



AGROMETEOROLOGICAL BULLETIN

July 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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www.hnms.gr
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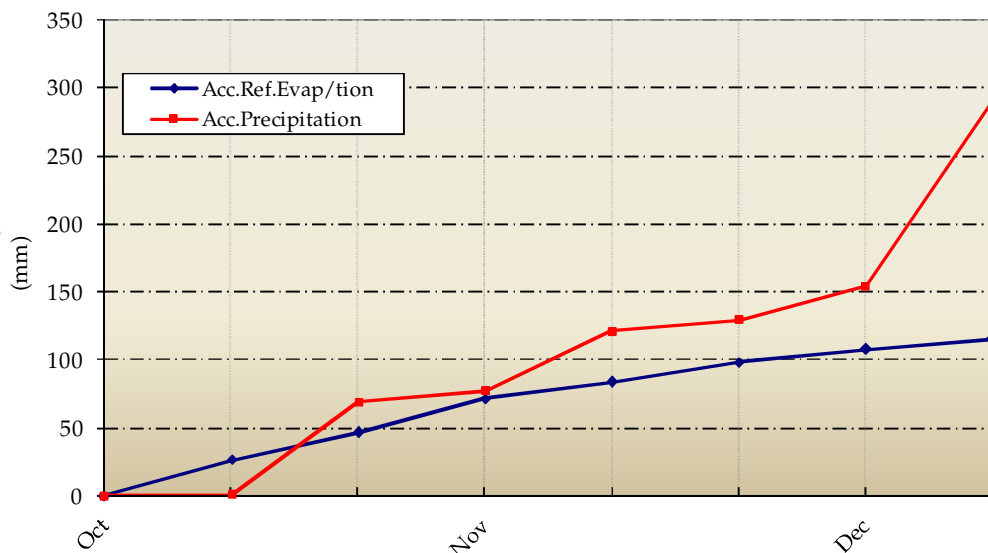
Agrinio

3rd 10-day period (21-31/07/2013)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	34.8	32.6	33.4	35.0	34.4	37.0	37.6	36.8	37.2	37.4	36.2	35.7	37.0	33.5
	Min	17.6	18.4	17.8	17.8	21.0	19.0	20.0	21.0	20.4	20.4	20.4	19.4	20.6	17.4
Relative Humidity	Max	92	91	85	80	73	80	75	76	78	78	83	81	68	-
	Min	29	38	32	27	30	24	21	23	31	37	43	30	31	-
Soil Temperature at 10 cm	06 UTC	27.4	27.0	28.0	28.4	29.0	30.0	31.0	32.0	31.6	31.8	32.0	29.8	33.1	28.0
	12 UTC	33.0	31.0	32.8	33.4	35.0	37.0	36.0	34.0	36.0	36.0	36.2	34.6	37.7	34.0
Sunshine Duration		10.7	12.5	12.4	13.2	13.3	13.2	13.1	12.5	12.8	12.9	12.8	12.7	12.4	11.6
Precipitation		2.0											2.0		3.2
Evaporation		7.2	10.2	9.5	5.1	11.6	7.6	9.4	16.5	10.0	9.3	11.0	107.4	114.2	91.3
Growing Degrees	5	21.2	20.5	20.6	21.4	22.7	23.0	23.8	23.9	23.8	23.9	23.3	248.1	261.7	224.3
	10	16.2	15.5	15.6	16.4	17.7	18.0	18.8	18.9	18.8	18.9	18.3	193.1	206.7	169.4

3rd 10-day period (21-31/07/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	67.0	69.2	61.1
Precipitation - Reference Evapotranspiration	-65.0	-69.2	-57.9
Number of Rainy Days	1.0	0.0	0.7
Number of Dry Days	0.0	62.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

