



AGROMETEOROLOGICAL BULLETIN

November 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

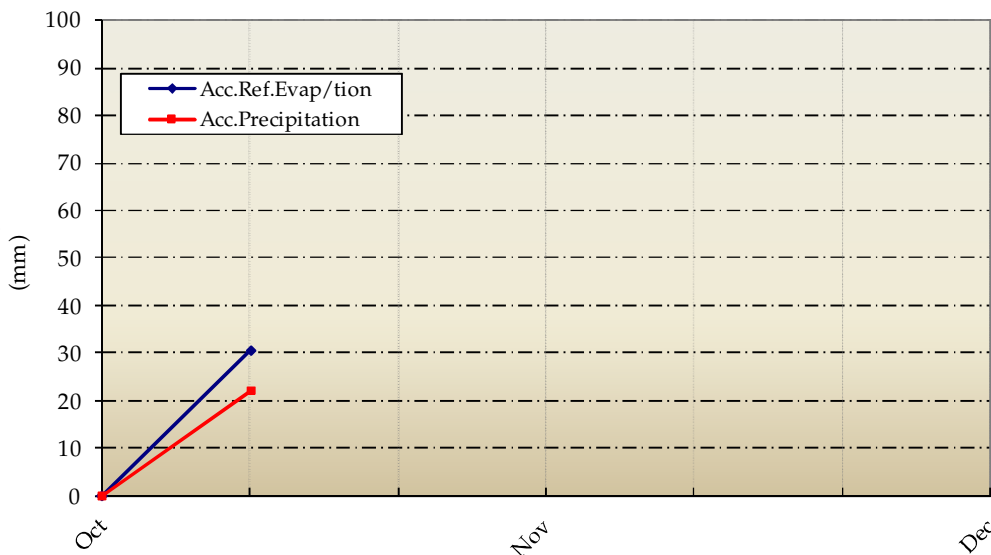
Web addresses of HNMS
www.hnms.gr
www.emy.gov.gr
www.meteo.gov.gr
www.meteohellas.gr

Agrinio

3rd 10-day period (21-30/11/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	-	-	-	-	16.0	16.2	17.4	14.8	15.0	-	15.9	20.0	16.7
	Min	-	-	-	-	10.0	10.2	5.4	3.0	3.4	-	6.4	8.0	6.4
Relative Humidity	Max	-	-	-	92	92	92	88	89	87	-	90	96	-
	Min	-	-	-	32	86	74	73	62	66	-	66	55	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	12.0	11.0	12.0	10.0	9.0	-	10.8	13.5	10.6
	12 UTC	-	-	-	-	14.0	14.0	13.0	13.0	11.0	-	13.0	14.3	12.7
Sunshine Duration		-	-	-	0.0	0.4	2.3	8.8	7.1	-	-	3.7	5.5	4.2
Precipitation		-	-	-	-	-	-	-	-	-	-	-	25.2	63.5
Evaporation		-	-	-	16.7	25.6	0.6	3.2	3.6	-	-	-	16.2	15.9
Growing Degrees	5	-	-	-	-	8.0	8.2	6.4	3.9	4.2	-	-	90.0	65.9
	10	-	-	-	-	3.0	3.2	1.4	0.0	0.0	-	-	40.0	21.3

3rd 10-day period (21-30/11/2013)	Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	9.8
Precipitation - Reference Evapotranspiration	-	15.4
Number of Rainy Days	0.0	3.0
Number of Dry Days	16.0	7.0

