



# AGROMETEOROLOGICAL BULLETIN

*September 2013*  
*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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Division of Climatology-Applications  
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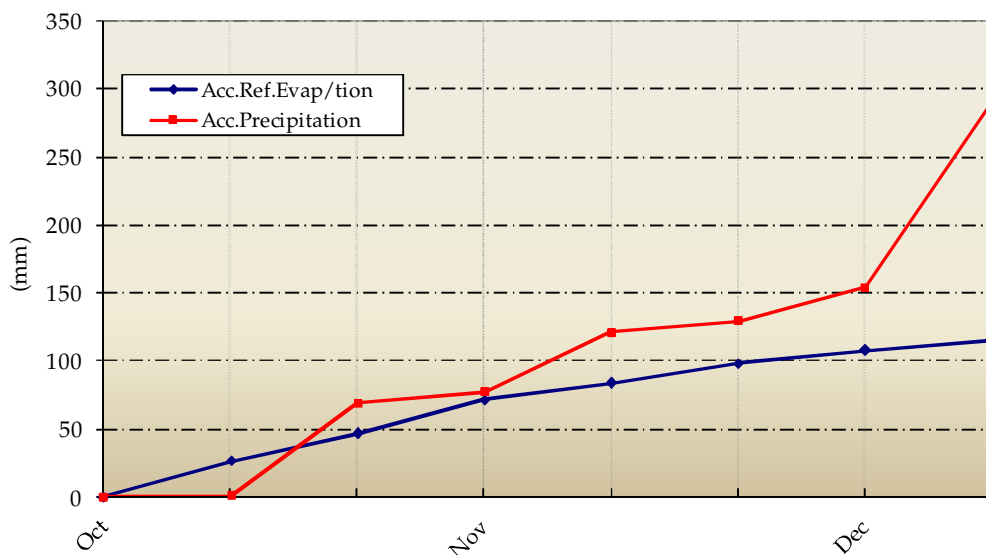
*Web addresses of HNMS*  
[www.hnms.gr](http://www.hnms.gr)  
[www.emy.gov.gr](http://www.emy.gov.gr)  
[www.meteo.gov.gr](http://www.meteo.gov.gr)  
[www.meteohellas.gr](http://www.meteohellas.gr)

Agrinio

3rd 10-day period (21-30/09/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	-	-	-	-	-	-	-	-	-	-		31.4	28.4
	Min	-	-	16.0	-	-	-	-	-	-	-	16.0	14.4	13.9
Relative Humidity	Max	-	90	-	-	-	-	-	-	-	-	90	90	-
	Min	-	44	-	-	-	-	-	-	-	-	44	34	-
Soil Temperature at 10 cm	06 UTC	-	-	22.0	-	-	-	-	-	-	-	22.0	22.5	20.7
	12 UTC	-	-	26.0	-	-	-	-	-	-	-	26.0	25.4	24.9
Sunshine Duration		-	11.5	-	-	-	-	-	-	-	-	11.5	10.3	7.7
Precipitation														17.6
Evaporation		-	4.2	-	-	-	-	-	-	-	-	-	46.9	47.0
Growing Degrees	5	-	-	-	-	-	-	-	-	-	-	-	178.8	161.3
	10	-	-	-	-	-	-	-	-	-	-	-	128.8	111.3

3rd 10-day period (21-30/09/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	32.2	31.0
Precipitation - Reference Evapotranspiration	-	-32.2	-13.4
Number of Rainy Days	0.0	0.0	1.7
Number of Dry Days	71.0	10.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



