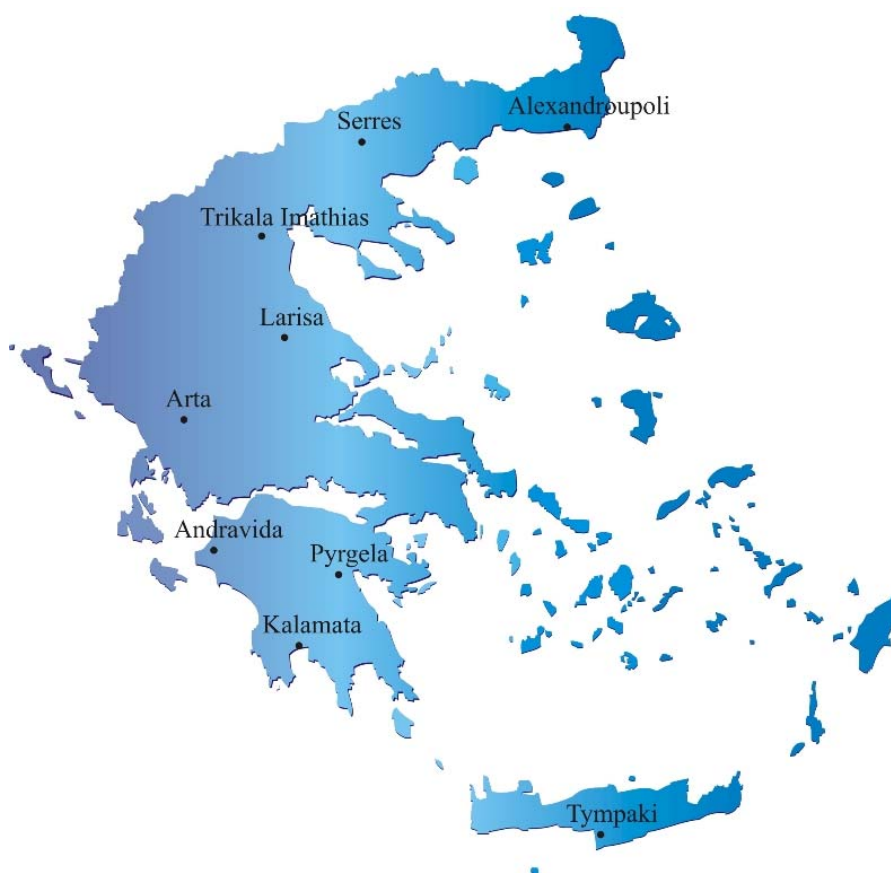




# AGROMETEOROLOGICAL BULLETIN

*January 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



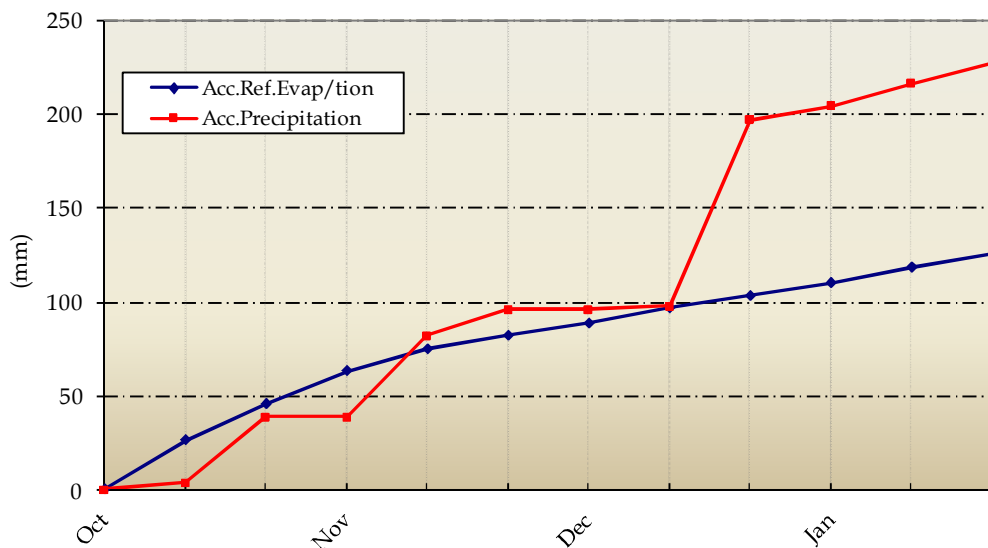
Hellenic National Meteorological Service  
Division of Climatology-Applications  
El. Venizelou Street 14, 16777  
Helliniko, Athens

