



AGROMETEOROLOGICAL BULLETIN

January 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
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Helliniko, Athens

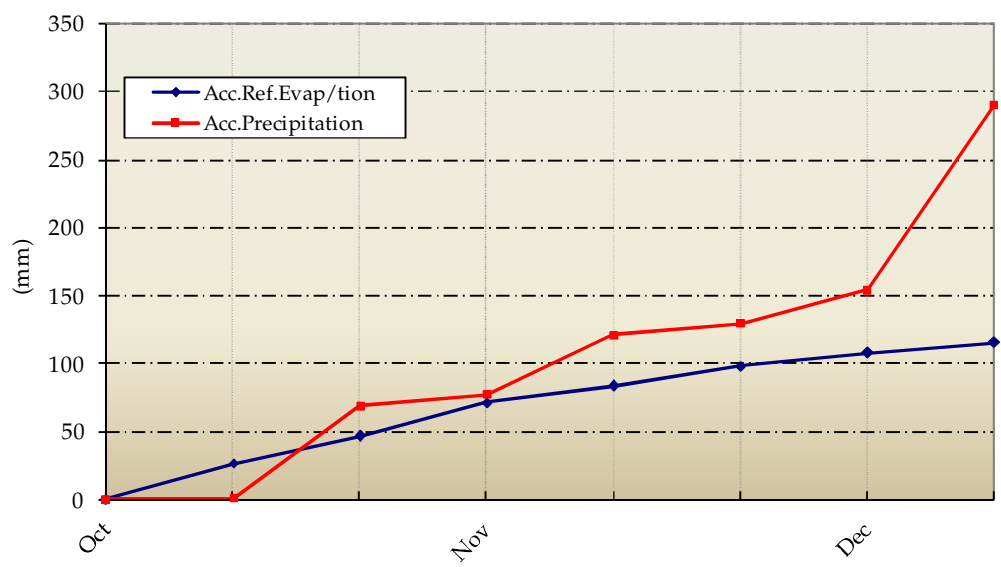
Web addresses of HNMS
www.hnms.gr
www.emy.gov.gr
www.meteo.gov.gr
www.meteohellas.gr

Agrinio

3rd 10-day period (21-31/01/2013)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	-	-	-	-	-	-	-	-	-	-	-		11.1	13.9
	Min	6.8	8.2	5.2	8.8	8.0	-	-	3.4	2.0	-0.4	1.0	4.8	1.8	3.3
Relative Humidity	Max	85	97	97	88	-	-	97	97	96	96	96	94	85	-
	Min	48	69	60	69	-	-	75	71	47	45	60	60	54	-
Soil Temperature at 10 cm	06 UTC	9.6	10.6	10.2	10.4	10.2	-	-	8.6	8.0	7.2	7.0	9.1	5.9	7.1
	12 UTC	10.8	11.2	10.4	10.8	-	-	-	9.4	8.8	8.0	8.2	9.7	6.6	8.9
Sunshine Duration		0.9	3.3	2.6	0.9	-	-	0.2	1.7	4.7	8.2	7.9	3.4	4.9	4.3
Precipitation		3.6	8.2	4.4	6.7	2.5							-	46.3	29.1
Evaporation		1.7	1.0	2.0	0.7	-	-	1.6	1.2	0.8	1.6	1.0	-	16.2	15.2
Growing Degrees	5	-	-	-	-	-	-	-	-	-	-	-	-	17.4	40.2
	10	-	-	-	-	-	-	-	-	-	-	-	-	0.0	5.9

3rd 10-day period (21-31/01/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	11.4	11.5
Precipitation - Reference Evapotranspiration	-	34.9	17.6
Number of Rainy Days	5.0	5.0	3.9
Number of Dry Days	2.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

