



AGROMETEOROLOGICAL BULLETIN

December 2016
1st 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



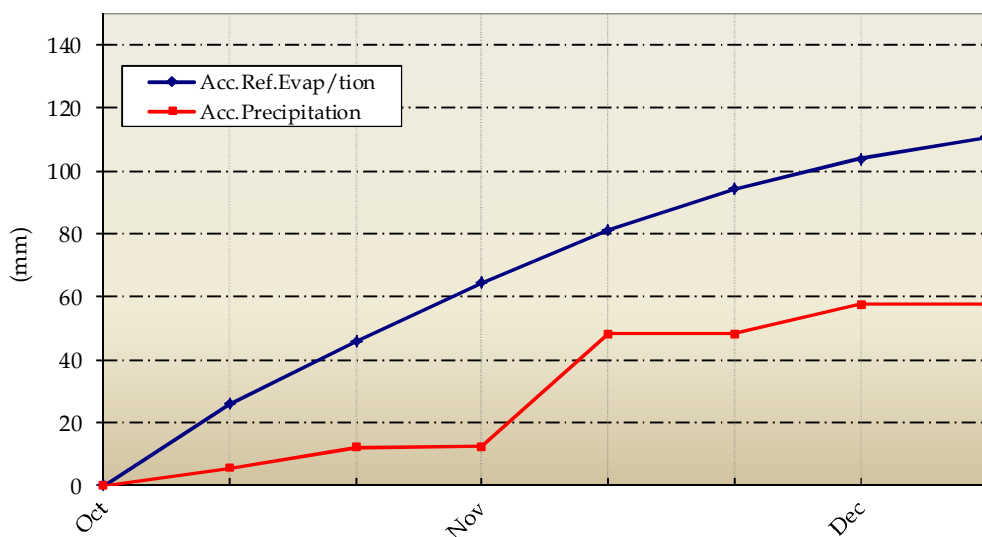
Hellenic National Meteorological Service
Division of Climatology-Applications
El. Venizelou Street 14, 16777
Helliniko, Athens

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

1st 10-day period (1-10/12/2016)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	4.4	11.8	12.0	9.8	9.0	10.4	11.0	7.6	12.6	14.2	10.3	12.9	11.0
	Min	-6.2	-3.2	3.0	-2.4	-2.0	-4.8	-2.0	-1.4	-3.4	1.6	-2.1	4.4	3.3
Relative Humidity	Max	89	92	74	70	69	87	89	73	83	87	81	90	-
	Min	52	60	30	31	34	51	37	33	50	50	43	58	-
Soil Temperature at 10 cm	06 UTC	2.8	2.8	5.5	3.8	3.2	3.0	3.2	3.4	3.0	4.6	3.5	8.0	7.1
	12 UTC	3.6	7.2	8.6	7.0	7.0	6.6	7.0	6.4	7.6	8.8	7.0	10.2	8.4
Sunshine Duration		2.8	4.5	8.2	6.3	8.3	8.1	7.3	8.5	8.2	8.1	7.0	4.3	2.7
Precipitation													0.6	30.2
Evaporation		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.6	15.9	14.9
Growing Degrees	5	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	2.9	5.4	36.4	28.2
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	5.3

1st 10-day period (1-10/12/2016)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.8	7.7	9.7
Precipitation - Reference Evapotranspiration	-6.8	-7.1	20.5
Number of Rainy Days	0.0	2.0	3.2
Number of Dry Days	11.0	4.0	-

