



AGROMETEOROLOGICAL BULLETIN

December 2010
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

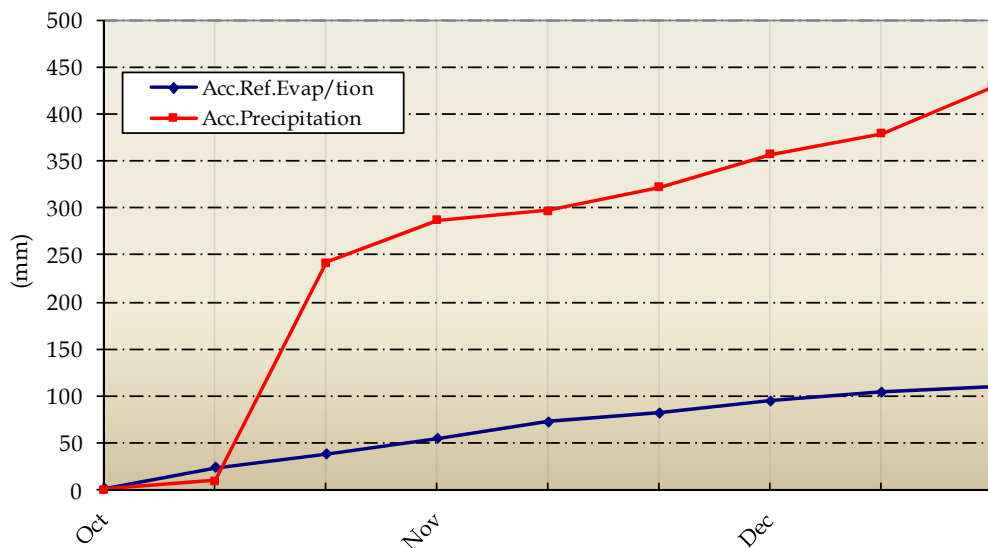
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www.hnms.gr
www.emy.gov.gr
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www.meteohellas.gr

Agrinio

2nd 10-day period (11-20/12/2010)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	16.5	12.0	9.8	12.2	11.6	8.4	7.0	13.0	15.4	17.5	12.3	-	14.6
	Min	0.0	-3.0	2.0	1.5	2.0	4.0	-0.5	-1.0	0.0	7.0	1.2	-	4.3
Relative Humidity	Max	-	87	100	100	91	97	97	100	100	97	97	-	-
	Min	-	36	91	43	48	72	71	76	77	69	65	-	-
Soil Temperature at 10 cm	06 UTC	10.0	-	8.6	8.4	9.0	8.6	7.4	6.2	8.8	9.8	8.5	-	8.3
	12 UTC	10.0	8.2	9.2	9.6	9.6	9.0	8.0	8.0	10.0	10.6	9.2	-	10.0
Sunshine Duration		8.2	8.4	0.0	7.1	4.2	0.0	0.5	1.2	1.1	1.0	3.2	-	3.5
Precipitation				29.2			9.8	2.8	3.0	4.4		49.2	-	49.2
Evaporation		0.6	4.4	0.6	1.2	1.4	0.4	0.4	0.0	0.8	0.8	10.6	-	13.6
Growing Degrees	5	3.3	0.0	0.9	1.9	1.8	1.2	0.0	1.0	2.7	7.3	20.0	-	45.7
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	2.3	-	9.2

2nd 10-day period (11-20/12/2010)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	5.6	-	7.4
Precipitation - Reference Evapotranspiration	43.6	-	41.8
Number of Rainy Days	5.0	-	4.5
Number of Dry Days	7.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

