



AGROMETEOROLOGICAL BULLETIN

November 2013
2nd 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

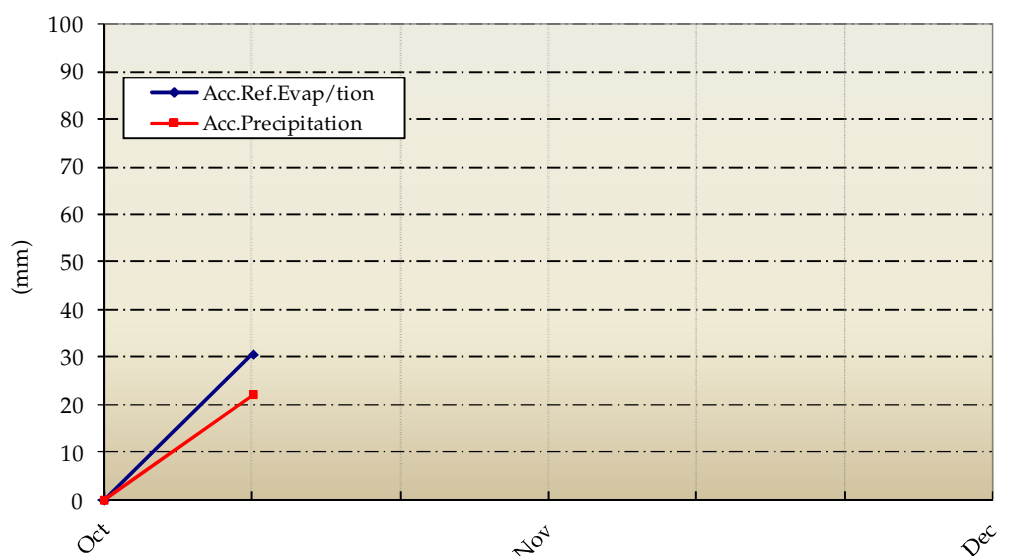
Agrinio

2nd 10-day period (11-20/11/2013)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	-	26.0	21.4	19.0	20.0	-	-	-	-	-	21.6	20.5	18.6
	Min	-	8.0	9.0	10.4	10.2	-	-	-	-	-	9.4	8.1	7.7
Relative Humidity	Max	91	92	90	89	87	-	-	-	-	-	90	91	-
	Min	46	79	84	66	60	-	-	-	-	-	67	52	-
Soil Temperature at 10 cm	06 UTC	-	16.2	16.0	14.6	12.0	-	-	-	-	-	14.7	13.3	12.0
	12 UTC	-	16.0	17.0	17.0	16.0	-	-	-	-	-	16.5	14.7	14.1
Sunshine Duration		9.6	0.0	0.0	4.9	-	-	-	-	-	-	3.6	5.8	4.4
Precipitation			12.0	7.0	9.0							28.0	8.1	53.7
Evaporation		18.0	0.0	17.0	1.7	-	-	-	-	-	-	-	23.3	17.2
Growing Degrees	5	-	12.0	10.2	9.7	10.1	-	-	-	-	-	-	92.7	81.2
	10	-	7.0	5.2	4.7	5.1	-	-	-	-	-	-	42.7	33.0

2nd 10-day period (11-20/11/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	14.4	11.3
Precipitation - Reference Evapotranspiration	-	-6.3	42.4
Number of Rainy Days	3.0	2.0	4.4
Number of Dry Days	5.0	10.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