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



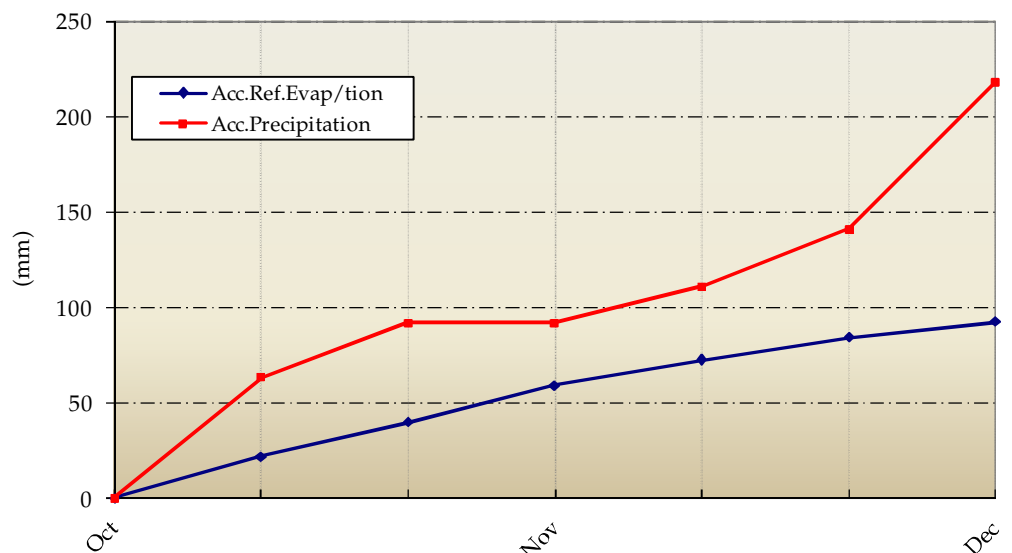
This station is not fully operated

Alexandroupoli

3rd 10-day period (21-30/11/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	19.8	17.4	18.0	15.4	18.2	10.8	11.0	9.8	10.6	11.6	14.3	15.9	12.8
	Min	10.4	11.4	10.4	12.4	10.8	8.0	7.8	3.4	0.4	2.0	7.7	8.7	5.0
Relative Humidity	Max	100	98	100	98	92	100	95	93	93	82	95	85	-
	Min	81	83	68	83	57	81	74	66	58	46	70	57	-
Soil Temperature at 10 cm	06 UTC	13.6	14.6	12.2	13.8	13.6	12.0	10.6	9.4	6.4	6.8	11.3	12.1	8.6
	12 UTC	16.0	15.2	14.8	14.6	15.0	13.0	11.2	9.8	9.4	9.0	12.8	13.2	10.3
Sunshine Duration		7.0	2.3	7.6	0.0	6.3	0.0	0.2	4.0	7.9	6.0	4.1	4.2	3.2
Precipitation			28.2		23.7	1.4	20.0	4.1				77.4	12.7	32.9
Evaporation		1.8	1.2	0.2	0.3	1.0	0.6	0.3	0.4	1.4	0.6	7.8	19.2	16.3
Growing Degrees	5	10.1	9.4	9.2	8.9	9.5	4.4	4.4	1.6	0.5	1.8	59.8	72.8	42.5
	10	5.1	4.4	4.2	3.9	4.5	0.0	0.0	0.0	0.0	0.0	22.1	27.8	11.5

3rd 10-day period (21-30/11/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	8.2	13.4	9.6
Precipitation - Reference Evapotranspiration	69.2	-0.7	23.3
Number of Rainy Days	5.0	2.0	3.3
Number of Dry Days	1.0	26.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

