



AGROMETEOROLOGICAL BULLETIN

March 2011
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

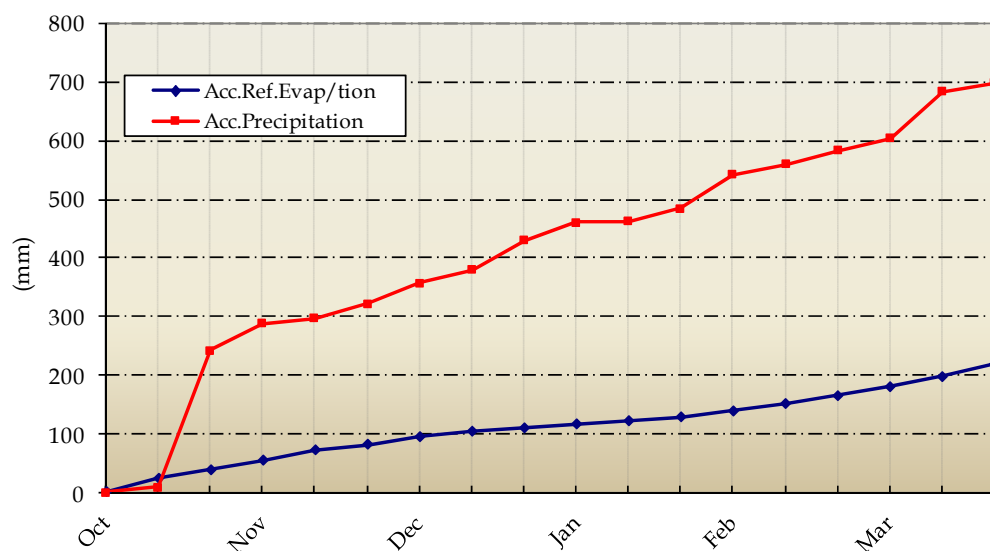
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www.hnms.gr
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Agrinio

2nd 10-day period (11-20/03/2011)		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	18.4	18.0	19.4	21.4	23.4	15.6	19.6	15.9	19.4	18.8	-	16.2
	Min	-1.0	-0.4	0.0	7.6	6.8	5.2	8.4	8.6	10.8	5.4	5.1	-	4.7
Relative Humidity	Max	93	96	93	94	97	94	97	100	97	100	96	-	-
	Min	26	26	35	44	32	30	82	43	69	48	44	-	-
Soil Temperature at 10 cm	06 UTC	6.6	9.4	8.0	9.6	10.6	10.8	12.6	12.2	13.2	11.6	10.5	-	9.3
	12 UTC	9.2	9.6	10.2	12.0	12.8	12.6	13.0	14.6	13.4	13.4	12.1	-	12.6
Sunshine Duration		9.8	10.1	8.0	7.9	6.6	5.3	0.3	9.5	2.6	7.2	6.7	-	5.6
Precipitation								3.9		12.2		16.1	-	28.1
Evaporation		2.6	2.8	2.0	2.8	2.1	2.5	0.0	1.3	3.2	2.8	22.1	-	29.9
Growing Degrees	5	3.0	4.0	4.0	8.5	9.1	9.3	7.0	9.1	8.4	7.4	69.8	-	55.0
	10	0.0	0.0	0.0	3.5	4.1	4.3	2.0	4.1	3.4	2.4	23.8	-	12.7

2nd 10-day period (11-20/03/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	21.7	-	20.4
Precipitation - Reference Evapotranspiration	-5.6	-	7.7
Number of Rainy Days	2.0	-	3.8
Number of Dry Days	8.0	-	-

