

AGROMETEOROLOGICAL BULLETIN

July 2009
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



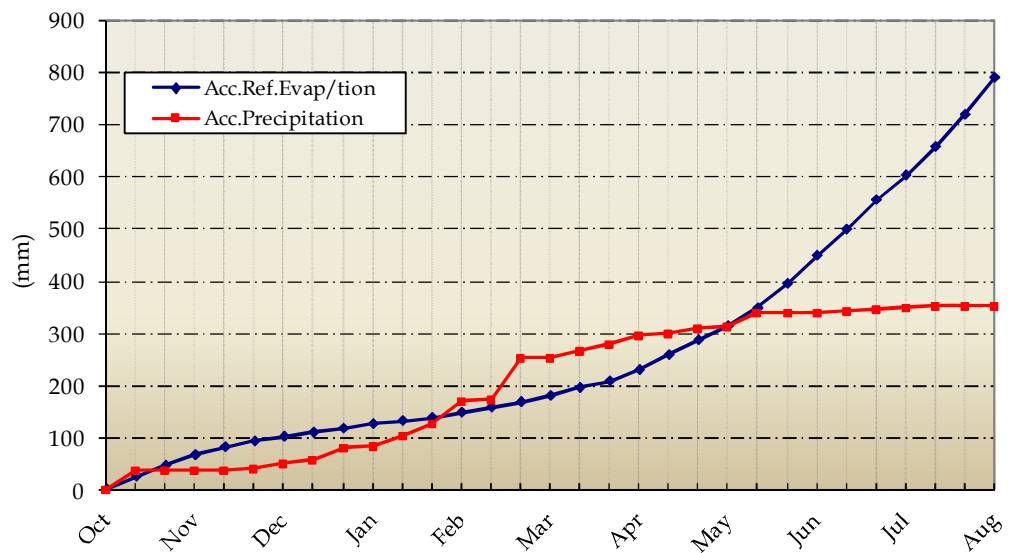
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Web addresses of HNMS
www.hnms.gr
www.emy.gov.gr
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3rd 10-day period (21-31/07/2009)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	32.4	32.6	34.6	34.8	33.2	33.2	32.6	31.8	33.0	33.0	30.8	32.9	-	30.8
	Min	21.8	20.2	20.0	17.8	21.0	23.4	23.2	20.6	20.2	18.6	18.4	20.5	-	18.1
Relative Humidity	Max	60	68	58	66	75	85	72	77	68	83	72	71	-	-
	Min	24	23	19	24	40	30	32	23	24	24	36	27	-	-
Soil Temperature at 10 cm	06 UTC	28.6	28.4	28.0	28.0	29.2	29.6	28.6	28.2	27.6	27.8	27.4	28.3	-	24.5
	12 UTC	31.8	32.0	33.2	33.0	32.8	33.0	32.8	31.2	31.2	31.0	30.4	32.0	-	28.7
Sunshine Duration		12.9	13.2	13.2	12.9	12.8	11.0	12.6	13.1	12.5	12.9	11.2	12.6	-	10.3
Precipitation														-	5.5
Evaporation		15.5	11.9	14.2	9.0	10.4	20.1	11.3	11.0	7.7	10.3	5.8	127.2	-	104.4
Growing Degrees	5	22.1	21.4	22.3	21.3	22.1	23.3	22.9	21.2	21.6	20.8	19.6	238.6	-	213.8
	10	17.1	16.4	17.3	16.3	17.1	18.3	17.9	16.2	16.6	15.8	14.6	183.6	-	158.8

3rd 10-day period (21-31/07/2009)	Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	71.3	- 64.5
Precipitation - Reference Evapotranspiration	-71.3	- -59.0
Number of Rainy Days	0.0	- 1.1
Number of Dry Days	21.0	- -

