



AGROMETEOROLOGICAL BULLETIN

October 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

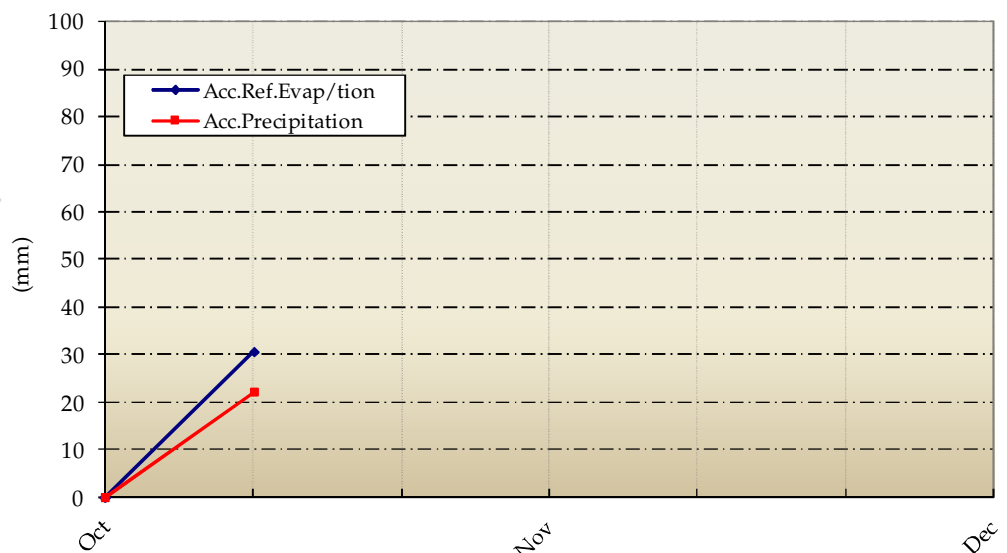
Web addresses of HNMS
www.hnms.gr
www.emy.gov.gr
www.meteo.gov.gr
www.meteohellas.gr

3rd 10-day period (21-31/10/2013)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	26.0	25.0	28.0	27.0	27.0	-	-	-	27.0	27.0	25.4	26.6	24.4	21.8
	Min	14.0	13.0	10.6	10.2	10.0	-	-	-	7.4	8.0	9.0	10.3	11.7	9.7
Relative Humidity	Max	89	88	91	90	92	-	-	90	91	93	95	91	90	-
	Min	35	41	43	36	39	-	-	33	44	42	45	40	49	-
Soil Temperature at 10 cm	06 UTC	16.0	16.0	16.8	17.0	16.0	-	-	-	16.0	16.0	16.0	16.2	18.5	14.8
	12 UTC	21.0	21.0	24.0	23.0	18.0	-	-	-	19.0	19.0	18.0	20.4	19.9	17.8
Sunshine Duration		9.6	8.4	10.4	9.4	-	-	-	9.9	10.5	8.8	8.2	9.4	6.6	5.7
Precipitation														8.1	42.6
Evaporation		4.0	3.0	3.6	4.8	-	-	-	3.4	4.6	2.4	5.0	-	26.1	29.5
Growing Degrees	5	15.0	14.0	14.3	13.6	13.5	-	-	-	12.2	12.5	12.2	-	143.1	118.3
	10	10.0	9.0	9.3	8.6	8.5	-	-	-	7.2	7.5	7.2	-	88.1	63.4

3rd 10-day period (21-31/10/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	18.4	24.7	18.5
Precipitation - Reference Evapotranspiration	-18.4	-16.6	24.1
Number of Rainy Days	0.0	4.0	3.7
Number of Dry Days	14.0	10.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