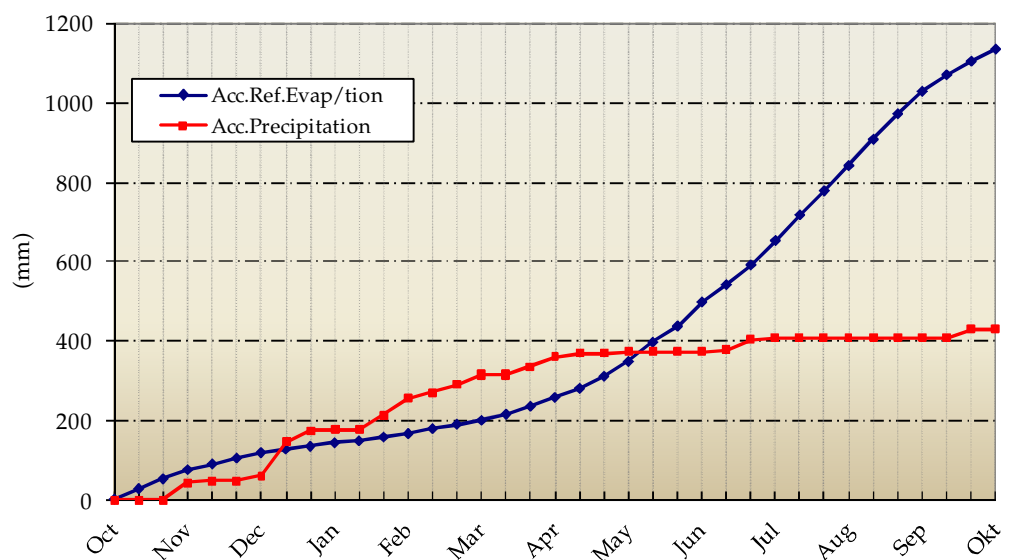
This station is not fully operated

Alexandroupoli

3rd 10-day period (21-30/09/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	23.8	24.8	23.2	24.8	25.8	25.6	26.4	25.6	25.4	26.8	25.2	28.4	24.9
	Min	11.4	13.0	11.4	13.6	12.4	13.8	13.4	16.0	13.4	16.0	13.4	14.7	13.0
Relative Humidity	Max	81	62	81	83	94	96	96	90	91	96	87	84	-
	Min	30	27	36	44	52	66	62	36	58	51	46	36	-
Soil Temperature at 10 cm	06 UTC	19.2	20.4	19.6	21.0	20.6	21.2	22.4	21.6	21.2	22.0	20.9	22.4	19.0
	12 UTC	24.0	24.6	23.8	24.6	25.0	25.2	26.0	25.0	25.4	25.8	24.9	25.4	22.4
Sunshine Duration		11.8	11.1	11.0	9.7	10.6	10.2	7.8	7.9	9.9	8.9	9.9	10.4	7.5
Precipitation								0.4	0.0			0.4		12.3
Evaporation		10.6	5.7	4.4	4.4	4.8	2.1	6.2	10.4	2.7	4.8	56.1	64.8	59.3
Growing Degrees	5	12.6	13.9	12.3	14.2	14.1	14.7	14.9	15.8	14.4	16.4	143.3	165.8	139.4
	10	7.6	8.9	7.3	9.2	9.1	9.7	9.9	10.8	9.4	11.4	93.3	115.8	89.4

3rd 10-day period (21-30/09/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	30.4	34.1	31.9
Precipitation - Reference Evapotranspiration	-30.0	-34.1	-19.6
Number of Rainy Days	1.0	0.0	1.1
Number of Dry Days	8.0	13.0	-