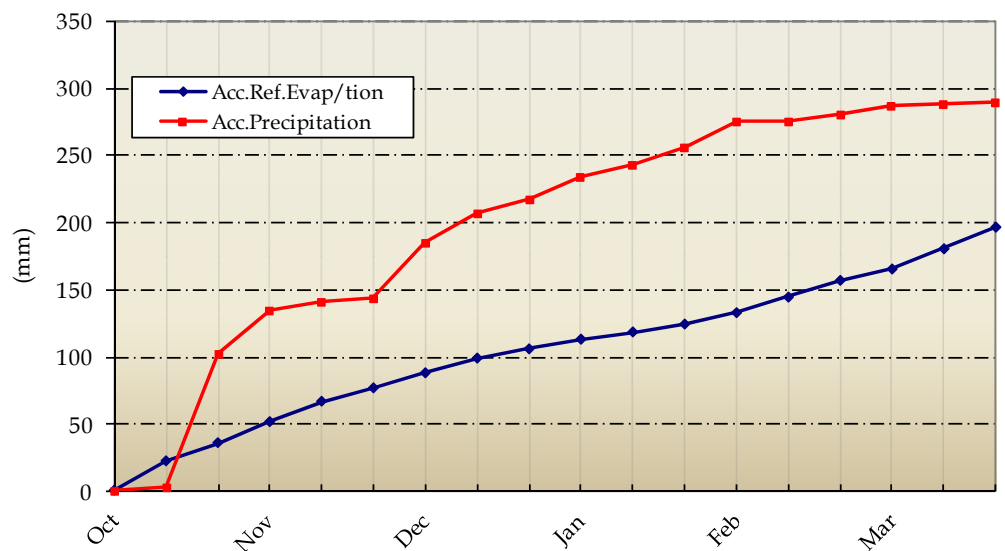
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



2nd 10-day period (11-20/03/2011)		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	14.4	15.2	16.4	17.8	14.8	14.2	13.4	9.6	14.0	11.8	11.6
	Min	-4.0	-0.4	0.4	1.2	4.2	9.4	8.0	12.2	9.0	6.0	4.6	1.9	2.9
Relative Humidity	Max	85	93	96	89	95	94	95	95	95	94	93	90	-
	Min	54	66	49	58	72	68	84	81	75	62	67	47	-
Soil Temperature at 10 cm	06 UTC	3.2	4.4	5.6	5.8	7.8	9.2	10.0	10.6	10.2	9.6	7.6	5.9	6.6
	12 UTC	5.6	7.0	7.6	9.0	9.6	11.0	10.6	10.6	10.4	9.6	9.1	8.2	8.9
Sunshine Duration		10.6	9.4	10.7	8.4	6.6	7.4	0.0	0.2	0.7	0.0	5.4	7.9	4.9
Precipitation								1.2	0.0		0.1	1.3	0.4	14.4
Evaporation		0.0	0.0	5.4	3.0	1.4	3.1	1.3	1.7	1.2	2.9	20.0	-	21.8
Growing Degrees	5	0.0	1.3	2.4	3.2	5.3	8.6	6.4	8.2	6.2	2.8	44.4	20.4	27.0
	10	0.0	0.0	0.0	0.0	0.3	3.6	1.4	3.2	1.2	0.0	9.7	0.0	3.4

2nd 10-day period (11-20/03/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	16.1	18.7	18.1
Precipitation - Reference Evapotranspiration	-14.8	-18.3	-3.7
Number of Rainy Days	2.0	1.0	2.2
Number of Dry Days	10.0	2.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