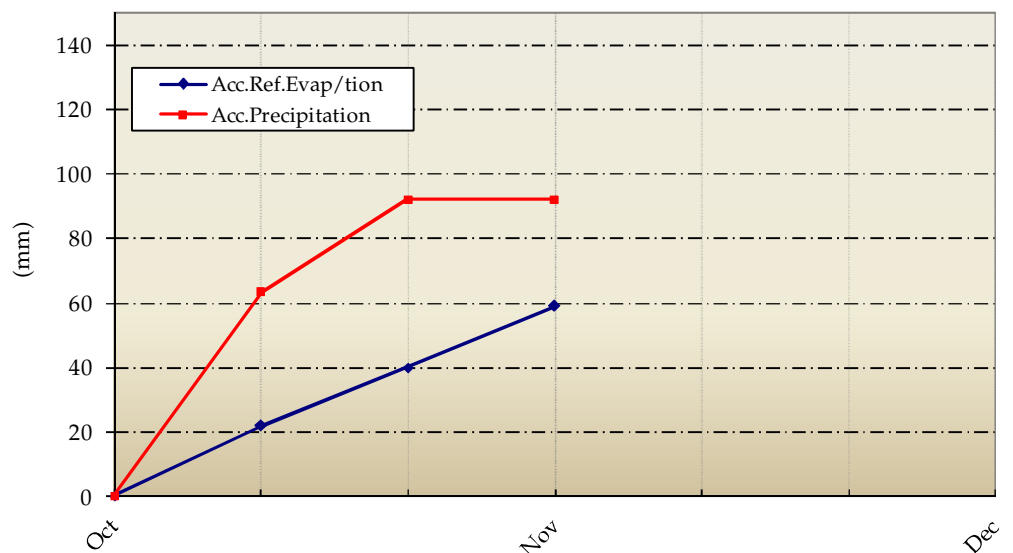
This station is not fully operated



3rd 10-day period (21-31/10/2013)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	19.6	22.2	23.0	20.4	15.6	17.6	20.4	19.4	21.0	25.4	21.4	20.5	20.9	17.4
	Min	7.4	8.6	9.8	12.4	9.4	8.2	5.0	5.0	9.8	7.6	9.4	8.4	12.8	8.0
Relative Humidity	Max	94	95	90	83	90	94	94	94	93	93	95	92	89	-
	Min	55	57	37	45	64	56	52	72	64	34	51	53	57	-
Soil Temperature at 10 cm	06 UTC	13.8	13.8	14.8	15.4	14.2	13.0	12.4	12.2	14.2	13.8	14.4	13.8	17.6	12.7
	12 UTC	16.8	18.2	18.4	17.8	16.6	15.8	16.2	16.0	17.4	17.6	16.2	17.0	19.0	15.2
Sunshine Duration		11.2	9.0	9.4	9.9	8.6	9.2	9.0	8.8	6.5	8.9	8.6	9.0	4.5	5.2
Precipitation														44.4	22.3
Evaporation		1.3	3.0	2.9	4.6	0.4	1.1	1.9	3.8	1.3	1.5	3.8	25.6	41.1	41.1
Growing Degrees	5	8.5	10.4	11.4	11.4	7.5	7.9	7.7	7.2	10.4	11.5	10.4	104.3	130.3	85.3
	10	3.5	5.4	6.4	6.4	2.5	2.9	2.7	2.2	5.4	6.5	5.4	49.3	75.3	34.4

3rd 10-day period (21-31/10/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	19.2	23.6	20.4
Precipitation - Reference Evapotranspiration	-19.2	20.8	1.9
Number of Rainy Days	0.0	4.0	2.2
Number of Dry Days	13.0	13.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

