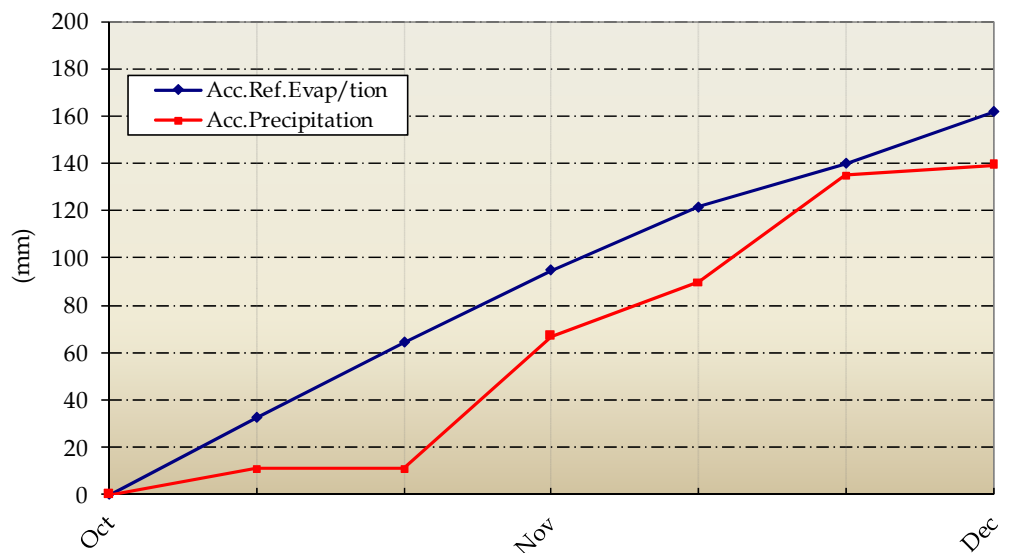
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-30/11/2012)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	20.6	19.2	17.8	18.2	17.8	18.2	18.8	21.2	20.8	22.4	19.5	-	18.8
	Min	13.6	13.8	16.4	16.2	15.8	14.4	12.4	12.0	17.4	18.4	15.0	-	12.7
Relative Humidity	Max	91	93	74	74	76	83	88	81	69	73	80	-	-
	Min	73	65	58	60	55	63	63	56	52	56	60	-	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		7.0	0.7	0.5	3.9	4.7	3.0	7.2	3.6	0.0	7.2	3.8	-	4.6
Precipitation		0.2	4.2	0.0								4.4	-	25.7
Evaporation		1.3	4.2	3.5	1.9	4.9	-	1.5	3.5	3.7	5.3	-	-	32.4
Growing Degrees	5	12.1	11.5	12.1	12.2	11.8	11.3	10.6	11.6	14.1	15.4	122.7	-	107.2
	10	7.1	6.5	7.1	7.2	6.8	6.3	5.6	6.6	9.1	10.4	72.7	-	57.3

3rd 10-day period (21-30/11/2012)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	22.0	-	-
Precipitation - Reference Evapotranspiration	-17.6	-	25.7
Number of Rainy Days	2.0	-	3.7
Number of Dry Days	0.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