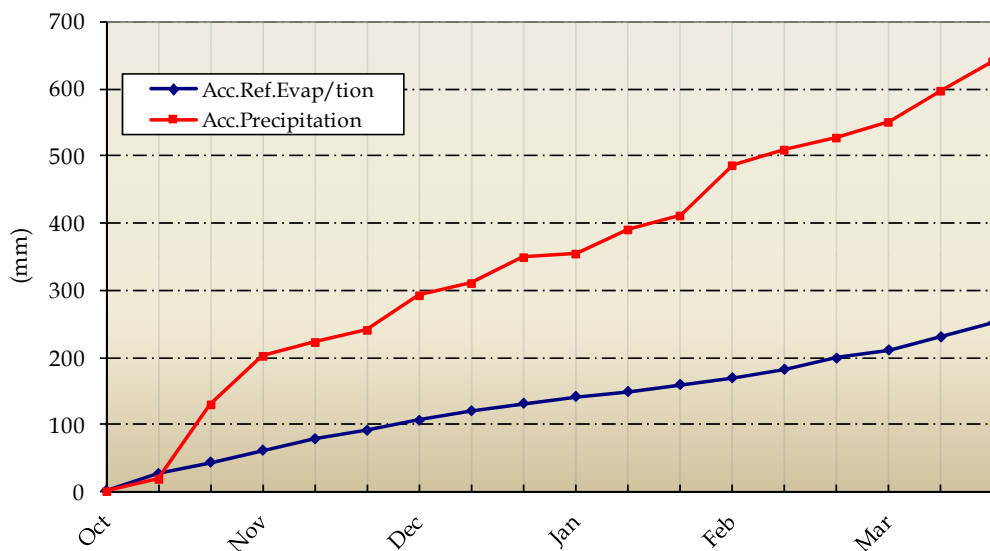


Andravida

2nd 10-day period (11-20/03/2011)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	14.4	16.8	18.0	19.6	21.0	21.4	20.8	19.4	13.8	17.8	18.3	15.0	15.7
	Min	3.2	1.6	5.4	8.8	9.0	7.4	12.0	10.6	10.0	5.4	7.3	6.2	6.3
Relative Humidity	Max	87	89	89	90	90	92	90	93	95	97	91	95	-
	Min	37	39	38	55	36	34	52	53	84	55	48	49	-
Soil Temperature at 10 cm	06 UTC	8.4	8.6	9.6	11.4	12.4	12.2	12.0	13.0	13.0	12.6	11.3	12.0	10.6
	12 UTC	12.0	13.2	13.4	14.8	16.0	15.2	15.0	17.0	15.2	14.8	14.7	15.2	12.8
Sunshine Duration		9.8	10.3	5.3	5.8	6.4	4.8	2.4	9.8	0.4	4.2	5.9	7.8	6.4
Precipitation								2.3		33.9	7.2	43.4	11.8	25.8
Evaporation		4.2	4.3	3.3	2.4	5.6	0.5	1.4	5.4	2.5	1.9	31.5	24.0	26.9
Growing Degrees	5	3.8	4.2	6.7	9.2	10.0	9.4	11.4	10.0	6.9	6.6	78.2	56.4	60.4
	10	0.0	0.0	1.7	4.2	5.0	4.4	6.4	5.0	1.9	1.6	30.2	7.4	15.6

2nd 10-day period (11-20/03/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	20.9	21.6	21.0
Precipitation - Reference Evapotranspiration	22.5	-9.8	4.8
Number of Rainy Days	3.0	3.0	3.7
Number of Dry Days	8.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