This station is not fully operated

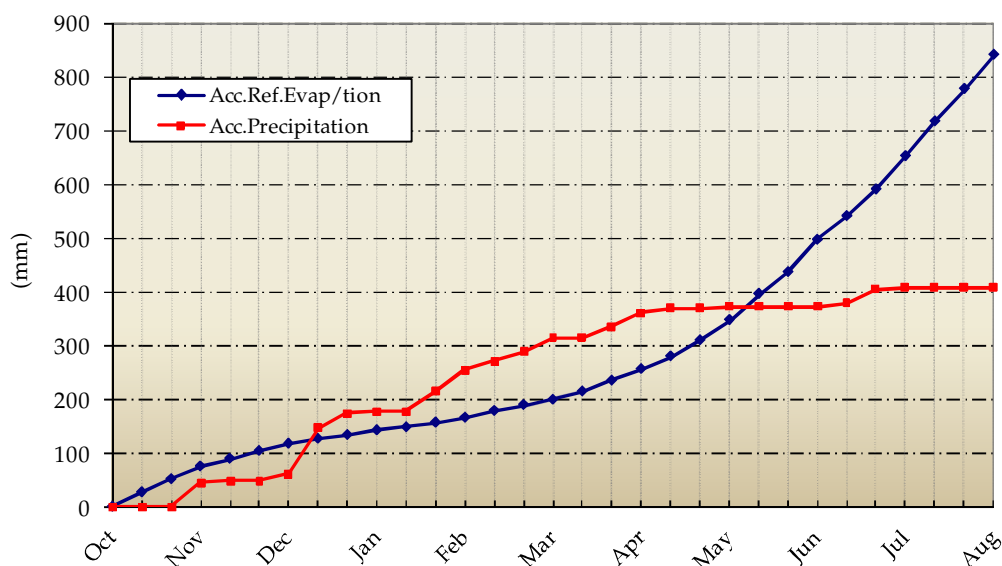


Alexandroupoli

3rd 10-day period (21-31/07/2013)		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	29.4	31.8	33.8	33.0	33.6	31.8	32.2	33.2	34.0	32.0	32.5	36.5	30.8
	Min	17.0	21.0	15.6	17.5	18.8	21.0	20.8	18.8	18.0	19.8	23.4	19.2	23.4	18.1
Relative Humidity	Max	66	62	73	70	68	73	70	73	79	70	71	70	64	-
	Min	32	28	28	26	26	26	42	38	33	39	34	32	26	-
Soil Temperature at 10 cm	06 UTC	27.2	27.2	26.2	26.8	27.8	28.2	28.8	27.6	27.8	28.6	29.8	27.8	30.8	24.5
	12 UTC	31.0	30.0	30.2	31.2	31.6	32.0	31.8	31.4	32.0	31.8	33.0	31.5	33.9	28.7
Sunshine Duration		10.2	11.7	13.4	13.1	13.0	12.2	10.3	12.4	12.9	12.2	7.2	11.7	12.0	10.3
Precipitation															5.5
Evaporation		6.6	12.0	8.8	9.3	7.7	12.6	7.1	9.5	7.8	10.6	9.4	101.4	124.4	104.4
Growing Degrees	5	20.0	20.2	18.7	20.7	20.9	22.3	21.3	20.5	20.6	21.9	22.7	229.8	274.5	213.8
	10	15.0	15.2	13.7	15.7	15.9	17.3	16.3	15.5	15.6	16.9	17.7	174.8	219.5	158.8

3rd 10-day period (21-31/07/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	63.7	78.3	64.5
Precipitation - Reference Evapotranspiration	-63.7	-78.3	-59.0
Number of Rainy Days	0.0	0.0	1.1
Number of Dry Days	30.0	55.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