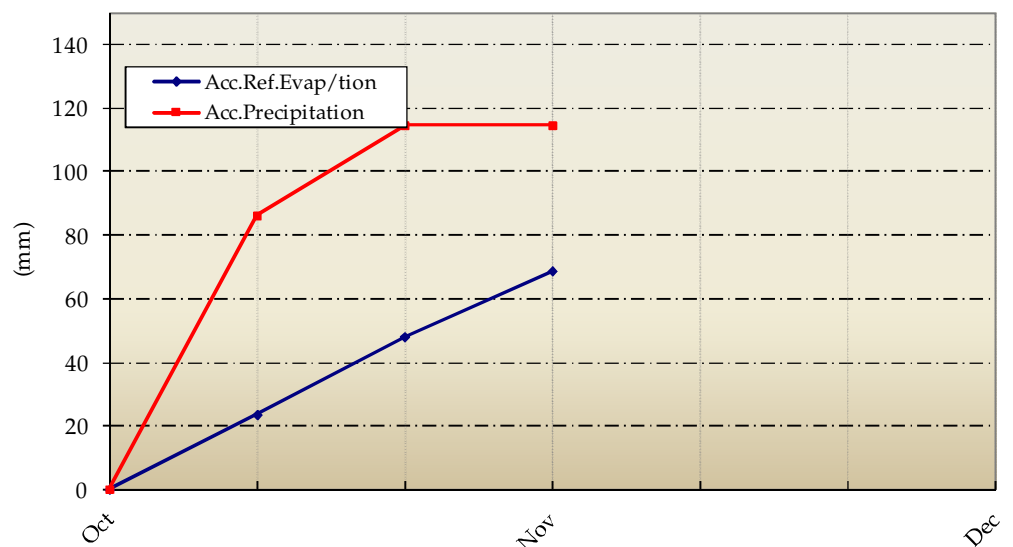


Andravida

3rd 10-day period (21-31/10/2013)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	22.6	23.0	23.8	26.4	24.8	24.2	22.8	23.0	23.3	22.9	23.5	23.7	23.7	21.5
	Min	9.7	11.5	13.0	10.4	10.5	9.4	8.3	11.5	13.0	13.1	10.3	11.0	13.8	11.4
Relative Humidity	Max	90	91	92	91	89	89	89	91	91	91	92	91	85	-
	Min	53	57	54	31	37	35	48	60	57	57	54	49	47	-
Soil Temperature at 10 cm	06 UTC	16.4	17.0	17.2	16.8	16.6	16.0	15.4	16.0	16.8	17.0	17.0	16.6	18.7	16.1
	12 UTC	21.2	21.2	21.8	21.2	21.2	20.8	20.6	20.8	21.0	21.0	21.2	21.1	21.9	18.7
Sunshine Duration		9.5	9.3	9.4	9.3	9.6	9.2	9.5	8.9	9.1	8.4	8.4	9.1	6.9	6.3
Precipitation														14.5	50.1
Evaporation		2.4	3.3	2.2	4.3	2.0	2.3	2.2	1.3	0.5	0.8	4.1	25.4	28.7	31.6
Growing Degrees	5	11.2	12.3	13.4	13.4	12.7	11.8	10.6	12.3	13.2	13.0	11.9	135.5	151.6	126.2
	10	6.2	7.3	8.4	8.4	7.7	6.8	5.6	7.3	8.2	8.0	6.9	80.5	96.6	71.3

3rd 10-day period (21-31/10/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	20.8	25.8	18.7
Precipitation - Reference Evapotranspiration	-20.8	-11.3	31.4
Number of Rainy Days	0.0	3.0	3.7
Number of Dry Days	15.0	11.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