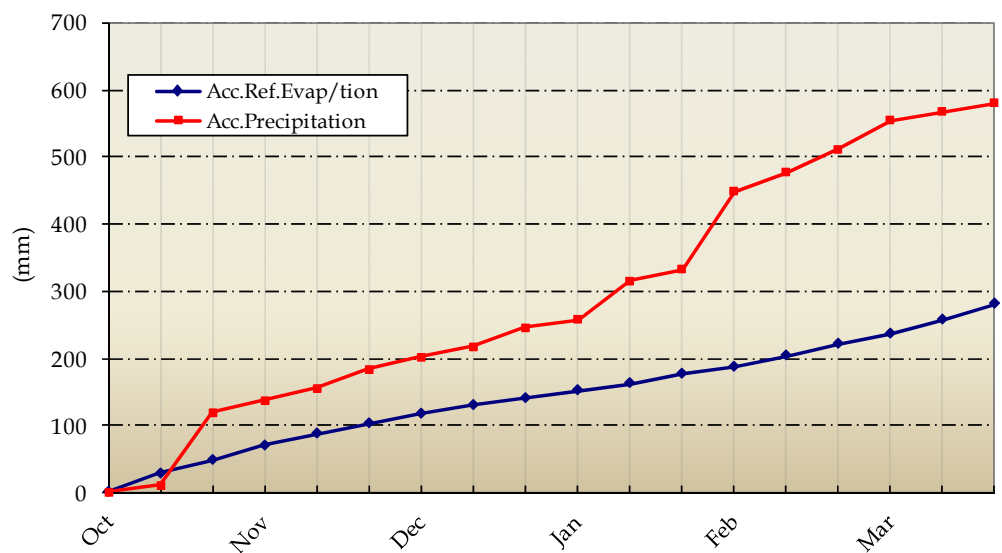


Kalamata

2nd 10-day period (11-20/03/2011)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	15.4	17.2	17.0	17.4	18.4	18.0	18.4	20.4	18.4	17.4	17.8	16.6	16.3
	Min	1.2	1.6	2.4	7.4	6.4	9.0	11.0	12.4	5.6	8.4	6.5	5.6	5.8
Relative Humidity	Max	91	93	95	97	97	98	97	95	97	97	96	95	-
	Min	33	30	52	61	57	63	68	40	56	63	52	45	-
Soil Temperature at 10 cm	06 UTC	9.0	9.6	10.2	11.4	12.4	13.0	13.4	13.6	13.4	13.6	12.0	11.9	10.9
	12 UTC	11.0	10.4	11.8	13.6	13.6	14.5	13.6	15.4	15.0	15.0	13.4	13.0	13.0
Sunshine Duration		10.5	10.5	8.1	8.8	6.7	4.1	0.6	9.3	9.5	5.5	7.4	7.3	6.1
Precipitation								2.5	0.1		11.3	13.9	12.1	22.7
Evaporation		3.4	4.4	3.2	4.2	1.2	1.8	0.2	3.8	5.0	1.9	29.1	31.2	33.5
Growing Degrees	5	3.3	4.4	4.7	7.4	7.4	8.5	9.7	11.4	7.0	7.9	71.7	60.9	60.5
	10	0.0	0.0	0.0	2.4	2.4	3.5	4.7	6.4	2.0	2.9	24.3	11.7	15.1

2nd 10-day period (11-20/03/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	23.8	23.7	21.7
Precipitation - Reference Evapotranspiration	-9.9	-11.6	1.0
Number of Rainy Days	3.0	4.0	3.8
Number of Dry Days	9.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

