



AGROMETEOROLOGICAL BULLETIN

December 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

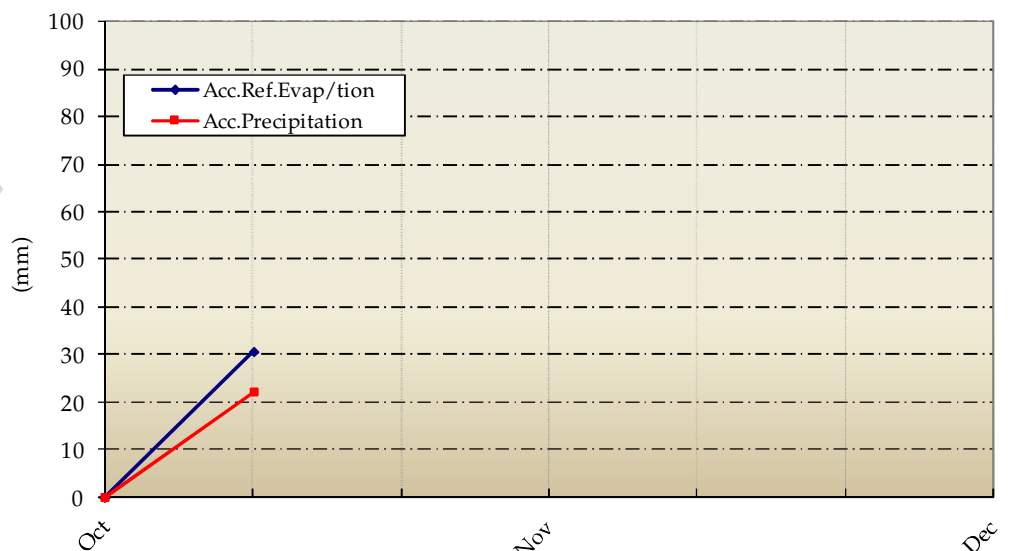
Agrinio

2nd 10-day period (11-20/12/2013)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	16.0	11.6	13.0	-	-	12.4	16.0	15.2	13.0	13.8	13.9	-	14.6
	Min	4.2	-1.6	3.0	-	-	6.6	4.4	0.4	-1.0	-2.6	1.7	3.3	4.3
Relative Humidity	Max	90	92	83	-	91	79	78	85	89	92	87	96	-
	Min	41	38	55	-	48	52	39	47	38	38	44	65	-
Soil Temperature at 10 cm	06 UTC	8.0	0.0	7.0	-	-	10.0	10.0	4.0	6.0	0.0	5.6	9.2	8.3
	12 UTC	9.0	11.0	11.0	-	-	12.0	12.0	13.0	11.0	10.0	11.1	9.4	10.0
Sunshine Duration		8.9	8.0	-	-	9.2	6.4	7.6	7.4	8.1	-	7.9	3.5	3.5
Precipitation													-	49.2
Evaporation		0.8	2.8	-	-	0.6	1.1	1.2	1.0	0.8	-	-	-	13.6
Growing Degrees	5	5.1	0.0	3.0	-	-	4.5	5.2	2.8	1.0	0.6	-	-	45.7
	10	0.1	0.0	0.0	-	-	0.0	0.2	0.0	0.0	0.0	-	-	9.2

2nd 10-day period (11-20/12/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.8	-	7.4
Precipitation - Reference Evapotranspiration	-6.8	-	41.8
Number of Rainy Days	0.0	-	4.5
Number of Dry Days	18.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