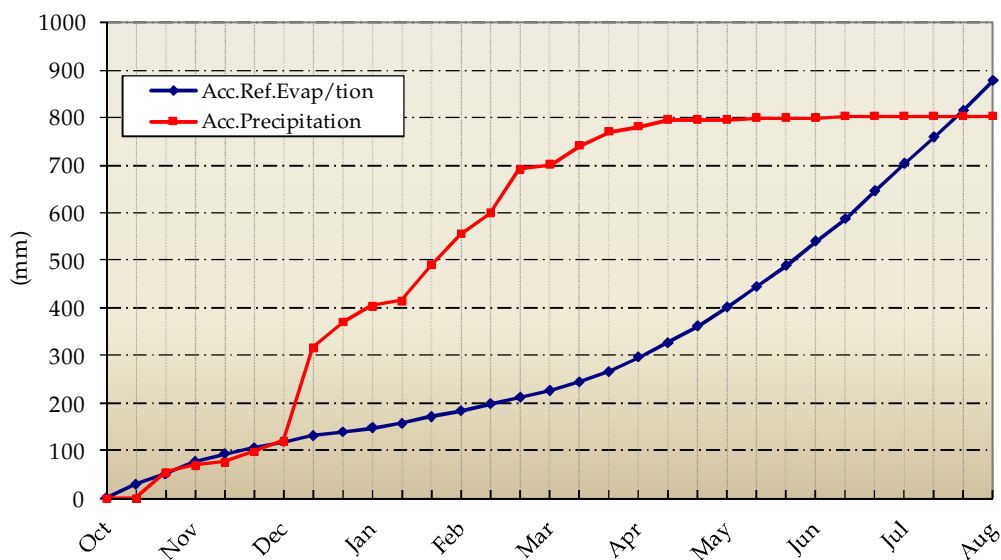


Andravida

3rd 10-day period (21-31/07/2013)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	30.0	32.4	30.1	31.1	30.7	32.2	33.5	32.6	33.3	35.0	30.8	32.0	32.7	30.6
	Min	19.4	19.2	18.0	18.7	18.8	19.4	20.0	22.9	20.3	21.5	20.4	19.9	21.0	18.5
Relative Humidity	Max	88	88	87	87	86	83	88	89	87	84	87	87	85	-
	Min	45	17	34	42	47	33	39	36	32	30	50	37	38	-
Soil Temperature at 10 cm	06 UTC	28.2	28.6	28.0	28.4	28.2	28.4	29.0	30.2	29.8	29.8	29.6	28.9	30.0	27.4
	12 UTC	34.4	34.4	34.4	34.4	34.8	35.0	35.8	36.0	35.2	36.6	35.4	35.1	37.4	31.9
Sunshine Duration		12.0	12.5	12.3	13.0	12.6	12.4	12.0	11.6	12.7	12.3	12.6	12.4	12.0	11.8
Precipitation															2.9
Evaporation		7.0	12.0	8.0	10.4	9.6	6.0	8.7	10.2	8.6	9.1	7.4	97.0	90.4	81.3
Growing Degrees	5	19.7	20.8	19.1	19.9	19.8	20.8	21.8	22.8	21.8	23.3	20.6	230.2	240.6	215.1
	10	14.7	15.8	14.1	14.9	14.8	15.8	16.8	17.8	16.8	18.3	15.6	175.2	185.6	160.1

3rd 10-day period (21-31/07/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	63.2	61.6	59.5
Precipitation - Reference Evapotranspiration	-63.2	-61.6	-56.6
Number of Rainy Days	0.0	0.0	0.3
Number of Dry Days	51.0	63.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