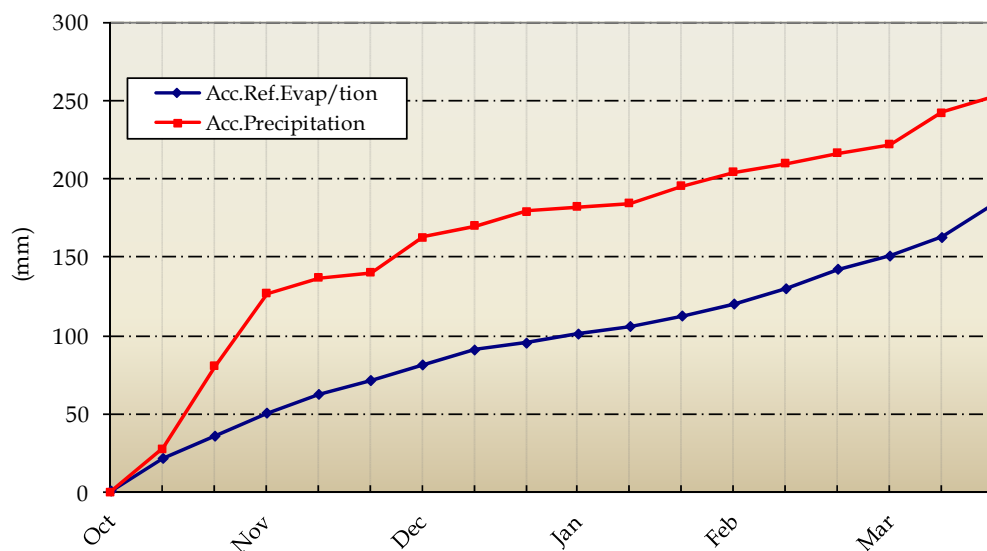


Larisa

2nd 10-day period (11-20/03/2011)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	15.6	19.0	18.0	19.8	19.4	20.4	18.6	21.2	16.6	12.6	18.1	14.4	14.0
	Min	-3.4	-0.4	-0.4	3.8	6.0	3.6	10.0	7.4	9.2	9.4	4.5	1.8	2.8
Relative Humidity	Max	91	92	93	97	97	97	97	97	95	95	95	94	-
	Min	24	33	38	39	52	57	65	49	61	70	49	42	-
Soil Temperature at 10 cm	06 UTC	0.0	2.4	1.0	8.0	7.4	8.6	10.4	10.2	12.0	11.8	7.2	8.5	8.4
	12 UTC	7.0	16.6	13.4	13.6	10.4	11.0	11.6	13.0	13.0	12.4	12.2	9.7	9.5
Sunshine Duration		8.6	8.8	7.2	6.9	5.1	8.2	4.9	8.1	1.5	0.1	5.9	6.1	5.1
Precipitation								6.0		4.1	0.4	10.5	14.0	13.9
Evaporation		0.0	5.5	1.7	4.6	2.3	9.4	2.1	1.0	0.3	1.1	28.0	28.9	20.7
Growing Degrees	5	1.1	4.3	3.8	6.8	7.7	7.0	9.3	9.3	7.9	6.0	63.2	30.9	36.4
	10	0.0	0.0	0.0	1.8	2.7	2.0	4.3	4.3	2.9	1.0	19.0	0.3	5.5

2nd 10-day period (11-20/03/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	21.5	18.8	18.5
Precipitation - Reference Evapotranspiration	-11.0	-4.8	-4.6
Number of Rainy Days	3.0	2.0	3.1
Number of Dry Days	8.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