This station is not fully operated

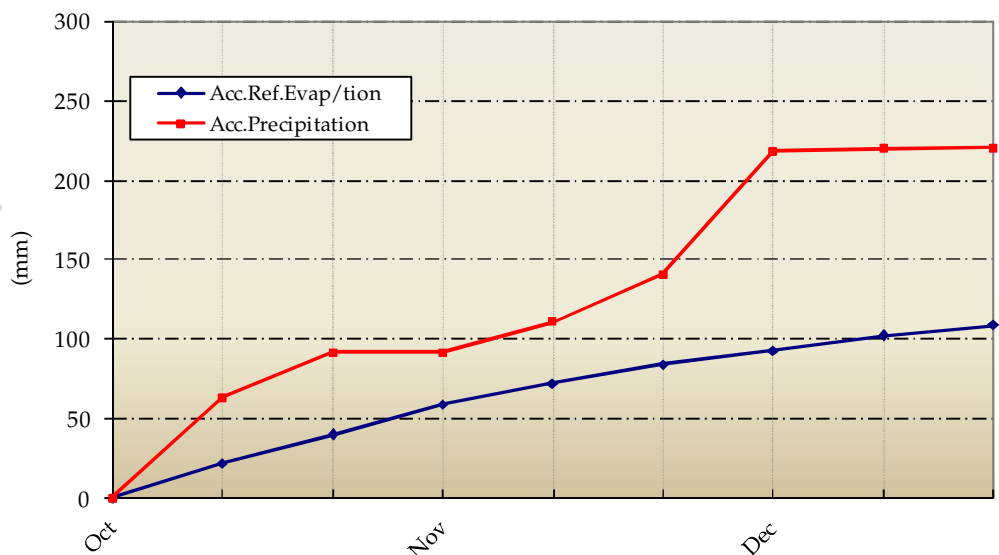


Alexandroupoli

2nd 10-day period (11-20/12/2013)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	4.6	2.0	5.0	9.0	9.6	9.4	9.4	9.8	10.6	11.0	8.0	8.0	10.6
	Min	-1.8	-1.4	1.0	-2.4	6.0	4.2	2.6	3.8	2.6	-3.8	1.1	0.4	3.1
Relative Humidity	Max	72	85	93	96	91	94	69	70	87	91	85	93	-
	Min	32	60	84	78	78	53	44	50	52	67	60	64	-
Soil Temperature at 10 cm	06 UTC	3.0	3.4	4.0	3.4	6.6	5.4	5.8	6.2	6.0	4.0	4.8	6.0	6.3
	12 UTC	5.2	4.2	5.4	5.0	7.6	7.2	7.2	7.6	7.8	6.2	6.3	6.1	7.5
Sunshine Duration		8.1	0.0	0.0	1.3	0.7	5.2	3.5	1.4	4.3	6.7	3.1	3.1	2.5
Precipitation			0.0	0.1								0.1	27.7	23.7
Evaporation		0.0	0.0	0.0	0.0	0.1	2.9	0.3	1.4	0.0	0.0	4.7	21.2	11.7
Growing Degrees	5	0.0	0.0	0.0	0.0	2.8	1.8	1.0	1.8	1.6	0.0	9.0	4.8	26.7
	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	5.3

2nd 10-day period (11-20/12/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.6	6.8	8.1
Precipitation - Reference Evapotranspiration	-6.5	20.9	15.6
Number of Rainy Days	1.0	4.0	2.9
Number of Dry Days	5.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

