



AGROMETEOROLOGICAL BULLETIN

June 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



Hellenic National Meteorological Service
Division of Climatology-Applications
El. Venizelou Street 14, 16777
Helliniko, Athens

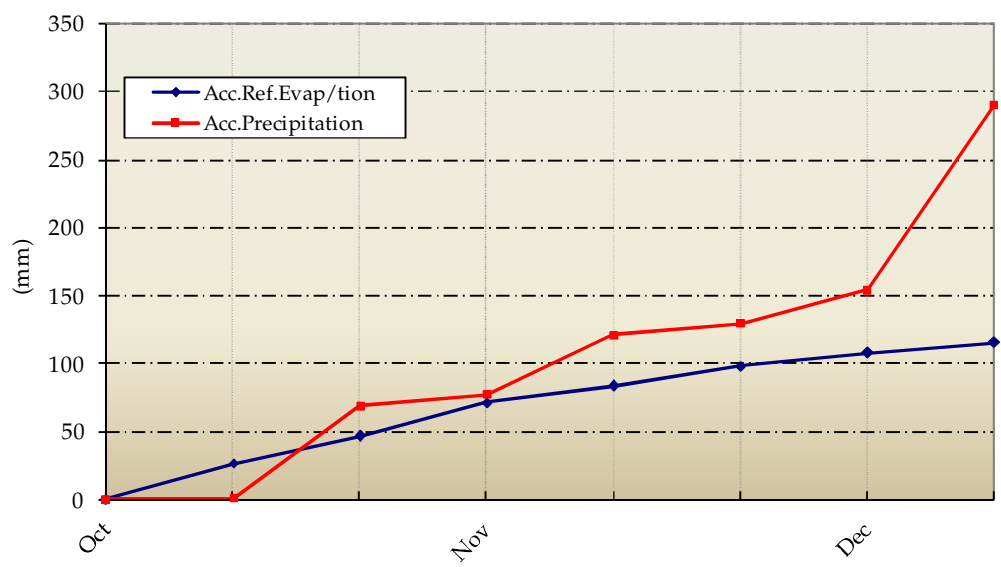
Web addresses of HNMS
www.hnms.gr
www.emy.gov.gr
www.meteo.gov.gr
www.meteohellas.gr

Agrinio

3rd 10-day period (21-30/06/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	36.8	37.0	36.8	35.0	33.6	34.0	34.0	31.0	29.6	27.6	33.5	35.9	31.8
	Min	20.6	23.8	23.0	21.0	17.8	16.8	17.4	15.0	15.4	15.4	18.6	19.2	16.2
Relative Humidity	Max	68	77	72	76	80	80	81	80	88	88	79	61	-
	Min	34	37	29	29	30	27	27	26	30	38	31	28	-
Soil Temperature at 10 cm	06 UTC	29.0	29.0	30.0	30.0	28.8	29.0	28.0	28.4	28.4	28.4	28.9	31.0	25.7
	12 UTC	33.2	34.0	34.0	34.0	34.0	32.5	33.0	33.0	33.0	32.6	33.3	36.2	31.9
Sunshine Duration		13.5	13.3	13.7	13.1	13.1	13.3	13.6	13.4	13.4	13.7	13.4	13.5	11.8
Precipitation														3.5
Evaporation		9.0	16.3	11.3	14.1	6.9	11.3	8.1	10.0	10.5	10.0	107.5	106.5	86.4
Growing Degrees	5	23.7	25.4	24.9	23.0	20.7	20.4	20.7	18.0	17.5	16.5	210.8	225.8	189.7
	10	18.7	20.4	19.9	18.0	15.7	15.4	15.7	13.0	12.5	11.5	160.8	175.8	139.7

3rd 10-day period (21-30/06/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	62.2	65.0	56.5
Precipitation - Reference Evapotranspiration	-62.2	-65.0	-53.0
Number of Rainy Days	0.0	0.0	0.6
Number of Dry Days	18.0	31.0	-