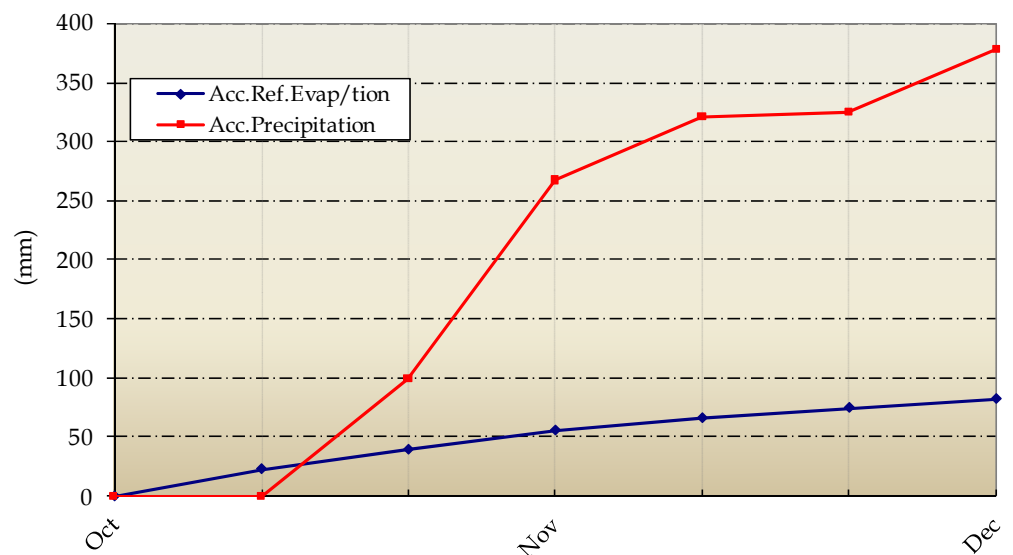


Ioannina

3rd 10-day period (21-30/11/2012)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	15.2	18.2	16.4	16.0	12.6	13.4	10.6	16.2	14.6	15.4	14.9	12.9	12.0
	Min	7.6	8.0	2.0	8.5	5.0	4.8	3.4	9.2	10.2	9.0	6.8	0.0	3.6
Relative Humidity	Max	97	89	88	100	97	97	97	87	100	98	95	94	-
	Min	60	44	47	68	81	68	80	73	82	78	68	49	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	7.1
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	8.3
Sunshine Duration		0.0	6.2	5.0	3.0	1.9	1.6	0.0	1.1	0.0	3.0	2.2	4.0	2.6
Precipitation									0.0	40.4	12.7	53.1	1.5	57.0
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	9.5
Growing Degrees	5	6.4	8.1	4.2	7.3	3.8	4.1	2.0	7.7	7.4	7.2	58.2	16.7	31.9
	10	1.4	3.1	0.0	2.3	0.0	0.0	0.0	2.7	2.4	2.2	14.1	0.9	4.7

3rd 10-day period (21-30/11/2012)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.5	7.0	6.7
Precipitation - Reference Evapotranspiration	45.6	-5.5	50.3
Number of Rainy Days	2.0	2.0	5.1
Number of Dry Days	8.0	11.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