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

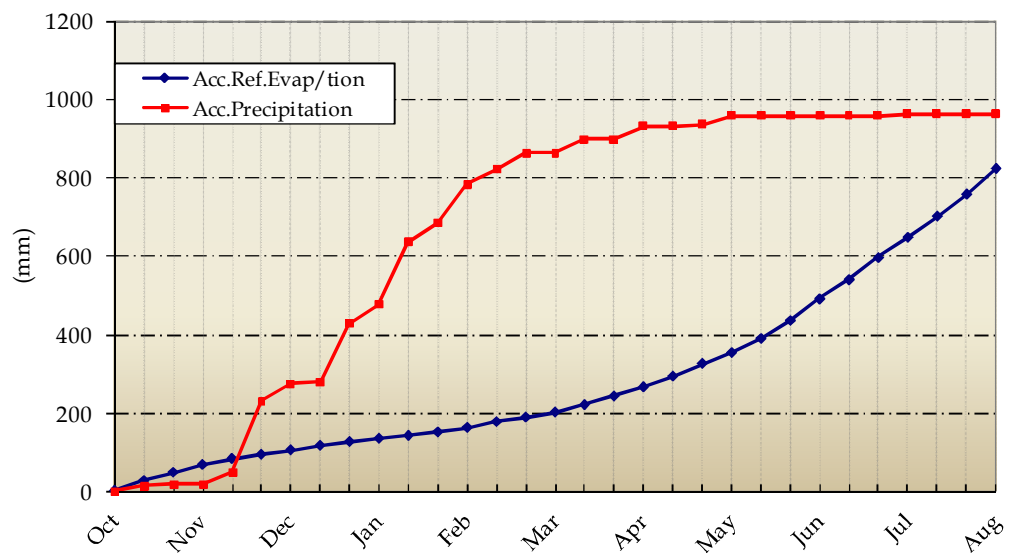


Andravida

3rd 10-day period (21-31/07/2009)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	33.0	32.6	33.6	34.6	36.4	32.8	35.4	33.0	31.8	35.0	31.6	33.6	-	30.6
	Min	19.2	19.2	20.4	19.4	20.6	19.6	20.0	19.0	19.8	18.8	19.4	19.6	-	18.5
Relative Humidity	Max	94	94	79	82	94	85	89	87	81	82	88	87	-	-
	Min	38	34	27	29	30	35	29	29	38	29	40	33	-	-
Soil Temperature at 10 cm	06 UTC	28.6	28.8	28.4	28.4	29.2	29.2	29.0	29.0	28.2	27.8	28.4	28.6	-	27.4
	12 UTC	34.8	34.6	34.4	35.0	35.6	35.4	36.2	34.8	34.4	35.4	35.6	35.1	-	31.9
Sunshine Duration		12.4	12.5	12.7	12.3	11.8	12.8	12.1	12.4	12.7	12.3	11.4	12.3	-	11.8
Precipitation														-	2.9
Evaporation		8.9	5.0	16.0	9.7	7.0	10.6	11.6	14.7	8.2	11.8	8.0	111.5	-	81.3
Growing Degrees	5	21.1	20.9	22.0	22.0	23.5	21.2	22.7	21.0	20.8	21.9	20.5	237.6	-	215.1
	10	16.1	15.9	17.0	17.0	18.5	16.2	17.7	16.0	15.8	16.9	15.5	182.6	-	160.1

3rd 10-day period (21-31/07/2009)	Previous Year Value	Past Years Mean Value	
Reference Evapotranspiration	65.8	-	59.5
Precipitation - Reference Evapotranspiration	-65.8	-	-56.6
Number of Rainy Days	0.0	-	0.3
Number of Dry Days	37.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