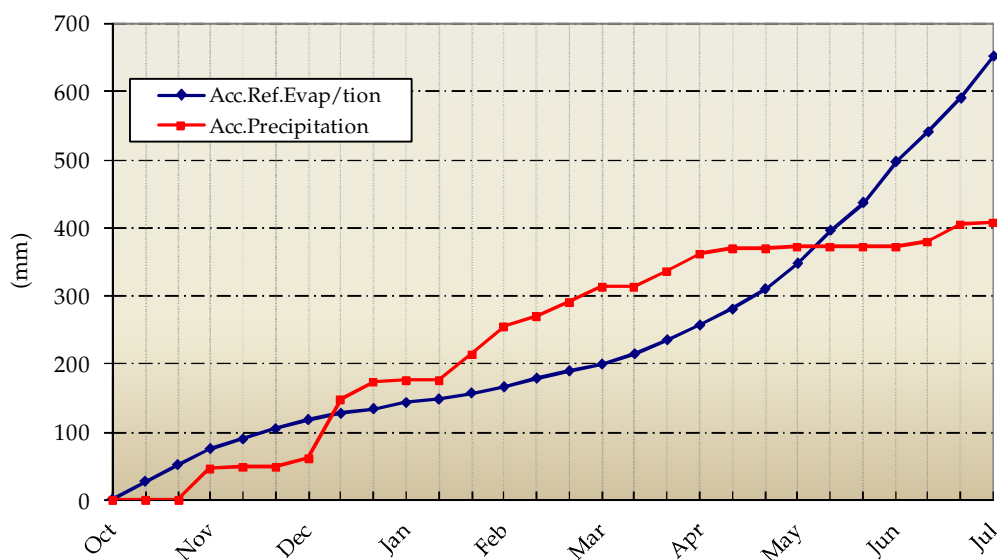
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-30/06/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	30.8	33.2	33.2	32.0	34.8	33.2	31.8	30.4	32.4	27.0	31.9	33.1	28.7
	Min	19.8	19.0	17.4	20.8	18.5	23.8	21.6	21.8	20.2	18.0	20.1	20.6	16.0
Relative Humidity	Max	73	73	75	75	67	67	72	76	73	90	74	75	-
	Min	29	21	31	38	27	37	38	43	31	50	34	30	-
Soil Temperature at 10 cm	06 UTC	24.0	24.4	25.2	26.2	26.4	27.6	27.2	27.2	27.0	26.8	26.2	27.2	23.1
	12 UTC	27.6	28.2	29.4	30.4	30.4	30.6	30.0	30.0	30.2	30.0	29.7	30.3	27.7
Sunshine Duration		13.6	13.5	12.9	12.2	13.3	13.3	12.0	11.5	12.8	11.3	12.6	11.8	10.9
Precipitation											3.2	3.2	0.0	4.4
Evaporation		5.6	6.9	13.6	7.0	12.3	9.4	6.6	6.0	12.5	9.3	89.2	97.6	85.9
Growing Degrees	5	20.3	21.1	20.3	21.4	21.7	23.5	21.7	21.1	21.3	17.5	209.9	218.4	173.3
	10	15.3	16.1	15.3	16.4	16.7	18.5	16.7	16.1	16.3	12.5	159.9	168.4	123.3

3rd 10-day period (21-30/06/2013)	Previous Year Value	Past Years Mean Value	
Reference Evapotranspiration	61.9	62.8	55.0
Precipitation - Reference Evapotranspiration	-58.7	-62.8	-50.6
Number of Rainy Days	1.0	0.0	1.3
Number of Dry Days	14.0	24.0	-