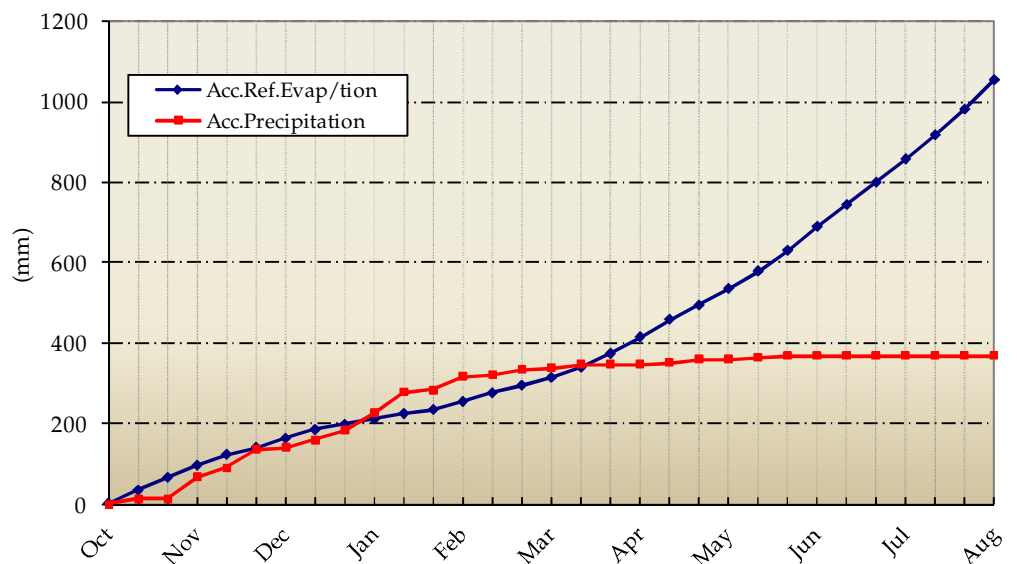


Iraklio

3rd 10-day period (21-31/07/2013)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	30.0	27.4	28.2	29.2	31.2	30.4	30.2	28.8	28.2	30.2	30.8	29.5	-	28.6
	Min	20.4	25.4	23.6	22.4	21.6	25.2	26.0	25.0	24.8	21.0	22.4	23.4	-	22.4
Relative Humidity	Max	72	70	72	62	78	60	66	70	67	70	80	70	-	-
	Min	44	57	47	46	40	45	50	49	49	49	46	47	-	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		12.8	13.9	12.5	12.8	12.7	12.5	12.5	12.2	12.4	12.6	12.2	12.6	-	11.6
Precipitation														-	0.4
Evaporation		7.3	7.5	7.9	7.4	10.1	8.6	8.6	7.2	6.8	5.4	8.8	85.6	-	102.1
Growing Degrees	5	20.2	21.4	20.9	20.8	21.4	22.8	23.1	21.9	21.5	20.6	21.6	236.2	-	225.3
	10	15.2	16.4	15.9	15.8	16.4	17.8	18.1	16.9	16.5	15.6	16.6	181.2	-	170.3

3rd 10-day period (21-31/07/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	73.5	-	-
Precipitation - Reference Evapotranspiration	-73.5	-	0.4
Number of Rainy Days	0.0	-	0.1
Number of Dry Days	74.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