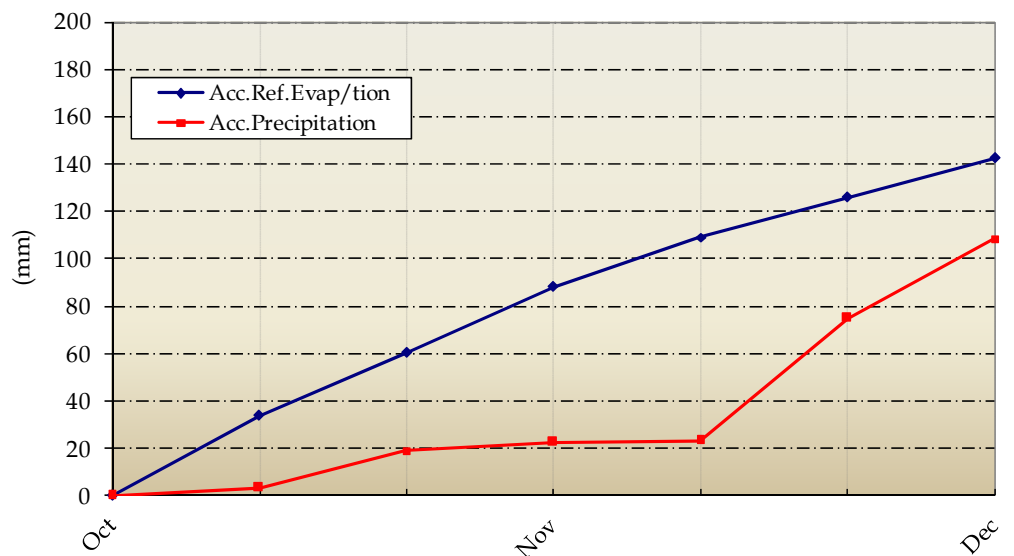


Kalamata

3rd 10-day period (21-30/11/2012)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	19.6	22.4	21.4	20.0	21.4	20.8	20.0	20.2	20.6	21.0	20.7	18.4	18.0
	Min	10.2	12.4	9.3	9.4	8.9	8.0	10.2	12.8	16.6	12.2	11.0	6.2	8.3
Relative Humidity	Max	95	70	88	92	91	92	94	93	93	94	90	94	-
	Min	65	36	35	50	38	51	59	67	57	50	51	48	-
Soil Temperature at 10 cm	06 UTC	15.6	16.0	15.6	15.0	15.0	14.8	15.6	16.0	16.4	16.4	15.6	12.3	12.7
	12 UTC	16.6	16.6	16.2	16.0	15.8	15.4	16.2	16.4	17.0	17.0	16.3	13.7	13.9
Sunshine Duration		1.5	7.7	7.7	8.5	7.2	7.1	4.2	0.9	0.0	6.2	5.1	6.0	4.3
Precipitation		2.8						0.1	12.3	16.6	1.7	33.5	0.1	54.0
Evaporation		-	2.2	3.4	2.2	1.8	0.6	1.5	0.7	0.2	1.0	-	17.0	26.0
Growing Degrees	5	9.9	12.4	10.4	9.7	10.2	9.4	10.1	11.5	13.6	11.6	108.7	73.1	81.4
	10	4.9	7.4	5.4	4.7	5.2	4.4	5.1	6.5	8.6	6.6	58.7	23.1	33.0

3rd 10-day period (21-30/11/2012)	Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	16.7	13.6
Precipitation - Reference Evapotranspiration	16.8	-13.5
Number of Rainy Days	5.0	1.0
Number of Dry Days	0.0	8.0