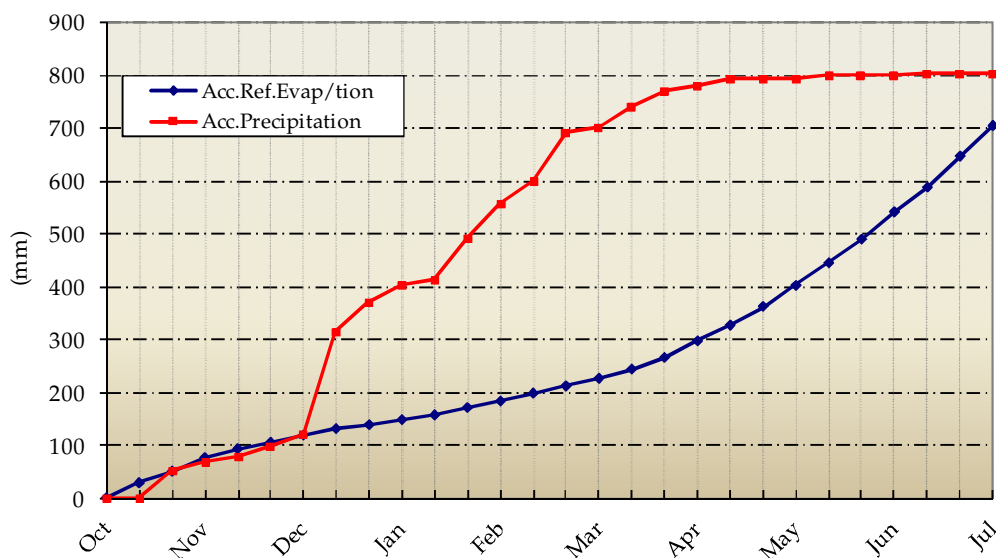
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-30/06/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	32.9	31.8	33.2	31.1	27.3	26.4	27.2	26.8	27.2	24.6	28.8	31.8	28.9
	Min	19.9	19.2	20.9	20.7	18.8	19.2	16.2	15.6	15.2	19.3	18.5	18.3	17.0
Relative Humidity	Max	80	86	88	89	83	84	88	88	85	83	85	85	-
	Min	40	42	41	42	45	54	49	42	32	49	44	36	-
Soil Temperature at 10 cm	06 UTC	28.4	28.4	29.4	29.0	28.4	27.6	26.4	26.0	25.8	26.8	27.6	27.6	25.9
	12 UTC	24.6	35.0	36.0	35.8	35.0	33.6	33.4	33.6	32.6	33.0	33.3	34.5	30.7
Sunshine Duration		13.3	13.1	12.9	12.8	13.6	13.5	12.2	12.6	13.1	13.3	13.0	12.6	12.3
Precipitation														1.3
Evaporation		10.6	7.2	9.6	7.4	9.7	9.9	6.4	7.2	8.8	9.0	85.8	85.6	74.3
Growing Degrees	5	21.4	20.5	22.1	20.9	18.1	17.8	16.7	16.2	16.2	17.0	186.8	200.6	179.7
	10	16.4	15.5	17.1	15.9	13.1	12.8	11.7	11.2	11.2	12.0	136.8	150.6	129.7

3rd 10-day period (21-30/06/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	57.9	57.6	53.3
Precipitation - Reference Evapotranspiration	-57.9	-57.6	-52.0
Number of Rainy Days	0.0	0.0	0.2
Number of Dry Days	20.0	32.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