This station is not fully operated

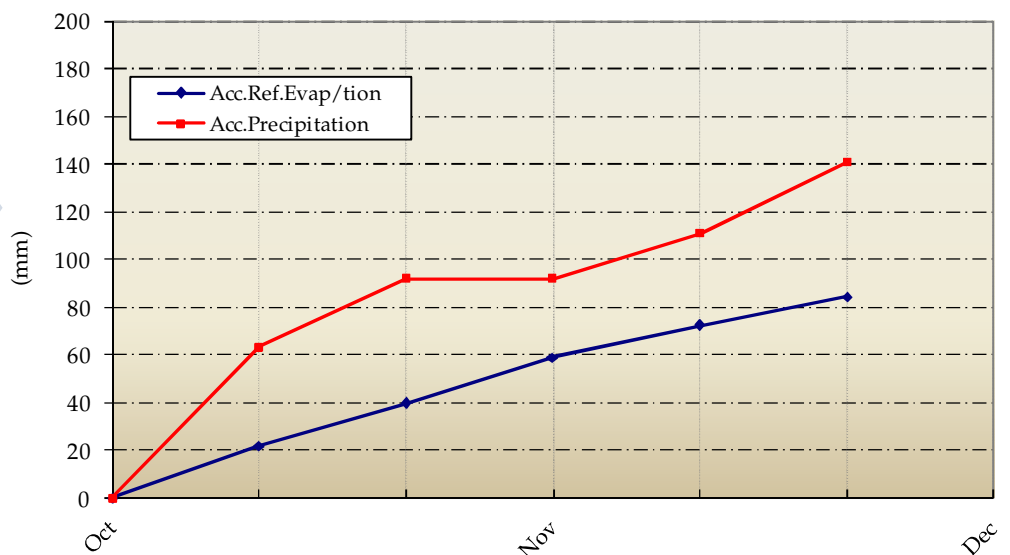


Alexandroupoli

2nd 10-day period (11-20/11/2013)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	19.4	22.2	16.8	15.6	12.2	14.2	15.0	15.6	14.4	17.6	16.3	16.9	14.4
	Min	12.8	12.8	12.6	11.4	10.6	8.0	2.6	2.5	7.4	5.6	8.6	8.6	6.2
Relative Humidity	Max	93	93	93	83	93	83	93	92	92	98	91	85	-
	Min	69	40	75	63	74	42	39	39	61	76	58	52	-
Soil Temperature at 10 cm	06 UTC	14.2	14.6	15.2	14.0	13.0	11.8	9.6	9.6	10.6	10.8	12.3	13.0	9.7
	12 UTC	15.4	16.8	15.2	15.2	13.2	13.2	12.4	12.4	12.0	12.4	13.8	14.3	11.5
Sunshine Duration		0.5	7.8	0.0	1.3	0.0	6.1	8.3	8.7	3.0	0.3	3.6	6.2	3.9
Precipitation					0.0	2.5					27.6	30.1		29.1
Evaporation		0.4	4.6	2.3	4.7	1.5	1.9	2.2	1.2	2.1	2.2	23.1	25.4	18.6
Growing Degrees	5	11.1	12.5	9.7	8.5	6.4	6.1	3.8	4.1	5.9	6.6	74.7	77.4	54.2
	10	6.1	7.5	4.7	3.5	1.4	1.1	0.0	0.0	0.9	1.6	26.8	27.4	17.6

2nd 10-day period (11-20/11/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	12.0	15.0	11.3
Precipitation - Reference Evapotranspiration	18.1	-15.0	17.8
Number of Rainy Days	2.0	0.0	2.9
Number of Dry Days	7.0	18.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