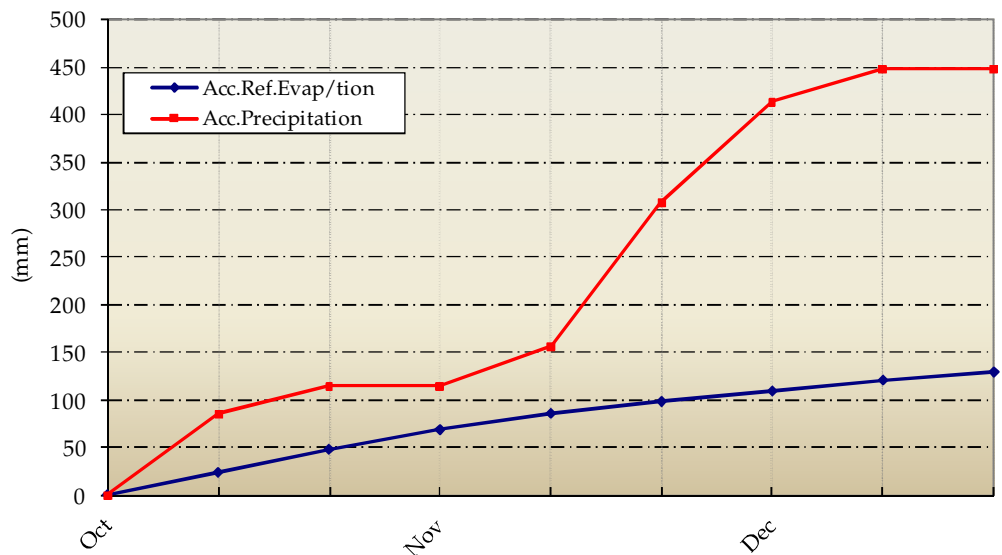


Andravida

2nd 10-day period (11-20/12/2013)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	11.2	13.4	15.8	17.2	17.0	17.8	14.9	13.6	14.0	14.8	15.0	14.0	15.1
	Min	4.2	0.0	1.4	6.6	6.9	8.0	4.2	1.8	0.1	1.3	3.4	7.1	6.8
Relative Humidity	Max	81	90	90	88	90	90	89	86	89	89	88	90	-
	Min	37	46	43	58	61	51	46	40	39	48	47	57	-
Soil Temperature at 10 cm	06 UTC	9.2	6.6	7.2	9.4	10.4	10.8	10.2	8.2	7.0	7.0	8.6	10.8	9.7
	12 UTC	10.6	11.0	10.4	12.2	12.4	10.8	13.2	13.4	10.0	9.5	11.4	12.4	11.2
Sunshine Duration		8.3	8.1	8.0	5.5	2.8	6.0	7.6	7.5	7.7	7.7	6.9	3.3	4.1
Precipitation						0.3	0.6					0.9	52.9	43.9
Evaporation		3.0	1.0	1.5	0.7	0.2	2.0	0.8	1.5	0.3	0.0	11.0	-	19.6
Growing Degrees	5	2.7	1.7	3.6	6.9	7.0	7.9	4.6	2.7	2.1	3.1	42.1	55.7	59.8
	10	0.0	0.0	0.0	1.9	2.0	2.9	0.0	0.0	0.0	0.0	6.8	15.9	16.6

2nd 10-day period (11-20/12/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	8.4	7.8	9.0
Precipitation - Reference Evapotranspiration	-7.5	45.1	34.9
Number of Rainy Days	2.0	9.0	4.7
Number of Dry Days	7.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

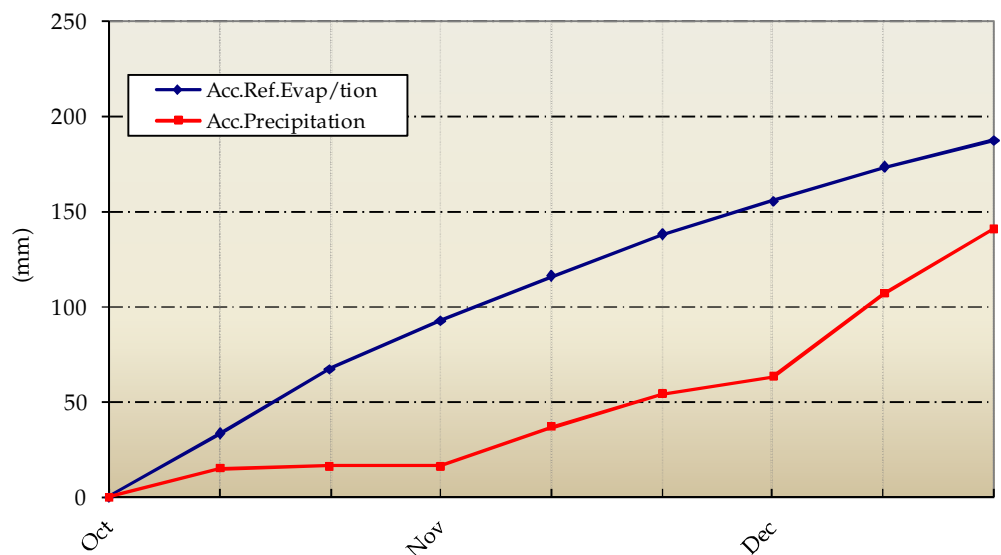


Iraklio

2nd 10-day period (11-20/12/2013)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	9.0	10.5	11.2	14.5	16.0	17.2	13.5	13.2	11.5	15.0	13.2	16.7	16.6
	Min	4.0	8.0	8.0	11.2	7.5	7.0	12.6	10.5	8.5	7.0	8.4	11.4	10.5
Relative Humidity	Max	71	81	74	86	88	88	77	90	94	95	84	88	-
	Min	48	44	59	67	61	70	66	64	78	72	63	62	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		1.0	0.7	0.2	1.0	3.5	3.0	0.0	1.4	0.0	2.3	1.3	2.4	3.8
Precipitation		5.6	1.4	0.8				2.2	1.6	17.0	5.4	34.0	23.9	23.4
Evaporation		4.1	2.5	2.4	0.6	0.9	0.0	0.7	5.0	0.9	0.5	17.6	39.6	25.9
Growing Degrees	5	1.5	4.3	4.6	7.9	6.8	7.1	8.1	6.9	5.0	6.0	58.0	90.3	85.7
	10	0.0	0.0	0.0	2.9	1.8	2.1	3.1	1.9	0.0	1.0	12.6	40.3	36.5