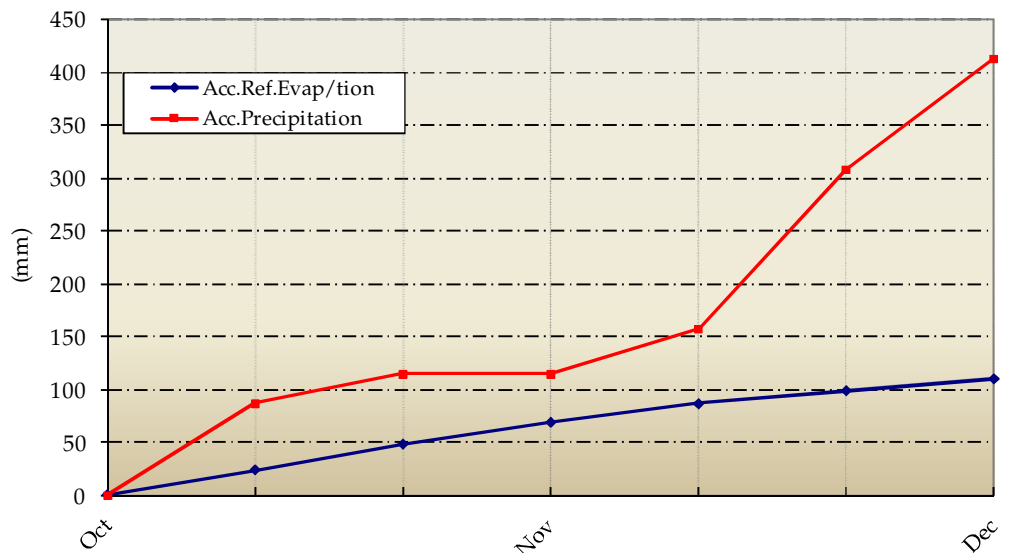


Andravida

3rd 10-day period (21-30/11/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	20.2	18.6	16.5	15.2	15.8	17.9	14.4	15.6	14.8	16.0	16.5	19.8	17.0
	Min	13.6	10.8	12.6	11.6	10.5	10.9	8.6	4.6	4.5	7.4	9.5	10.1	8.6
Relative Humidity	Max	83	89	92	90	87	91	85	86	88	86	88	90	-
	Min	58	59	76	78	72	55	53	35	49	55	59	55	-
Soil Temperature at 10 cm	06 UTC	16.0	14.4	14.4	14.4	13.2	13.0	13.2	11.4	10.9	11.4	13.2	14.6	11.7
	12 UTC	17.6	15.8	15.2	15.0	14.4	15.0	15.0	13.4	14.0	12.0	14.7	16.4	13.4
Sunshine Duration		0.9	5.5	1.4	0.0	2.4	6.2	7.1	7.4	4.1	0.0	3.5	6.1	4.6
Precipitation		4.9	10.0	33.2	24.4	20.8	4.9	4.7			2.3	105.2	23.5	62.9
Evaporation		1.6	2.2	0.0	1.2	3.0	10.1	2.0	0.8	2.3	4.7	27.9	13.6	20.2
Growing Degrees	5	11.9	9.7	9.6	8.4	8.2	9.4	6.5	5.1	4.7	6.7	80.1	99.6	78.3
	10	6.9	4.7	4.6	3.4	3.2	4.4	1.5	0.1	0.0	1.7	30.4	49.6	31.1

3rd 10-day period (21-30/11/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	11.1	13.6	10.9
Precipitation - Reference Evapotranspiration	94.1	9.9	52.0
Number of Rainy Days	8.0	5.0	5.0
Number of Dry Days	0.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

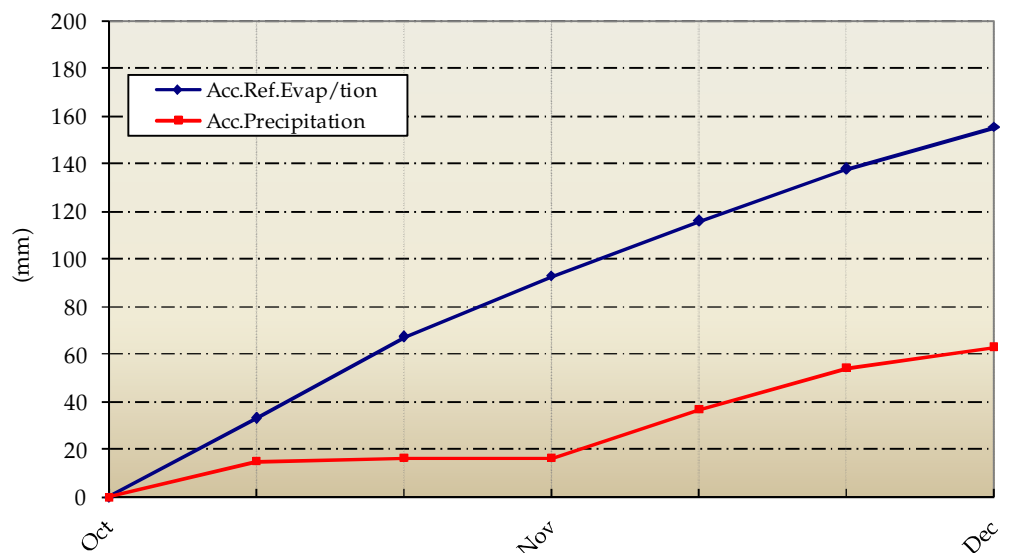


Iraklio

3rd 10-day period (21-30/11/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	24.0	20.2	23.2	22.0	21.4	20.0	20.0	16.0	17.2	17.8	20.2	19.5	18.8
	Min	17.0	17.0	13.0	16.6	19.0	15.8	13.8	13.0	10.6	10.5	14.6	15.0	12.7
Relative Humidity	Max	92	90	95	74	81	90	78	78	78	78	83	80	-
	Min	48	67	50	43	62	61	59	57	53	41	54	60	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		3.5	5.6	5.3	0.0	4.1	4.3	5.5	0.3	7.9	0.0	3.6	3.8	4.6
Precipitation		2.6	1.9			0.0	4.0		0.5		0.0	9.0	4.4	25.7
Evaporation		1.2	1.5	3.2	3.1	1.1	1.0	2.1	2.0	1.4	1.1	17.7	-	32.4
Growing Degrees	5	15.5	13.6	13.1	14.3	15.2	12.9	11.9	9.5	8.9	9.2	124.1	122.7	107.2
	10	10.5	8.6	8.1	9.3	10.2	7.9	6.9	4.5	3.9	4.2	74.1	72.7	57.3