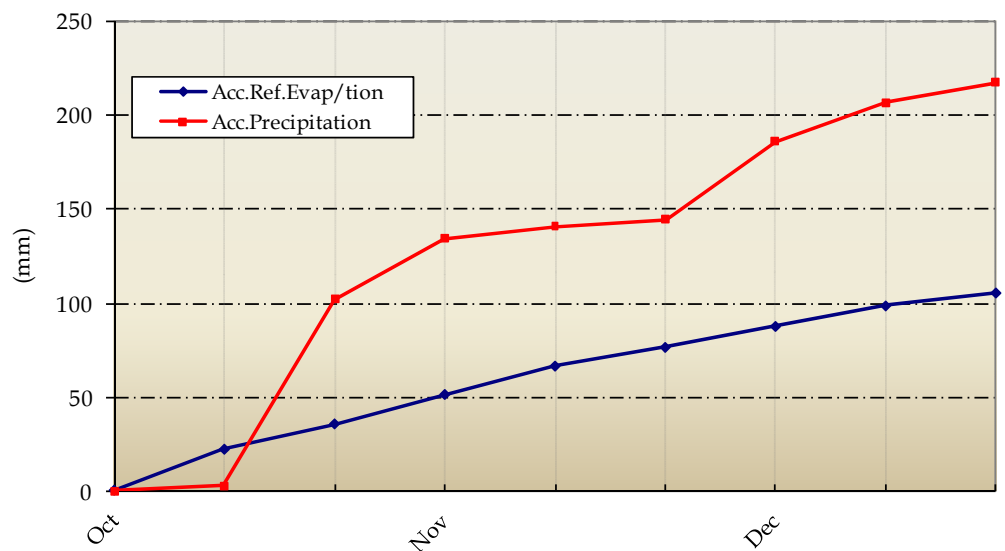


Alexandroupoli

2nd 10-day period (11-20/12/2010)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	4.4	5.6	7.0	7.2	4.0	2.8	3.6	13.0	14.4	9.2	7.1	8.8	10.6
	Min	0.8	-6.6	-0.8	0.2	1.2	-0.2	0.2	-3.6	6.4	4.0	0.2	3.5	3.1
Relative Humidity	Max	69	85	96	96	100	90	96	96	88	94	91	95	-
	Min	38	51	63	66	49	55	83	59	64	71	60	72	-
Soil Temperature at 10 cm	06 UTC	8.0	5.2	6.6	5.2	5.6	4.2	4.6	3.2	8.8	6.6	5.8	7.5	6.3
	12 UTC	7.4	5.2	6.2	6.0	5.6	4.2	5.0	4.4	7.6	7.0	5.9	8.1	7.5
Sunshine Duration		1.6	7.4	7.4	4.6	0.0	0.0	0.8	2.7	1.5	0.0	2.6	1.4	2.5
Precipitation				2.7		0.7	4.5	1.7		1.0		10.6	99.3	23.7
Evaporation		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	2.4	7.3	11.7
Growing Degrees	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4	1.6	7.0	18.2	26.7
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.4	2.2	5.3

2nd 10-day period (11-20/12/2010)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.9	6.6	8.1
Precipitation - Reference Evapotranspiration	3.7	92.7	15.6
Number of Rainy Days	5.0	9.0	2.9
Number of Dry Days	2.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