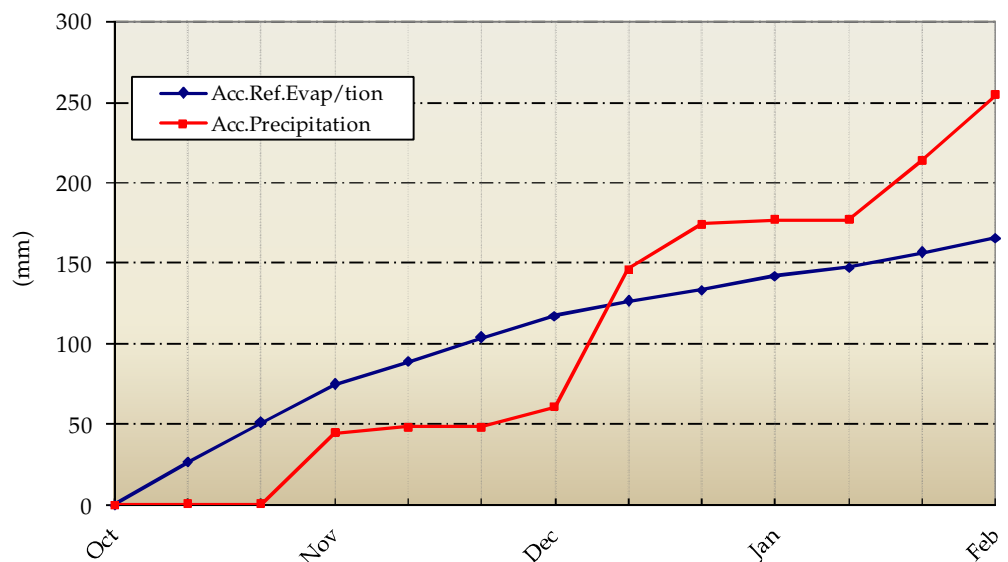


This station is not fully operated

3rd 10-day period (21-31/01/2013)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	16.4	17.0	15.8	13.4	14.6	9.4	3.4	3.0	6.6	6.2	8.2	10.4	6.0	8.8
	Min	10.8	10.0	10.4	8.6	5.4	1.5	-1.0	-2.4	-1.4	-2.2	-1.0	3.5	-1.1	1.4
Relative Humidity	Max	93	92	90	94	100	100	92	89	92	93	96	94	84	-
	Min	66	64	58	73	67	85	84	82	51	65	74	70	55	-
Soil Temperature at 10 cm	06 UTC	10.0	10.6	11.0	9.2	8.6	9.2	5.4	4.4	3.6	3.6	4.4	7.3	3.9	4.6
	12 UTC	11.2	12.0	12.0	10.0	10.4	7.4	5.4	5.0	4.8	4.6	4.6	7.9	4.4	5.8
Sunshine Duration		4.4	7.6	8.5	0.0	6.4	0.0	0.0	0.0	7.1	3.3	0.6	3.4	4.1	3.3
Precipitation			15.0		1.4	9.0	12.0	1.6				1.0	40.0	12.7	16.6
Evaporation		2.1	3.5	3.5	1.6	1.8	0.1	0.0	0.0	0.0	0.0	0.0	12.6	3.0	10.0
Growing Degrees	5	8.6	8.5	8.1	6.0	5.0	0.5	0.0	0.0	0.0	0.0	0.0	36.7	9.0	16.7
	10	3.6	3.5	3.1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.2	0.0	2.2

3rd 10-day period (21-31/01/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	9.0	10.2	10.8
Precipitation - Reference Evapotranspiration	31.0	2.5	5.8
Number of Rainy Days	6.0	3.0	2.7
Number of Dry Days	2.0	6.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