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

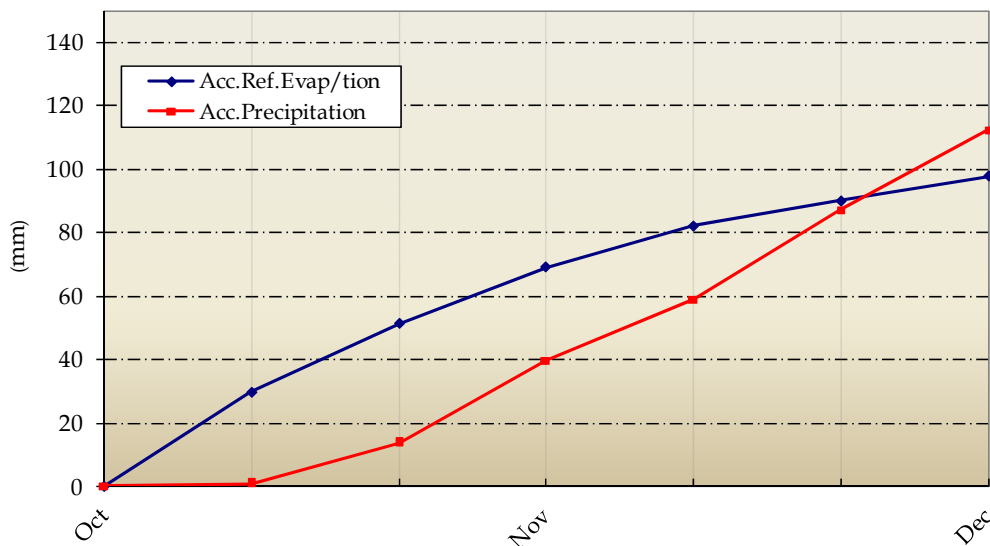


Larisa

3rd 10-day period (21-30/11/2012)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	14.4	16.8	16.6	17.0	17.4	17.0	15.9	13.2	16.2	19.8	16.4	12.8	13.6
	Min	12.4	10.1	9.0	9.0	10.0	8.2	8.2	6.8	6.8	6.0	8.6	1.5	4.1
Relative Humidity	Max	100	93	98	99	99	99	99	100	100	100	99	95	-
	Min	75	57	62	60	57	56	58	80	80	41	63	58	-
Soil Temperature at 10 cm	06 UTC	14.4	14.2	13.6	12.2	14.2	13.6	13.6	13.2	12.6	12.6	13.4	8.1	9.5
	12 UTC	14.0	14.8	15.4	14.2	15.6	14.4	14.0	13.6	13.2	13.0	14.2	9.3	10.2
Sunshine Duration		0.0	5.1	6.3	3.8	4.4	7.3	4.0	0.1	0.0	6.9	3.8	3.6	3.5
Precipitation		8.2	0.3							16.7	0.0	25.2	1.0	21.8
Evaporation		8.1	1.0	0.6	0.8	2.6	1.1	0.3	0.5	0.0	1.9	16.9	6.7	10.2
Growing Degrees	5	8.4	8.5	7.8	8.0	8.7	7.6	7.1	5.0	6.5	7.9	75.4	21.3	40.6
	10	3.4	3.5	2.8	3.0	3.7	2.6	2.1	0.0	1.5	2.9	25.4	0.5	8.0

3rd 10-day period (21-30/11/2012)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.7	6.2	7.3
Precipitation - Reference Evapotranspiration	17.5	-5.2	14.5
Number of Rainy Days	3.0	1.0	3.5
Number of Dry Days	0.0	10.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

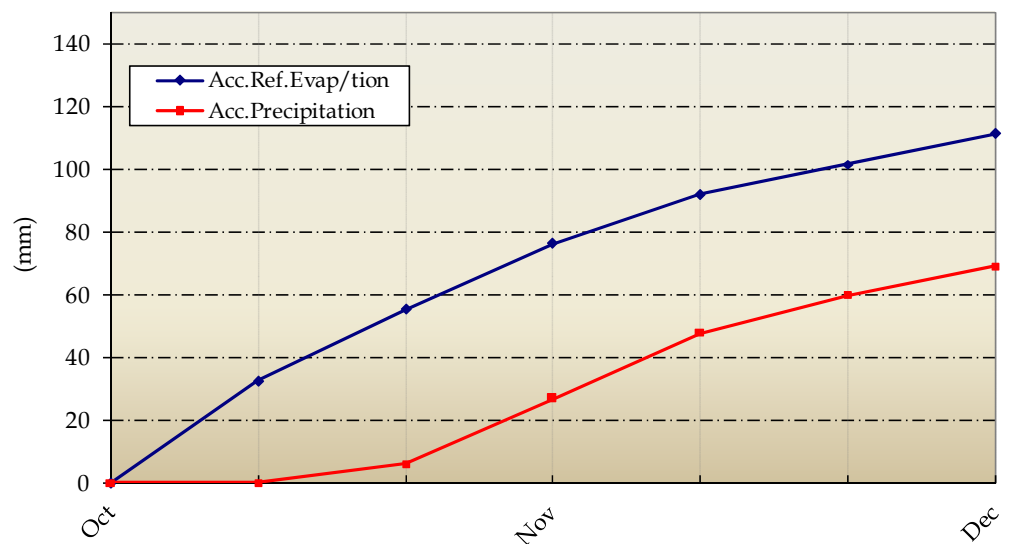


Mikra

3rd 10-day period (21-30/11/2012)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	16.0	16.7	16.0	16.3	15.8	16.0	16.2	15.4	19.0	19.8	16.7	11.4	13.2
	Min	14.0	9.9	9.4	12.4	11.2	9.4	11.0	11.1	11.0	9.6	10.9	2.6	5.2
Relative Humidity	Max	92	92	89	85	85	88	88	89	90	85	88	90	-
	Min	65	60	60	58	63	64	64	74	65	37	61	57	-
Soil Temperature at 10 cm	06 UTC	14.4	13.8	13.6	14.6	14.4	13.6	14.0	14.2	14.6	13.6	14.1	8.0	8.8
	12 UTC	15.0	14.8	15.0	15.2	15.2	15.2	15.0	15.0	15.0	15.0	15.0	9.4	10.6
Sunshine Duration		0.0	3.3	2.3	4.1	1.6	5.4	4.8	0.0	0.8	8.1	3.0	3.8	3.5
Precipitation		3.5		0.0						5.6		9.1	0.3	21.0
Evaporation		0.9	2.4	1.6	1.0	0.8	1.4	0.8	1.2	1.1	1.0	12.2	11.5	15.7
Growing Degrees	5	10.0	8.3	7.7	9.4	8.5	7.7	8.6	8.3	10.0	9.7	88.1	20.1	43.9
	10	5.0	3.3	2.7	4.4	3.5	2.7	3.6	3.3	5.0	4.7	38.1	0.0	10.2