3rd 10-day period (21-30/11/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	17.7	22.0	-
Precipitation - Reference Evapotranspiration	-8.7	-17.6	25.7
Number of Rainy Days	4.0	2.0	3.7
Number of Dry Days	3.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

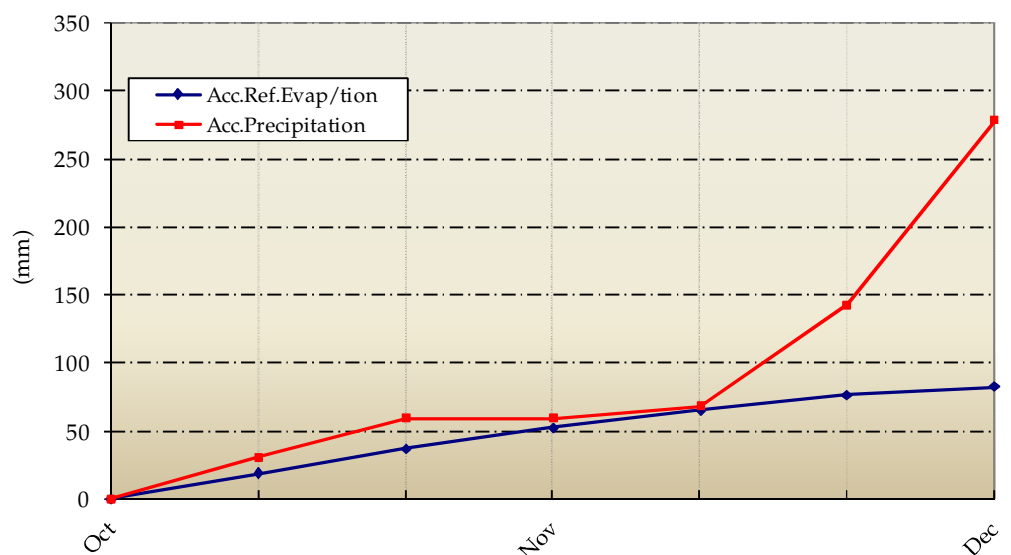


Ioannina

3rd 10-day period (21-30/11/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	12.6	12.6	11.3	9.6	11.0	9.2	9.6	8.0	10.2	5.3	9.9	14.9	12.0
	Min	9.8	7.0	8.3	7.2	6.6	3.2	2.0	2.1	-3.0	-2.1	4.1	6.8	3.6
Relative Humidity	Max	96	96	97	97	97	97	97	95	98	97	97	95	-
	Min	79	66	78	76	70	81	81	58	52	79	72	68	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	7.1
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	8.3
Sunshine Duration		0.0	1.9	0.0	0.0	0.6	0.0	3.8	2.6	3.4	0.0	1.2	2.2	2.6
Precipitation		28.6	2.8	28.9	17.7	27.6	15.9	0.4	0.0		14.0	135.9	53.1	57.0
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	9.5
Growing Degrees	5	6.2	4.8	4.8	3.4	3.8	1.2	0.8	0.1	0.0	0.0	25.1	58.2	31.9
	10	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	14.1	4.7

3rd 10-day period (21-30/11/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.0	7.5	6.7
Precipitation - Reference Evapotranspiration	129.9	45.6	50.3
Number of Rainy Days	8.0	2.0	5.1
Number of Dry Days	0.0	8.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