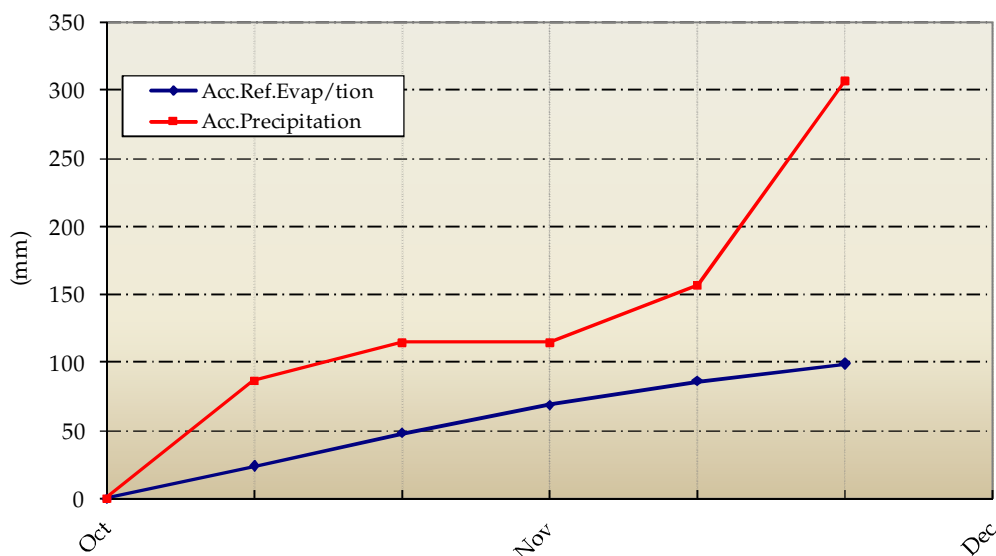


Andravida

2nd 10-day period (11-20/11/2013)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	20.7	19.1	17.0	18.4	21.2	17.4	19.8	19.5	20.4	21.4	19.5	20.8	18.6
	Min	16.2	14.8	12.9	10.6	9.2	12.8	11.3	7.3	12.0	13.9	12.1	8.4	9.7
Relative Humidity	Max	92	92	93	92	91	90	90	92	91	93	92	90	-
	Min	75	69	73	60	48	69	50	48	45	58	60	48	-
Soil Temperature at 10 cm	06 UTC	18.0	17.8	16.2	14.4	14.8	15.4	15.2	13.4	15.4	15.6	15.6	14.4	13.2
	12 UTC	19.0	19.0	15.8	16.0	16.4	16.2	17.6	16.6	17.2	17.4	17.1	17.0	15.2
Sunshine Duration		0.8	0.0	0.0	1.8	7.8	0.0	8.6	5.4	6.3	5.2	3.6	4.8	4.9
Precipitation		17.8	36.1	34.2	26.3						35.8	150.2	20.3	50.9
Evaporation		29.9	0.6	50.2	1.0	4.2	5.2	3.0	1.0	20.9	6.6	122.6	9.0	21.4
Growing Degrees	5	13.5	12.0	10.0	9.5	10.2	10.1	10.6	8.4	11.2	12.7	108.0	95.9	91.7
	10	8.5	7.0	5.0	4.5	5.2	5.1	5.6	3.4	6.2	7.7	58.0	45.9	42.4

2nd 10-day period (11-20/11/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	12.5	12.1	11.8
Precipitation - Reference Evapotranspiration	137.7	8.2	39.1
Number of Rainy Days	5.0	2.0	4.2
Number of Dry Days	4.0	10.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