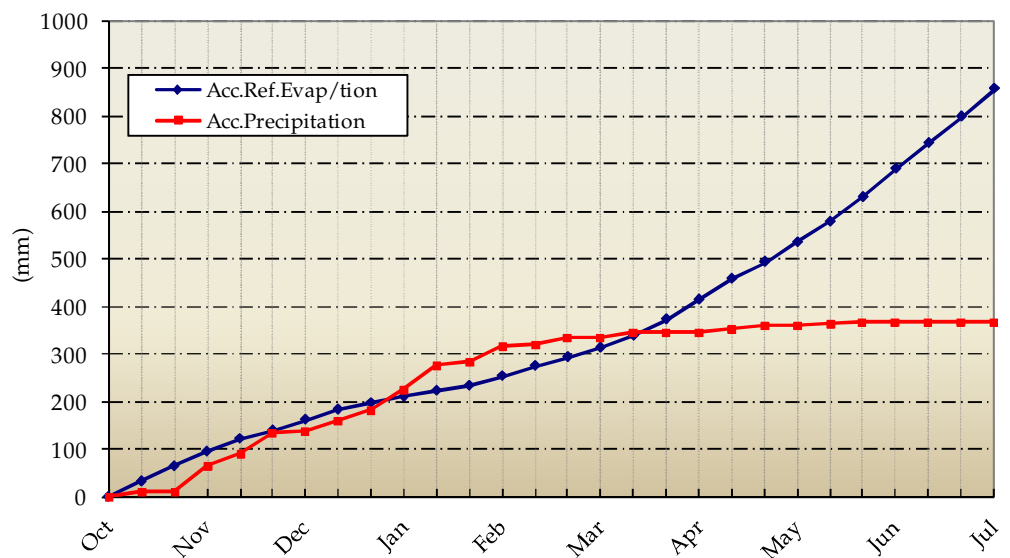


Iraklio

3rd 10-day period (21-30/06/2013)		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	27.0	29.0	32.2	29.0	28.0	27.4	27.4	27.2	26.2	28.0	-	28.2
	Min	23.6	19.6	18.8	20.4	23.0	19.0	18.8	20.4	22.4	19.6	20.6	-	20.4
Relative Humidity	Max	80	88	81	78	76	88	91	91	81	70	82	-	-
	Min	66	67	56	44	46	61	65	65	57	57	58	-	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		13.1	13.0	13.4	13.1	13.1	13.0	12.5	11.5	12.5	12.8	12.8	-	12.3
Precipitation													-	0.0
Evaporation		4.5	5.9	5.6	7.0	7.7	4.9	3.7	6.3	7.7	8.0	61.3	-	89.0
Growing Degrees	5	20.1	18.3	18.9	21.3	21.0	18.5	18.1	18.9	19.8	17.9	192.8	-	193.1
	10	15.1	13.3	13.9	16.3	16.0	13.5	13.1	13.9	14.8	12.9	142.8	-	143.1

3rd 10-day period (21-30/06/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	58.3	-	-
Precipitation - Reference Evapotranspiration	-58.3	-	0.0
Number of Rainy Days	0.0	-	0.0
Number of Dry Days	43.0	-	-

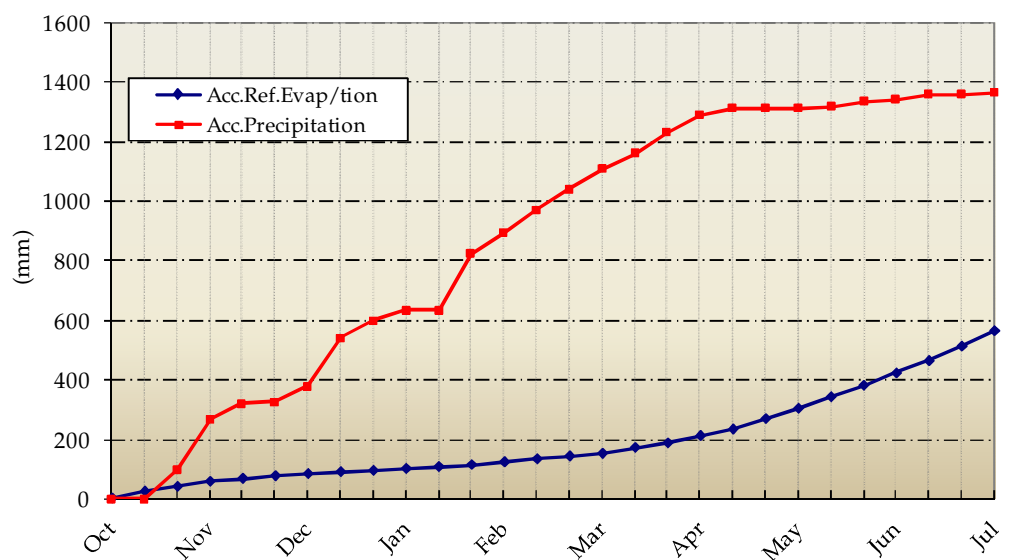
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-30/06/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	34.8	36.0	36.0	30.8	29.0	28.4	27.0	29.1	26.0	24.4	30.2	33.2	29.4
	Min	17.1	17.4	17.0	14.7	12.3	12.5	15.4	11.6	11.0	9.3	13.8	18.5	13.7
Relative Humidity	Max	62	82	90	64	64	89	65	56	90	68	73	75	-
	Min	31	34	15	25	27	27	27	22	26	34	27	31	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	21.5
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	25.9
Sunshine Duration		9.5	10.8	10.5	13.1	12.8	13.0	8.6	12.4	10.3	5.8	10.7	11.8	10.8
Precipitation			3.6							0.0		3.6		6.5
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	67.3
Growing Degrees	5	21.0	21.7	21.5	17.8	15.7	15.5	16.2	15.4	13.5	11.9	169.9	208.3	166.2
	10	16.0	16.7	16.5	12.8	10.7	10.5	11.2	10.4	8.5	6.9	119.9	158.3	116.2