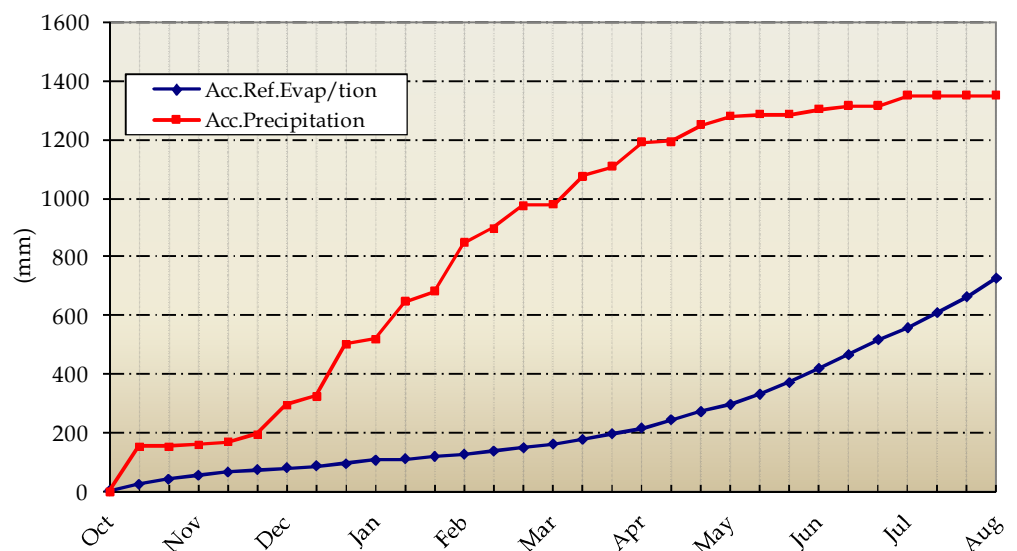


Arta

3rd 10-day period (21-31/07/2009)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	35.0	34.0	35.4	37.0	36.0	34.0	34.6	33.6	34.6	34.4	34.6	34.8	-	31.9
	Min	18.6	19.4	18.4	19.0	18.4	19.0	21.0	18.4	18.8	19.0	20.4	19.1	-	17.8
Relative Humidity	Max	61	77	78	78	81	78	59	80	80	69	81	75	-	-
	Min	36	41	32	33	44	38	33	37	38	33	38	37	-	-
Soil Temperature at 10 cm	06 UTC	28.6	29.0	28.8	29.0	29.2	29.4	29.0	29.4	29.2	30.4	29.8	29.3	-	26.9
	12 UTC	30.8	31.0	31.0	31.4	31.4	31.6	31.6	30.4	31.0	31.4	31.0	31.1	-	31.9
Sunshine Duration		12.8	12.6	12.8	12.4	12.7	12.7	12.6	12.6	12.6	11.6	11.2	12.4	-	10.9
Precipitation														-	4.3
Evaporation		8.6	6.4	7.6	6.6	6.2	8.4	8.1	6.4	8.0	7.4	7.3	81.0	-	-
Growing Degrees	5	21.8	21.7	21.9	23.0	22.2	21.5	22.8	21.0	21.7	21.7	22.5	241.8	-	218.0
	10	16.8	16.7	16.9	18.0	17.2	16.5	17.8	16.0	16.7	16.7	17.5	186.8	-	163.0

3rd 10-day period (21-31/07/2009)	Previous Year Value	Past Years Mean Value	
Reference Evapotranspiration	64.2	-	54.2
Precipitation - Reference Evapotranspiration	-64.2	-	-49.9
Number of Rainy Days	0.0	-	1.1
Number of Dry Days	26.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