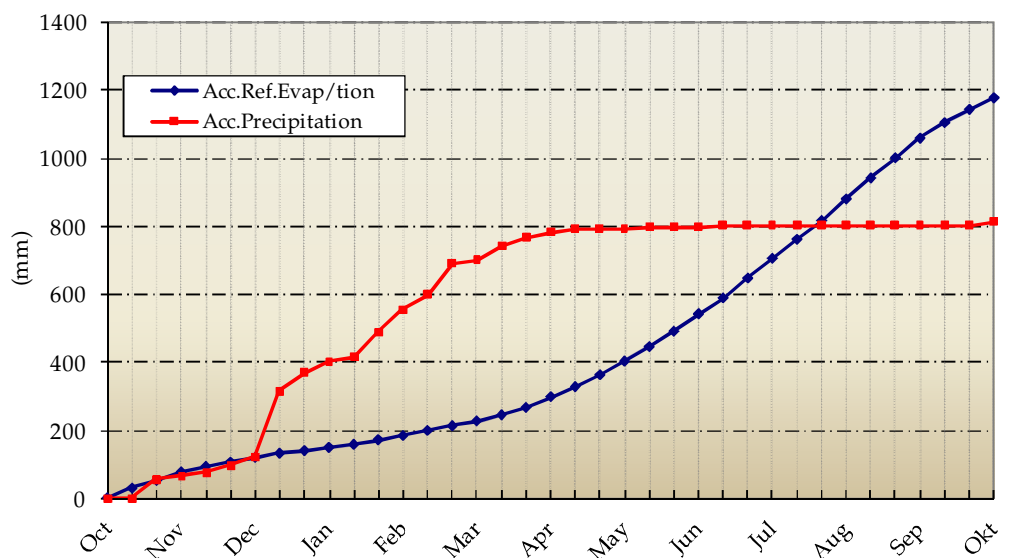
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-30/09/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	28.4	27.4	26.0	25.2	26.5	26.9	28.0	27.4	28.0	27.9	27.2	28.7	27.0
	Min	17.7	16.4	16.2	14.8	15.5	16.1	17.5	16.4	15.9	17.2	16.4	16.6	15.6
Relative Humidity	Max	89	83	85	83	85	87	87	87	88	88	86	89	-
	Min	28	33	27	45	43	41	35	49	42	51	39	40	-
Soil Temperature at 10 cm	06 UTC	24.0	23.6	21.6	20.4	21.0	21.6	22.2	22.2	22.4	22.6	22.2	21.9	22.0
	12 UTC	29.0	29.6	27.4	26.8	28.4	28.0	29.0	28.6	28.2	26.8	28.2	27.1	25.5
Sunshine Duration		10.6	6.2	10.7	10.2	10.5	9.3	10.0	10.4	10.0	4.6	9.2	9.6	8.1
Precipitation			8.8									8.8		16.0
Evaporation		11.0	2.8	7.3	4.3	5.7	3.9	5.7	5.7	3.5	11.3	61.2	56.2	48.4
Growing Degrees	5	18.1	16.9	16.1	15.0	16.0	16.5	17.8	16.9	17.0	17.6	167.7	176.6	162.7
	10	13.1	11.9	11.1	10.0	11.0	11.5	12.8	11.9	12.0	12.6	117.7	126.6	112.7

3rd 10-day period (21-30/09/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	34.1	33.5	30.8
Precipitation - Reference Evapotranspiration	-25.3	-33.5	-14.8
Number of Rainy Days	1.0	0.0	1.5
Number of Dry Days	5.0	15.0	-

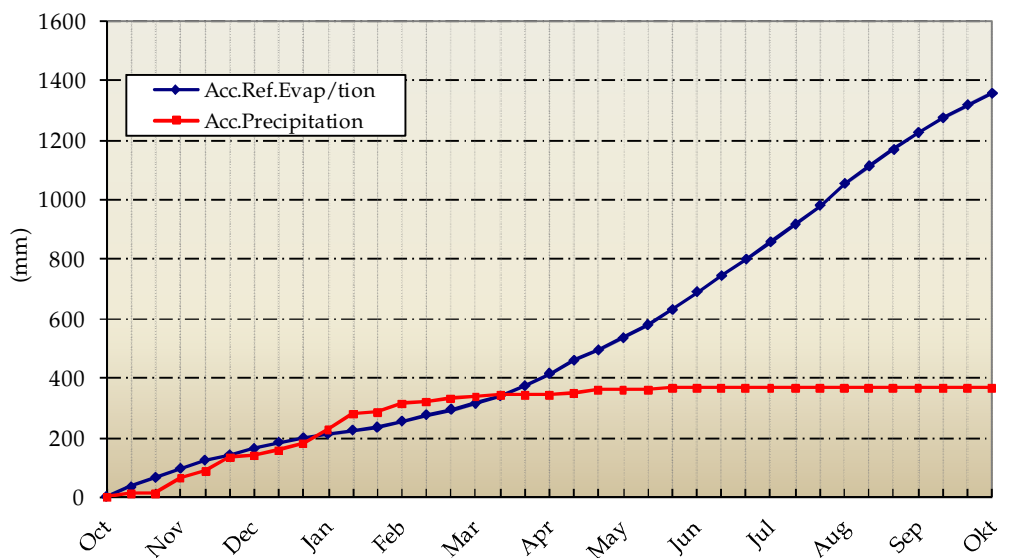
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-30/09/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	27.0	25.4	24.6	26.0	26.0	26.8	26.8	26.6	26.6	27.6	26.3	-	25.7
	Min	20.0	19.8	21.5	18.2	17.8	18.2	19.4	19.0	18.6	16.8	18.9	-	18.8
Relative Humidity	Max	85	72	67	79	88	88	85	91	90	76	82	-	-
	Min	63	48	51	48	57	60	59	66	61	28	54	-	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		9.0	9.4	9.6	9.8	9.7	9.3	9.0	9.4	9.5	9.7	9.4	-	8.3
Precipitation													-	4.1
Evaporation		3.2	7.2	5.5	5.3	4.5	2.7	4.6	5.3	3.6	5.9	47.8	-	61.7
Growing Degrees	5	18.5	17.6	18.1	17.1	16.9	17.5	18.1	17.8	17.6	17.2	176.4	-	172.5
	10	13.5	12.6	13.1	12.1	11.9	12.5	13.1	12.8	12.6	12.2	126.4	-	122.5