3rd 10-day period (21-30/06/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	51.8	57.4	50.2
Precipitation - Reference Evapotranspiration	-48.2	-57.4	-43.7
Number of Rainy Days	1.0	0.0	1.3
Number of Dry Days	7.0	25.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

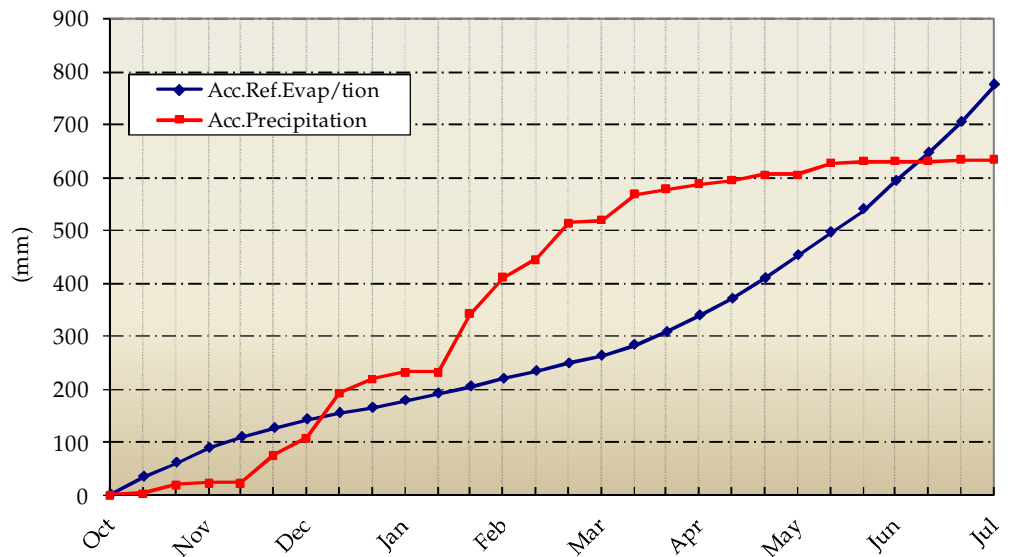


Kalamata

3rd 10-day period (21-30/06/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	36.0	29.0	30.7	37.0	31.5	31.7	32.7	31.2	31.0	27.6	31.8	33.4	30.4
	Min	20.8	17.7	18.0	19.0	18.6	19.8	21.0	15.9	17.1	17.4	18.5	18.5	16.7
Relative Humidity	Max	93	93	93	88	87	69	70	71	83	82	83	89	-
	Min	26	57	45	18	29	35	15	28	14	36	30	30	-
Soil Temperature at 10 cm	06 UTC	24.6	24.8	25.0	25.4	25.2	24.8	25.0	24.2	24.4	23.8	24.7	25.6	24.2
	12 UTC	28.6	27.8	28.6	29.4	28.8	28.4	28.6	28.6	27.4	27.2	28.3	28.5	28.7
Sunshine Duration		12.8	12.2	12.1	12.6	13.0	13.1	12.9	13.2	13.1	11.9	12.7	12.1	11.8
Precipitation														0.4
Evaporation		9.1	5.1	10.8	6.7	15.9	10.8	9.7	12.4	13.6	6.8	100.9	-	88.4
Growing Degrees	5	23.4	18.4	19.4	23.0	20.1	20.8	21.9	18.6	19.1	17.5	201.9	209.4	185.7
	10	18.4	13.4	14.4	18.0	15.1	15.8	16.9	13.6	14.1	12.5	151.9	159.4	135.7