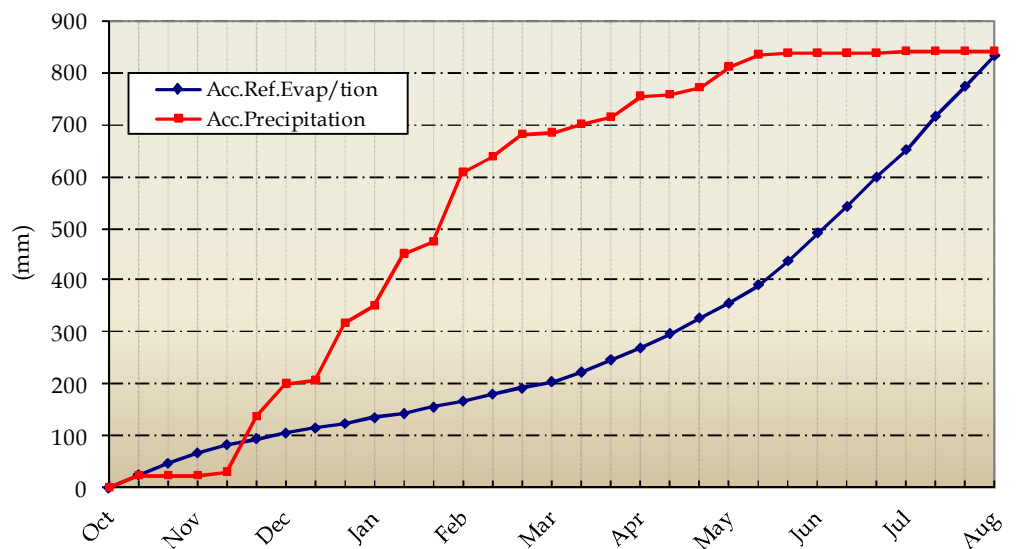


Kalamata

3rd 10-day period (21-31/07/2009)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	30.4	31.6	31.0	33.4	33.0	38.8	32.6	31.4	30.6	32.4	33.2	32.6	-	31.5
	Min	20.0	19.4	16.8	16.6	18.6	22.0	20.4	20.4	15.6	16.4	17.2	18.5	-	18.2
Relative Humidity	Max	80	88	91	92	87	70	85	89	89	85	88	86	-	-
	Min	53	38	33	35	39	22	45	34	46	35	30	37	-	-
Soil Temperature at 10 cm	06 UTC	25.6	25.4	25.2	25.0	25.4	25.6	26.0	26.0	25.4	25.0	25.2	25.4	-	26.0
	12 UTC	27.6	27.4	27.0	27.6	29.0	27.8	28.2	27.2	27.0	27.2	27.2	27.6	-	30.3
Sunshine Duration		11.1	12.4	12.5	12.2	12.2	12.4	11.4	12.2	12.1	12.2	10.4	11.9	-	11.2
Precipitation														-	0.9
Evaporation		10.0	18.0	8.0	7.0	6.0	11.0	8.0	2.0	6.0	10.0	9.0	95.0	-	90.1
Growing Degrees	5	20.2	20.5	18.9	20.0	20.8	25.4	21.5	20.9	18.1	19.4	20.2	225.9	-	218.3
	10	15.2	15.5	13.9	15.0	15.8	20.4	16.5	15.9	13.1	14.4	15.2	170.9	-	163.3

3rd 10-day period (21-31/07/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	59.7	-	62.2
Precipitation - Reference Evapotranspiration	-59.7	-	-61.3
Number of Rainy Days	0.0	-	0.4
Number of Dry Days	36.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