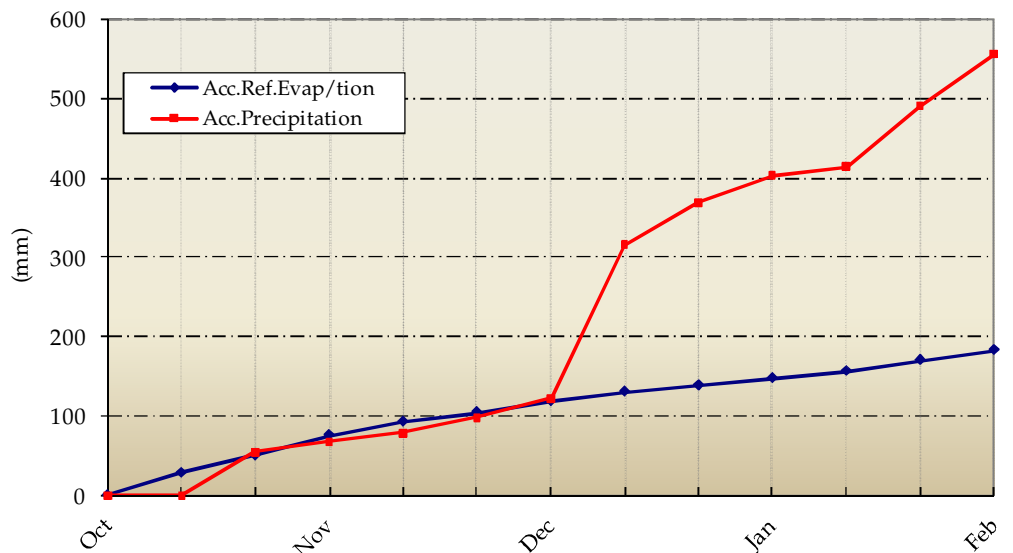


Andravida

3rd 10-day period (21-31/01/2013)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	17.8	16.2	16.0	16.1	12.2	11.1	12.0	13.2	14.3	14.0	16.2	14.5	11.7	14.0
	Min	11.6	9.4	8.5	10.7	8.6	7.9	7.2	5.2	4.7	1.6	4.8	7.3	4.1	5.3
Relative Humidity	Max	87	87	86	78	90	90	92	91	89	90	87	88	92	-
	Min	40	63	49	51	72	73	70	63	47	58	62	59	50	-
Soil Temperature at 10 cm	06 UTC	11.4	11.0	11.0	11.5	10.8	9.8	10.2	9.2	9.2	8.2	9.0	10.1	7.2	8.6
	12 UTC	12.2	12.2	13.4	12.6	11.2	10.2	10.4	10.8	11.4	11.2	12.0	11.6	9.4	10.2
Sunshine Duration		0.4	2.6	4.1	2.2	0.0	0.4	1.1	3.4	5.8	8.6	6.7	3.2	4.3	4.8
Precipitation		2.2	5.5	0.9	6.6	13.8	28.9	7.0	1.1				66.0	27.7	33.1
Evaporation		0.8	0.3	1.1	2.1	1.2	0.3	0.8	0.9	1.5	0.4	1.8	11.2	15.5	18.6
Growing Degrees	5	9.7	7.8	7.3	8.4	5.4	4.5	4.6	4.2	4.5	2.8	5.5	64.7	34.4	51.2
	10	4.7	2.8	2.3	3.4	0.4	0.0	0.0	0.0	0.0	0.0	0.5	14.1	5.1	9.9

3rd 10-day period (21-31/01/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	12.4	11.9	11.9
Precipitation - Reference Evapotranspiration	53.6	15.8	21.2
Number of Rainy Days	8.0	4.0	4.6
Number of Dry Days	0.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