*Web addresses of HNMS*  
[www.hnms.gr](http://www.hnms.gr)  
[www.emy.gov.gr](http://www.emy.gov.gr)  
[www.meteo.gov.gr](http://www.meteo.gov.gr)  
[www.meteohellas.gr](http://www.meteohellas.gr)

2nd 10-day period (11-20/01/2010)		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	13.0	9.2	7.4	6.6	5.2	6.0	7.4	5.2	2.8	7.7	9.7	8.0
	Min	4.8	3.2	4.6	3.0	3.8	2.0	1.2	5.2	0.6	-2.0	2.6	1.0	0.2
Relative Humidity	Max	93	97	97	97	84	82	88	97	100	-	93	95	-
	Min	50	63	76	69	60	54	67	80	67	-	65	67	-
Soil Temperature at 10 cm	06 UTC	10.0	8.8	8.2	7.0	6.5	6.0	5.6	6.6	6.6	4.4	7.0	4.6	4.2
	12 UTC	10.8	9.6	8.6	7.8	7.2	6.2	6.4	7.2	6.6	5.0	7.5	5.3	5.1
Sunshine Duration		0.9	1.4	0.0	0.0	0.9	0.0	0.0	0.0	0.0	2.2	0.5	3.8	3.1
Precipitation			0.9	7.2			0.0	0.0	1.7	0.6	0.7	11.1	26.1	11.4
Evaporation		0.3	0.4	0.2	0.6	1.9	2.2	0.5	0.1	0.0	0.0	6.2	9.3	6.6
Growing Degrees	5	4.6	3.1	1.9	0.2	0.2	0.0	0.0	1.3	0.0	0.0	11.3	18.3	9.4
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.9

2nd 10-day period (11-20/01/2010)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.1	6.0	8.8
Precipitation - Reference Evapotranspiration	4.0	20.1	2.6
Number of Rainy Days	5.0	3.0	2.2
Number of Dry Days	1.0	4.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