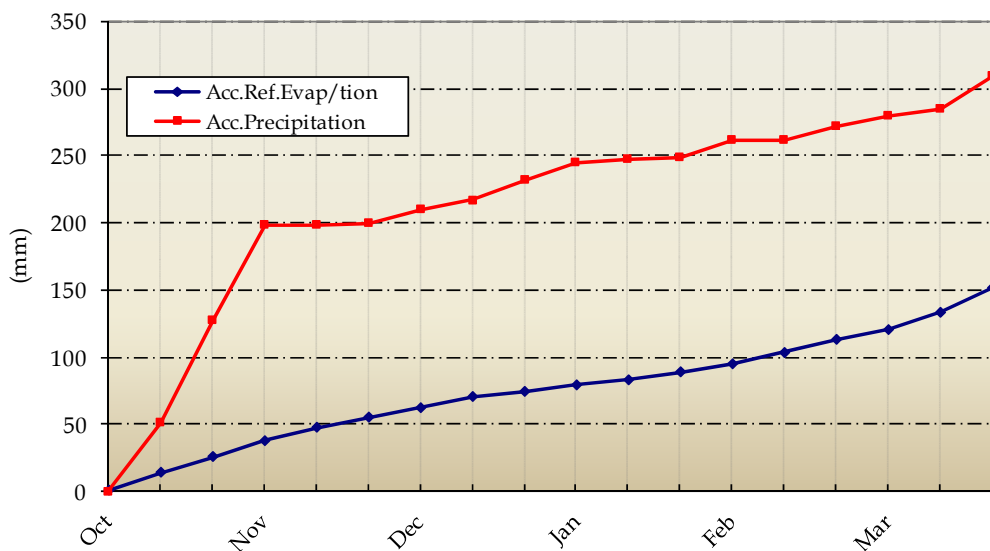


2nd 10-day period (11-20/03/2011)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	17.0	18.6	19.8	21.0	20.4	20.4	15.6	19.2	14.0	14.0	18.0	15.3	14.0
	Min	-2.8	-1.0	1.4	2.4	4.2	5.8	10.0	8.8	10.0	9.0	4.8	2.0	3.4
Relative Humidity	Max	92	92	94	94	94	97	95	95	95	95	94	82	-
	Min	20	25	27	26	39	44	74	53	89	61	46	35	-
Soil Temperature at 10 cm	06 UTC	5.0	6.2	7.4	8.2	9.0	10.4	11.4	11.0	11.8	11.6	9.2	7.1	7.7
	12 UTC	6.2	6.6	8.8	9.4	10.2	11.4	11.6	12.2	11.6	12.6	10.1	8.7	9.6
Sunshine Duration		9.0	9.0	9.1	8.8	6.1	6.7	0.9	5.6	0.0	0.6	5.6	8.4	4.7
Precipitation						0.0		5.1		17.7	1.2	24.0	6.2	10.9
Evaporation		0.0	0.0	0.0	3.9	2.1	2.0	0.7	0.8	0.3	1.1	10.9	26.8	16.6
Growing Degrees	5	2.1	3.8	5.6	6.7	7.3	8.1	7.8	9.0	7.0	6.5	63.9	36.9	38.5
	10	0.0	0.0	0.6	1.7	2.3	3.1	2.8	4.0	2.0	1.5	18.0	3.2	7.3

Series

2nd 10-day period (11-20/03/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	18.3	21.5	16.0
Precipitation - Reference Evapotranspiration	5.7	-15.3	-5.1
Number of Rainy Days	3.0	1.0	2.7
Number of Dry Days	9.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

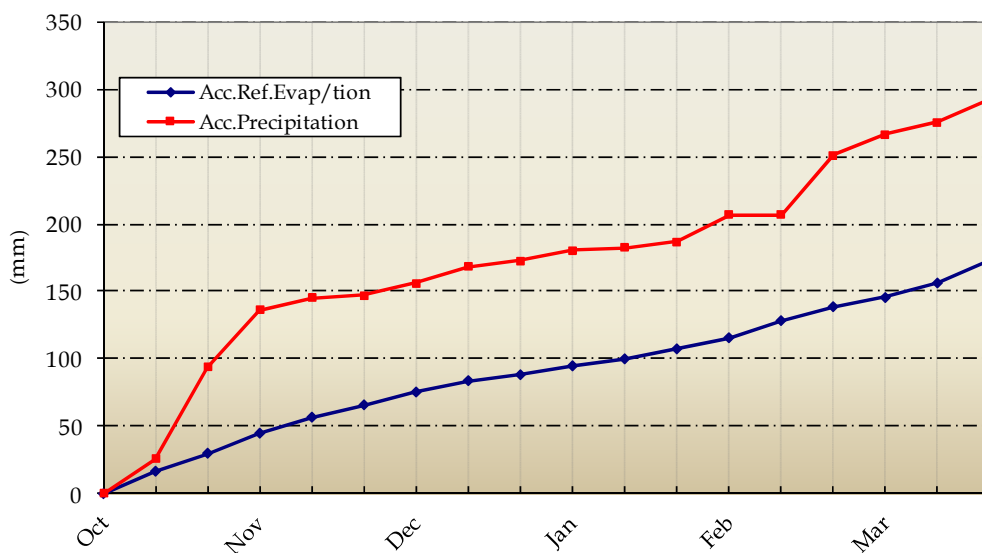


Trikala Imathias

2nd 10-day period (11-20/03/2011)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	18.2	18.8	-	19.4	18.6	-	14.8	18.8	16.8	12.6	17.2	15.8	13.8
	Min	-2.4	-0.8	-	7.0	6.4	-	8.0	10.4	10.6	7.0	5.8	2.6	3.6
Relative Humidity	Max	99	-	100	100	-	100	100	100	100	94	99	83	-
	Min	24	-	90	51	-	85	93	63	58	85	69	30	-
Soil Temperature at 10 cm	06 UTC	5.4	6.0	-	8.6	9.6	-	10.6	11.2	11.6	12.0	9.4	7.6	8.6
	12 UTC	9.8	8.2	-	10.4	11.6	-	11.2	12.4	13.2	11.4	11.0	9.5	9.1
Sunshine Duration		10.2	-	6.7	7.6	-	2.6	0.0	3.2	2.3	0.0	4.1	8.6	4.9
Precipitation							0.6	0.6		4.1	10.8	16.1	5.7	19.5
Evaporation		0.0	-	-	1.8	-	-	0.5	0.9	1.6	0.9	-	21.6	17.7
Growing Degrees	5	2.9	4.0	-	8.2	7.5	-	6.4	9.6	8.7	4.8	-	42.2	39.3
	10	0.0	0.0	-	3.2	2.5	-	1.4	4.6	3.7	0.0	-	3.5	7.6