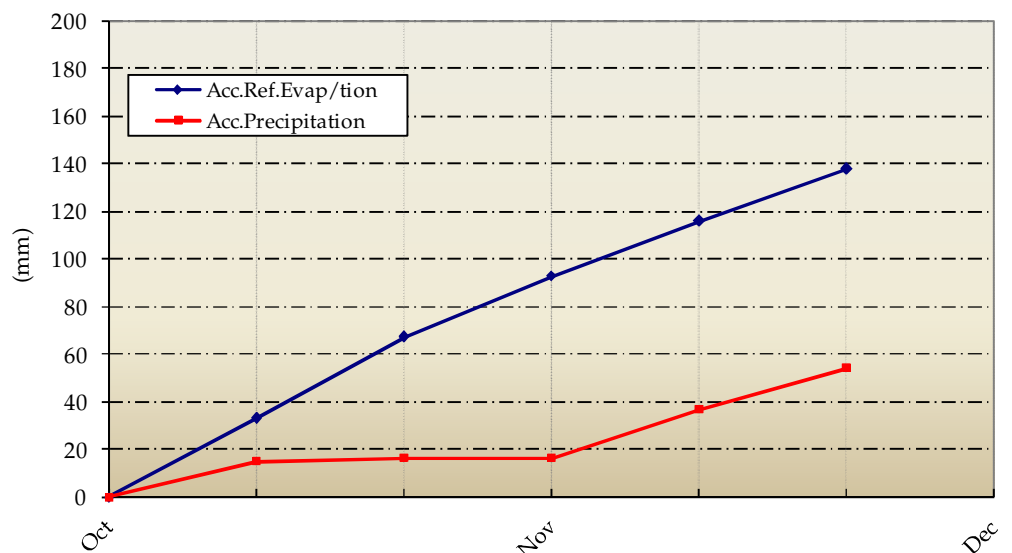


Iraklio

2nd 10-day period (11-20/11/2013)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	25.0	25.4	25.4	23.0	20.0	20.2	17.4	18.4	19.8	23.4	21.8	20.4	19.7
	Min	15.0	17.5	17.0	18.8	15.4	16.4	16.6	16.2	12.0	16.2	16.1	15.8	13.2
Relative Humidity	Max	83	86	80	90	87	83	78	83	92	80	84	84	-
	Min	50	49	45	54	67	65	61	57	71	58	58	66	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		7.8	8.2	8.3	1.8	4.2	5.5	0.0	6.1	6.9	5.3	5.4	4.0	4.9
Precipitation					16.6	0.4		0.4				17.4	45.1	22.2
Evaporation		2.8	4.5	4.9	0.3	1.5	1.9	3.4	3.1	0.0	3.6	26.0	-	33.6
Growing Degrees	5	15.0	16.5	16.2	15.9	12.7	13.3	12.0	12.3	10.9	14.8	139.6	131.4	114.3
	10	10.0	11.5	11.2	10.9	7.7	8.3	7.0	7.3	5.9	9.8	89.6	81.4	64.3

2nd 10-day period (11-20/11/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	21.8	18.2	-
Precipitation - Reference Evapotranspiration	-4.4	26.9	22.2
Number of Rainy Days	3.0	3.0	2.7
Number of Dry Days	6.0	7.0	-

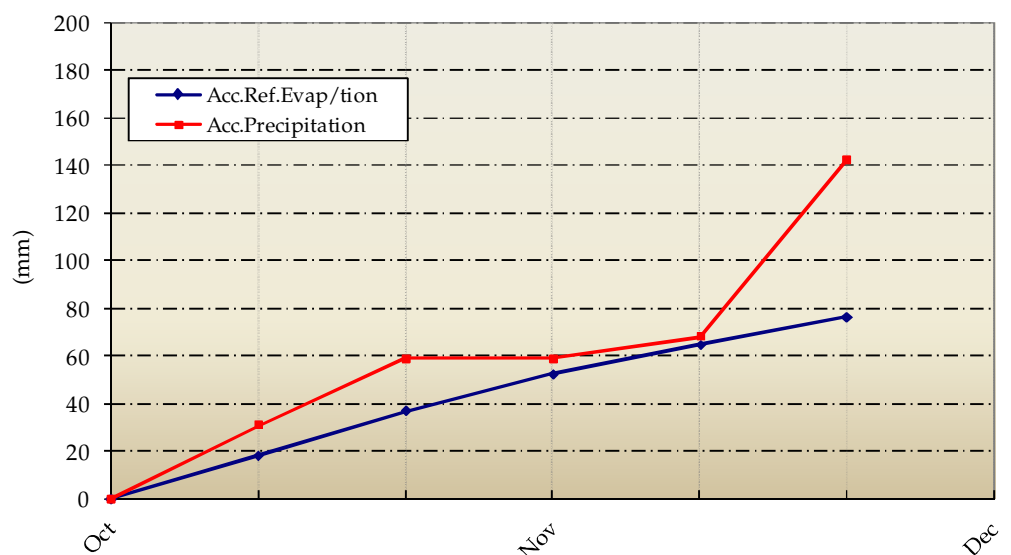
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