3rd 10-day period (21-30/06/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	70.3	65.6	58.1
Precipitation - Reference Evapotranspiration	-70.3	-65.6	-57.7
Number of Rainy Days	0.0	0.0	0.3
Number of Dry Days	16.0	37.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

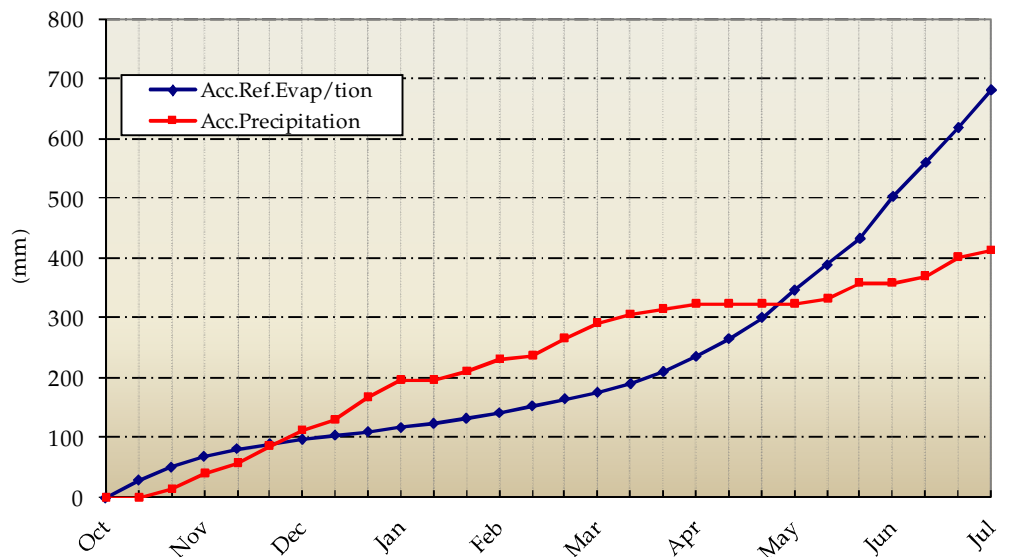


Larisa

3rd 10-day period (21-30/06/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	33.5	34.8	36.8	37.4	37.1	32.6	30.0	31.7	31.0	28.2	33.3	34.4	32.8
	Min	22.0	20.2	19.0	21.2	18.0	19.6	21.4	19.8	18.0	17.8	19.7	19.3	16.5
Relative Humidity	Max	69	88	78	78	84	71	61	69	93	79	77	70	-
	Min	32	28	23	11	18	29	34	22	30	31	26	21	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	26.2	25.0
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	28.0	27.7
Sunshine Duration		12.3	11.5	9.4	12.6	12.5	12.6	8.1	11.5	7.0	9.7	10.7	11.8	11.1
Precipitation									0.0	10.2		10.2	0.6	6.4
Evaporation		6.5	12.3	10.2	13.8	12.1	11.2	13.8	10.8	8.4	8.1	107.2	122.7	93.9
Growing Degrees	5	22.8	22.5	22.9	24.3	22.6	21.1	20.7	20.8	19.5	18.0	215.1	218.3	196.6
	10	17.8	17.5	17.9	19.3	17.6	16.1	15.7	15.8	14.5	13.0	165.1	168.3	146.6