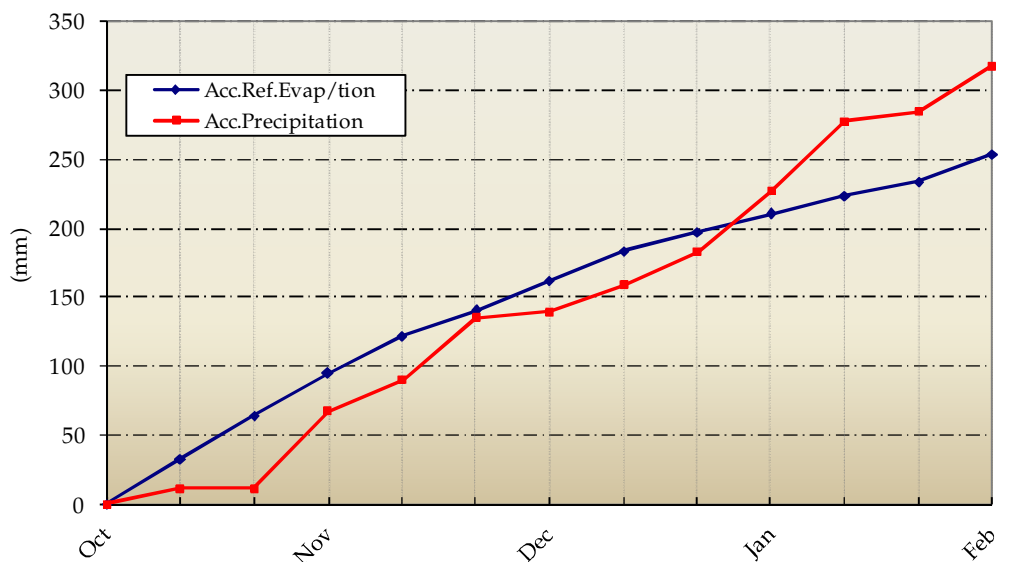


Iraklio

3rd 10-day period (21-31/01/2013)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	20.4	18.6	17.4	19.2	18.0	14.2	15.0	13.8	13.2	13.4	15.6	16.3	-	15.0
	Min	15.2	11.2	10.8	11.8	9.0	8.6	9.0	8.6	10.4	9.4	10.2	10.4	-	8.9
Relative Humidity	Max	75	91	85	92	80	89	90	90	92	78	85	86	-	-
	Min	34	56	59	53	46	67	48	64	66	57	61	56	-	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		8.4	8.3	6.8	5.9	5.8	1.0	4.4	3.7	0.0	1.7	6.0	4.7	-	4.0
Precipitation						3.7	10.6	0.1	7.8	7.5	3.6		33.3	-	25.2
Evaporation		4.3	0.2	4.2	6.1	1.0	1.3	4.5	8.5	2.5	2.7	3.0	38.3	-	29.5
Growing Degrees	5	12.8	9.9	9.1	10.5	8.5	6.4	7.0	6.2	6.8	6.4	7.9	91.5	-	76.7
	10	7.8	4.9	4.1	5.5	3.5	1.4	2.0	1.2	1.8	1.4	2.9	36.5	-	23.4

3rd 10-day period (21-31/01/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	20.1	-	-
Precipitation - Reference Evapotranspiration	13.2	-	25.2
Number of Rainy Days	6.0	-	4.4
Number of Dry Days	5.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