2nd 10-day period (11-20/11/2013)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	17.6	16.0	16.6	14.9	17.3	14.4	17.1	15.4	17.0	15.2	16.2	16.7	13.9
	Min	11.1	11.6	11.1	12.0	6.3	7.2	2.5	-0.4	7.0	9.4	7.8	4.3	4.6
Relative Humidity	Max	98	98	96	62	82	78	80	97	97	97	88	95	-
	Min	71	67	48	45	37	53	34	32	57	67	51	51	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	8.9
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	10.1
Sunshine Duration		1.3	0.0	0.0	0.0	7.3	1.2	5.6	5.2	0.6	0.3	2.2	3.7	3.0
Precipitation		44.6	3.8	0.0	0.0					5.8	20.2	74.4	3.4	63.6
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	13.4
Growing Degrees	5	9.4	8.8	8.9	8.5	6.8	5.8	4.8	2.5	7.0	7.3	69.7	55.3	44.8
	10	4.4	3.8	3.9	3.5	1.8	0.8	0.0	0.0	2.0	2.3	22.4	8.9	8.8

2nd 10-day period (11-20/11/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	11.5	8.8	7.9
Precipitation - Reference Evapotranspiration	62.9	-5.4	55.7
Number of Rainy Days	4.0	2.0	4.4
Number of Dry Days	0.0	11.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