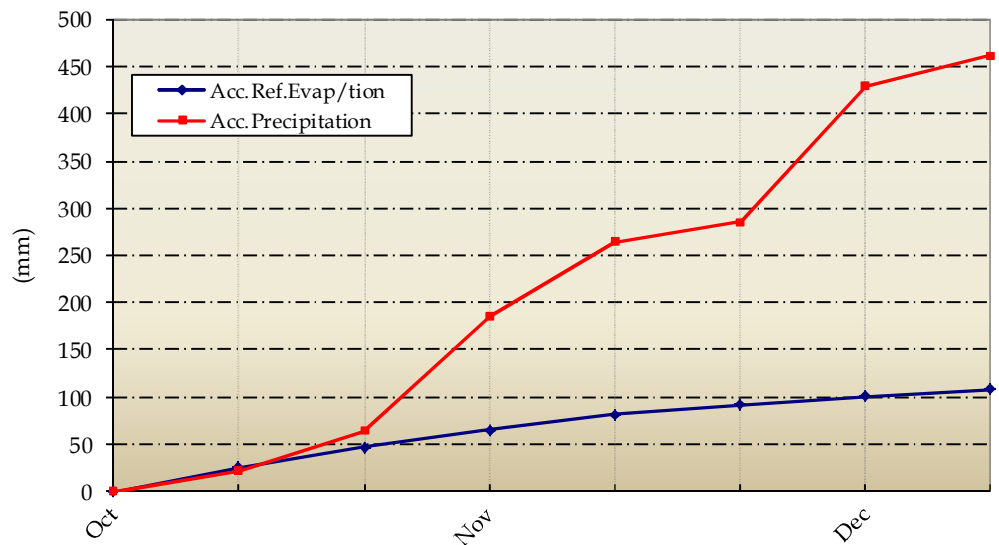
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



1st 10-day period (1-10/12/2016)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	12.3	16.2	19.1	14.4	18.0	13.4	17.6	15.2	15.7	16.0	15.8	17.8	15.9
	Min	1.8	3.0	11.0	10.9	9.6	10.4	8.8	7.0	4.4	5.0	7.2	5.4	7.3
Relative Humidity	Max	82	86	87	90	91	100	93	90	90	91	90	91	-
	Min	44	40	53	80	51	83	65	46	54	62	58	53	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	10.4
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	12.0
Sunshine Duration		5.9	6.8	3.0	0.0	5.6	0.0	1.5	6.8	6.0	6.9	4.2	7.2	4.3
Precipitation					5.0	0.7	25.7					31.4		41.8
Evaporation		2.0	3.0	4.0	3.6	2.2	0.4	0.6	2.0	3.4	1.1	22.3	15.0	19.4
Growing Degrees	5	2.1	4.6	10.1	7.7	8.8	6.9	8.2	6.1	5.1	5.5	64.9	66.2	66.0
	10	0.0	0.0	5.1	2.7	3.8	1.9	3.2	1.1	0.1	0.5	18.3	16.2	20.7

1st 10-day period (1-10/12/2016)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.8	7.4	9.1
Precipitation - Reference Evapotranspiration	23.6	-7.4	32.7
Number of Rainy Days	3.0	0.0	4.6
Number of Dry Days	3.0	12.0	-

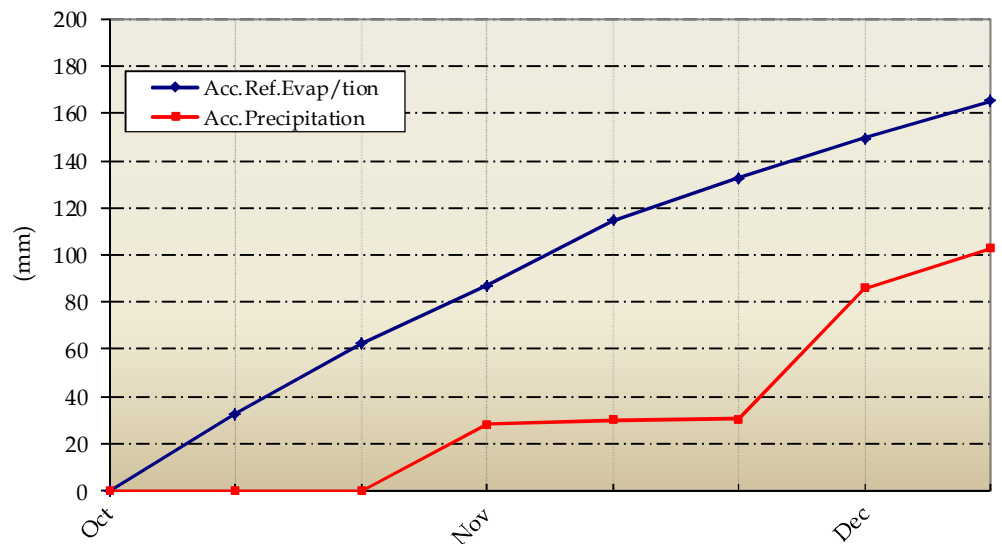
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