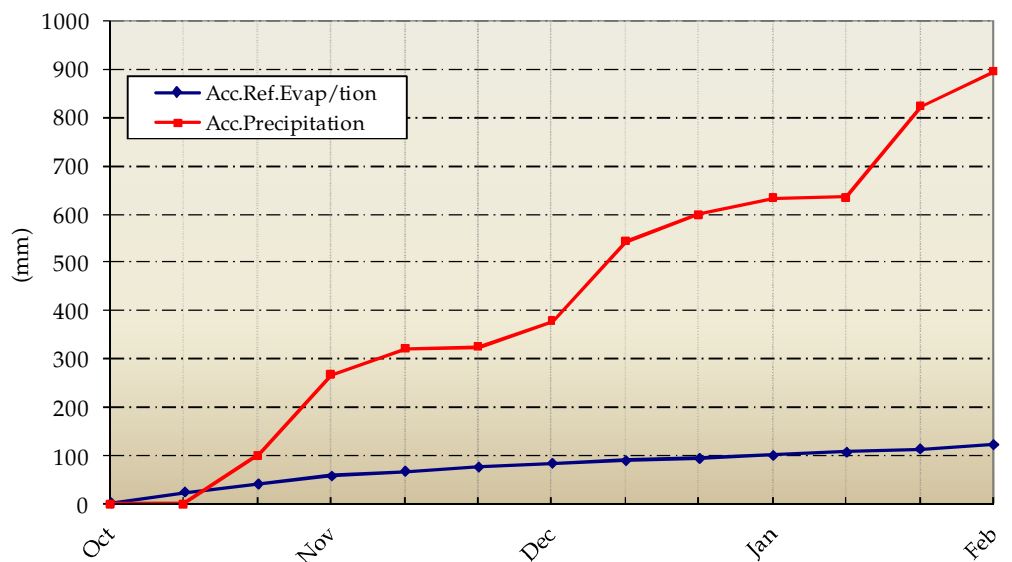


Ioannina

3rd 10-day period (21-31/01/2013)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	15.0	8.8	10.4	9.2	6.0	10.8	6.6	7.8	9.6	12.0	12.0	9.8	7.0	9.3
	Min	5.2	6.5	5.0	4.4	4.2	4.4	3.0	1.4	-1.5	-2.2	-1.4	2.6	-0.8	0.7
Relative Humidity	Max	94	94	94	94	94	90	90	93	93	92	97	93	92	-
	Min	47	91	60	70	84	54	76	64	48	36	42	61	47	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	3.7
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	4.6
Sunshine Duration		1.4	0.0	3.5	1.0	0.0	5.4	0.3	0.0	3.7	6.0	4.6	2.4	3.5	3.1
Precipitation		6.0	29.7	5.1	13.3	16.0	0.1	0.0					70.2	33.9	37.2
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	-	8.0
Growing Degrees	5	5.1	2.7	2.7	1.8	0.1	2.6	0.0	0.0	0.0	0.0	0.3	15.3	5.2	13.3
	10	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.4

3rd 10-day period (21-31/01/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	9.0	8.3	8.6
Precipitation - Reference Evapotranspiration	61.2	25.6	28.6
Number of Rainy Days	6.0	5.0	4.3
Number of Dry Days	0.0	6.0	-

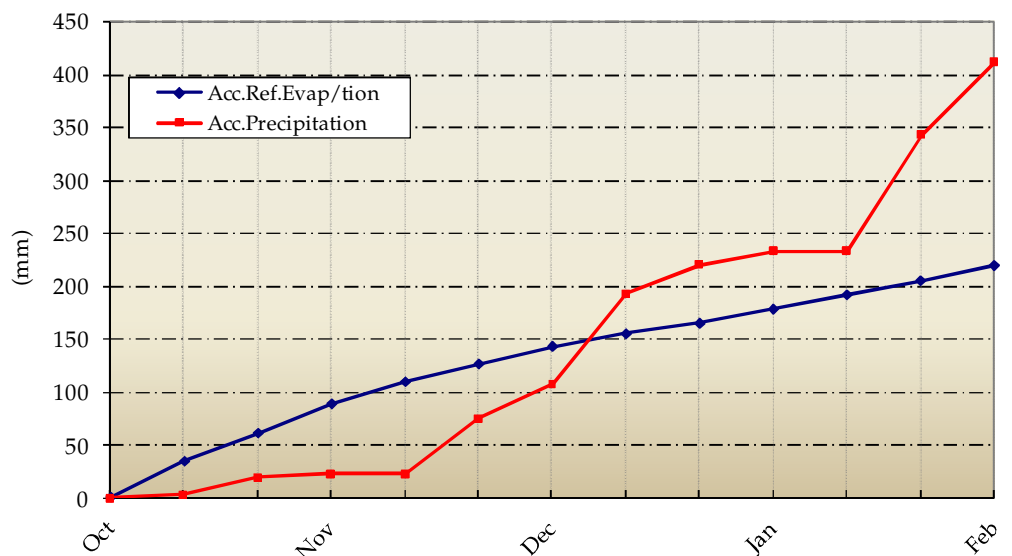
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-31/01/2013)		21	22	23	24	25	26	27	28	29	30	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	18.0	15.0	16.6	16.5	14.0	12.7	14.2	13.7	14.2	16.2	17.6	15.3	12.7	14.8
	Min	6.9	9.1	5.8	8.1	8.1	7.6	7.2	4.2	5.2	3.1	5.2	6.4	4.1	5.3
Relative Humidity	Max	93	94	95	93	94	95	95	94	92	92	85	93	85	-
	Min	52	78	51	57	75	75	56	52	47	41	52	58	51	-
Soil Temperature at 10 cm	06 UTC	11.0	11.0	10.8	11.6	11.2	10.6	11.0	10.2	10.2	9.8	10.0	10.7	8.3	9.0
	12 UTC	11.6	11.6	11.2	11.2	11.4	11.2	11.6	12.0	10.6	10.6	10.8	11.3	9.2	10.3
Sunshine Duration		0.0	0.0	5.1	0.2	0.1	0.3	2.8	6.8	4.8	8.5	7.7	3.3	4.6	4.4
Precipitation		2.5	2.4	1.0	11.5	17.8	23.5	10.2					68.9	41.9	36.5
Evaporation		1.2	0.5	2.6	0.0	1.5	0.3	2.3	1.8	2.4	1.6	2.0	16.2	19.9	21.4
Growing Degrees	5	7.5	7.1	6.2	7.3	6.1	5.2	5.7	4.0	4.7	4.7	6.4	64.6	37.9	55.6
	10	2.5	2.1	1.2	2.3	1.1	0.2	0.7	0.0	0.0	0.0	1.4	11.3	3.9	9.3