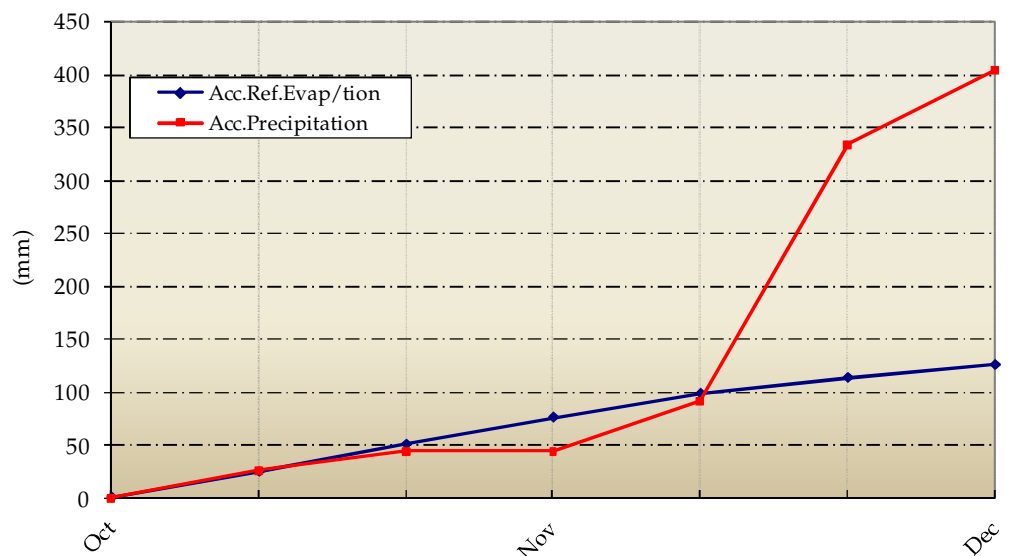


Kalamata

3rd 10-day period (21-30/11/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	20.6	19.4	20.0	18.3	16.2	19.5	15.9	17.8	17.5	15.1	18.0	20.7	18.0
	Min	10.9	9.3	10.7	11.3	10.3	10.5	7.7	4.2	4.2	9.5	8.9	11.0	8.3
Relative Humidity	Max	95	94	94	95	95	95	93	87	89	88	92	90	-
	Min	57	52	64	54	72	47	43	28	30	68	52	51	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	15.6	12.7
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	16.3	13.9
Sunshine Duration		1.3	8.3	3.4	0.4	0.7	6.6	6.3	7.9	3.6	0.0	3.8	5.1	4.3
Precipitation		5.2	7.8	10.2	39.1	3.5	4.5				0.9	71.2	33.5	54.0
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	26.0
Growing Degrees	5	10.8	9.4	10.4	9.8	8.3	10.0	6.8	6.0	5.9	7.3	84.5	108.7	81.4
	10	5.8	4.4	5.4	4.8	3.3	5.0	1.8	1.0	0.9	2.3	34.5	58.7	33.0

3rd 10-day period (21-30/11/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	12.5	16.7	12.1
Precipitation - Reference Evapotranspiration	58.7	16.8	41.9
Number of Rainy Days	7.0	5.0	4.8
Number of Dry Days	0.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