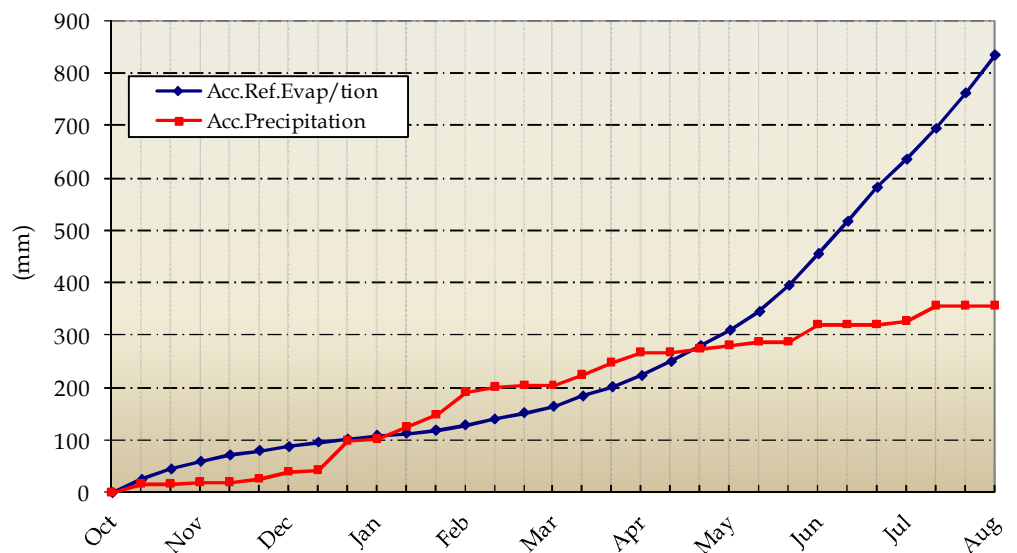


Larisa

3rd 10-day period (21-31/07/2009)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	32.0	32.8	34.8	39.6	43.4	35.4	31.6	31.4	32.0	33.4	34.8	34.7	-	33.2
	Min	19.0	17.4	18.4	18.4	21.2	22.6	23.0	17.6	18.0	20.0	18.8	19.5	-	18.1
Relative Humidity	Max	75	79	68	69	76	67	67	74	72	67	74	72	-	-
	Min	32	29	23	22	18	22	34	32	31	26	21	26	-	-
Soil Temperature at 10 cm	06 UTC	28.0	27.8	26.6	28.0	28.6	29.4	29.0	27.6	27.6	28.2	28.2	28.1	-	26.9
	12 UTC	30.8	30.4	29.4	30.0	31.8	28.2	30.4	30.4	30.0	30.8	31.0	30.3	-	29.2
Sunshine Duration		12.9	12.8	12.7	12.6	12.4	12.5	6.5	12.6	12.3	11.9	11.6	11.9	-	10.7
Precipitation														-	4.4
Evaporation		11.6	3.9	9.9	8.7	13.8	13.4	6.3	12.8	10.8	7.7	11.5	110.4	-	104.1
Growing Degrees	5	20.5	20.1	21.6	24.0	27.3	24.0	22.3	19.5	20.0	21.7	21.8	242.8	-	227.1
	10	15.5	15.1	16.6	19.0	22.3	19.0	17.3	14.5	15.0	16.7	16.8	187.8	-	172.1

3rd 10-day period (21-31/07/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	72.5	-	66.2
Precipitation - Reference Evapotranspiration	-72.5	-	-61.8
Number of Rainy Days	0.0	-	1.1
Number of Dry Days	24.0	-	-

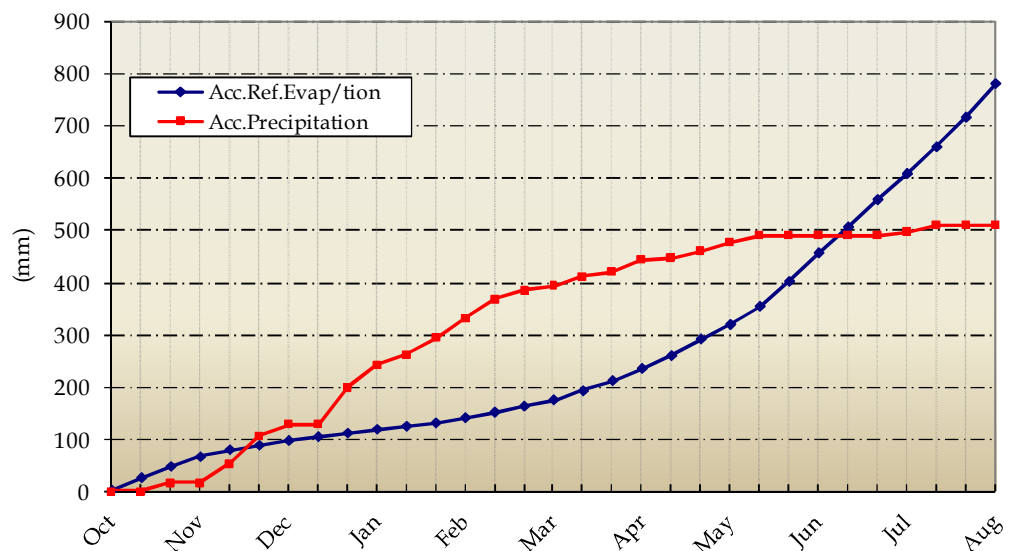
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-31/07/2009)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	35.4	33.0	35.0	39.4	39.8	39.6	33.6	32.6	34.0	33.4	36.6	35.7	-	34.1
	Min	18.8	17.6	19.0	18.8	19.2	17.6	22.8	16.4	15.4	19.2	17.6	18.4	-	16.8
Relative Humidity	Max	55	45	35	52	59	67	55	47	48	49	64	52	-	-
	Min	23	23	20	18	26	33	33	32	32	26	29	27	-	-
Soil Temperature at 10 cm	06 UTC	30.4	28.6	28.6	28.2	28.8	28.6	30.2	28.4	27.4	27.6	27.8	28.6	-	26.7
	12 UTC	-	35.6	35.4	36.8	38.4	38.0	36.8	35.6	35.2	35.0	35.6	36.2	-	35.2
Sunshine Duration		10.4	12.2	12.4	11.7	12.1	12.0	12.1	12.5	12.5	12.1	12.0	12.0	-	10.8
Precipitation														-	5.3
Evaporation		8.6	0.3	11.4	9.7	8.9	8.1	7.8	8.3	10.5	9.3	7.5	90.4	-	80.5
Growing Degrees	5	22.1	20.3	22.0	24.1	24.5	23.6	23.2	19.5	19.7	21.3	22.1	242.4	-	224.7
	10	17.1	15.3	17.0	19.1	19.5	18.6	18.2	14.5	14.7	16.3	17.1	187.4	-	169.7