1st 10-day period (1-10/12/2016)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	12.0	16.6	21.2	19.8	16.6	16.0	16.8	13.2	14.2	16.0	16.2	17.3	17.3
	Min	9.4	9.8	11.0	11.2	13.0	13.8	9.0	12.4	11.2	6.6	10.7	13.1	11.5
Relative Humidity	Max	84	69	86	86	95	89	86	71	86	89	84	78	-
	Min	52	45	47	57	67	65	64	51	61	61	57	57	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		1.5	6.4	6.4	2.6	1.0	2.7	5.8	2.4	4.4	7.2	4.0	4.8	3.5
Precipitation		8.6				8.3						16.9		24.2
Evaporation		6.1	4.2	2.0	0.8	0.0	0.2	2.5	2.5	2.6	0.1	21.0	20.4	28.3
Growing Degrees	5	5.7	8.2	11.1	10.5	9.8	9.9	7.9	7.8	7.7	6.3	84.9	101.7	94.2
	10	0.7	3.2	6.1	5.5	4.8	4.9	2.9	2.8	2.7	1.3	34.9	51.7	44.6

1st 10-day period (1-10/12/2016)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	15.6	16.7	-
Precipitation - Reference Evapotranspiration	1.3	-16.7	24.2
Number of Rainy Days	2.0	0.0	3.7
Number of Dry Days	0.0	10.0	-

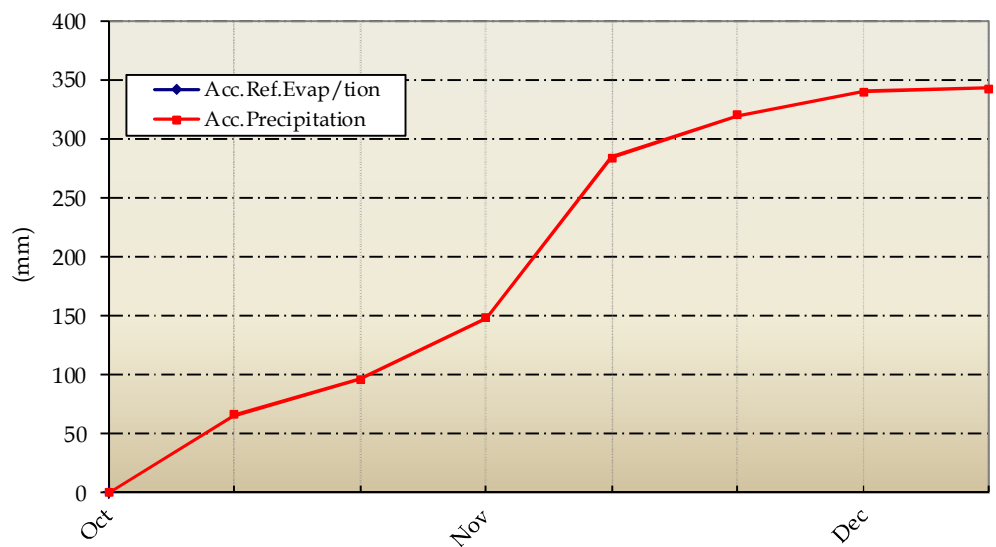
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



1st 10-day period (1-10/12/2016)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	9.7	12.1	14.5	13.2	13.5	-	13.9	11.6	12.0	12.3	12.5	12.1	10.3
	Min	-6.8	-5.2	1.8	6.5	3.5	5.6	6.4	-1.4	-5.2	-4.0	0.1	-1.3	1.9
Relative Humidity	Max	-	100	100	100	100	100	100	100	100	-	100	100	-
	Min	32	54	-	70	61	90	47	-	56	-	59	70	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	5.5
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	6.5
Sunshine Duration		-	4.8	-	0.2	4.7	0.0	2.9	-	3.9	-	2.8	2.7	2.5
Precipitation				0.5	0.7		1.3					2.5	0.0	51.5
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	10.5
Growing Degrees	5	0.0	0.0	3.2	4.9	3.5	-	5.2	0.1	0.0	0.0	-	9.3	17.8
	10	0.0	0.0	0.0	0.0	0.0	-	0.2	0.0	0.0	0.0	-	0.0	0.9