3rd 10-day period (21-30/06/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	63.0	69.3	61.9
Precipitation - Reference Evapotranspiration	-52.8	-68.7	-55.5
Number of Rainy Days	1.0	1.0	0.9
Number of Dry Days	14.0	25.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

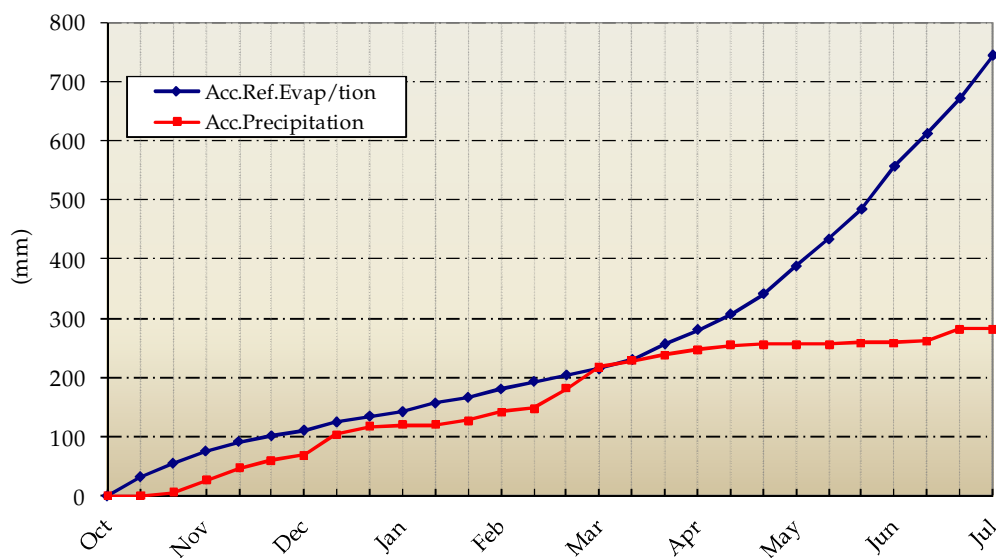


Mikra

3rd 10-day period (21-30/06/2013)		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	31.7	34.0	34.4	34.4	31.4	27.6	29.6	30.4	26.6	31.2	33.2	30.8
	Min	24.5	21.2	22.0	21.8	19.6	22.6	22.0	20.6	17.9	18.9	21.1	20.8	17.9
Relative Humidity	Max	74	79	75	72	68	55	55	66	78	73	70	73	-
	Min	35	38	31	27	21	37	42	31	33	36	33	28	-
Soil Temperature at 10 cm	06 UTC	23.0	30.0	30.0	30.0	29.6	29.8	29.0	27.6	27.8	26.0	28.3	27.8	25.3
	12 UTC	30.0	35.0	33.8	34.0	36.2	34.8	32.2	31.0	34.2	32.6	33.4	33.2	30.2
Sunshine Duration		11.8	12.8	8.0	11.8	13.4	13.0	6.2	11.1	9.6	12.3	11.0	12.5	11.0
Precipitation										0.8	0.2	1.0	7.4	4.8
Evaporation		3.2	10.8	7.8	14.0	11.2	13.0	10.0	10.0	10.7	16.3	107.0	123.6	93.3
Growing Degrees	5	23.0	21.5	23.0	23.1	22.0	22.0	19.8	20.1	19.2	17.8	211.3	220.5	193.2
	10	18.0	16.5	18.0	18.1	17.0	17.0	14.8	15.1	14.2	12.8	161.3	170.5	143.2