3rd 10-day period (21-31/07/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	64.4	-	58.8
Precipitation - Reference Evapotranspiration	-64.4	-	-53.5
Number of Rainy Days	0.0	-	0.5
Number of Dry Days	25.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

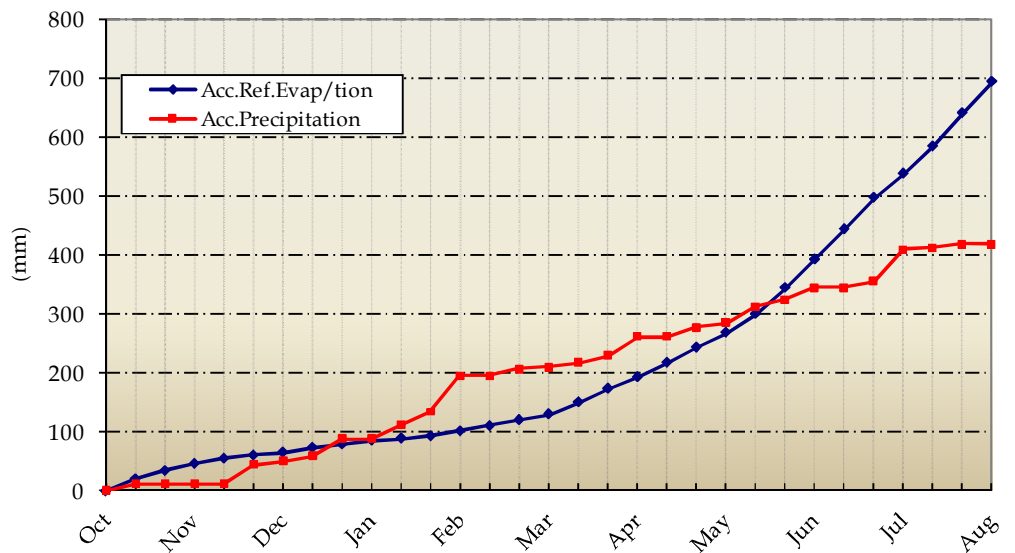


Series

3rd 10-day period (21-31/07/2009)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	33.0	34.0	35.0	38.0	40.4	35.4	35.4	34.0	35.0	35.0	38.0	35.7	-	32.6
	Min	21.2	19.6	19.4	21.0	22.6	24.0	21.4	20.2	19.2	20.0	20.2	20.8	-	18.8
Relative Humidity	Max	55	61	54	50	57	47	46	52	52	54	61	54	-	-
	Min	29	30	24	26	27	29	20	29	27	26	26	27	-	-
Soil Temperature at 10 cm	06 UTC	27.8	28.0	-	28.4	29.0	29.6	29.0	28.4	28.2	28.2	28.0	28.5	-	26.3
	12 UTC	29.2	29.6	30.2	29.6	30.4	31.0	30.2	30.0	30.4	30.6	31.0	30.2	-	29.4
Sunshine Duration		12.3	12.5	12.7	12.0	12.2	5.0	12.2	12.5	11.9	10.2	9.6	11.2	-	10.1
Precipitation														-	13.1
Evaporation		8.0	9.0	9.0	7.0	9.0	9.0	7.0	9.0	5.0	5.0	7.0	84.0	-	76.8
Growing Degrees	5	22.1	21.8	22.2	24.5	26.5	24.7	23.4	22.1	22.1	22.5	24.1	256.0	-	227.1
	10	17.1	16.8	17.2	19.5	21.5	19.7	18.4	17.1	17.1	17.5	19.1	201.0	-	172.3