1st 10-day period (1-10/12/2016)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	-	6.1
Precipitation - Reference Evapotranspiration	-	-	45.4
Number of Rainy Days	3.0	0.0	4.2
Number of Dry Days	2.0	11.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

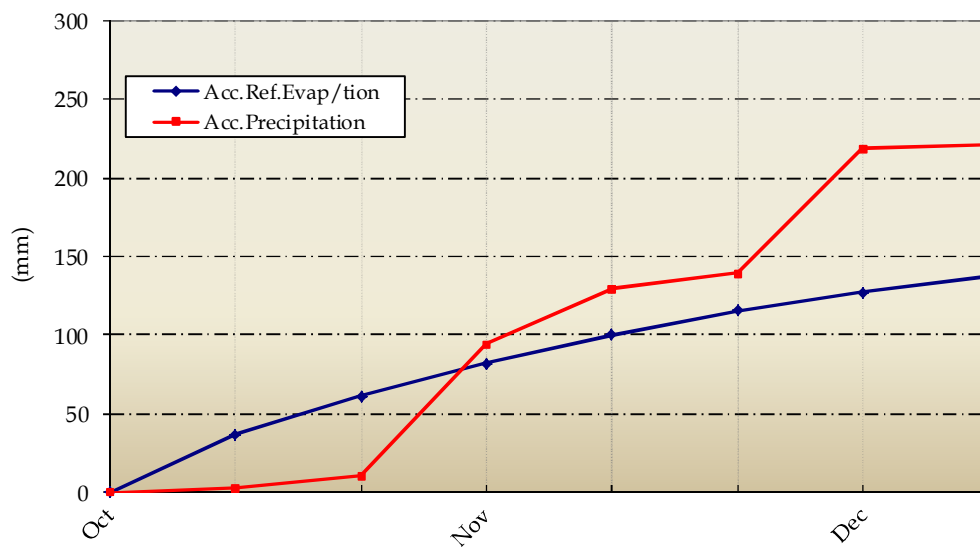


Kalamata

1st 10-day period (1-10/12/2016)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	13.6	17.2	16.6	15.0	18.0	18.4	16.5	16.7	17.2	18.7	16.8	19.7	16.9
	Min	3.3	1.0	7.5	8.7	9.2	7.9	9.8	11.0	2.4	5.6	6.6	5.4	7.2
Relative Humidity	Max	85	91	93	93	92	93	93	92	92	92	92	92	-
	Min	31	47	75	77	51	57	58	40	43	39	52	40	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	12.5	11.5
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	13.7	12.5
Sunshine Duration		8.5	7.9	1.5	0.0	3.2	3.4	1.1	8.4	8.5	8.1	5.1	7.5	4.0
Precipitation				1.0	1.3		0.0	0.2				2.5		45.8
Evaporation		1.9	0.6	0.0	0.8	1.3	0.9	0.8	2.1	2.1	0.5	11.0	13.7	26.7
Growing Degrees	5	3.5	4.1	7.1	6.9	8.6	8.2	8.2	8.9	4.8	7.2	67.2	75.7	70.4
	10	0.0	0.0	2.1	1.9	3.6	3.2	3.2	3.9	0.0	2.2	19.8	25.7	22.7

1st 10-day period (1-10/12/2016)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	10.5	13.2	10.9
Precipitation - Reference Evapotranspiration	-8.0	-13.2	34.9
Number of Rainy Days	3.0	0.0	4.7
Number of Dry Days	2.0	11.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