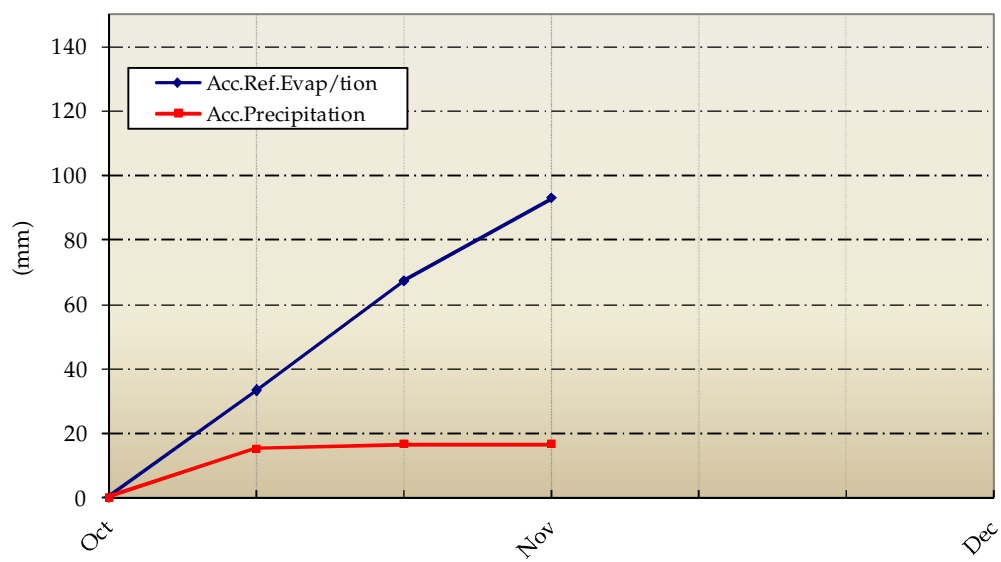


Iraklio

3rd 10-day period (21-31/10/2013)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	22.0	21.8	22.8	22.8	22.4	22.0	22.0	22.4	22.0	22.5	22.2	22.3	23.8	21.6
	Min	12.6	13.4	13.6	19.6	18.0	15.6	17.4	14.0	13.6	13.4	13.6	15.0	18.0	15.6
Relative Humidity	Max	82	89	91	79	79	83	89	95	91	91	93	87	87	-
	Min	52	60	61	62	61	54	58	63	67	66	67	61	58	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		8.7	8.6	8.5	7.9	7.1	7.5	8.1	8.6	7.2	8.2	7.7	8.0	5.6	5.7
Precipitation														55.8	29.2
Evaporation		3.0	2.5	3.3	2.2	2.6	2.8	3.5	1.2	1.8	1.0	0.2	24.1	-	48.8
Growing Degrees	5	12.3	12.6	13.2	16.2	15.2	13.8	14.7	13.2	12.8	13.0	12.9	149.9	174.7	149.6
	10	7.3	7.6	8.2	11.2	10.2	8.8	9.7	8.2	7.8	8.0	7.9	94.9	119.7	94.6

3rd 10-day period (21-31/10/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	25.7	30.7	-
Precipitation - Reference Evapotranspiration	-25.7	25.1	29.2
Number of Rainy Days	0.0	6.0	3.0
Number of Dry Days	14.0	10.0	-

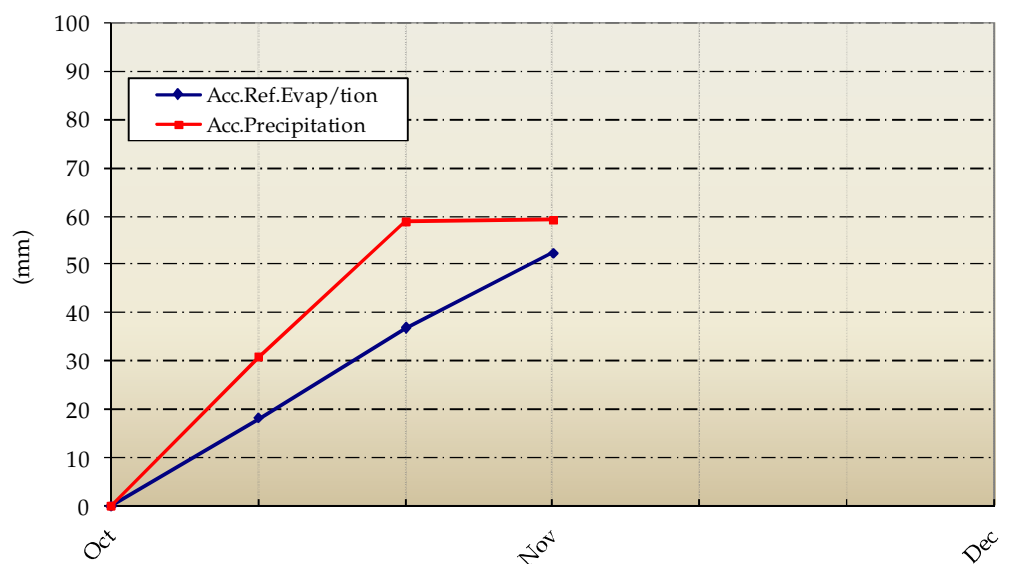
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-31/10/2013)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	21.2	22.0	24.6	22.0	21.7	24.8	22.4	22.4	23.0	23.8	21.8	22.7	20.2	17.6
	Min	2.0	5.6	4.8	4.4	3.8	2.8	3.4	4.1	5.2	6.8	4.3	4.3	7.6	7.0
Relative Humidity	Max	98	98	100	97	97	96	98	82	100	100	100	97	96	-
	Min	31	46	36	29	44	27	34	37	35	42	29	35	52	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	11.9
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	13.8
Sunshine Duration		5.9	4.5	5.0	7.2	6.3	6.6	7.2	8.5	7.6	7.8	7.4	6.7	4.6	4.6
Precipitation							0.0		0.0	0.0	0.1	0.1	0.2	168.0	37.6
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	-	18.9
Growing Degrees	5	6.6	8.8	9.7	8.2	7.8	8.8	7.9	8.3	9.1	10.3	8.1	93.5	97.9	81.3
	10	1.6	3.8	4.7	3.2	2.8	3.8	2.9	3.3	4.1	5.3	3.1	38.5	42.9	30.0