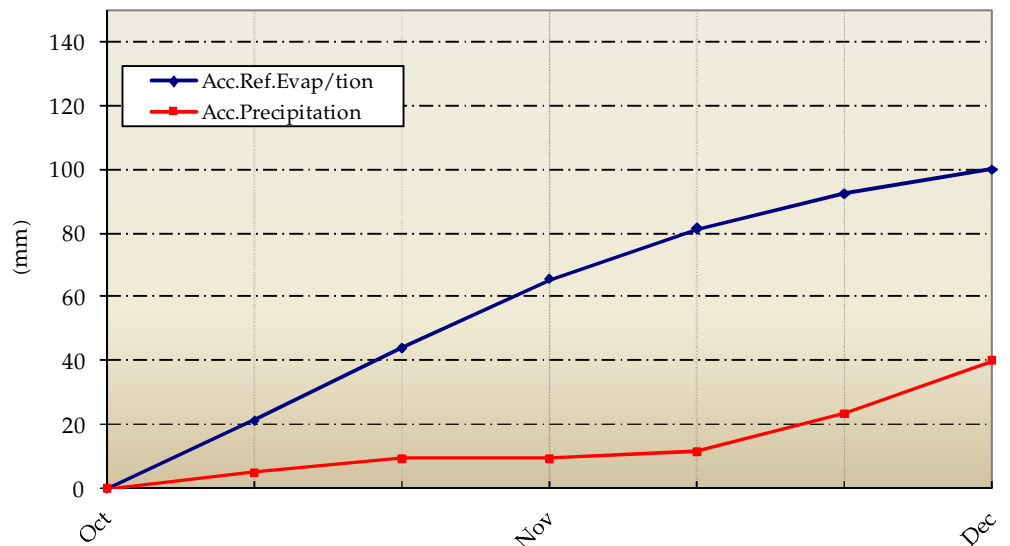


Larisa

3rd 10-day period (21-30/11/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	16.0	19.8	18.4	12.6	15.8	12.5	14.8	11.8	13.0	8.2	14.3	16.4	13.6
	Min	7.9	7.6	6.4	7.4	3.4	7.6	2.8	-0.8	-1.9	0.6	4.1	8.6	4.1
Relative Humidity	Max	100	100	97	100	100	98	100	98	100	99	99	99	-
	Min	71	36	56	89	58	70	32	43	34	53	54	63	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	13.4	9.5
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	14.2	10.2
Sunshine Duration		0.0	7.3	2.3	0.0	3.2	1.6	7.4	7.4	7.0	0.0	3.6	3.8	3.5
Precipitation		0.3		0.0	5.1		3.6	1.2			6.5	16.7	25.2	21.8
Evaporation		0.0	1.4	0.7	0.3	0.0	0.1	2.5	0.7	0.5	0.0	6.2	16.9	10.2
Growing Degrees	5	7.0	8.7	7.4	5.0	4.6	5.1	3.8	0.5	0.6	0.0	42.6	75.4	40.6
	10	2.0	3.7	2.4	0.0	0.0	0.1	0.0	0.0	0.0	0.0	8.1	25.4	8.0

3rd 10-day period (21-30/11/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.6	7.7	7.3
Precipitation - Reference Evapotranspiration	9.1	17.5	14.5
Number of Rainy Days	5.0	3.0	3.5
Number of Dry Days	0.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

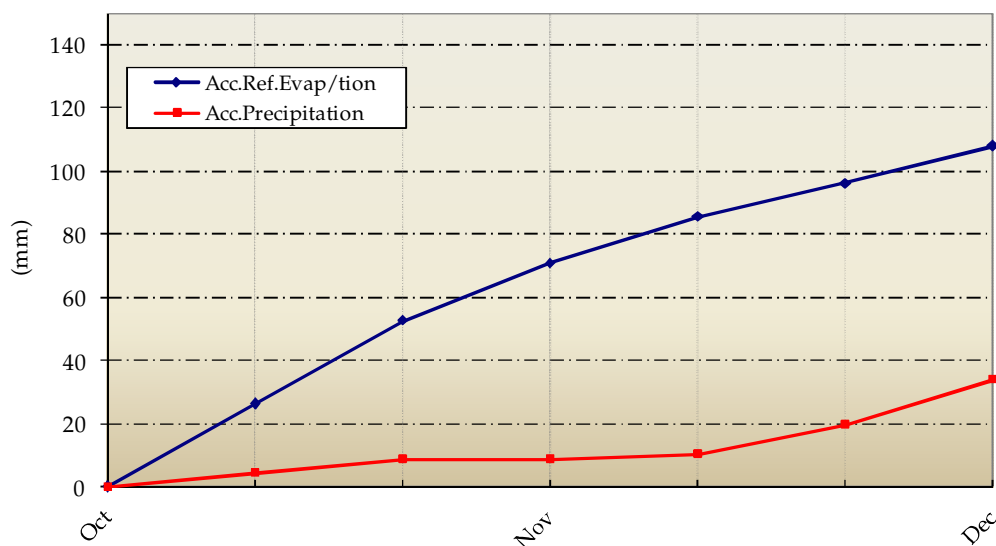


Mikra

3rd 10-day period (21-30/11/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	16.5	19.3	19.8	18.0	14.2	11.8	11.6	10.0	12.2	8.8	14.2	16.7	13.2
	Min	9.8	10.9	11.1	9.4	6.2	8.9	6.8	6.0	-1.7	-0.9	6.6	10.9	5.2
Relative Humidity	Max	94	92	86	91	89	91	91	75	87	92	89	88	-
	Min	75	42	48	81	69	68	51	46	39	67	59	61	-
Soil Temperature at 10 cm	06 UTC	13.2	14.0	13.4	13.4	11.2	11.2	10.0	7.8	6.0	5.8	10.6	14.1	8.8
	12 UTC	15.0	16.2	15.8	14.0	13.8	12.0	11.2	9.8	8.4	7.6	12.4	15.0	10.6
Sunshine Duration		1.1	6.6	3.9	0.0	2.1	0.3	8.2	8.4	7.8	0.0	3.8	3.0	3.5
Precipitation					4.6		0.1	8.9			0.8	14.4	9.1	21.0
Evaporation		0.0	2.9	1.2	0.2	0.6	3.3	1.0	0.0	0.0	0.1	9.3	12.2	15.7
Growing Degrees	5	8.2	10.1	10.5	8.7	5.2	5.4	4.2	3.0	0.3	0.0	55.4	88.1	43.9
	10	3.2	5.1	5.5	3.7	0.2	0.4	0.0	0.0	0.0	0.0	18.0	38.1	10.2