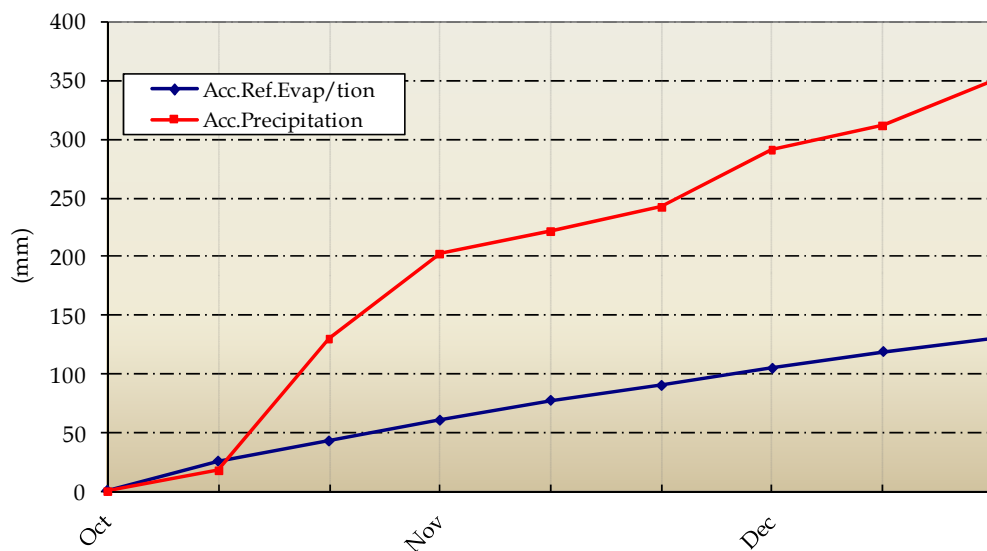


Andravida

2nd 10-day period (11-20/12/2010)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	11.0	12.0	15.2	13.4	12.8	12.2	10.0	14.6	16.8	20.6	13.9	16.3	15.1
	Min	2.4	-0.8	5.0	5.6	6.2	8.4	4.0	3.4	9.6	10.8	5.5	8.7	6.8
Relative Humidity	Max	66	81	95	91	88	92	90	88	92	85	87	93	-
	Min	23	38	61	52	58	64	72	62	68	49	55	59	-
Soil Temperature at 10 cm	06 UTC	8.8	5.6	9.2	9.6	9.8	10.0	9.0	7.0	9.8	11.2	9.0	12.0	9.7
	12 UTC	9.2	8.8	11.4	12.2	11.4	11.4	9.2	9.4	12.2	12.6	10.8	13.4	11.2
Sunshine Duration		7.5	8.0	2.3	5.9	7.0	2.9	2.1	2.4	2.6	1.5	4.2	3.1	4.1
Precipitation				12.4	0.0	0.6	15.7	7.0	3.3			39.0	23.1	43.9
Evaporation		0.7	4.4	0.8	1.0	0.6	1.1	2.2	2.8	0.5	1.4	15.5	14.2	19.6
Growing Degrees	5	1.7	0.6	5.1	4.5	4.5	5.3	2.0	4.0	8.2	10.7	46.6	74.9	59.8
	10	0.0	0.0	0.1	0.0	0.0	0.3	0.0	0.0	3.2	5.7	9.3	27.6	16.6

2nd 10-day period (11-20/12/2010)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	11.2	10.0	9.0
Precipitation - Reference Evapotranspiration	27.8	13.1	34.9
Number of Rainy Days	5.0	8.0	4.7
Number of Dry Days	7.0	1.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

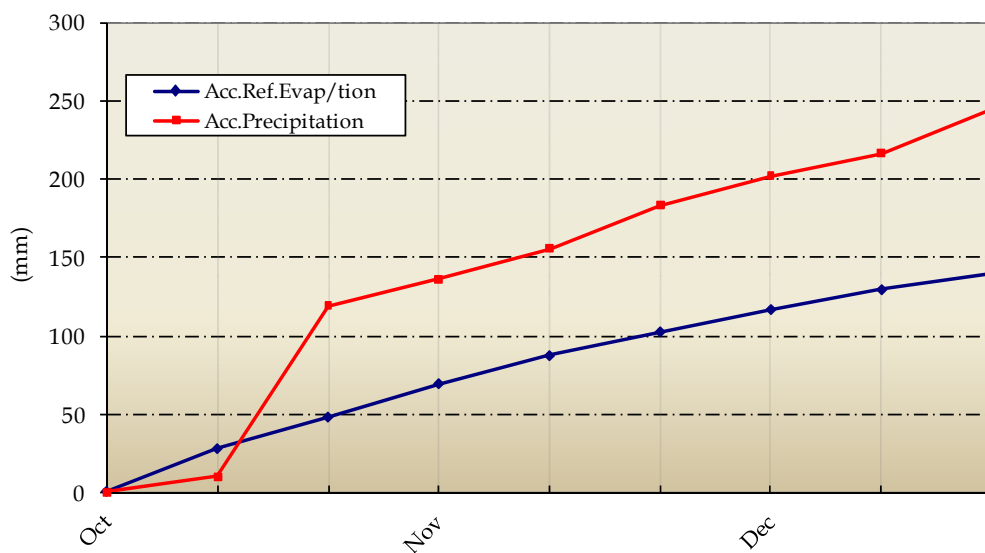


Kalamata

2nd 10-day period (11-20/12/2010)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	11.0	13.0	17.2	14.8	14.0	14.0	11.0	12.8	17.4	18.2	14.3	16.6	15.9
	Min	0.6	-2.8	1.8	4.0	5.0	7.8	1.4	0.6	10.6	11.2	4.0	7.9	6.6
Relative Humidity	Max	69	87	97	100	97	97	97	96	95	89	92	94	-
	Min	25	28	72	39	65	67	80	69	68	56	57	66	-
Soil Temperature at 10 cm	06 UTC	12.8	10.0	10.2	11.2	11.4	11.6	11.2	10.0	11.4	12.6	11.2	12.6	10.6
	12 UTC	12.6	10.4	11.0	11.4	11.6	12.2	10.8	10.6	12.0	13.2	11.6	13.1	11.5
Sunshine Duration		8.3	8.3	0.9	6.0	1.5	1.6	1.2	4.9	3.0	0.0	3.6	2.8	3.9
Precipitation				11.2		0.2	10.0	5.0	2.3			28.7	66.8	53.6
Evaporation		0.0	0.0	0.5	1.8	0.6	1.0	0.0	0.5	1.0	0.8	6.2	17.3	23.9
Growing Degrees	5	0.8	0.1	4.5	4.4	4.5	5.9	1.2	1.7	9.0	9.7	41.8	72.4	62.3
	10	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	4.0	4.7	9.6	23.1	17.2