3rd 10-day period (21-31/10/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	15.6	16.3	14.7
Precipitation - Reference Evapotranspiration	-15.4	151.7	22.9
Number of Rainy Days	2.0	4.0	3.8
Number of Dry Days	12.0	10.0	-

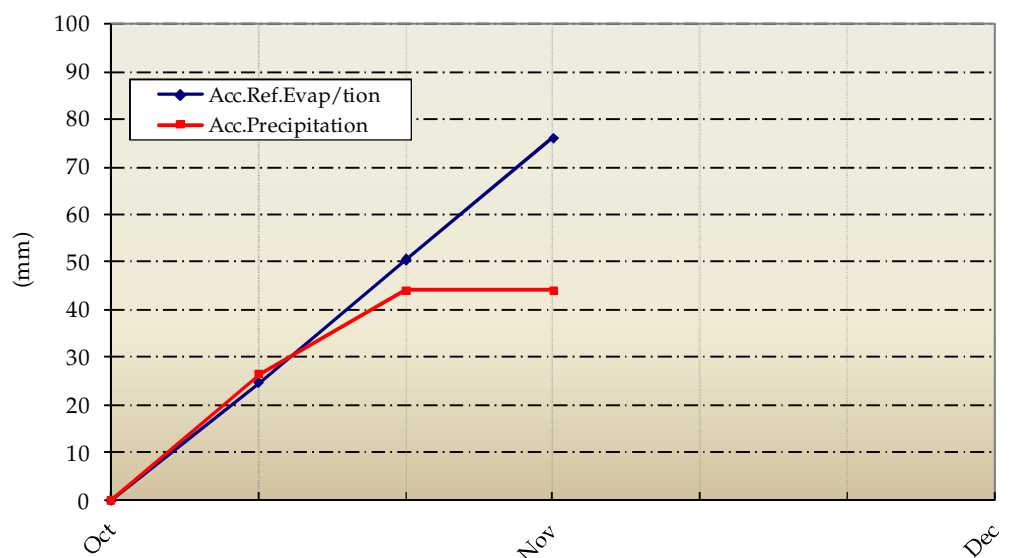
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-31/10/2013)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	23.3	23.4	25.4	26.6	24.1	25.1	24.0	24.6	24.2	23.8	24.1	24.4	24.5	22.3
	Min	10.6	10.3	10.8	11.0	11.9	11.4	8.3	8.8	8.0	9.8	10.8	10.2	13.3	11.5
Relative Humidity	Max	92	93	94	90	91	89	93	86	89	92	93	91	89	-
	Min	50	52	41	34	56	40	27	29	33	39	43	40	46	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	19.5	16.7
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	20.7	18.5
Sunshine Duration		9.2	9.4	9.5	9.5	9.0	9.4	9.5	9.3	9.6	9.6	10.4	9.5	6.6	5.9
Precipitation														3.5	43.6
Evaporation		4.8	2.0	1.0	7.1	3.9	2.6	3.2	3.4	10.8	3.6	4.0	46.4	30.1	36.3
Growing Degrees	5	12.0	11.9	13.1	13.8	13.0	13.3	11.2	11.7	11.1	11.8	12.5	135.2	152.6	130.7
	10	7.0	6.9	8.1	8.8	8.0	8.3	6.2	6.7	6.1	6.8	7.5	80.2	97.6	75.7