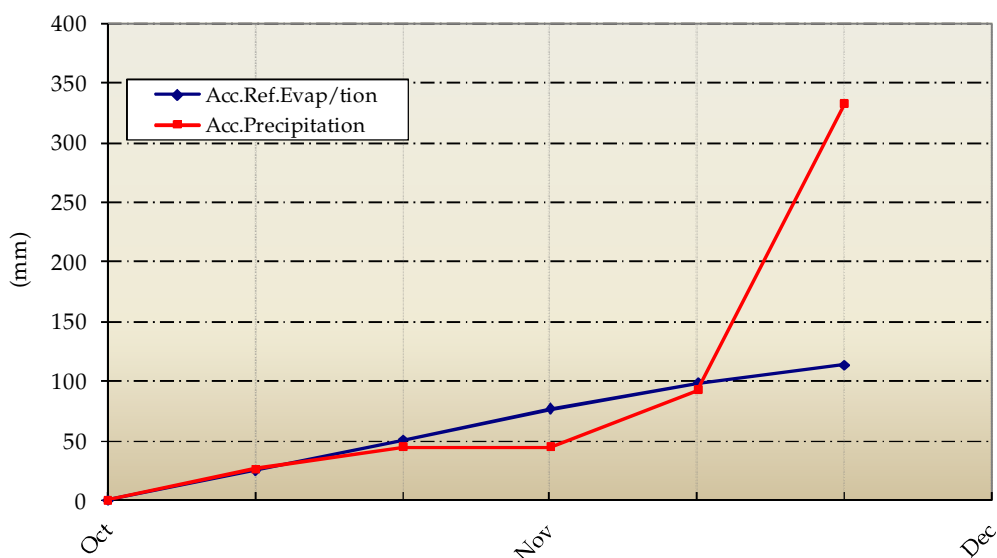


Kalamata

2nd 10-day period (11-20/11/2013)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	19.8	21.5	15.9	15.7	21.8	19.9	21.5	20.8	20.2	22.2	19.9	21.4	19.5
	Min	14.5	15.3	13.1	11.5	8.7	12.8	13.5	9.3	10.2	15.9	12.5	10.6	9.3
Relative Humidity	Max	95	95	94	94	92	74	90	86	82	88	89	85	-
	Min	89	70	87	79	43	54	45	37	48	52	60	46	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	15.9	14.0
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	16.8	15.4
Sunshine Duration		0.0	0.0	0.0	0.1	7.1	1.6	6.5	7.0	6.9	6.8	3.6	4.8	4.6
Precipitation		132.8	43.0	24.3	22.2						18.4	240.7	51.8	55.3
Evaporation		-	-	-	-	-	-	-	-	-	-	-	28.8	22.8
Growing Degrees	5	12.2	13.4	9.5	8.6	10.3	11.4	12.5	10.1	10.2	14.1	112.1	110.3	93.9
	10	7.2	8.4	4.5	3.6	5.3	6.4	7.5	5.1	5.2	9.1	62.1	60.3	44.2

2nd 10-day period (11-20/11/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	15.1	16.6	13.4
Precipitation - Reference Evapotranspiration	225.6	35.2	41.9
Number of Rainy Days	5.0	2.0	3.8
Number of Dry Days	4.0	11.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

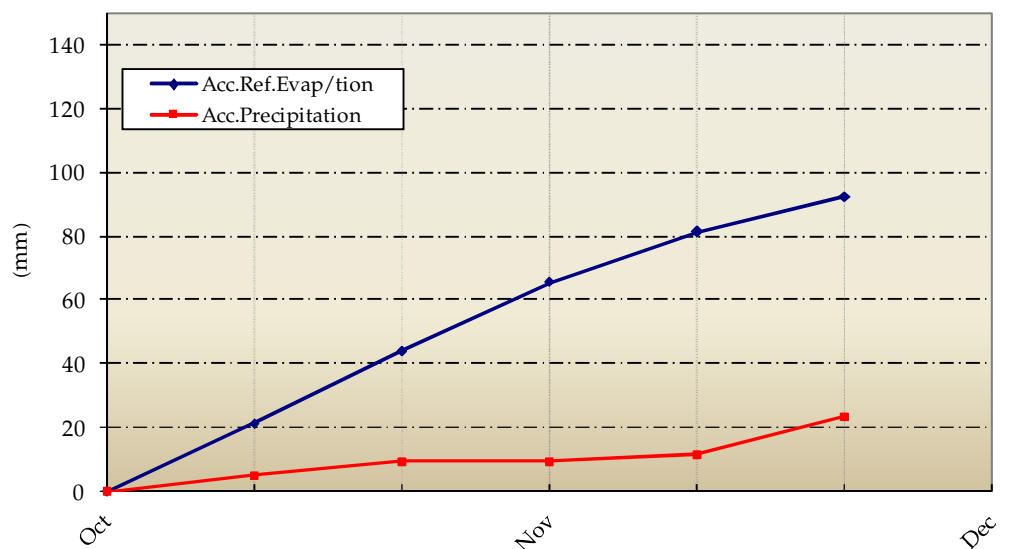


Larisa

2nd 10-day period (11-20/11/2013)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	16.4	20.0	18.0	16.0	16.3	15.4	15.8	14.4	13.6	18.0	16.4	15.5	15.3
	Min	9.4	13.9	15.8	12.0	10.8	8.6	2.4	1.8	6.6	8.1	8.9	8.2	5.5
Relative Humidity	Max	99	98	89	95	92	93	98	100	98	100	96	96	-
	Min	89	64	62	61	55	52	49	59	72	64	63	66	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	13.3	10.9
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	13.8	11.6
Sunshine Duration		0.0	0.7	0.9	0.0	1.8	0.3	3.5	3.1	0.3	1.9	1.2	2.0	3.5
Precipitation		3.4	0.9		4.2	0.1				0.5	2.8	11.9	28.3	21.2
Evaporation		0.0	0.9	2.4	0.0	0.5	1.6	2.1	1.3	0.1	0.4	9.3	18.9	13.7
Growing Degrees	5	7.9	12.0	11.9	9.0	8.6	7.0	4.1	3.1	5.1	8.1	76.7	68.5	54.7
	10	2.9	7.0	6.9	4.0	3.6	2.0	0.0	0.0	0.1	3.1	29.5	20.6	14.5