2nd 10-day period (11-20/12/2010)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	10.3	10.5	10.5
Precipitation - Reference Evapotranspiration	18.4	56.3	43.1
Number of Rainy Days	5.0	7.0	4.7
Number of Dry Days	7.0	1.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

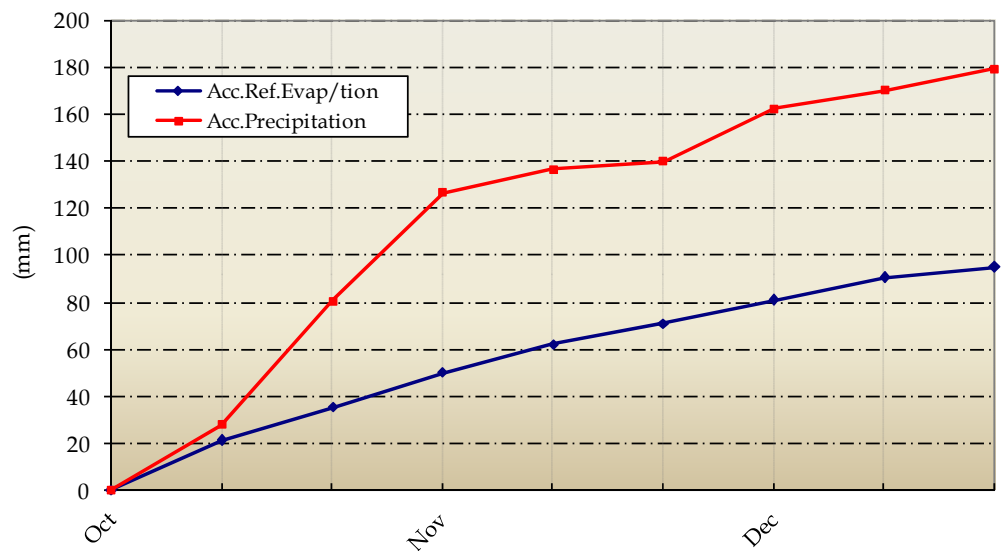


Larisa

2nd 10-day period (11-20/12/2010)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	5.4	7.0	5.0	9.6	4.6	2.2	0.6	4.2	5.0	8.0	5.2	10.6	11.0
	Min	-0.6	-5.8	-2.6	0.2	0.6	-1.6	-10.0	-12.0	-4.0	1.4	-3.4	5.4	1.7
Relative Humidity	Max	85	90	93	96	90	93	96	96	96	97	93	98	-
	Min	32	25	78	54	49	81	69	52	62	77	58	77	-
Soil Temperature at 10 cm	06 UTC	7.2	6.0	6.4	2.0	7.4	4.8	3.2	1.6	1.6	3.0	4.3	9.3	6.9
	12 UTC	8.2	7.2	5.6	7.6	7.6	4.8	2.8	0.6	4.4	5.4	5.4	9.7	7.3
Sunshine Duration		7.0	7.4	0.0	7.0	0.5	0.0	3.2	3.9	1.5	0.9	3.1	0.8	3.1
Precipitation				0.0			9.4					9.4	37.9	14.0
Evaporation		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	4.5	6.0
Growing Degrees	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.3	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 (11-20/12/2010)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	4.4	5.2	5.8
Precipitation - Reference Evapotranspiration	5.0	32.7	8.2
Number of Rainy Days	1.0	7.0	3.3
Number of Dry Days	5.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