3rd 10-day period (21-30/09/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	38.2	-	-
Precipitation - Reference Evapotranspiration	-38.2	-	4.1
Number of Rainy Days	0.0	-	0.6
Number of Dry Days	135.0	-	-

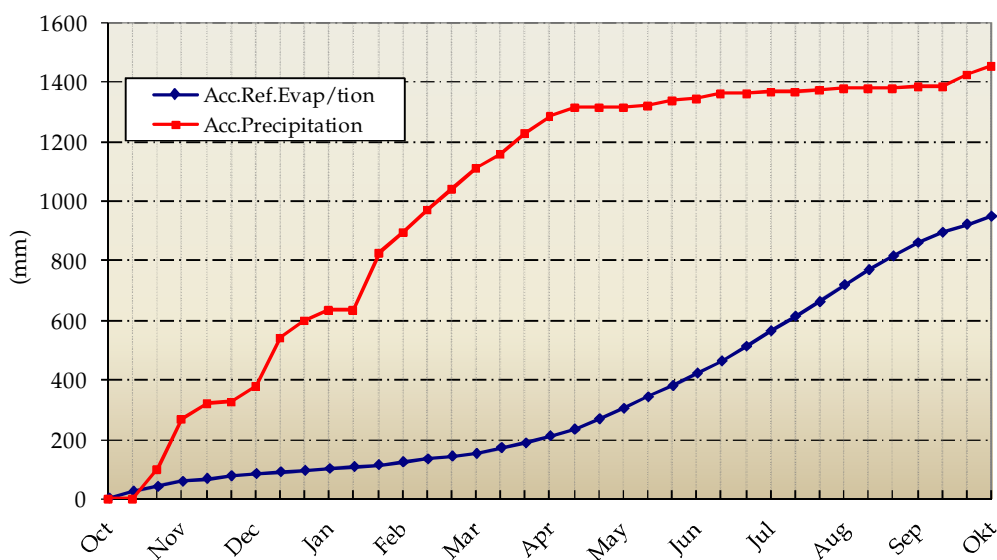
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-30/09/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	26.7	26.7	25.2	25.2	26.0	24.8	25.6	28.0	28.4	24.5	26.1	29.1	24.8
	Min	10.9	14.4	9.8	6.3	7.6	7.4	9.3	13.6	10.0	11.5	10.1	10.4	11.3
Relative Humidity	Max	87	67	90	89	94	96	97	95	97	95	91	89	-
	Min	43	33	25	30	26	38	42	49	32	35	35	30	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	16.9
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	19.5
Sunshine Duration		8.4	4.8	8.0	8.6	8.8	6.6	6.4	8.2	7.3	2.2	6.9	8.3	6.4
Precipitation											30.1	30.1		24.5
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	40.6
Growing Degrees	5	13.8	15.6	12.5	10.8	11.8	11.1	12.5	15.8	14.2	13.0	131.0	147.5	130.3
	10	8.8	10.6	7.5	5.8	6.8	6.1	7.5	10.8	9.2	8.0	81.0	97.5	80.3

3rd 10-day period (21-30/09/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	26.3	28.5	25.1
Precipitation - Reference Evapotranspiration	3.8	-28.5	-0.6
Number of Rainy Days	1.0	0.0	2.5
Number of Dry Days	11.0	10.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