3rd 10-day period (21-31/07/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	53.2	-	53.7
Precipitation - Reference Evapotranspiration	-53.2	-	-40.6
Number of Rainy Days	0.0	-	2.1
Number of Dry Days	20.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

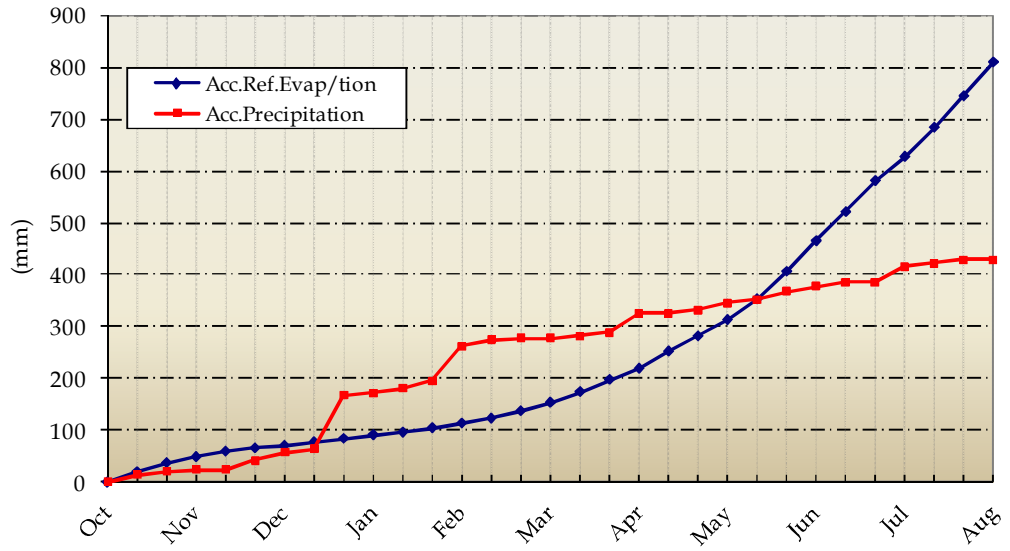


Trikala Imathias

3rd 10-day period (21-31/07/2009)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	31.6	34.6	34.4	35.0	35.6	34.2	32.0	31.0	34.0	32.4	38.0	33.9	-	31.7
	Min	18.6	17.6	18.8	19.8	21.6	21.0	19.4	18.6	18.6	20.4	19.8	19.5	-	18.3
Relative Humidity	Max	67	92	68	96	96	56	97	75	97	84	93	84	-	-
	Min	40	29	36	40	45	29	37	43	38	43	24	37	-	-
Soil Temperature at 10 cm	06 UTC	28.2	28.2	28.6	28.6	29.2	29.2	28.4	28.2	28.2	28.6	28.6	28.5	-	25.7
	12 UTC	32.0	32.4	33.0	33.2	33.4	33.0	31.2	32.0	31.8	-	32.2	32.4	-	27.3
Sunshine Duration		12.0	12.0	11.5	11.8	11.0	11.5	10.1	11.0	12.1	8.8	12.0	11.3	-	9.6
Precipitation														-	4.6
Evaporation		5.3	4.1	4.7	4.3	4.8	9.4	4.6	4.5	4.1	4.5	5.8	56.1	-	70.8
Growing Degrees	5	20.1	21.1	21.6	22.4	23.6	22.6	20.7	19.8	21.3	21.4	23.9	238.5	-	220.3
	10	15.1	16.1	16.6	17.4	18.6	17.6	15.7	14.8	16.3	16.4	18.9	183.5	-	165.3