3rd 10-day period (21-30/06/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	72.5	72.7	61.4
Precipitation - Reference Evapotranspiration	-71.5	-65.3	-56.6
Number of Rainy Days	2.0	2.0	1.1
Number of Dry Days	15.0	24.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

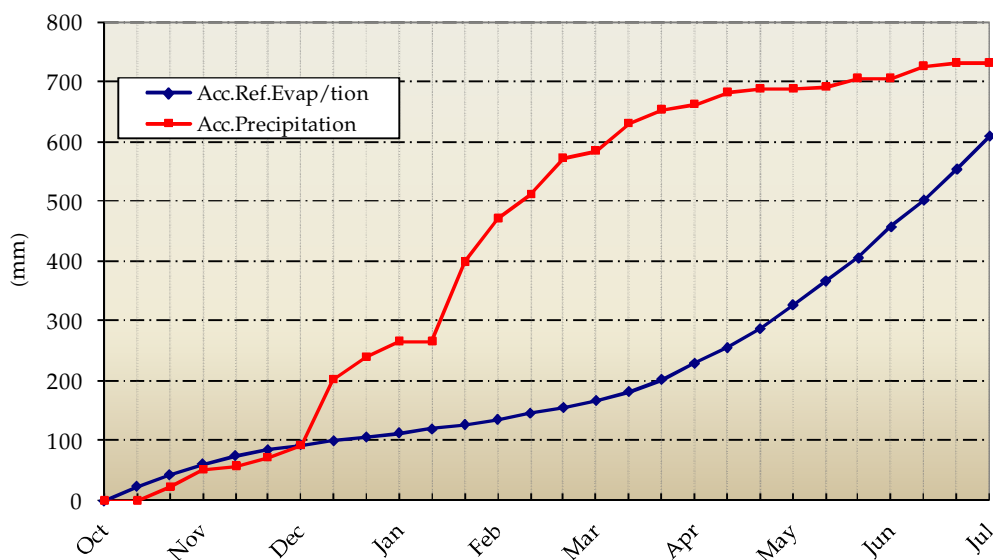


Tripoli

3rd 10-day period (21-30/06/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	31.9	34.3	34.9	33.5	31.5	32.5	30.2	29.2	28.2	25.4	31.2	32.1	29.8
	Min	20.3	17.3	13.6	14.0	12.5	12.3	13.3	12.0	10.5	12.5	13.8	15.2	12.5
Relative Humidity	Max	56	57	74	83	79	74	78	62	75	72	71	60	-
	Min	25	19	20	15	18	18	22	21	12	28	20	19	-
Soil Temperature at 10 cm	06 UTC	27.0	26.8	26.8	25.6	26.4	26.8	27.2	26.8	26.2	26.2	26.6	26.8	24.0
	12 UTC	33.2	34.0	34.8	34.0	34.4	34.2	34.4	34.0	33.8	31.2	33.8	33.0	27.2
Sunshine Duration		12.9	12.0	7.9	12.3	12.5	11.0	11.2	12.0	12.6	11.9	11.6	11.6	11.1
Precipitation				0.4								0.4		5.4
Evaporation		0.1	0.7	16.7	10.2	8.9	7.5	9.3	7.6	9.5	6.1	76.6	-	65.6
Growing Degrees	5	21.1	20.8	19.3	18.8	17.0	17.4	16.8	15.6	14.4	14.0	175.0	-	161.5
	10	16.1	15.8	14.3	13.8	12.0	12.4	11.8	10.6	9.4	9.0	125.0	-	111.5

3rd 10-day period (21-30/06/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	55.1	58.7	53.9
Precipitation - Reference Evapotranspiration	-54.7	-58.7	-48.5
Number of Rainy Days	1.0	0.0	0.7
Number of Dry Days	9.0	29.0	-

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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