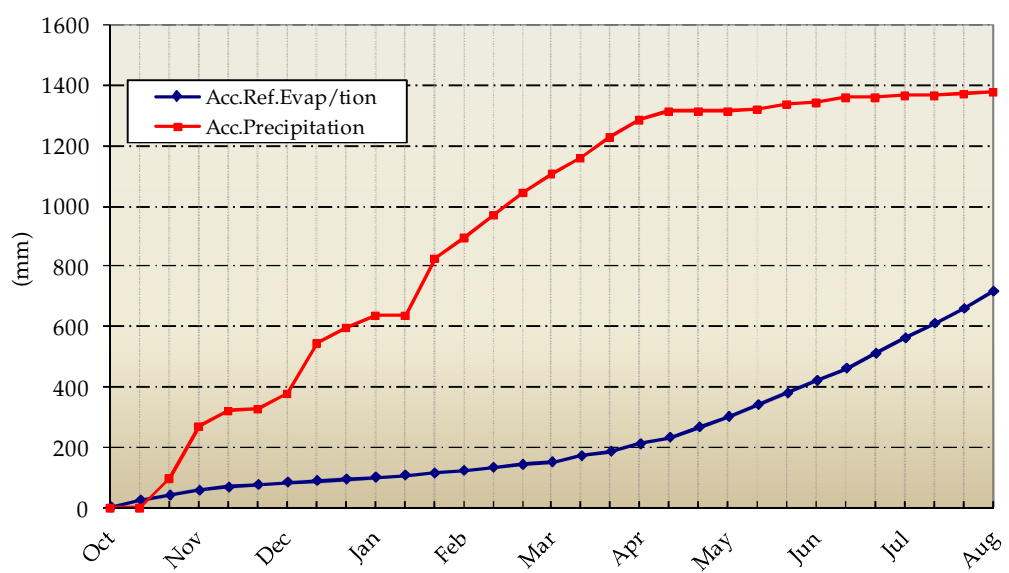


Ioannina

3rd 10-day period (21-31/07/2013)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	32.1	30.2	31.8	31.8	34.7	34.8	36.0	34.6	37.2	36.8	35.7	34.2	35.2	31.1
	Min	12.9	14.4	14.6	13.5	14.1	15.0	16.0	17.5	16.9	17.5	18.0	15.5	19.9	15.7
Relative Humidity	Max	97	85	92	75	86	55	82	62	88	88	88	82	71	-
	Min	19	27	25	24	18	22	19	26	20	17	24	22	26	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	23.6
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	27.8
Sunshine Duration		7.9	8.0	8.7	12.1	12.2	12.1	11.9	10.9	12.0	12.1	7.9	10.5	11.1	10.1
Precipitation		0.4	0.7	0.2								3.6	4.9	11.5	10.3
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	-	85.3
Growing Degrees	5	17.5	17.3	18.2	17.7	19.4	19.9	21.0	21.1	22.1	22.2	21.9	218.1	247.9	197.9
	10	12.5	12.3	13.2	12.7	14.4	14.9	16.0	16.1	17.1	17.2	16.9	163.1	192.9	144.4

3rd 10-day period (21-31/07/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	57.5	66.0	55.8
Precipitation - Reference Evapotranspiration	-52.6	-54.5	-45.5
Number of Rainy Days	4.0	1.0	1.5
Number of Dry Days	0.0	55.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