2nd 10-day period (11-20/12/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	14.1	13.5	-
Precipitation - Reference Evapotranspiration	19.9	10.4	23.4
Number of Rainy Days	7.0	6.0	3.8
Number of Dry Days	2.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

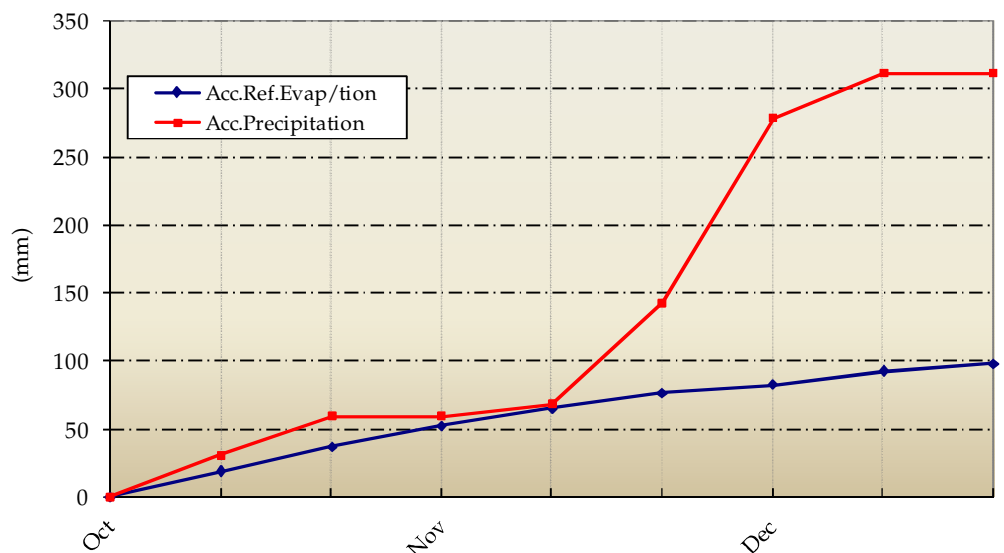


Ioannina

2nd 10-day period (11-20/12/2013)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	10.1	8.4	11.4	11.8	12.4	14.0	12.7	11.2	9.4	11.8	11.3	8.2	9.6
	Min	2.9	-7.1	-4.7	-5.4	-2.9	-0.5	-3.2	-0.4	-7.4	-8.3	-3.7	1.4	1.6
Relative Humidity	Max	88	96	94	95	96	95	88	95	94	95	94	97	-
	Min	15	27	36	40	45	27	27	26	32	34	31	74	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	4.9
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	5.7
Sunshine Duration		5.0	5.2	5.0	3.1	5.8	6.1	5.4	3.8	4.3	5.3	4.9	1.7	2.5
Precipitation													56.5	54.5
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	5.5
Growing Degrees	5	1.5	0.0	0.0	0.0	0.0	1.8	0.0	0.4	0.0	0.0	3.7	-	16.0
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.8

2nd 10-day period (11-20/12/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.0	4.6	5.7
Precipitation - Reference Evapotranspiration	-6.0	51.9	48.8
Number of Rainy Days	0.0	6.0	4.4
Number of Dry Days	13.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