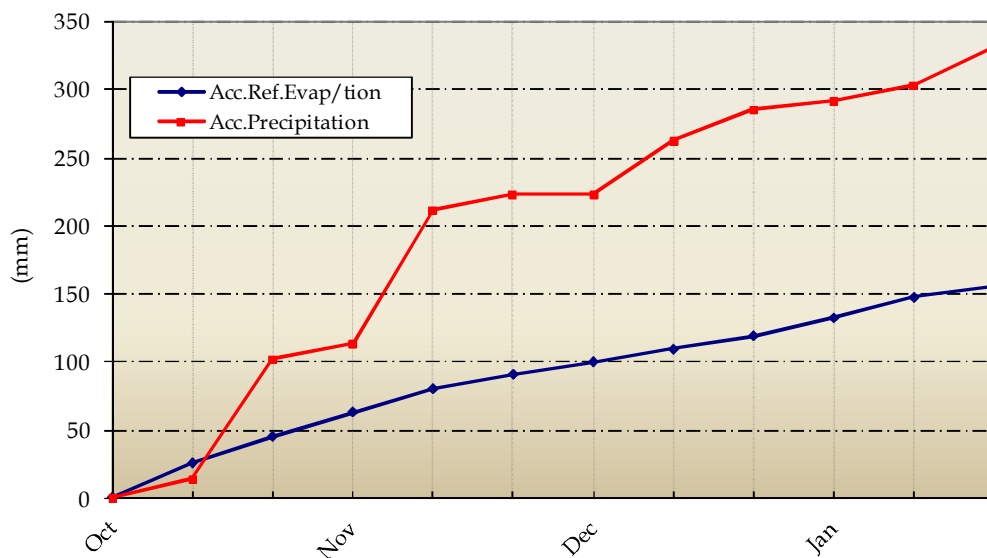


Andravida

2nd 10-day period (11-20/01/2010)		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	14.6	12.4	14.0	15.0	13.4	15.2	12.0	13.4	10.8	13.2	15.3	13.6
	Min	6.2	8.6	6.0	7.8	4.8	7.8	4.8	6.6	4.4	2.6	6.0	7.2	4.8
Relative Humidity	Max	97	97	97	97	97	97	97	97	97	97	97	97	-
	Min	78	72	72	64	62	69	57	72	47	52	64	62	-
Soil Temperature at 10 cm	06 UTC	11.2	11.6	11.4	11.8	10.8	12.0	10.2	10.8	10.2	9.8	11.0	10.4	8.3
	12 UTC	12.0	12.6	12.2	12.4	12.2	12.2	12.0	11.6	11.8	11.4	12.0	12.0	9.8
Sunshine Duration		0.4	2.5	0.2	0.4	0.0	0.7	7.8	1.9	5.1	5.4	2.4	4.1	4.4
Precipitation		2.8	11.3	1.9	2.3		4.0	1.0	2.0	2.7		28.0	51.9	33.0
Evaporation		1.9	1.0	0.2	3.2	0.4	0.1	0.5	1.4	1.0	0.7	10.4	21.1	18.1
Growing Degrees	5	3.6	6.6	4.2	5.9	4.9	5.6	5.0	4.3	3.9	1.7	45.7	62.6	42.4
	10	0.0	1.6	0.0	0.9	0.0	0.6	0.0	0.0	0.0	0.0	3.1	15.6	7.2

2nd 10-day period (11-20/01/2010)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	8.2	8.3	9.4
Precipitation - Reference Evapotranspiration	19.8	43.6	23.6
Number of Rainy Days	8.0	4.0	3.7
Number of Dry Days	0.0	2.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