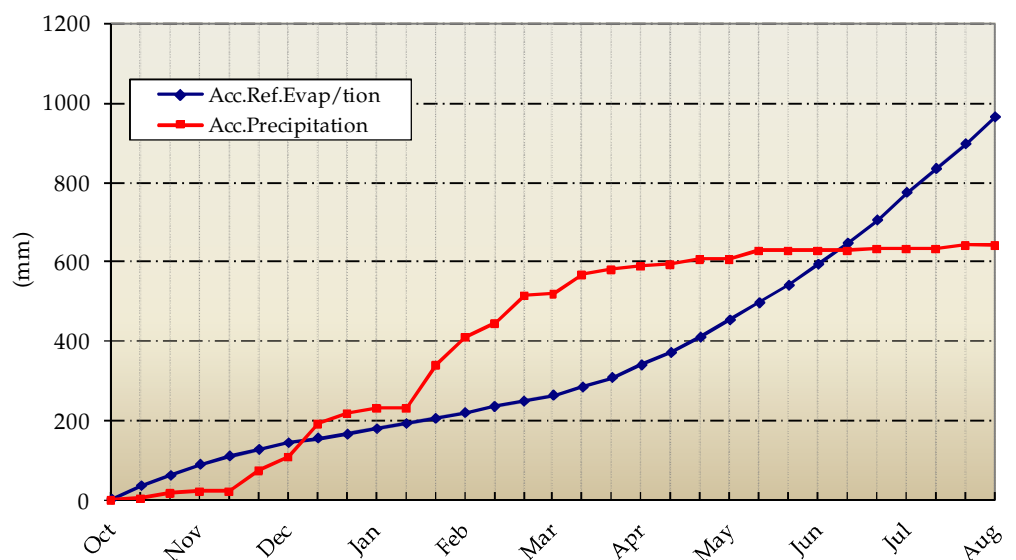


Kalamata

3rd 10-day period (21-31/07/2013)		21	22	23	24	25	26	27	28	29	30	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	32.4	31.2	31.1	33.6	33.6	34.2	33.9	33.0	36.9	34.7	34.8	33.6	34.2	31.5
	Min	19.6	18.3	18.2	19.4	18.8	21.0	20.4	18.9	20.3	17.8	21.4	19.5	21.1	18.2
Relative Humidity	Max	82	91	86	87	87	73	80	83	88	89	87	85	84	-
	Min	24	33	34	23	28	23	28	28	16	27	32	27	33	-
Soil Temperature at 10 cm	06 UTC	24.4	25.2	25.2	25.4	25.6	26.0	26.0	25.6	26.2	26.0	26.8	25.7	27.8	26.0
	12 UTC	28.0	28.2	28.2	28.4	28.6	29.0	29.0	28.8	29.2	29.2	29.6	28.7	29.9	30.3
Sunshine Duration		12.0	8.0	10.6	12.3	11.8	11.3	9.6	10.5	12.4	11.9	12.1	11.1	11.9	11.2
Precipitation			0.0										0.0		0.9
Evaporation		8.6	7.2	8.6	7.8	9.2	8.8	9.2	8.6	11.4	9.6	8.0	97.0	88.6	90.1
Growing Degrees	5	21.0	19.8	19.7	21.5	21.2	22.6	22.2	21.0	23.6	21.3	23.1	236.8	249.3	218.3
	10	16.0	14.8	14.7	16.5	16.2	17.6	17.2	16.0	18.6	16.3	18.1	181.8	194.3	163.3

3rd 10-day period (21-31/07/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	68.2	73.8	62.2
Precipitation - Reference Evapotranspiration	-68.2	-73.8	-61.3
Number of Rainy Days	0.0	0.0	0.4
Number of Dry Days	14.0	68.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

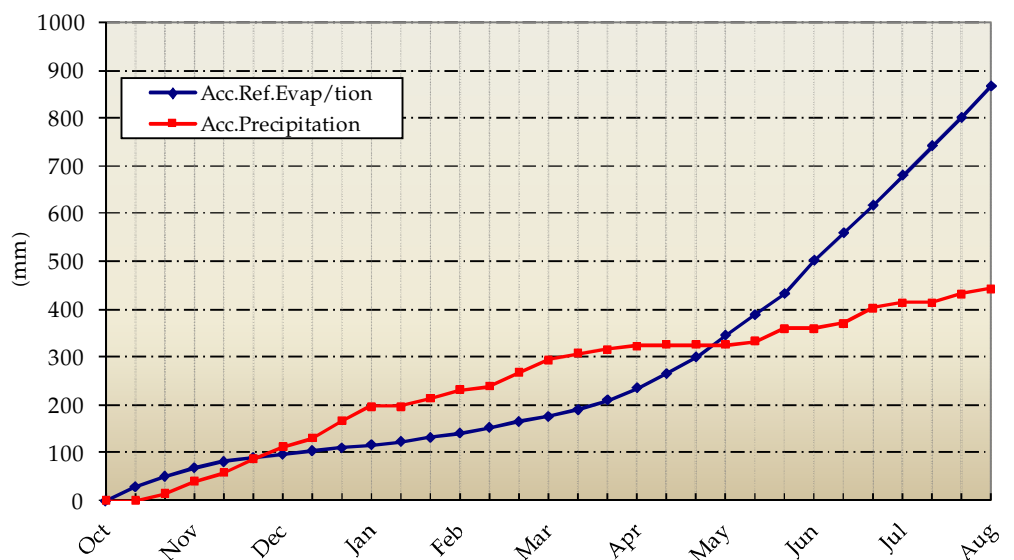


Larisa

3rd 10-day period (21-31/07/2013)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	33.7	28.1	31.4	35.4	36.7	36.8	35.0	35.0	36.4	38.2	34.8	34.7	36.9	33.2
	Min	16.6	18.2	17.5	16.4	16.6	18.8	19.8	19.0	19.1	19.8	21.6	18.5	21.9	18.1
Relative Humidity	Max	85	100	93	82	80	71	70	79	75	73	70	80	67	-
	Min	24	41	32	19	18	19	25	27	23	22	28	25	22	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	29.8	26.9
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	31.8	29.2
Sunshine Duration		7.6	8.9	12.0	12.4	12.3	11.7	12.0	12.0	11.8	9.1	11.8	11.1	11.8	10.7
Precipitation			10.9										10.9		4.4
Evaporation		8.8	4.8	10.3	9.6	10.4	9.7	10.3	14.7	12.0	9.5	12.2	112.3	122.6	104.1
Growing Degrees	5	20.2	18.2	19.5	20.9	21.7	22.8	22.4	22.0	22.8	24.0	23.2	237.5	268.4	227.1
	10	15.2	13.2	14.5	15.9	16.7	17.8	17.4	17.0	17.8	19.0	18.2	182.5	213.4	172.1