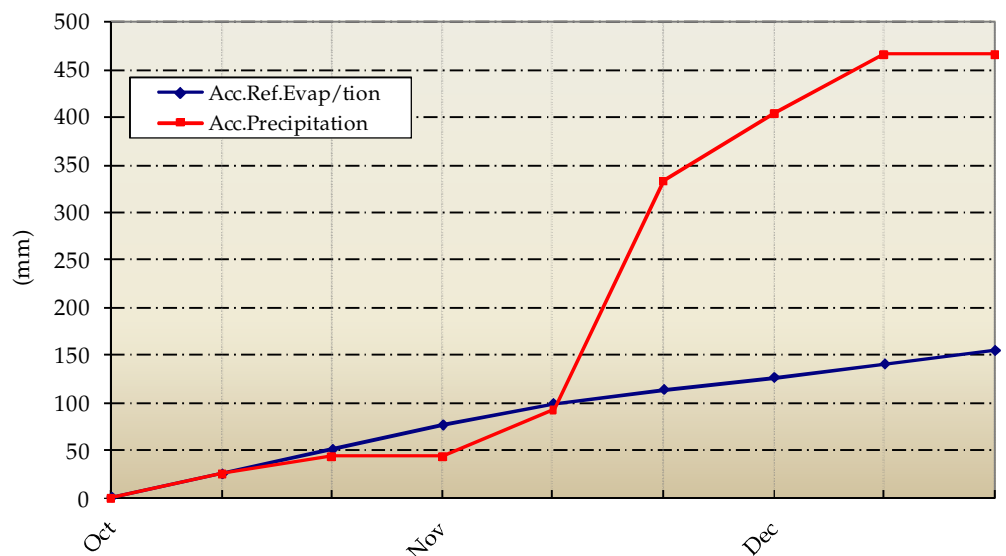


Kalamata

2nd 10-day period (11-20/12/2013)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	14.2	15.3	18.0	15.8	18.5	17.4	15.8	14.7	15.3	17.3	16.2	15.8	15.9
	Min	4.5	0.1	2.7	4.2	5.7	6.5	8.7	6.9	2.8	1.3	4.3	6.4	6.6
Relative Humidity	Max	57	91	91	92	93	92	62	77	88	89	83	94	-
	Min	35	30	28	59	42	54	35	32	36	38	39	56	-
Soil Temperature at 10 cm	06 UTC	-	-	7.4	8.6	9.4	9.6	9.8	9.0	7.8	8.2	8.7	11.6	10.6
	12 UTC	-	-	8.2	9.2	9.4	9.8	9.8	9.6	9.2	8.6	9.2	12.4	11.5
Sunshine Duration		8.3	6.3	7.7	0.5	8.1	0.7	7.9	7.0	8.1	8.3	6.3	4.0	3.9
Precipitation													26.9	53.6
Evaporation		-	-	-	-	-	-	-	-	-	-	-	20.9	23.9
Growing Degrees	5	4.4	2.7	5.4	5.0	7.1	7.0	7.3	5.8	4.1	4.3	52.9	60.9	62.3
	10	0.0	0.0	0.4	0.0	2.1	2.0	2.3	0.8	0.0	0.0	7.5	15.1	17.2

2nd 10-day period (11-20/12/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	14.1	9.8	10.5
Precipitation - Reference Evapotranspiration	-14.1	17.1	43.1
Number of Rainy Days	0.0	6.0	4.7
Number of Dry Days	17.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