3rd 10-day period (21-31/01/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	14.4	14.8	13.4
Precipitation - Reference Evapotranspiration	54.5	27.1	23.1
Number of Rainy Days	7.0	6.0	4.7
Number of Dry Days	1.0	5.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

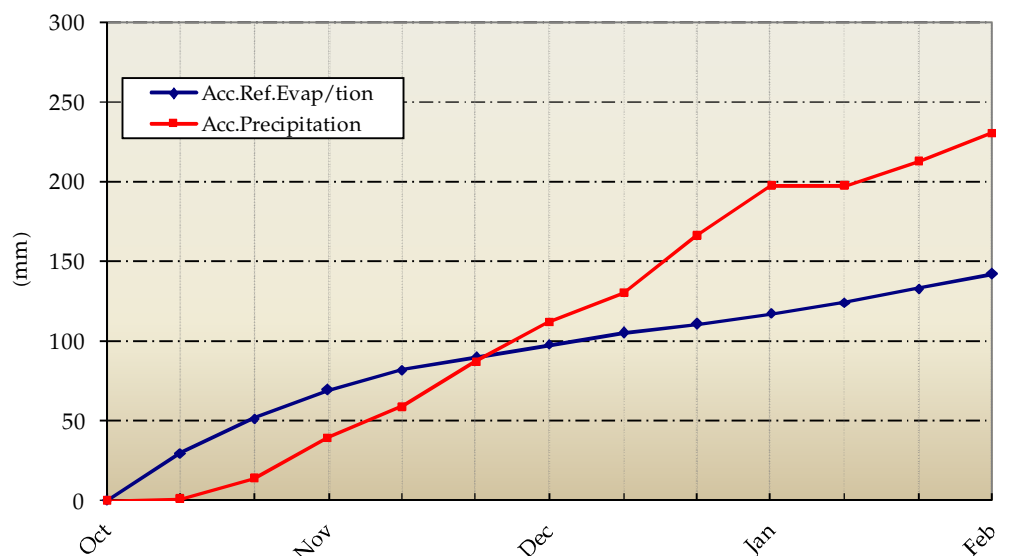


Larisa

3rd 10-day period (21-31/01/2013)		21	22	23	24	25	26	27	28	29	30	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	16.6	14.6	16.0	12.9	7.8	9.4	7.4	11.2	11.6	11.4	12.2	11.9	9.4	10.7
	Min	3.2	3.2	4.2	2.2	0.7	4.1	4.4	-0.5	0.5	-2.6	-1.3	1.6	0.6	1.2
Relative Humidity	Max	99	100	96	99	100	100	83	99	100	99	100	98	84	-
	Min	35	57	33	67	89	69	62	57	46	47	52	56	46	-
Soil Temperature at 10 cm	06 UTC	7.2	9.2	7.4	7.2	6.8	7.0	7.4	6.6	5.2	5.4	5.8	6.8	4.3	5.5
	12 UTC	8.2	-	9.0	8.0	7.0	8.2	7.8	8.2	7.8	6.8	7.2	7.8	5.5	6.2
Sunshine Duration		2.5	3.0	7.0	0.5	0.0	0.1	0.7	7.5	6.2	5.0	3.2	3.2	4.8	3.5
Precipitation					10.0	7.9	0.2	0.0					18.1	2.4	10.7
Evaporation		2.7	0.1	1.5	0.4	0.0	0.1	0.5	2.6	0.0	0.0	0.0	7.9	19.0	7.0
Growing Degrees	5	4.9	3.9	5.1	2.6	0.0	1.8	0.9	0.4	1.1	0.0	0.5	21.0	9.9	18.5
	10	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	1.5