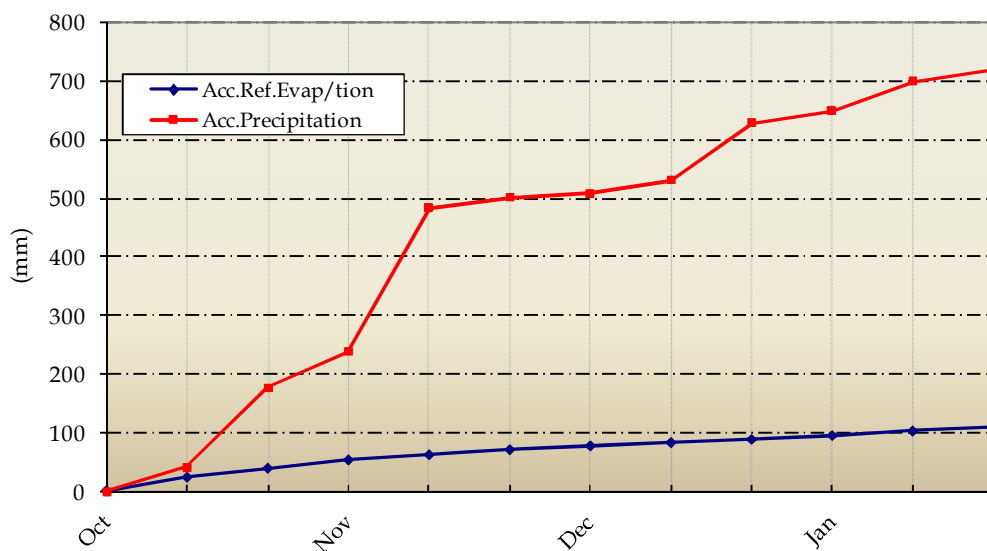


Arta

2nd 10-day period (11-20/01/2010)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	12.4	14.2	12.2	13.0	15.0	12.6	16.8	15.8	14.4	11.8	13.8	14.9	13.9
	Min	3.4	7.4	2.8	6.4	4.6	8.0	7.0	7.2	1.8	-1.2	4.7	5.0	2.8
Relative Humidity	Max	98	97	98	95	94	85	55	99	96	100	92	88	-
	Min	70	75	65	41	57	35	41	38	38	30	49	40	-
Soil Temperature at 10 cm	06 UTC	9.8	10.0	9.6	10.0	9.4	10.2	9.4	9.8	9.0	7.4	9.5	8.7	6.5
	12 UTC	10.0	10.2	10.0	10.4	10.0	10.0	9.8	10.6	9.0	8.0	9.8	9.2	7.9
Sunshine Duration		2.5	0.9	1.7	1.1	1.2	0.0	7.6	6.0	7.3	8.3	3.7	3.1	4.5
Precipitation		6.0	10.5				2.7		0.1			19.3	34.4	33.8
Evaporation		0.3	0.5	1.6	1.0	0.6	1.8	1.1	1.0	2.6	0.0	10.5	-	-
Growing Degrees	5	2.9	5.8	2.5	4.7	4.8	5.3	6.9	6.5	3.1	0.3	42.8	49.8	34.7
	10	0.0	0.8	0.0	0.0	0.0	0.3	1.9	1.5	0.0	0.0	4.5	7.2	4.3

2nd 10-day period (11-20/01/2010)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.2	8.1	7.6
Precipitation - Reference Evapotranspiration	12.1	26.3	26.2
Number of Rainy Days	4.0	3.0	3.2
Number of Dry Days	0.0	3.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

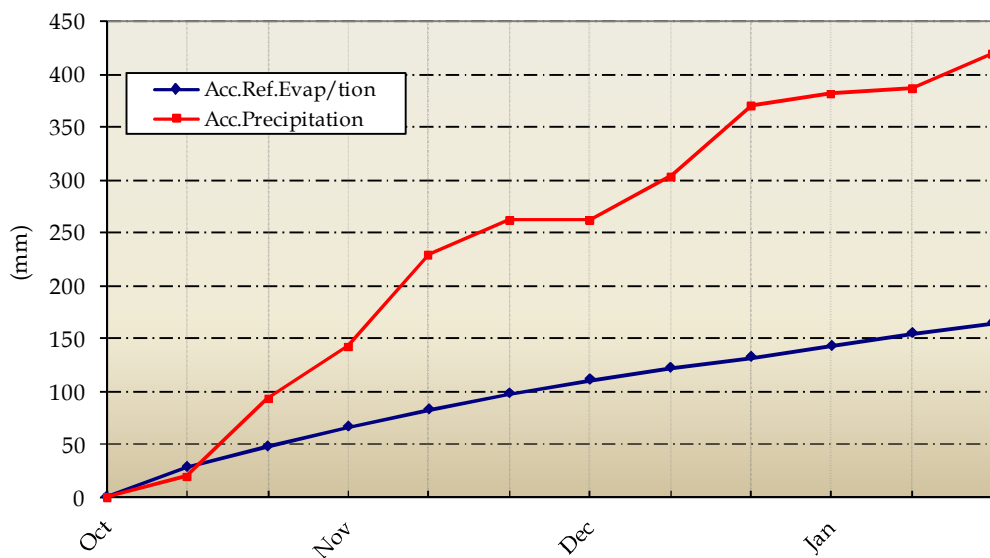


Kalamata

2nd 10-day period (11-20/01/2010)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	12.4	11.8	13.4	15.8	15.8	13.6	17.2	13.6	13.2	11.4	13.8	16.2	14.6
	Min	3.8	8.0	5.0	7.6	6.2	10.0	10.0	7.4	3.4	3.2	6.5	7.5	4.9
Relative Humidity	Max	97	97	97	97	97	97	79	94	94	97	95	93	-
	Min	72	85	70	63	65	56	50	62	52	52	63	56	-
Soil Temperature at 10 cm	06 UTC	11.8	12.0	11.6	12.0	12.0	12.4	11.6	11.8	10.6	10.4	11.6	10.8	9.0
	12 UTC	12.4	12.0	12.0	-	12.6	12.6	12.2	12.2	11.4	10.8	12.0	11.3	10.1
Sunshine Duration		0.3	0.0	2.4	3.0	2.3	0.7	7.8	0.4	5.9	2.9	2.6	4.5	4.2
Precipitation		1.3	15.3	0.1	5.1		8.0			0.5	1.8	32.1	23.4	33.9
Evaporation		0.4	0.0	4.7	1.2	1.2	2.1	1.4	1.4	1.3	0.8	14.5	13.8	23.4
Growing Degrees	5	3.1	4.9	4.2	6.7	6.0	6.8	8.6	5.5	3.3	2.3	51.4	68.9	47.5
	10	0.0	0.0	0.0	1.7	1.0	1.8	3.6	0.5	0.0	0.0	8.6	19.0	8.1