3rd 10-day period (21-31/10/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	25.7	27.8	21.6
Precipitation - Reference Evapotranspiration	-25.7	-24.3	22.0
Number of Rainy Days	0.0	4.0	3.7
Number of Dry Days	14.0	7.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

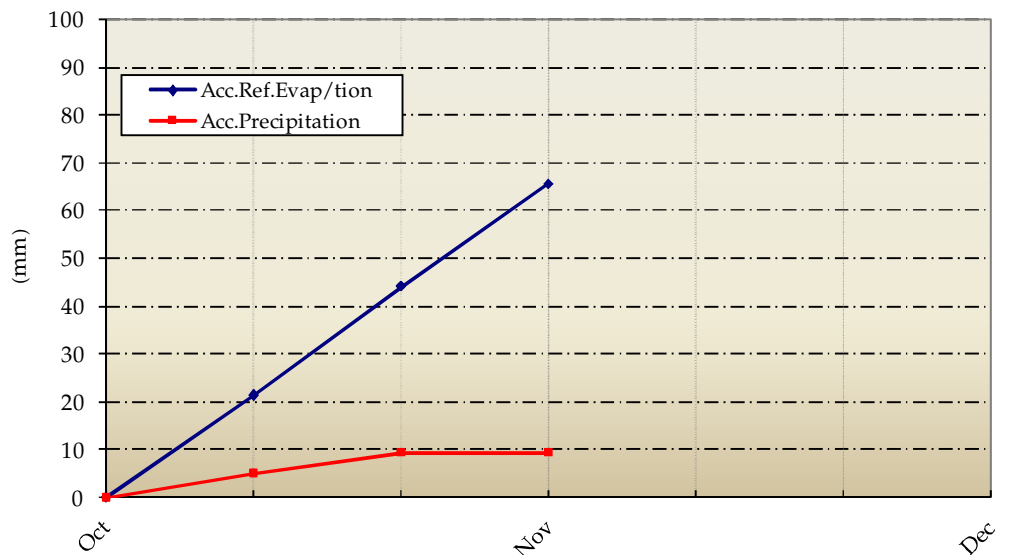


Larisa

3rd 10-day period (21-31/10/2013)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	25.0	26.6	26.4	24.4	25.3	25.2	25.0	26.4	26.6	25.8	25.0	25.6	22.4	18.9
	Min	6.0	6.6	8.2	8.2	7.0	5.2	5.0	5.4	6.2	7.2	7.4	6.6	10.4	8.3
Relative Humidity	Max	95	94	91	90	96	97	95	96	94	97	82	93	96	-
	Min	28	25	27	36	32	27	26	25	26	28	30	28	41	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	17.7	14.6
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	18.6	15.6
Sunshine Duration		7.7	7.6	7.7	10.2	7.6	7.5	7.5	7.4	7.3	6.5	7.1	7.6	4.6	4.4
Precipitation														25.9	23.9
Evaporation		3.6	7.3	5.2	4.0	1.9	4.5	1.3	3.4	3.1	1.7	4.4	40.4	28.1	24.8
Growing Degrees	5	10.5	11.6	12.3	11.3	11.2	10.2	10.0	10.9	11.4	11.5	11.2	122.1	125.3	94.1
	10	5.5	6.6	7.3	6.3	6.2	5.2	5.0	5.9	6.4	6.5	6.2	67.1	70.3	41.5