3rd 10-day period (21-31/01/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	9.2	12.0	8.6
Precipitation - Reference Evapotranspiration	8.9	-9.6	2.1
Number of Rainy Days	3.0	2.0	3.0
Number of Dry Days	5.0	13.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

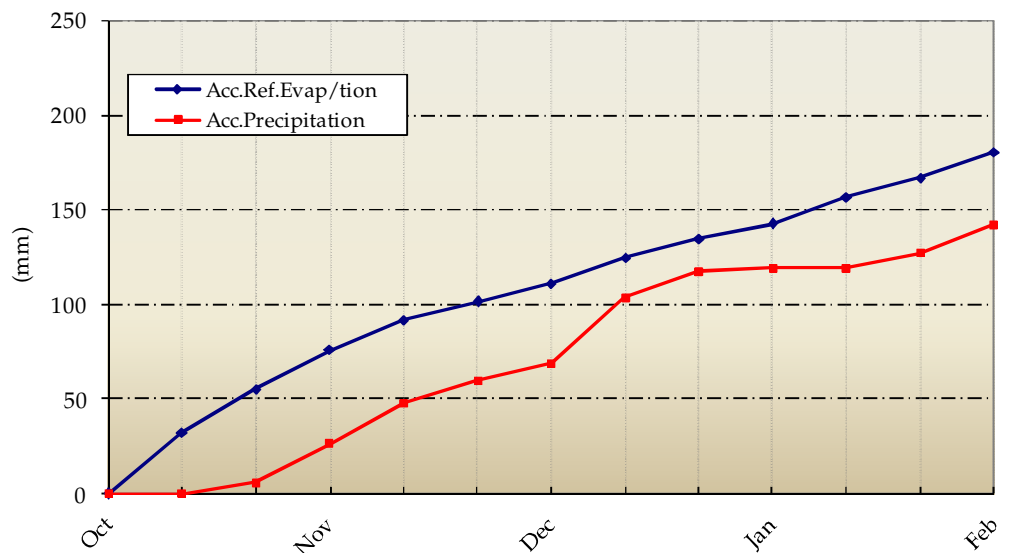


Mikra

3rd 10-day period (21-31/01/2013)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	17.0	15.7	16.4	9.2	9.3	9.8	6.3	9.0	10.5	12.6	12.4	11.7	6.0	9.8
	Min	3.0	4.6	4.0	4.0	1.2	5.6	3.8	0.1	0.0	-1.0	3.0	2.6	-0.5	1.9
Relative Humidity	Max	93	93	90	92	95	90	78	90	88	84	84	89	86	-
	Min	57	49	28	65	85	64	59	54	44	37	42	53	51	-
Soil Temperature at 10 cm	06 UTC	7.4	8.2	8.4	8.2	7.0	8.2	6.4	6.2	5.8	5.4	6.4	7.1	3.7	5.1
	12 UTC	8.4	10.4	9.6	10.2	10.2	8.0	8.8	9.4	7.0	6.4	7.8	8.7	4.4	6.5
Sunshine Duration		2.8	2.9	7.9	0.1	0.0	0.6	0.0	5.1	5.5	7.4	4.0	3.3	3.7	3.5
Precipitation					6.8	3.0	5.6					0.0	15.4	8.0	11.8
Evaporation		0.4	1.4	3.9	1.7	-	2.0	0.4	1.7	3.1	3.2	1.0	-	-	12.6
Growing Degrees	5	5.0	5.2	5.2	1.6	0.3	2.7	0.1	0.0	0.3	0.8	2.7	23.7	1.0	18.0
	10	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	1.5