3rd 10-day period (21-31/07/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	66.1	76.1	66.2
Precipitation - Reference Evapotranspiration	-55.2	-76.1	-61.8
Number of Rainy Days	1.0	0.0	1.1
Number of Dry Days	4.0	36.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

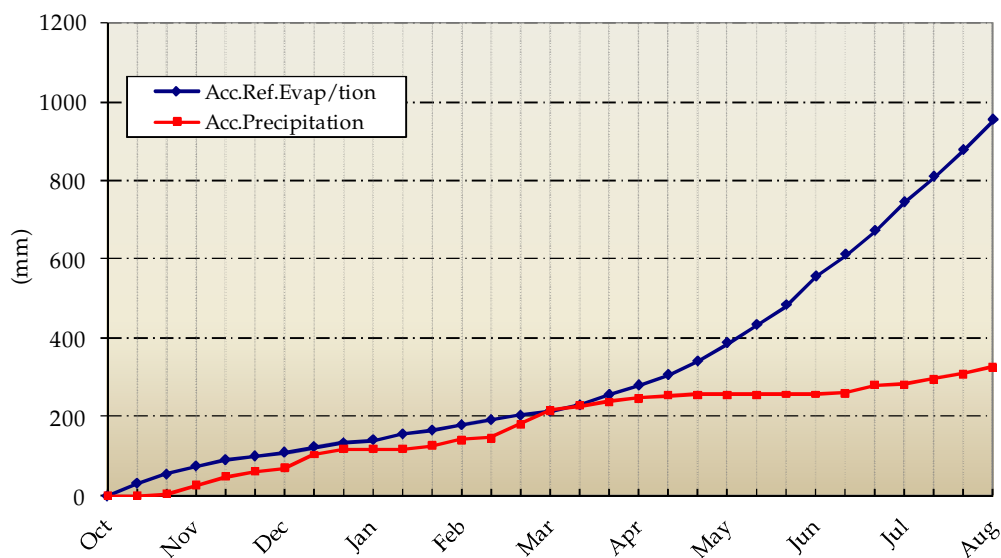


Mikra

3rd 10-day period (21-31/07/2013)		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	29.4	30.8	34.0	35.6	35.5	33.0	32.8	34.3	36.8	33.0	33.4	34.9	31.8
	Min	20.2	19.0	19.6	19.0	18.0	20.2	20.5	20.2	21.0	20.0	26.9	20.4	23.8	19.4
Relative Humidity	Max	67	92	85	74	70	67	70	67	70	67	57	71	67	-
	Min	25	44	33	20	18	27	28	29	26	22	30	27	30	-
Soil Temperature at 10 cm	06 UTC	28.4	27.0	25.6	26.0	26.8	28.4	28.6	29.0	29.0	29.4	30.8	28.1	31.8	26.8
	12 UTC	33.0	30.0	31.4	32.4	33.4	33.2	33.4	34.2	33.8	35.2	34.6	33.1	35.3	31.6
Sunshine Duration		5.5	6.8	11.9	12.5	13.0	11.8	12.1	12.8	12.7	11.4	12.1	11.1	12.0	10.5
Precipitation			16.4										16.4	0.0	9.4
Evaporation		1.4	5.2	8.0	7.5	10.7	16.8	2.8	14.0	7.4	8.8	15.4	98.0	140.7	101.0
Growing Degrees	5	21.3	19.2	20.2	21.5	21.8	22.9	21.8	21.5	22.7	23.4	25.0	241.1	268.2	226.2
	10	16.3	14.2	15.2	16.5	16.8	17.9	16.8	16.5	17.7	18.4	20.0	186.1	213.2	171.2