2nd 10-day period (11-20/11/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	11.1	8.0	8.8
Precipitation - Reference Evapotranspiration	0.8	20.3	12.4
Number of Rainy Days	6.0	1.0	3.4
Number of Dry Days	4.0	11.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

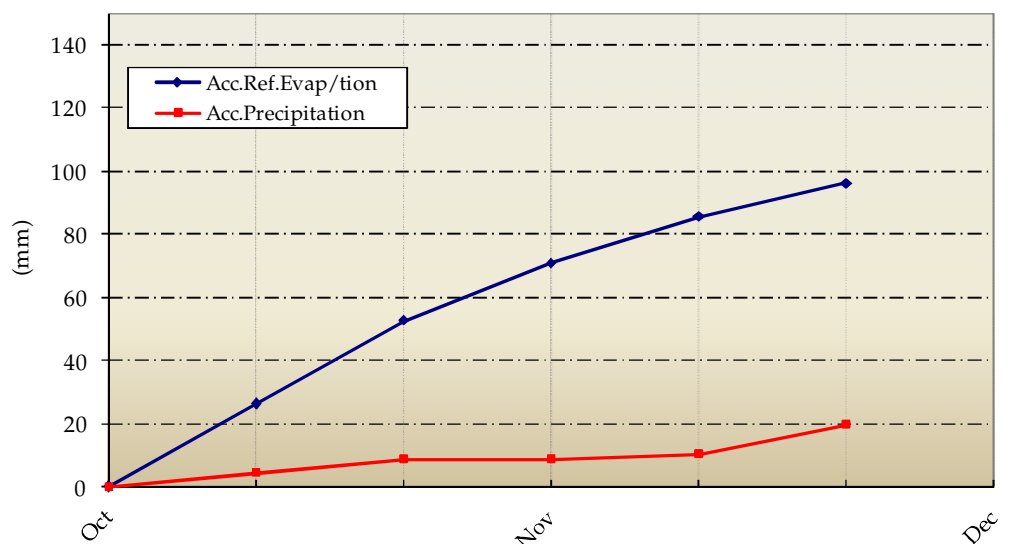


Mikra

2nd 10-day period (11-20/11/2013)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	20.0	23.2	20.2	16.8	14.6	16.3	16.0	16.5	14.2	16.5	17.4	16.6	14.7
	Min	14.0	16.0	15.7	13.9	11.5	12.2	9.6	4.2	8.3	11.1	11.6	9.2	6.8
Relative Humidity	Max	92	80	70	84	77	78	83	88	77	92	82	88	-
	Min	63	40	54	40	58	50	50	46	63	62	53	57	-
Soil Temperature at 10 cm	06 UTC	17.4	17.2	16.8	16.0	14.6	14.0	13.6	10.8	12.0	13.4	14.6	13.3	10.3
	12 UTC	18.2	19.2	18.0	17.8	16.6	15.8	15.2	15.2	13.2	15.2	16.4	14.7	12.2
Sunshine Duration		0.1	4.1	0.0	0.2	0.0	3.8	3.6	7.6	0.0	1.2	2.1	3.2	3.5
Precipitation		4.9	0.1		0.0	4.4						9.4	12.0	21.1
Evaporation		0.2	4.0	4.4	2.1	0.3	1.0	1.6	0.8	0.8	1.1	16.3	-	18.7
Growing Degrees	5	12.0	14.6	13.0	10.4	8.1	9.3	7.8	5.4	6.3	8.8	95.4	79.0	57.6
	10	7.0	9.6	8.0	5.4	3.1	4.3	2.8	0.4	1.3	3.8	45.4	29.0	17.1

2nd 10-day period (11-20/11/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	10.7	9.6	11.2
Precipitation - Reference Evapotranspiration	-1.3	2.4	9.9
Number of Rainy Days	3.0	1.0	3.0
Number of Dry Days	3.0	11.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