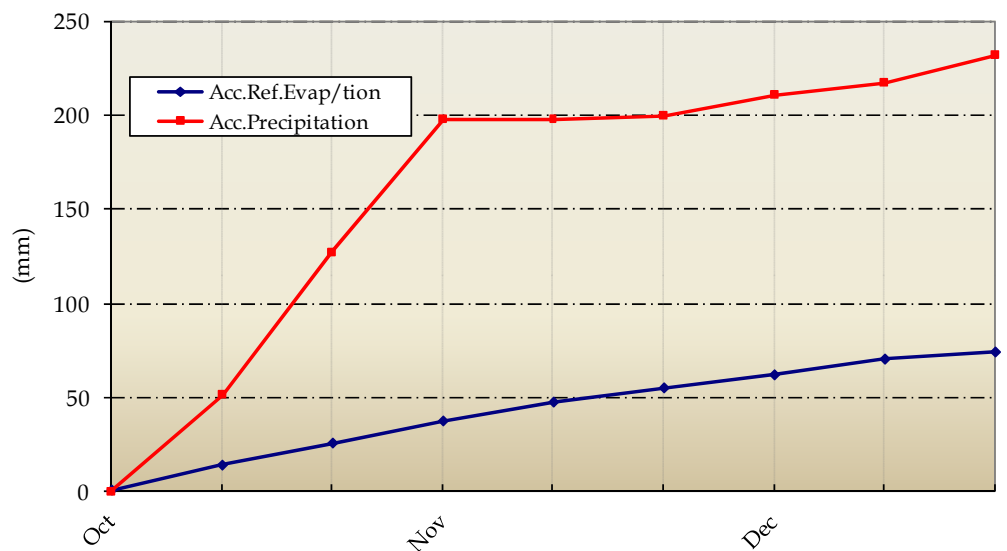


Series

2nd 10-day period (11-20/12/2010)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	4.4	6.0	1.4	5.8	3.8	-1.0	2.6	3.4	11.8	9.8	4.8	9.0	8.9
	Min	0.4	-5.4	-1.8	-1.2	-3.2	-3.0	-7.6	-7.0	-1.0	3.0	-2.7	3.9	1.0
Relative Humidity	Max	73	92	96	96	96	96	96	92	93	91	92	93	-
	Min	28	34	92	63	49	87	64	59	58	69	60	77	-
Soil Temperature at 10 cm	06 UTC	6.0	4.4	4.0	3.2	4.0	4.0	3.2	3.2	3.4	3.8	3.9	8.3	4.7
	12 UTC	5.6	4.2	4.0	3.0	4.0	4.0	3.2	3.0	3.4	3.8	3.8	8.7	5.3
Sunshine Duration		4.3	3.1	0.0	3.2	1.5	0.0	2.8	0.0	4.4	0.0	1.9	0.2	2.5
Precipitation				10.0			5.0				0.0	15.0	26.1	14.9
Evaporation		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8	4.2
Growing Degrees	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.4	1.8	18.8	12.7
	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	0.6

2nd 10-day period (11-20/12/2010)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	3.8	4.5	4.2
Precipitation - Reference Evapotranspiration	11.2	21.6	10.7
Number of Rainy Days	2.0	6.0	3.0
Number of Dry Days	2.0	2.0	-

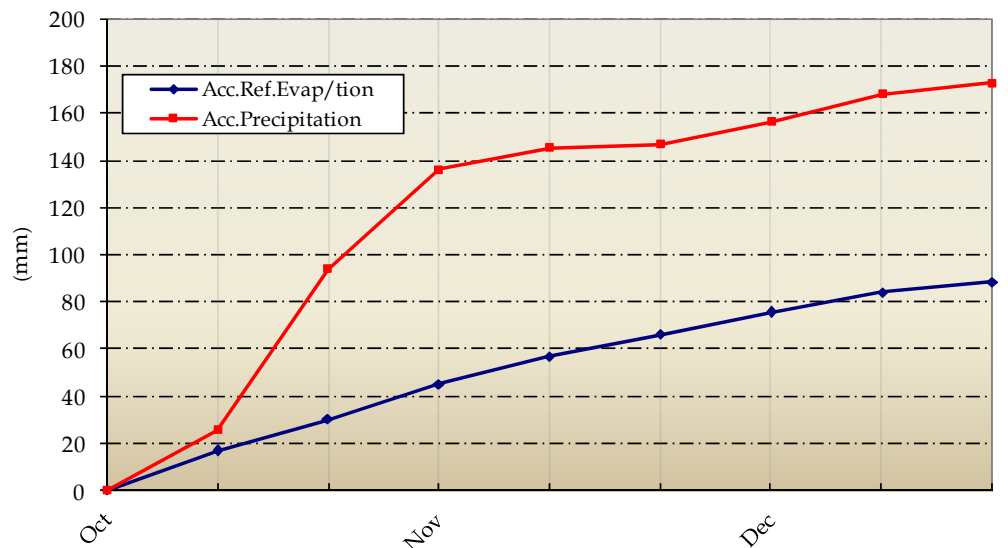
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