3rd 10-day period (21-30/11/2012)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	9.6	7.6	9.9
Precipitation - Reference Evapotranspiration	-0.5	-7.3	11.1
Number of Rainy Days	2.0	1.0	3.6
Number of Dry Days	0.0	11.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

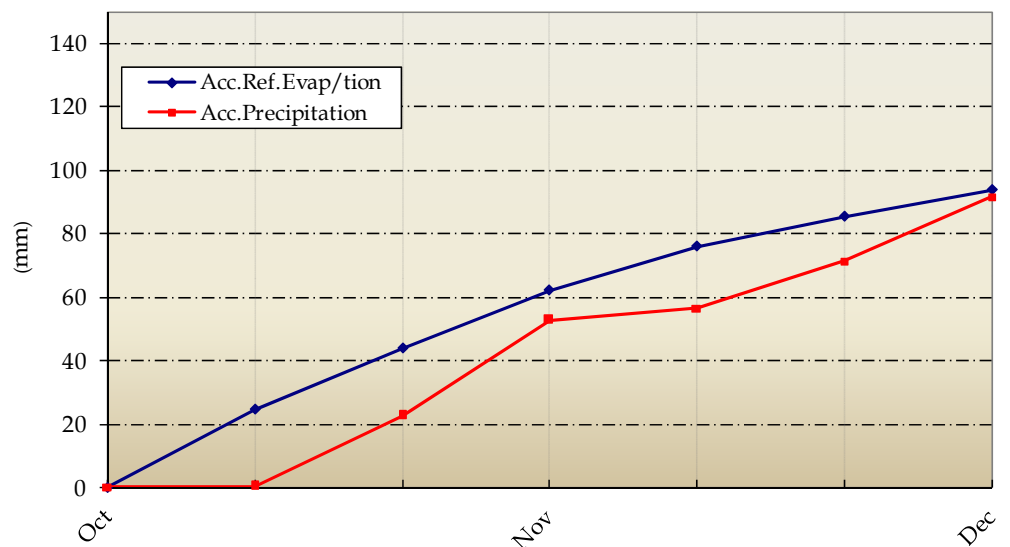


Tripoli

3rd 10-day period (21-30/11/2012)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	16.7	14.4	13.9	15.6	15.6	15.8	15.3	16.1	16.6	16.5	15.6	13.4	12.9
	Min	5.6	8.1	7.0	3.5	0.7	1.3	2.3	9.7	10.8	9.2	5.8	0.4	3.6
Relative Humidity	Max	98	76	80	96	99	99	99	97	87	94	92	94	-
	Min	90	63	55	56	45	58	79	86	61	42	64	50	-
Soil Temperature at 10 cm	06 UTC	10.6	11.4	10.2	8.6	8.2	8.0	8.4	11.0	11.4	11.4	9.9	6.0	8.3
	12 UTC	12.8	13.0	12.2	12.2	11.8	11.4	11.0	12.2	13.0	13.4	12.3	8.8	9.4
Sunshine Duration		2.6	4.5	2.5	6.8	6.6	4.8	2.4	1.0	1.7	6.8	4.0	5.7	4.2
Precipitation			0.6					0.0	3.6	10.1	6.0	20.3		45.1
Evaporation		0.0	0.2	1.7	1.4	0.6	2.3	1.5	0.0	1.7	0.0	9.4	11.9	13.0
Growing Degrees	5	6.2	6.3	5.5	4.6	3.2	3.6	3.8	7.9	8.7	7.9	57.4	18.9	35.8
	10	1.2	1.3	0.5	0.0	0.0	0.0	0.0	2.9	3.7	2.9	12.3	0.0	5.3

3rd 10-day period (21-30/11/2012)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	8.4	8.6	9.3
Precipitation - Reference Evapotranspiration	11.9	-8.6	35.8
Number of Rainy Days	4.0	0.0	4.7
Number of Dry Days	1.0	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.

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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