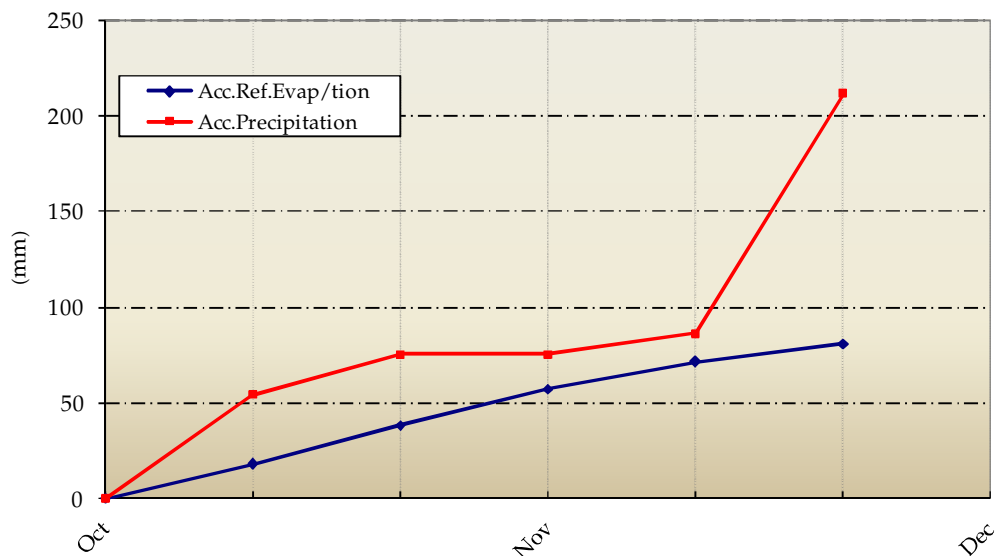


Tripoli

2nd 10-day period (11-20/11/2013)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	14.8	17.0	13.8	13.7	16.2	13.2	13.8	14.1	14.3	17.5	14.8	15.5	14.9
	Min	11.6	10.5	10.2	6.9	5.8	9.4	6.2	2.0	5.9	8.5	7.7	3.3	4.4
Relative Humidity	Max	100	100	100	100	98	76	80	100	93	100	95	94	-
	Min	83	70	85	70	57	65	79	51	66	57	68	62	-
Soil Temperature at 10 cm	06 UTC	13.0	12.4	13.4	10.8	10.6	11.0	10.4	9.2	9.8	11.2	11.2	9.1	9.7
	12 UTC	13.4	14.4	13.8	12.4	12.8	12.0	-	12.0	12.8	12.8	12.9	12.4	10.8
Sunshine Duration		0.0	1.1	0.0	0.0	5.0	0.0	6.8	6.4	5.7	4.8	3.0	3.6	4.5
Precipitation		25.6	12.6	40.5	28.4						18.2	125.3	14.9	45.7
Evaporation		0.0	28.4	56.8	0.6	1.2	0.9	1.3	0.3	2.3	1.6	93.4	8.7	15.6
Growing Degrees	5	8.2	8.8	7.0	5.3	6.0	6.3	5.0	3.1	5.1	8.0	62.7	43.9	46.8
	10	3.2	3.8	2.0	0.3	1.0	1.3	0.0	0.0	0.1	3.0	14.7	2.9	10.1

2nd 10-day period (11-20/11/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	9.4	9.4	10.5
Precipitation - Reference Evapotranspiration	115.9	5.5	35.2
Number of Rainy Days	5.0	2.0	4.0
Number of Dry Days	4.0	10.0	-

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

© HELLENIC NATIONAL METEOROLOGICAL SERVICE
 Reproduction is prohibited without written permission
 El. Venizelou street 14, Zip Code 16777
 Helliniko, Athens