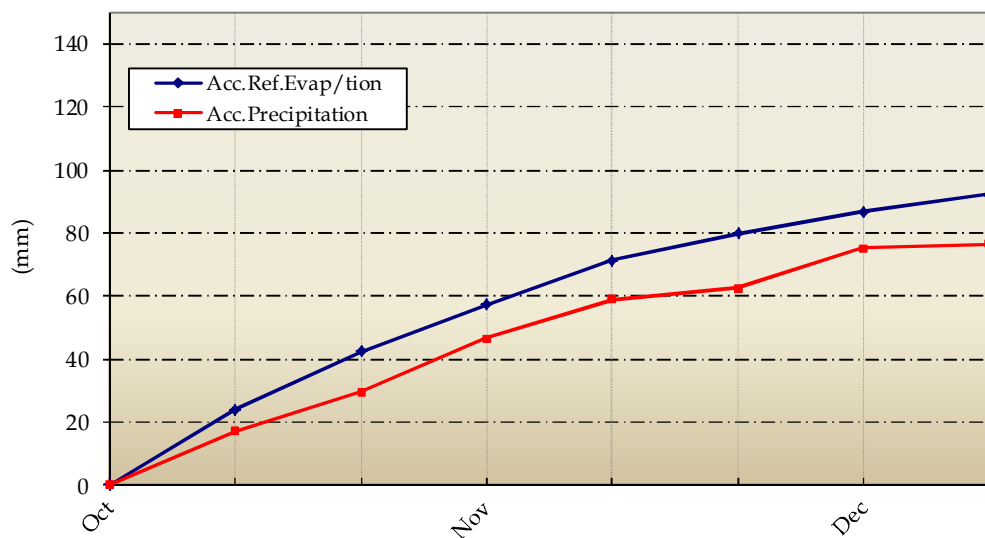


Larisa

1st 10-day period (1-10/12/2016)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	6.2	13.1	12.4	9.0	9.8	11.4	13.2	9.6	11.0	13.9	11.0	13.2	11.5
	Min	-3.8	-3.5	3.5	6.8	6.9	3.8	1.0	4.1	-3.5	-1.8	1.4	1.8	2.7
Relative Humidity	Max	100	100	91	100	100	100	100	100	100	100	99	100	-
	Min	56	49	43	84	76	65	37	62	54	48	57	66	-
Soil Temperature at 10 cm	06 UTC	10.2	9.8	9.8	10.0	10.6	10.2	10.4	10.6	9.8	9.2	10.1	11.0	8.1
	12 UTC	10.2	9.4	10.0	10.6	11.0	10.4	10.6	10.6	9.8	9.2	10.2	11.2	8.8
Sunshine Duration		2.9	5.9	0.7	0.0	0.0	0.9	4.1	1.1	6.5	6.8	2.9	4.5	2.9
Precipitation					1.2	0.0	0.2		0.0			1.4		18.5
Evaporation		0.0	0.0	1.4	0.2	0.7	0.0	2.2	0.0	0.0	0.8	5.3	6.6	7.8
Growing Degrees	5	0.0	0.0	3.0	2.9	3.4	2.6	2.1	1.9	0.0	1.1	16.8	25.5	25.6
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3

1st 10-day period (1-10/12/2016)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	5.5	5.3	6.7
Precipitation - Reference Evapotranspiration	-4.1	-5.3	11.8
Number of Rainy Days	2.0	0.0	3.6
Number of Dry Days	3.0	12.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