3rd 10-day period (21-31/07/2013)	Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	76.8	80.0
Precipitation - Reference Evapotranspiration	-60.4	-80.0
Number of Rainy Days	1.0	0.0
Number of Dry Days	4.0	36.0

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

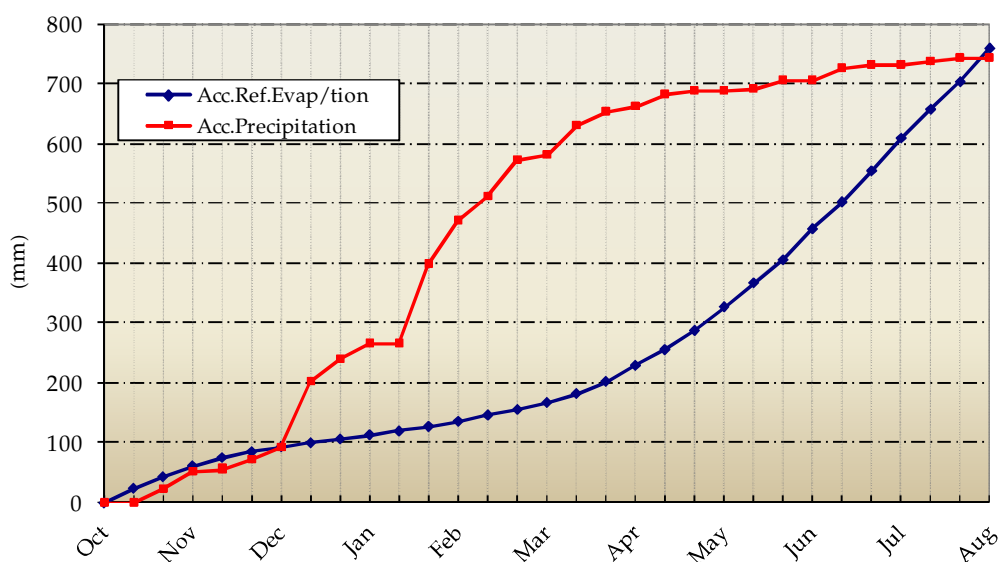


Tripoli

3rd 10-day period (21-31/07/2013)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	32.2	28.8	30.6	32.7	33.9	35.0	32.2	33.2	33.6	36.8	33.2	32.9	34.9	30.5
	Min	12.7	15.3	12.1	10.9	13.2	13.5	14.8	14.1	16.7	13.9	17.2	14.0	16.2	14.6
Relative Humidity	Max	68	89	90	45	58	62	57	67	47	66	61	65	73	-
	Min	18	35	23	28	13	14	23	22	16	15	22	21	20	-
Soil Temperature at 10 cm	06 UTC	24.0	24.8	23.4	23.4	25.2	25.6	26.0	25.4	26.4	26.4	27.4	25.3	28.3	25.8
	12 UTC	31.2	30.0	30.4	-	32.0	32.4	32.0	32.0	32.2	33.4	33.8	31.9	34.8	28.5
Sunshine Duration		7.9	7.8	11.5	12.0	9.5	9.6	8.2	12.0	12.5	12.0	8.8	10.2	11.3	10.6
Precipitation		0.5	0.0									0.0	0.5	12.0	4.2
Evaporation		5.4	4.4	7.6	9.4	7.2	5.8	8.2	7.4	9.4	7.5	6.0	78.3	-	71.9
Growing Degrees	5	17.5	17.1	16.4	16.8	18.6	19.3	18.5	18.7	20.2	20.4	20.2	203.3	225.9	192.7
	10	12.5	12.1	11.4	11.8	13.6	14.3	13.5	13.7	15.2	15.4	15.2	148.3	170.9	137.7

3rd 10-day period (21-31/07/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	56.1	60.3	58.9
Precipitation - Reference Evapotranspiration	-55.6	-48.3	-54.7
Number of Rainy Days	1.0	1.0	1.2
Number of Dry Days	5.0	20.0	-

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.

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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HELLENIC NATIONAL METEOROLOGICAL SERVICE

Division of Climatology-Applications

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