3rd 10-day period (21-30/11/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	11.7	9.6	9.9
Precipitation - Reference Evapotranspiration	2.7	-0.5	11.1
Number of Rainy Days	4.0	2.0	3.6
Number of Dry Days	8.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

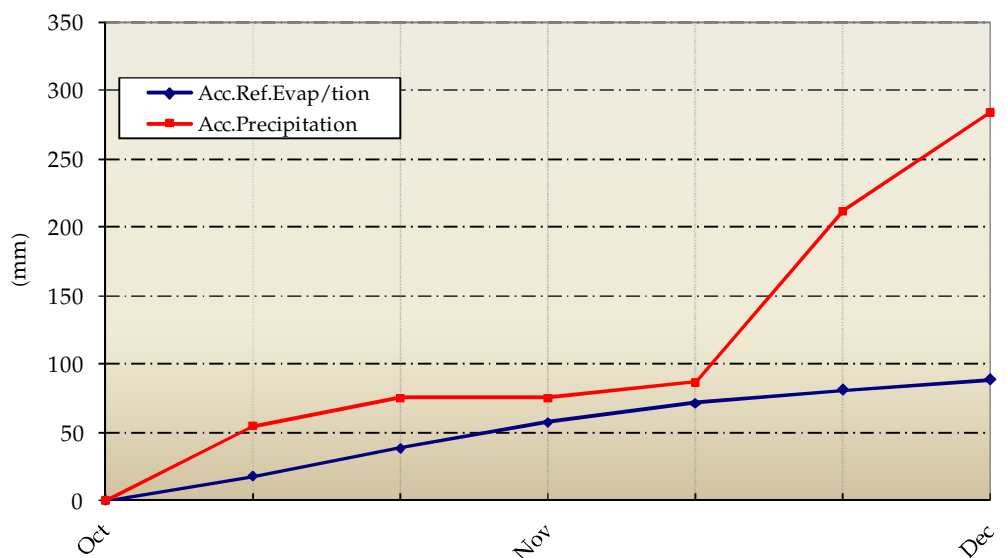


Tripoli

3rd 10-day period (21-30/11/2013)		21	22	23	24	25	26	27	28	29	30	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	15.9	15.7	15.3	11.8	12.6	13.5	11.3	13.1	12.2	10.0	13.1	15.6	12.9
	Min	9.1	4.9	4.4	7.1	5.9	5.7	3.6	-2.6	-3.0	2.7	3.8	5.8	3.6
Relative Humidity	Max	98	99	99	100	100	100	71	98	99	95	96	92	-
	Min	75	55	56	90	55	64	41	26	46	88	60	64	-
Soil Temperature at 10 cm	06 UTC	11.8	10.4	10.0	10.2	9.4	9.2	8.4	5.2	4.4	6.4	8.5	9.9	8.3
	12 UTC	-	13.2	12.4	-	10.8	11.2	10.2	8.2	7.0	7.6	10.1	12.3	9.4
Sunshine Duration		0.6	6.8	3.1	0.3	1.9	5.0	6.8	8.0	2.8	0.0	3.5	4.0	4.2
Precipitation		5.1	6.6	7.0	42.2	1.2	8.0				2.2	72.3	20.3	45.1
Evaporation		0.7	0.1	1.7	7.8	0.9	0.3	0.6	0.0	0.2	0.2	12.5	9.4	13.0
Growing Degrees	5	7.5	5.3	4.9	4.5	4.3	4.6	2.5	0.3	0.0	1.4	35.0	57.4	35.8
	10	2.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	12.3	5.3

3rd 10-day period (21-30/11/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.5	8.4	9.3
Precipitation - Reference Evapotranspiration	64.8	11.9	35.8
Number of Rainy Days	7.0	4.0	4.7
Number of Dry Days	0.0	1.0	-

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