2nd 10-day period (11-20/12/2010)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	2.8	10.0	2.4	5.4	1.8	-1.4	3.2	5.4	11.2	10.0	5.1	8.4	10.4
	Min	-1.8	-5.6	-0.6	-2.2	-4.2	-5.6	-6.4	-5.8	-1.2	4.8	-2.9	3.7	2.2
Relative Humidity	Max	86	99	92	85	100	95	99	99	94	98	95	96	-
	Min	31	31	87	44	41	87	54	57	68	88	59	76	-
Soil Temperature at 10 cm	06 UTC	7.4	5.2	4.8	5.6	5.0	4.2	4.2	4.0	3.8	6.2	5.0	7.7	6.6
	12 UTC	7.4	5.4	4.8	6.2	5.0	4.4	4.4	4.0	4.8	6.4	5.3	8.1	6.8
Sunshine Duration		8.1	6.8	0.0	6.9	7.0	0.0	8.2	5.6	5.7	0.0	4.8	0.8	3.2
Precipitation				4.2			0.8					5.0	36.7	15.2
Evaporation		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8	5.9	4.7
Growing Degrees	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	2.4	16.2	21.4
	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	1.9

2nd 10-day period (11-20/12/2010)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	4.4	5.3	5.3
Precipitation - Reference Evapotranspiration	0.6	31.4	9.9
Number of Rainy Days	2.0	8.0	3.0
Number of Dry Days	2.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

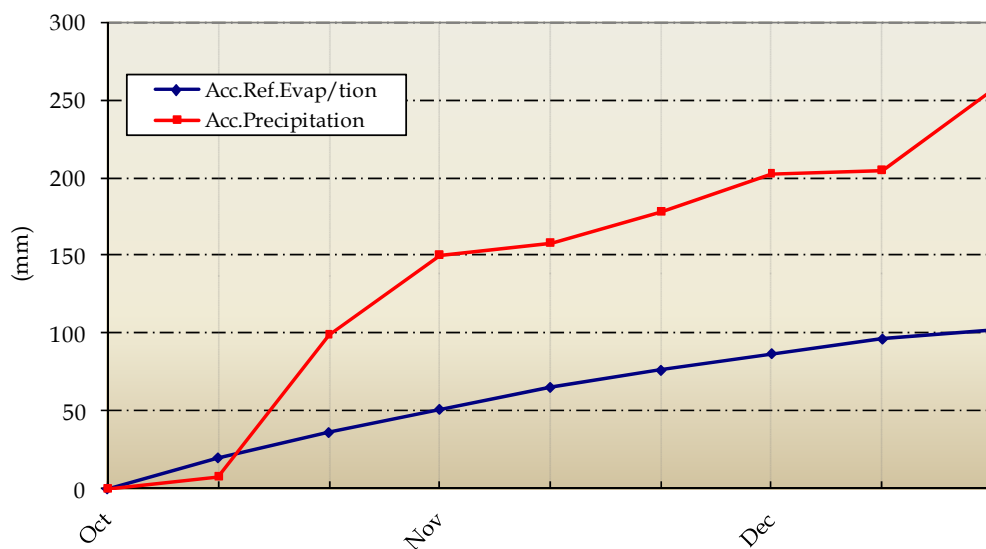


Tripoli

2nd 10-day period (11-20/12/2010)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	6.2	7.0	8.8	9.8	6.6	8.6	5.8	8.6	12.2	15.2	8.9	-	10.8
	Min	-3.2	-8.2	-0.8	0.8	1.0	2.8	-1.4	0.4	7.4	8.4	0.7	-	1.8
Relative Humidity	Max	80	90	97	96	97	100	92	94	89	95	93	-	-
	Min	43	33	88	50	91	95	54	72	78	69	67	-	-
Soil Temperature at 10 cm	06 UTC	5.0	2.0	3.4	4.6	4.8	5.6	4.2	3.0	6.4	7.2	4.6	-	6.0
	12 UTC	5.6	3.2	6.2	6.6	5.8	7.2	5.4	5.2	7.8	9.2	6.2	-	6.7
Sunshine Duration		7.7	8.4	0.0	6.2	0.0	1.0	1.9	1.2	0.9	2.5	3.0	-	3.6
Precipitation		1.2		30.6	0.9	3.3	12.5	0.8	1.7	1.7	0.1	52.8	-	40.9
Evaporation		0.0	0.0	0.0	0.9	0.0	0.0	0.8	0.4	0.0	0.1	2.2	-	10.0
Growing Degrees	5	0.0	0.0	0.0	0.3	0.0	0.7	0.0	0.0	4.8	6.8	12.6	-	19.6
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	1.8	-	1.5