2nd 10-day period (11-20/03/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	16.7	22.0	17.3
Precipitation - Reference Evapotranspiration	-0.6	-16.3	2.2
Number of Rainy Days	4.0	1.0	2.8
Number of Dry Days	8.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

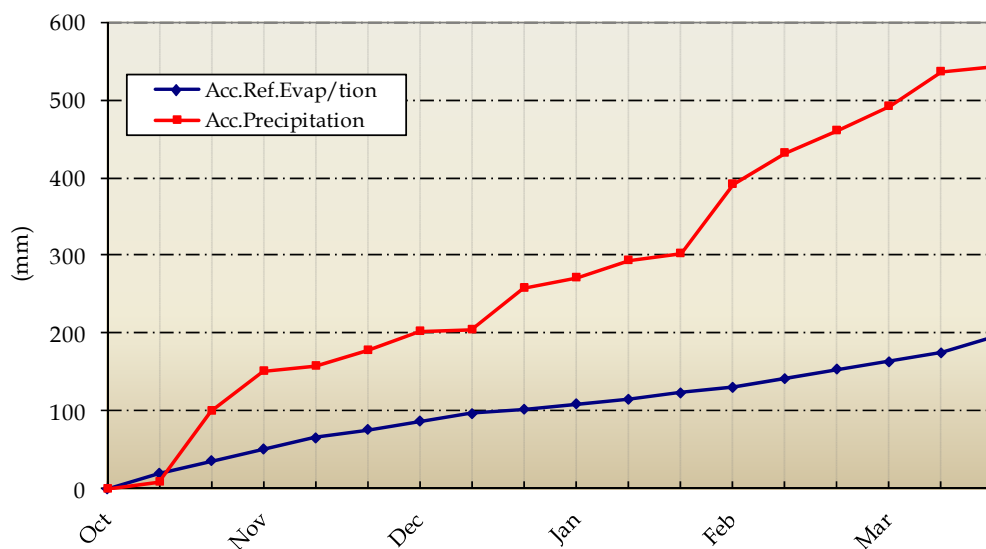


Tripoli

2nd 10-day period (11-20/03/2011)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	12.2	14.8	17.8	19.2	19.6	20.4	13.4	18.0	14.8	9.4	16.0	-	12.2
	Min	-8.0	-3.6	-2.2	4.2	2.6	4.6	9.6	7.8	3.6	7.0	2.6	-	1.7
Relative Humidity	Max	96	96	96	97	100	90	90	94	93	97	95	-	-
	Min	27	24	30	32	29	33	52	26	54	81	39	-	-
Soil Temperature at 10 cm	06 UTC	2.2	3.2	4.2	6.6	7.6	8.2	9.4	9.0	8.4	9.6	6.8	-	6.6
	12 UTC	7.4	8.4	9.4	11.4	12.2	11.0	10.6	13.8	12.8	10.6	10.8	-	8.1
Sunshine Duration		9.0	9.3	9.5	9.5	6.5	4.4	1.8	9.9	5.4	0.0	6.5	-	5.7
Precipitation								1.3		1.5	3.5	6.3	-	22.3
Evaporation		0.0	0.0	0.0	3.0	3.0	1.0	0.3	2.0	1.3	0.9	11.5	-	20.1
Growing Degrees	5	0.0	0.6	2.8	6.7	6.1	7.5	6.5	7.9	4.2	3.2	45.5	-	24.1
	10	0.0	0.0	0.0	1.7	1.1	2.5	1.5	2.9	0.0	0.0	9.7	-	2.5