3rd 10-day period (21-31/07/2009)	Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	64.9	53.4
Precipitation - Reference Evapotranspiration	-64.9	-48.8
Number of Rainy Days	0.0	1.4
Number of Dry Days	20.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

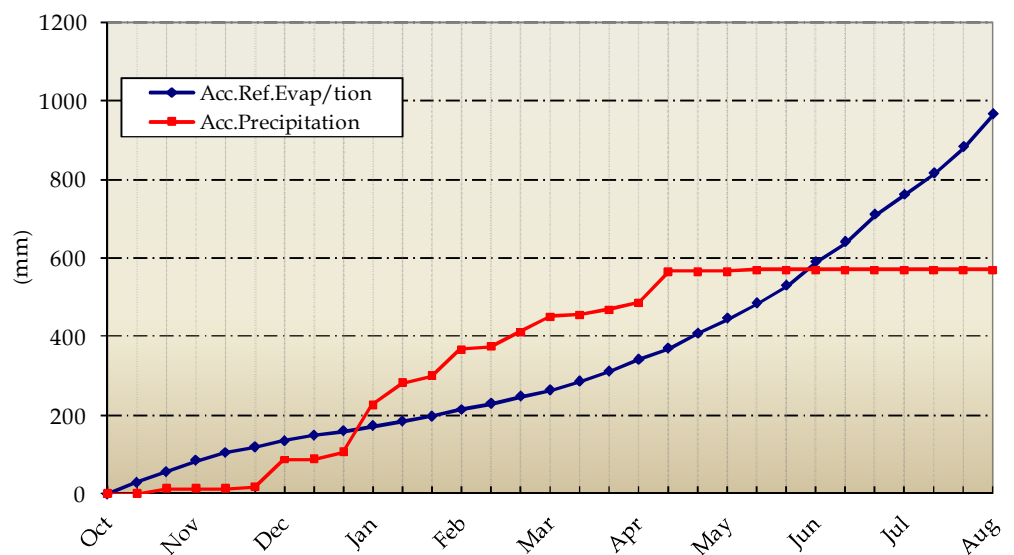


Tympaki

3rd 10-day period (21-31/07/2009)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	33.4	31.8	33.0	35.8	36.6	33.8	34.0	32.0	31.8	32.0	31.6	33.3	-	31.8
	Min	23.0	22.6	20.8	20.0	21.4	24.6	25.4	25.0	20.4	19.4	22.4	22.3	-	20.7
Relative Humidity	Max	65	50	57	56	46	88	53	59	61	66	50	59	-	-
	Min	24	25	28	18	22	28	34	29	28	29	32	27	-	-
Soil Temperature at 10 cm	06 UTC	32.2	30.8	30.0	29.4	30.6	31.8	32.8	31.6	29.4	29.4	29.6	30.7	-	30.9
	12 UTC	36.4	35.0	35.0	35.4	37.2	38.4	37.0	35.2	34.2	34.4	34.6	35.7	-	35.3
Sunshine Duration		12.3	12.3	11.7	12.6	11.6	11.2	11.2	12.3	12.1	11.4	11.5	11.8	-	12.1
Precipitation														-	0.1
Evaporation		17.0	13.8	17.4	16.0	11.9	10.1	14.5	16.2	14.4	15.9	14.3	161.5	-	132.3
Growing Degrees	5	23.2	22.2	21.9	22.9	24.0	24.2	24.7	23.5	21.1	20.7	22.0	250.4	-	233.6
	10	18.2	17.2	16.9	17.9	19.0	19.2	19.7	18.5	16.1	15.7	17.0	195.4	-	178.6

3rd 10-day period (21-31/07/2009)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	83.1	-	74.6
Precipitation - Reference Evapotranspiration	-83.1	-	-74.5
Number of Rainy Days	0.0	-	0.0
Number of Dry Days	88.0	-	-

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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