3rd 10-day period (21-31/01/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	13.8	11.7	9.9
Precipitation - Reference Evapotranspiration	1.6	-3.7	1.9
Number of Rainy Days	3.0	2.0	3.3
Number of Dry Days	5.0	9.0	-

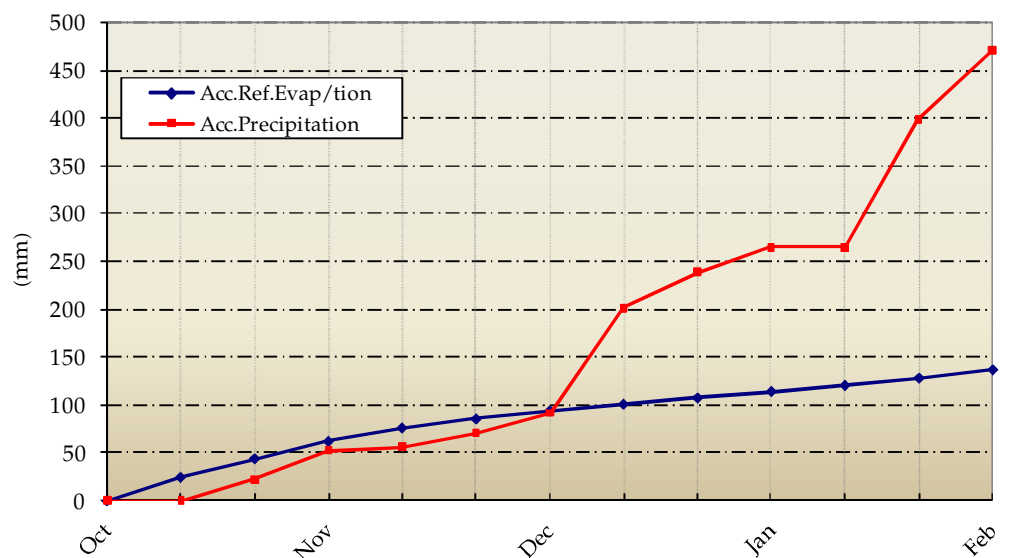
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-31/01/2013)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	14.7	10.8	11.6	12.7	8.1	5.9	7.0	7.6	9.6	12.8	15.4	10.6	6.8	9.8
	Min	4.4	7.3	5.0	4.7	3.8	0.9	2.4	-1.0	-1.4	-3.6	-2.6	1.8	-1.0	0.9
Relative Humidity	Max	88	80	80	96	92	98	99	100	100	100	100	94	84	-
	Min	53	71	51	61	76	97	95	66	50	30	52	64	54	-
Soil Temperature at 10 cm	06 UTC	6.0	6.8	6.4	6.6	5.6	5.0	5.4	4.0	3.2	3.0	3.2	5.0	2.9	4.6
	12 UTC	9.0	8.4	8.6	9.2	7.0	-	-	6.4	6.6	6.6	7.2	7.7	4.2	5.4
Sunshine Duration		4.9	2.8	5.9	2.3	0.0	0.0	0.0	3.4	2.9	7.2	6.8	3.3	3.8	4.0
Precipitation		3.9	5.3	1.6	17.8	20.7	17.7	5.1					72.1	29.8	32.5
Evaporation		1.2	0.6	0.2	0.0	0.6	0.4	0.1	1.8	1.2	2.6	0.0	8.7	2.2	8.6
Growing Degrees	5	4.6	4.1	3.3	3.7	1.0	0.0	0.0	0.0	0.0	0.0	1.4	18.0	4.9	14.3
	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	0.0	0.9

3rd 10-day period (21-31/01/2013)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	8.6	10.5	11.0
Precipitation - Reference Evapotranspiration	63.5	19.3	21.5
Number of Rainy Days	7.0	4.0	4.6
Number of Dry Days	1.0	6.0	-

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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