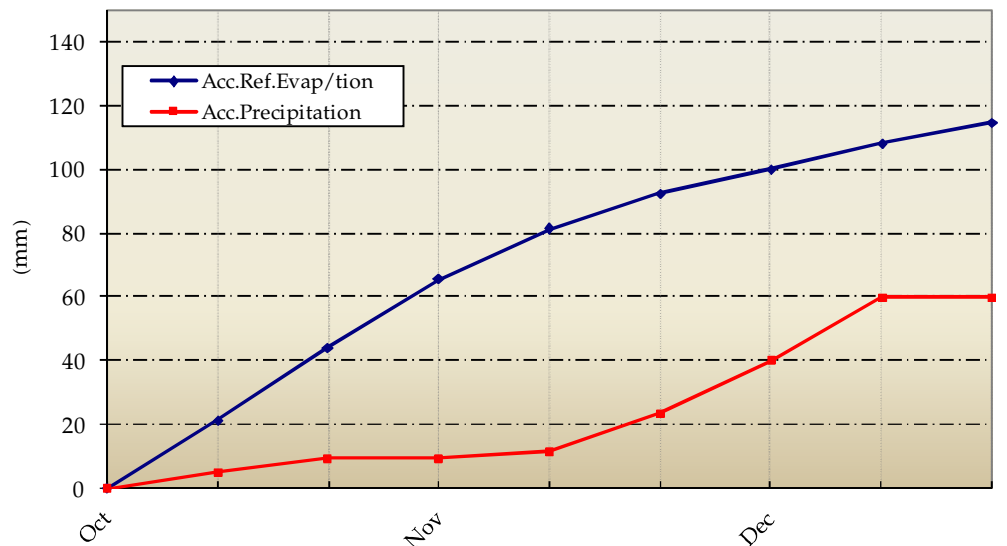


Larisa

2nd 10-day period (11-20/12/2013)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	10.2	10.4	12.4	13.0	12.5	12.2	10.6	11.0	11.3	11.6	11.5	9.1	11.0
	Min	1.8	-5.5	0.4	-3.6	-3.0	3.7	2.4	2.0	-3.6	-6.4	-1.2	0.6	1.7
Relative Humidity	Max	79	88	87	95	97	85	79	84	91	89	87	98	-
	Min	27	29	34	38	43	36	39	38	36	39	36	61	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	7.3	6.9
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	7.6	7.3
Sunshine Duration		6.3	6.6	5.9	6.8	6.4	3.8	4.2	5.9	5.9	6.6	5.8	3.2	3.1
Precipitation									0.0			0.0	36.6	14.0
Evaporation		0.0	3.9	1.8	1.9	1.5	2.0	0.7	2.1	0.0	0.2	14.1	10.2	6.0
Growing Degrees	5	1.0	0.0	1.4	0.0	0.0	3.0	1.5	1.5	0.0	0.0	8.4	6.9	20.8
	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	2.1

2nd 10-day period (11-20/12/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.4	5.6	5.8
Precipitation - Reference Evapotranspiration	-6.4	31.0	8.2
Number of Rainy Days	0.0	3.0	3.3
Number of Dry Days	13.0	1.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

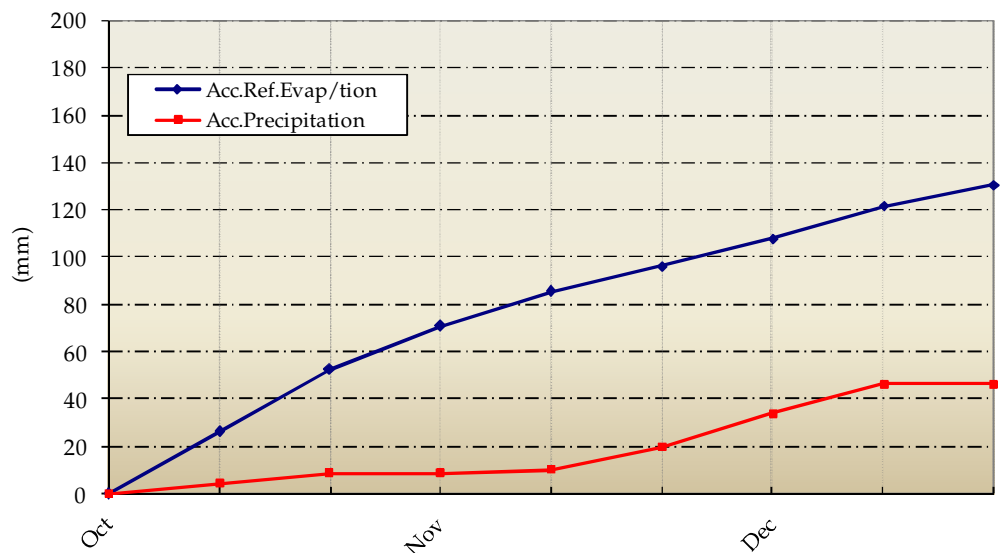


Mikra

2nd 10-day period (11-20/12/2013)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	9.2	11.7	11.4	12.1	11.3	9.2	9.9	10.2	9.6	9.9	10.4	8.3	10.6
	Min	-2.0	-2.6	2.8	-2.0	-1.6	-0.2	-2.4	-0.1	-2.8	-3.0	-1.4	2.7	3.0
Relative Humidity	Max	80	70	74	84	92	92	85	90	87	90	84	84	-
	Min	29	23	31	39	50	43	43	45	46	54	40	59	-
Soil Temperature at 10 cm	06 UTC	5.6	4.2	6.3	4.8	4.8	5.2	5.0	4.6	3.8	3.2	4.8	6.1	6.2
	12 UTC	5.8	6.8	8.0	7.4	7.2	6.6	6.4	6.0	6.0	5.8	6.6	7.3	7.7
Sunshine Duration		7.9	7.9	4.6	7.8	6.2	0.1	6.8	5.2	7.9	7.2	6.2	3.1	2.8
Precipitation													13.6	12.5
Evaporation		4.2	0.7	0.0	0.0	0.0	2.2	1.0	0.0	0.0	0.0	8.1	-	10.6
Growing Degrees	5	0.0	0.0	2.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	2.2	15.7	24.9
	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	2.8