2nd 10-day period (11-20/03/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	20.3	-	19.5
Precipitation - Reference Evapotranspiration	-14.0	-	2.8
Number of Rainy Days	3.0	-	4.1
Number of Dry Days	7.0	-	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

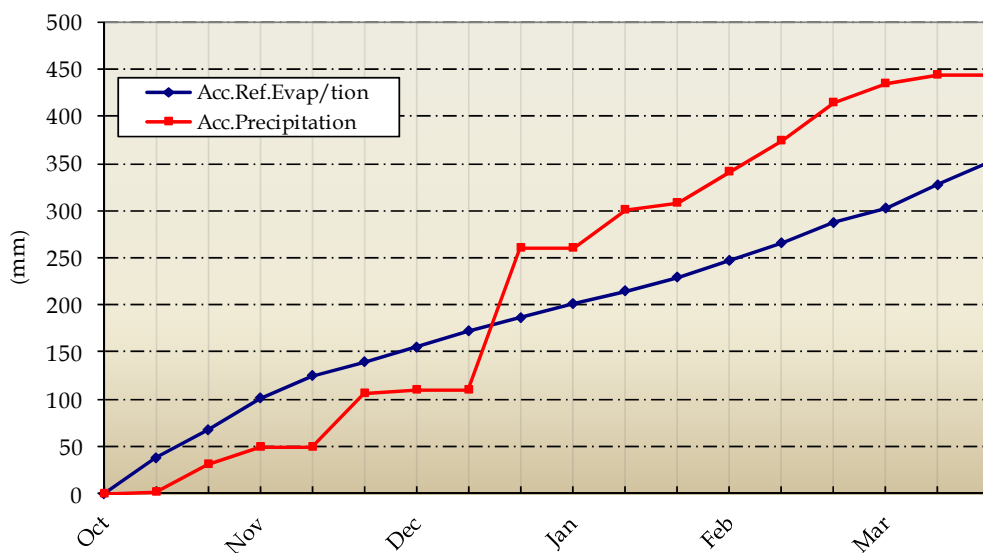


Tympaki

2nd 10-day period (11-20/03/2011)		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	17.4	16.0	17.8	19.0	19.8	18.2	19.0	17.6	18.6	17.8	18.2	16.9
	Min	1.6	4.4	4.6	6.0	6.0	7.4	8.2	12.0	9.6	8.4	6.8	9.0	7.8
Relative Humidity	Max	86	85	97	99	99	96	98	100	100	98	96	94	-
	Min	28	45	38	58	38	48	31	35	59	52	43	34	-
Soil Temperature at 10 cm	06 UTC	7.6	9.4	11.0	12.2	12.6	13.8	14.2	15.0	13.8	14.4	12.4	14.9	13.4
	12 UTC	11.8	14.2	14.6	16.0	17.4	17.2	16.0	16.6	18.6	19.0	16.1	19.4	16.0
Sunshine Duration		10.6	9.5	8.6	6.5	10.3	6.7	0.0	0.3	7.8	10.1	7.0	6.1	6.6
Precipitation									0.3			0.3	0.1	17.4
Evaporation		4.7	4.3	1.5	4.0	3.3	3.6	1.0	0.5	3.0	3.0	28.9	47.3	40.0
Growing Degrees	5	2.9	5.9	5.3	6.9	7.5	8.6	8.2	10.5	8.6	8.5	72.9	85.8	73.3
	10	0.0	0.9	0.3	1.9	2.5	3.6	3.2	5.5	3.6	3.5	25.0	35.8	25.5

2nd 10-day period (11-20/03/2011)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	24.3	27.5	24.5
Precipitation - Reference Evapotranspiration	-24.0	-27.4	-7.1
Number of Rainy Days	1.0	1.0	2.8
Number of Dry Days	8.0	14.0	-

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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HELLENIC NATIONAL METEOROLOGICAL SERVICE

Division of Climatology-Applications

Issue Editors :

Charalabopoulos Christos

Filiou Anna

The present bulletin was designed and implemented under the support of Water Resources Management Division of Agriculture University of Athens (Professor A. Liakatas)