3rd 10-day period (21-31/10/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	21.5	17.8	16.4
Precipitation - Reference Evapotranspiration	-21.5	8.1	7.5
Number of Rainy Days	0.0	5.0	3.5
Number of Dry Days	15.0	6.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

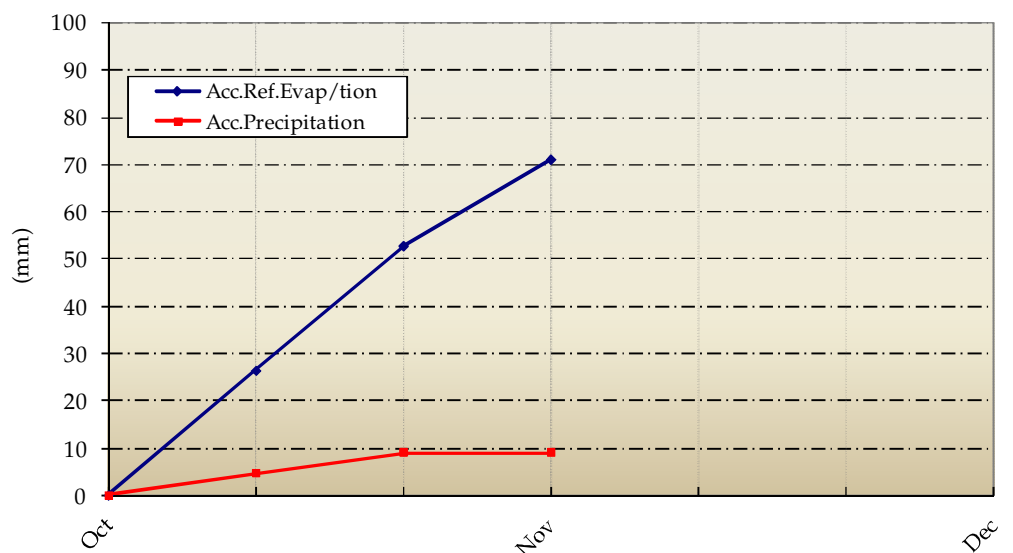


Mikra

3rd 10-day period (21-31/10/2013)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	21.8	23.7	24.8	22.9	21.6	20.6	20.6	20.7	21.0	22.9	24.5	22.3	21.9	18.1
	Min	8.8	9.3	10.6	10.6	10.6	11.4	11.8	10.8	10.9	11.6	9.7	10.6	13.2	9.2
Relative Humidity	Max	86	88	83	84	88	88	88	88	88	93	80	87	86	-
	Min	49	39	32	47	58	64	59	56	60	37	32	48	46	-
Soil Temperature at 10 cm	06 UTC	16.2	16.4	16.8	17.2	17.2	17.6	18.0	17.4	16.8	17.2	16.2	17.0	17.9	13.8
	12 UTC	20.0	20.0	20.4	20.2	20.4	20.6	20.8	21.0	20.2	20.0	20.0	20.3	22.1	16.0
Sunshine Duration		9.1	9.0	8.9	10.3	8.0	6.7	6.5	4.8	5.9	5.6	7.5	7.5	5.8	4.6
Precipitation														20.5	21.1
Evaporation		2.5	5.1	4.0	0.6	4.2	3.0	3.0	2.8	5.2	1.0	0.8	32.2	29.7	29.7
Growing Degrees	5	10.3	11.5	12.7	11.8	11.1	11.0	11.2	10.8	11.0	12.3	12.1	125.6	138.0	95.5
	10	5.3	6.5	7.7	6.8	6.1	6.0	6.2	5.8	6.0	7.3	7.1	70.6	83.0	42.9