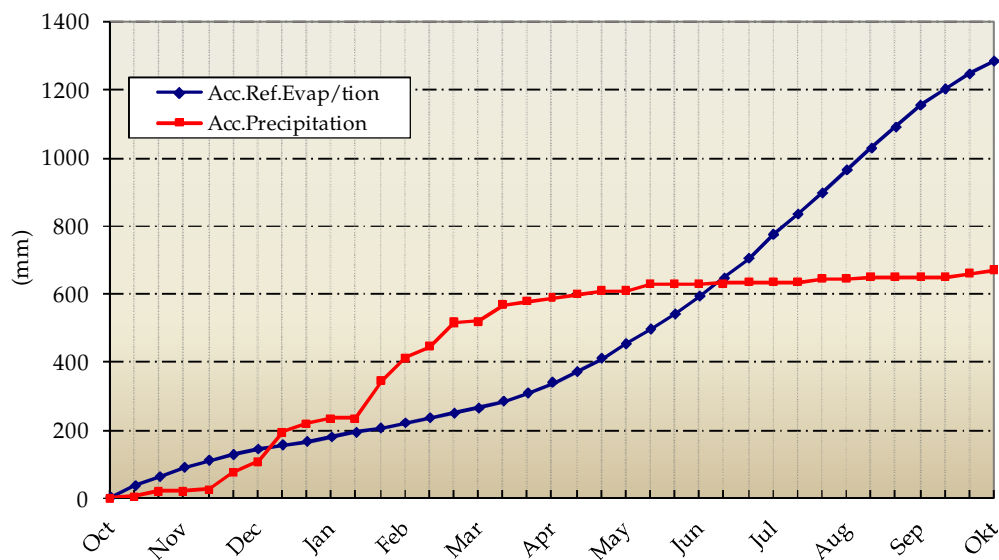


Kalamata

3rd 10-day period (21-30/09/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	28.5	27.4	26.5	27.2	29.1	29.2	31.0	28.4	28.5	26.7	28.2	30.2	27.6
	Min	18.3	17.1	14.7	13.5	14.2	15.3	16.0	14.8	17.4	14.0	15.5	16.1	15.0
Relative Humidity	Max	87	93	90	92	90	92	91	91	88	91	90	85	-
	Min	41	41	30	34	34	31	23	32	39	60	36	36	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	22.3	21.4
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	24.2	24.4
Sunshine Duration		10.9	5.6	8.7	10.0	10.4	10.1	10.8	10.2	10.7	6.6	9.4	10.2	7.7
Precipitation			10.3	0.7								11.0		12.3
Evaporation		6.6	0.7	6.8	3.8	6.6	4.8	5.6	1.0	5.8	3.7	45.4	54.1	51.4
Growing Degrees	5	18.4	17.3	15.6	15.4	16.7	17.3	18.5	16.6	18.0	15.4	168.9	181.5	162.8
	10	13.4	12.3	10.6	10.4	11.7	12.3	13.5	11.6	13.0	10.4	118.9	131.5	112.8

3rd 10-day period (21-30/09/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	38.2	41.3	32.9
Precipitation - Reference Evapotranspiration	-27.2	-41.3	-20.6
Number of Rainy Days	2.0	0.0	1.7
Number of Dry Days	4.0	14.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