2nd 10-day period (11-20/12/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	9.2	9.9	8.4
Precipitation - Reference Evapotranspiration	-9.2	3.7	4.1
Number of Rainy Days	0.0	5.0	2.9
Number of Dry Days	17.0	1.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

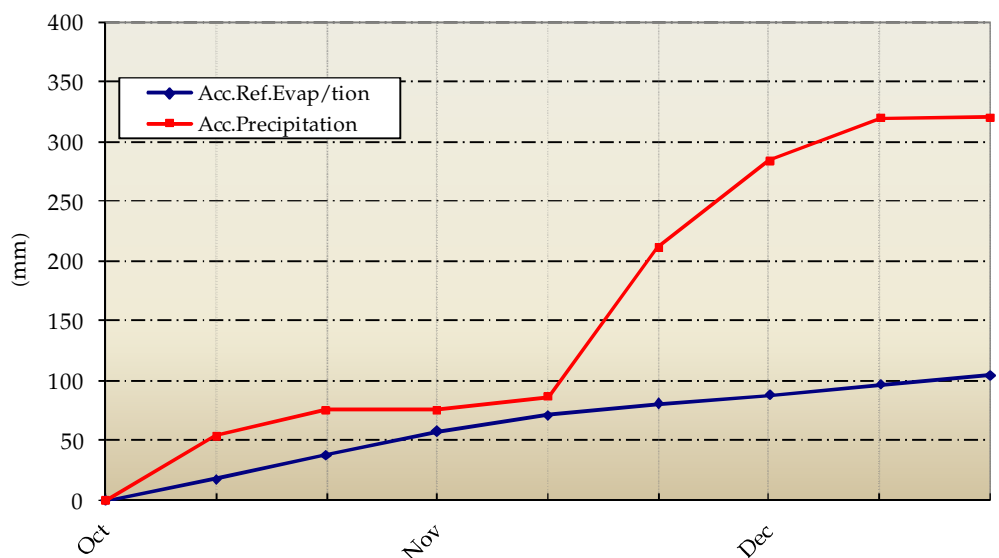


Tripoli

2nd 10-day period (11-20/12/2013)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	8.0	11.4	11.4	13.5	13.5	7.4	7.5	7.8	10.1	12.3	10.3	10.9	10.8
	Min	0.9	-5.5	-3.8	-3.7	-3.4	-0.3	4.1	1.7	-4.6	-5.2	-2.0	1.7	1.8
Relative Humidity	Max	66	87	97	100	100	100	74	79	99	100	90	97	-
	Min	55	33	39	49	80	76	58	56	47	46	54	57	-
Soil Temperature at 10 cm	06 UTC	5.2	2.4	2.6	2.6	3.4	4.2	5.2	4.4	3.0	2.4	3.5	5.3	6.0
	12 UTC	5.4	4.8	5.4	5.4	7.2	5.2	5.8	6.0	5.4	4.4	5.5	7.1	6.7
Sunshine Duration		3.5	7.3	5.4	6.5	5.3	0.1	4.1	3.7	6.8	6.7	4.9	3.4	3.6
Precipitation		0.6					0.0					0.6	37.5	40.9
Evaporation		0.0	0.0	0.0	0.0	0.0	1.2	0.6	0.0	0.0	0.0	1.8	-	10.0
Growing Degrees	5	0.0	0.0	0.0	0.0	0.1	0.0	0.8	0.0	0.0	0.0	0.9	19.1	19.6
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	1.5

2nd 10-day period (11-20/12/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.6	6.5	7.6
Precipitation - Reference Evapotranspiration	-7.0	31.0	33.3
Number of Rainy Days	1.0	4.0	4.3
Number of Dry Days	3.0	0.0	-

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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Helliniko, Athens



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Issue Editors :

Papakrivou Anastasia

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