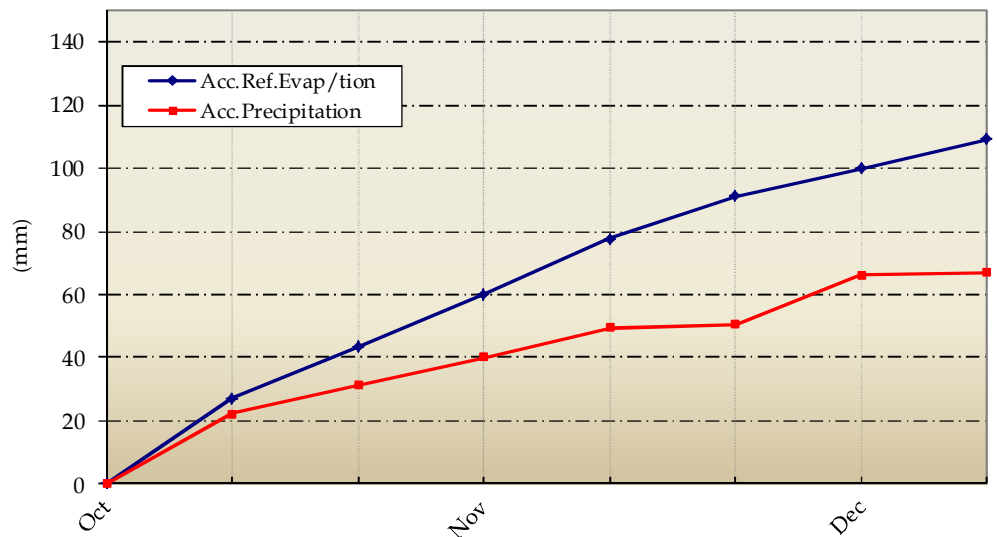


Mikra

1st 10-day period (1-10/12/2016)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	10.8	13.4	13.0	9.2	9.7	10.6	13.2	10.1	12.3	17.4	12.0	14.4	11.5
	Min	0.4	1.0	2.6	7.2	7.4	3.8	0.2	2.6	-1.4	0.4	2.4	5.6	3.4
Relative Humidity	Max	59	83	68	96	95	95	96	94	96	86	87	91	-
	Min	32	40	30	70	52	54	32	51	40	26	43	55	-
Soil Temperature at 10 cm	06 UTC	4.4	5.8	7.0	8.4	9.0	7.0	6.3	7.8	5.6	5.8	6.7	9.5	7.3
	12 UTC	6.0	7.6	8.4	9.0	9.8	9.2	9.2	8.8	7.2	8.0	8.3	10.7	8.9
Sunshine Duration		6.0	6.4	8.2	0.0	0.0	3.4	8.4	5.0	8.0	8.3	5.4	5.4	3.1
Precipitation					0.9	0.0						0.9		19.0
Evaporation		4.4	2.1	4.8	1.2	1.3	2.9	2.1	4.3	0.6	2.6	26.3	14.1	13.0
Growing Degrees	5	0.6	2.2	2.8	3.2	3.6	2.2	1.7	1.4	0.5	3.9	22.0	49.7	28.1
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.2	3.2

1st 10-day period (1-10/12/2016)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	9.4	10.0	8.7
Precipitation - Reference Evapotranspiration	-8.5	-10.0	10.3
Number of Rainy Days	1.0	0.0	3.0
Number of Dry Days	3.0	13.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

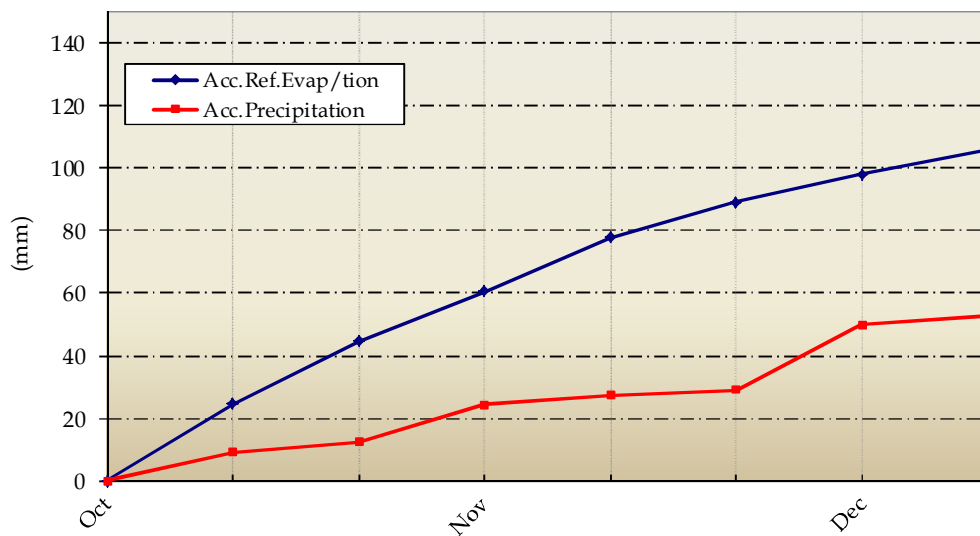


Tanagra

1st 10-day period (1-10/12/2016)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	9.2	15.8	15.4	13.2	12.8	14.0	13.1	9.4	14.4	18.6	13.6	15.7	14.0
	Min	3.2	0.8	3.8	8.7	9.2	3.0	6.6	7.0	-0.6	1.4	4.3	5.1	5.7
Relative Humidity	Max	93	78	99	99	91	97	99	94	97	99	95	96	-
	Min	33	32	47	65	46	48	41	47	47	21	43	52	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		5.3	7.2	1.3	0.0	3.5	9.9	0.1	0.3	7.1	7.4	4.2	5.1	
Precipitation		1.1		0.0	1.1		0.1	0.5				2.8	0.0	28.6
Evaporation		-	-	-	-	-	-	-	-	-	-	-	20.9	
Growing Degrees	5	1.2	3.3	4.6	6.0	6.0	3.5	4.9	3.2	1.9	5.0	39.5	54.1	
	10	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	2.0	7.3	