2nd 10-day period (11-20/12/2010)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	5.8	-	7.6
Precipitation - Reference Evapotranspiration	47.0	-	33.3
Number of Rainy Days	9.0	-	4.3
Number of Dry Days	6.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

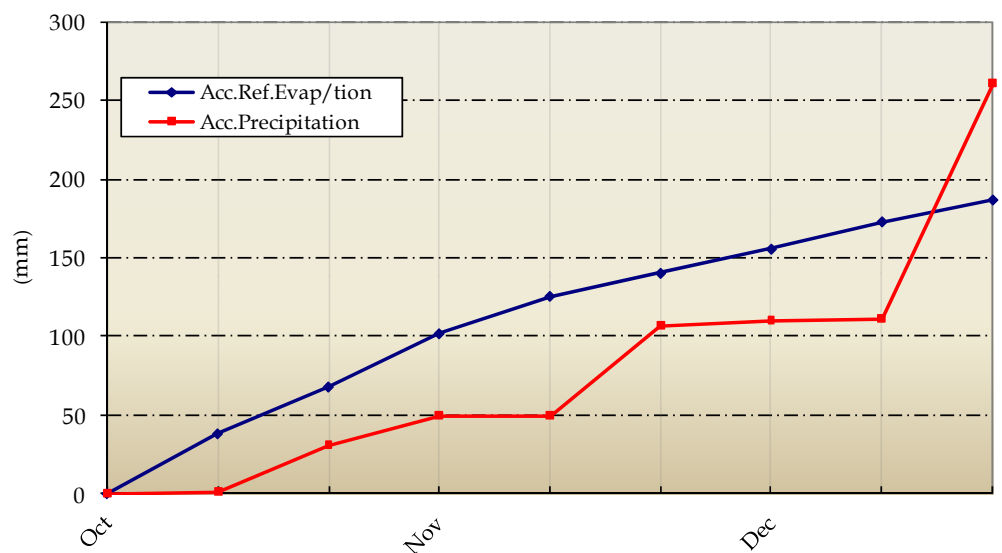


Tympaki

2nd 10-day period (11-20/12/2010)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	17.0	11.2	18.0	17.6	15.2	16.0	15.2	17.0	18.0	19.8	16.5	18.8	17.0
	Min	3.4	1.8	2.6	11.4	8.0	8.2	9.0	5.6	11.0	9.4	7.0	11.5	8.7
Relative Humidity	Max	100	100	98	94	96	98	97	91	94	90	96	97	-
	Min	35	30	56	25	64	60	51	44	53	49	47	57	-
Soil Temperature at 10 cm	06 UTC	12.8	8.0	8.0	13.8	11.2	13.0	12.2	9.6	12.2	12.0	11.3	13.1	12.0
	12 UTC	11.6	10.6	11.4	14.8	13.0	14.2	12.2	11.4	14.6	15.0	12.9	15.2	13.7
Sunshine Duration		0.0	8.4	0.6	0.9	0.4	0.9	0.9	3.0	1.9	3.8	2.1	2.9	4.3
Precipitation		36.6	32.0	16.4	2.4	0.5	41.6	19.8	0.3	0.4		150.0	57.9	31.3
Evaporation		1.2	2.5	3.8	2.3	1.2	1.1	1.7	1.3	2.2	1.8	19.1	26.5	26.9
Growing Degrees	5	5.2	1.5	5.3	9.5	6.6	7.1	7.1	6.3	9.5	9.6	67.7	101.3	78.9
	10	0.2	0.0	0.3	4.5	1.6	2.1	2.1	1.3	4.5	4.6	21.2	51.3	30.1

1st 10-day period (1-10/12/2010)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	13.9	12.9	13.3
Precipitation - Reference Evapotranspiration	136.1	45.0	18.0
Number of Rainy Days	9.0	6.0	3.9
Number of Dry Days	0.0	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.

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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ΥΠΗΡΕΣΙΑ

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