3rd 10-day period (21-31/10/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	18.3	20.8	17.3
Precipitation - Reference Evapotranspiration	-18.3	-0.3	3.8
Number of Rainy Days	0.0	4.0	3.2
Number of Dry Days	20.0	10.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

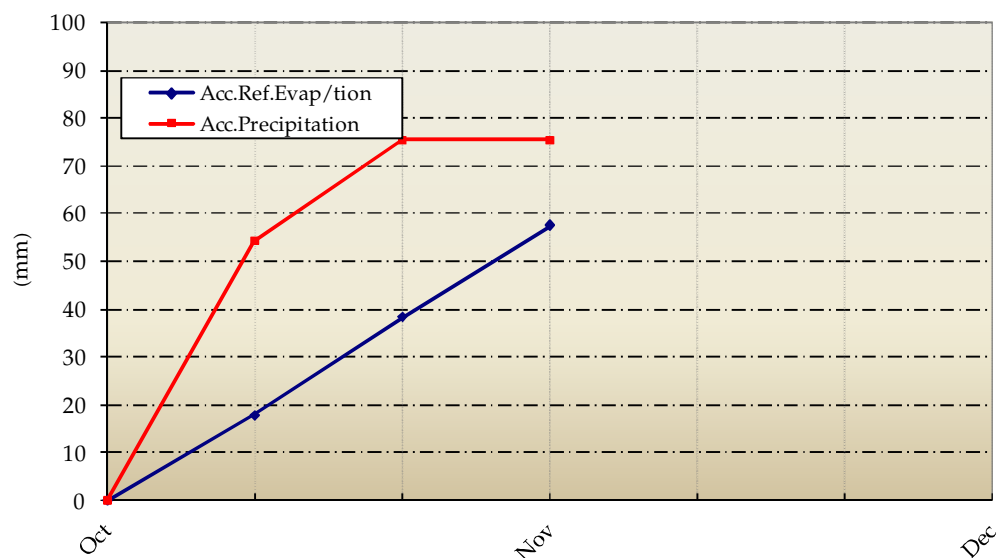


Tripoli

3rd 10-day period (21-31/10/2013)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	23.2	23.5	24.6	23.5	21.7	22.9	25.5	24.9	25.3	25.1	23.0	23.9	20.4	17.6
	Min	2.8	2.5	3.1	5.8	3.7	0.5	-1.2	1.0	1.3	2.3	3.1	2.3	8.0	6.5
Relative Humidity	Max	98	99	97	84	100	100	76	74	86	82	84	89	89	-
	Min	26	30	20	29	30	15	47	43	15	22	32	28	46	-
Soil Temperature at 10 cm	06 UTC	11.8	11.4	11.4	12.6	12.2	11.2	10.2	10.4	10.6	11.0	11.2	11.3	14.0	12.8
	12 UTC	16.8	17.2	17.2	17.4	17.2	16.2	-	-	15.6	16.2	15.4	16.6	17.2	14.2
Sunshine Duration		9.0	9.0	8.5	8.9	8.1	8.1	8.2	8.3	8.2	8.3	8.1	8.4	6.0	5.3
Precipitation														30.2	39.1
Evaporation		0.6	3.4	2.7	2.4	1.3	3.6	2.2	2.4	2.6	2.0	2.8	26.0	19.5	23.9
Growing Degrees	5	8.0	8.0	8.9	9.7	7.7	6.7	7.2	8.0	8.3	8.7	8.1	89.1	101.3	77.8
	10	3.0	3.0	3.9	4.7	2.7	1.7	2.2	3.0	3.3	3.7	3.1	34.1	46.3	27.7

3rd 10-day period (21-31/10/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	19.1	18.3	18.0
Precipitation - Reference Evapotranspiration	-19.1	11.9	21.1
Number of Rainy Days	0.0	2.0	3.8
Number of Dry Days	14.0	11.0	-

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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Helliniko, Athens



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ΥΠΗΡΕΣΙΑ

HELLENIC NATIONAL METEOROLOGICAL SERVICE

Division of Climatology-Applications

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