1st 10-day period (1-10/12/2016)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	8.1	8.5	
Precipitation - Reference Evapotranspiration	-5.3	-8.5	28.6
Number of Rainy Days	4.0	0.0	4.4
Number of Dry Days	0.0	12.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

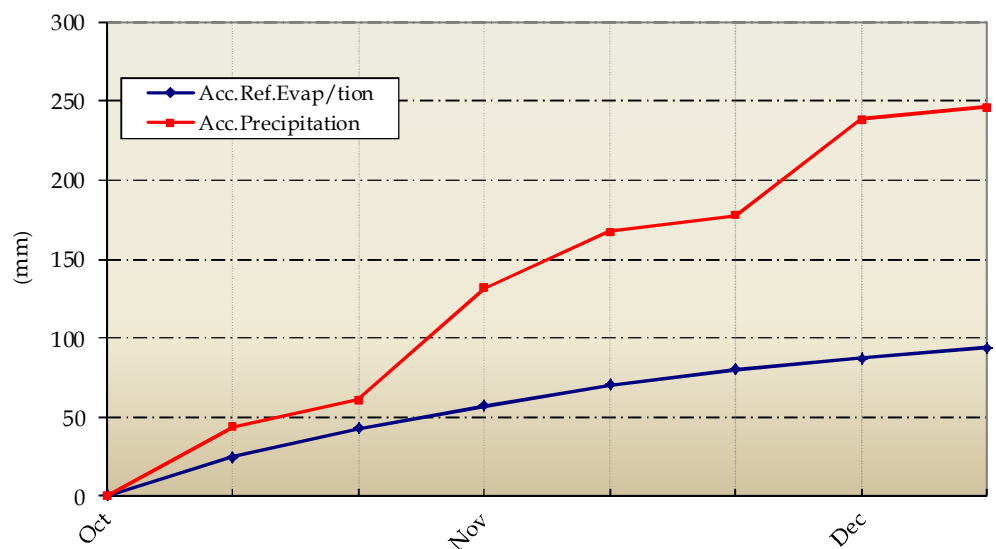


Tripoli

1st 10-day period (1-10/12/2016)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	10.1	12.6	11.3	9.7	9.5	9.8	12.7	8.1	13.8	17.0	11.5	15.1	11.6
	Min	-2.3	-3.6	4.3	3.0	6.0	2.4	7.2	0.1	-5.0	-2.9	0.9	-1.8	2.8
Relative Humidity	Max	100	100	100	100	100	100	100	100	100	100	100	100	-
	Min	30	30	-	85	76	96	71	58	58	-	63	41	-
Soil Temperature at 10 cm	06 UTC	5.2	4.2	-	-	8.4	7.4	8.8	8.4	4.8	-	6.7	5.4	7.1
	12 UTC	7.2	7.0	-	-	8.8	8.4	10.2	8.6	6.6	-	8.1	8.1	7.9
Sunshine Duration		8.3	6.9	0.0	0.0	0.5	0.0	1.0	3.7	7.5	7.5	3.5	6.6	3.7
Precipitation				1.2	3.4	1.8	0.9	0.1		0.0		7.4		38.8
Evaporation		0.0	-	-	0.0	0.2	0.0	0.8	0.0	-	-	-	4.3	9.1
Growing Degrees	5	0.0	0.0	2.8	1.4	2.8	1.1	5.0	0.0	0.0	2.1	15.0	16.9	26.1
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6

1st 10-day period (1-10/12/2016)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.6	6.8	8.4
Precipitation - Reference Evapotranspiration	0.8	-6.8	30.4
Number of Rainy Days	5.0	0.0	4.3
Number of Dry Days	2.0	12.0	-

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



ΕΘΝΙΚΗ
ΜΕΤΕΩΡΟΛΟΓΙΚΗ
ΥΠΗΡΕΣΙΑ

HELLENIC NATIONAL METEOROLOGICAL SERVICE

Division of Climatology-Applications

Issue Editors :

Papakrivou Anastasia

The present bulletin was designed and implemented under the support of Water Resources Management Division of Agriculture University of Athens