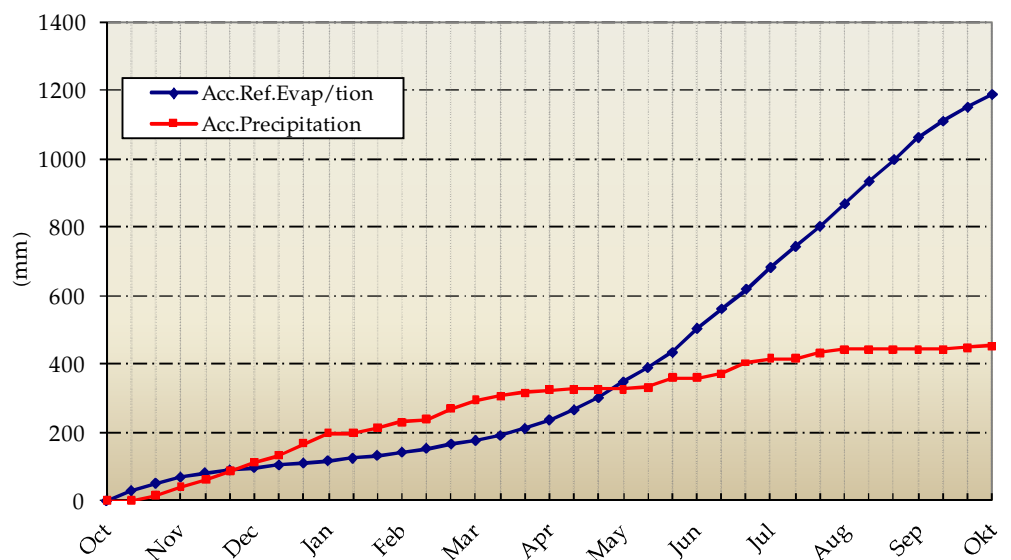


Larisa

3rd 10-day period (21-30/09/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	28.0	26.9	26.0	29.4	32.5	32.0	31.3	30.2	31.4	32.5	30.0	31.6	27.3
	Min	17.2	19.2	11.8	9.4	11.8	11.5	12.8	14.2	13.1	15.0	13.6	13.9	13.0
Relative Humidity	Max	55	66	74	74	76	78	71	90	95	96	78	87	-
	Min	23	19	23	20	13	16	18	28	26	17	20	23	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	22.2	20.9
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	24.7	22.7
Sunshine Duration		8.2	6.8	7.8	8.0	7.7	7.0	7.7	7.7	7.8	3.2	7.2	8.3	7.0
Precipitation											4.1	4.1		7.0
Evaporation		14.8	7.8	7.1	5.9	5.8	5.5	7.1	6.5	5.4	2.6	68.5	53.6	51.2
Growing Degrees	5	17.6	18.1	13.9	14.4	17.2	16.8	17.1	17.2	17.3	18.8	168.1	177.5	151.5
	10	12.6	13.1	8.9	9.4	12.2	11.8	12.1	12.2	12.3	13.8	118.1	127.5	101.5

3rd 10-day period (21-30/09/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	37.4	33.4	31.7
Precipitation - Reference Evapotranspiration	-33.3	-33.4	-24.7
Number of Rainy Days	1.0	0.0	1.7
Number of Dry Days	13.0	13.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



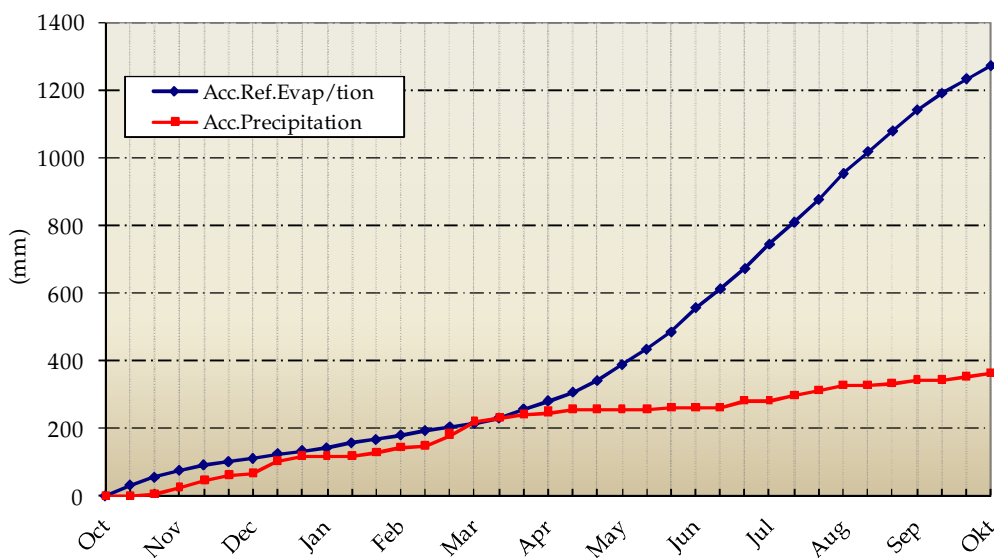


Mikra

3rd 10-day period (21-30/09/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	26.6	25.1	24.9	26.8	29.0	26.7	29.4	27.4	26.7	24.6	26.7	28.3	25.8
	Min	14.6	18.2	11.4	19.1	12.2	13.0	14.4	17.7	15.3	16.9	15.3	15.2	14.1
Relative Humidity	Max	77	77	83	56	72	85	88	79	82	90	79	78	-
	Min	24	27	29	31	23	46	31	40	54	58	36	30	-
Soil Temperature at 10 cm	06 UTC	21.6	22.0	21.0	22.0	21.4	21.6	22.2	23.4	23.0	23.6	22.2	21.0	19.9
	12 UTC	25.8	24.6	24.6	25.6	26.6	26.6	27.0	26.8	26.4	26.4	26.0	26.2	23.6
Sunshine Duration		10.7	10.1	10.5	10.5	10.5	8.8	9.7	7.5	8.9	1.7	8.9	10.1	6.9
Precipitation											10.4	10.4		10.7
Evaporation		5.4	8.5	10.2	9.1	7.0	5.5	4.6	5.5	8.0	2.4	66.2	80.4	49.1
Growing Degrees	5	15.6	16.7	13.2	18.0	15.6	14.9	16.9	17.6	16.0	15.8	160.0	167.7	149.6
	10	10.6	11.7	8.2	13.0	10.6	9.9	11.9	12.6	11.0	10.8	110.0	117.7	99.6

3rd 10-day period (21-30/09/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	39.0	39.2	29.8
Precipitation - Reference Evapotranspiration	-28.6	-39.2	-19.1
Number of Rainy Days	1.0	0.0	1.5
Number of Dry Days	13.0	10.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

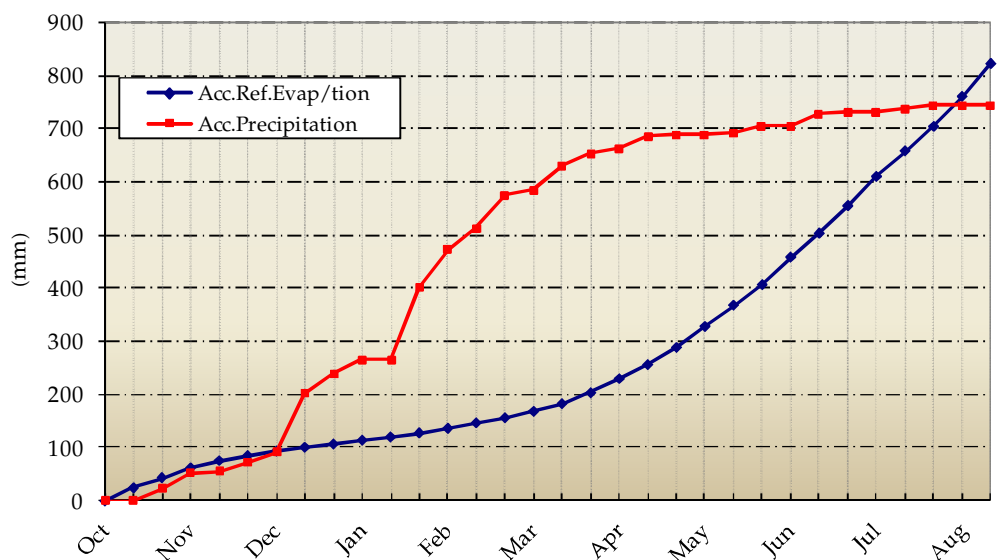


Tripoli

3rd 10-day period (21-30/09/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	25.0	21.1	21.9	24.3	26.2	25.2	28.2	28.4	29.5	29.2	25.9	30.0	25.0
	Min	11.7	13.7	9.1	6.8	7.6	9.2	10.6	8.9	9.5	9.4	9.6	10.5	10.2
Relative Humidity	Max	93	95	90	94	93	95	90	93	94	72	91	89	-
	Min	41	57	38	33	23	29	14	17	17	17	29	18	-
Soil Temperature at 10 cm	06 UTC	19.4	20.2	17.4	16.0	16.4	17.4	17.4	18.0	-	19.0	17.9	-	18.9
	12 UTC	24.2	-	21.6	22.4	23.0	23.6	24.2	24.2	-	24.2	23.4	-	21.1
Sunshine Duration		5.5	5.1	7.6	10.4	9.6	8.5	10.2	-	9.8	8.0	8.3	-	7.8
Precipitation				0.7								0.7		11.6
Evaporation		3.4	2.3	2.6	3.2	3.7	2.4	4.1	-	-	7.0	-	-	36.1
Growing Degrees	5	13.4	12.4	10.5	10.6	11.9	12.2	14.4	13.7	14.5	14.3	127.8	152.3	126.3
	10	8.4	7.4	5.5	5.6	6.9	7.2	9.4	8.7	9.5	9.3	77.8	102.3	76.4

3rd 10-day period (21-30/09/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	28.8	37.4	29.5
Precipitation - Reference Evapotranspiration	-28.1	-37.4	-17.9
Number of Rainy Days	1.0	0.0	1.5
Number of Dry Days	6.0	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<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.

**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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