2nd 10-day period (11-20/01/2010)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	9.8	11.4	11.1
Precipitation - Reference Evapotranspiration	22.3	12.0	22.8
Number of Rainy Days	7.0	6.0	3.8
Number of Dry Days	0.0	4.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

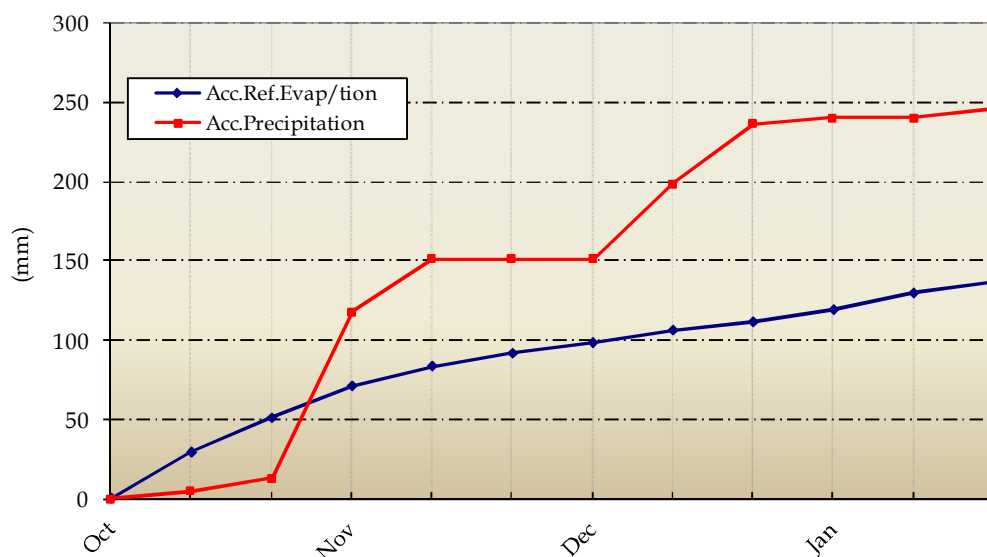


Larisa

2nd 10-day period (11-20/01/2010)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	13.2	11.0	11.8	9.2	10.2	8.4	8.2	8.6	8.6	8.6	9.8	9.5	9.3
	Min	1.0	4.8	2.6	6.4	6.2	5.2	5.2	5.6	2.0	1.8	4.1	2.4	0.0
Relative Humidity	Max	89	91	96	97	97	88	91	97	97	88	93	98	-
	Min	44	70	56	73	78	77	70	78	53	44	64	74	-
Soil Temperature at 10 cm	06 UTC	7.8	8.6	8.6	9.0	8.8	9.0	8.2	8.6	8.0	7.2	8.4	6.6	5.0
	12 UTC	8.6	9.0	9.0	9.2	9.4	9.0	8.6	8.8	8.4	8.2	8.8	6.9	5.5
Sunshine Duration		4.3	0.3	5.4	0.0	0.0	0.0	0.0	0.2	6.6	6.2	2.3	2.6	3.6
Precipitation			0.7		1.9	1.1	1.3		1.0			6.0	19.5	8.6
Evaporation		1.4	0.8	0.0	0.7	0.8	0.1	0.2	0.5	0.9	0.0	5.4	-	5.9
Growing Degrees	5	2.1	2.9	2.2	2.8	3.2	1.8	1.7	2.1	0.3	0.2	19.3	-	9.7
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.4

2nd 10-day period (11-20/01/2010)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.8	5.6	6.4
Precipitation - Reference Evapotranspiration	-0.8	13.9	2.2
Number of Rainy Days	5.0	2.0	2.6
Number of Dry Days	15.0	3.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



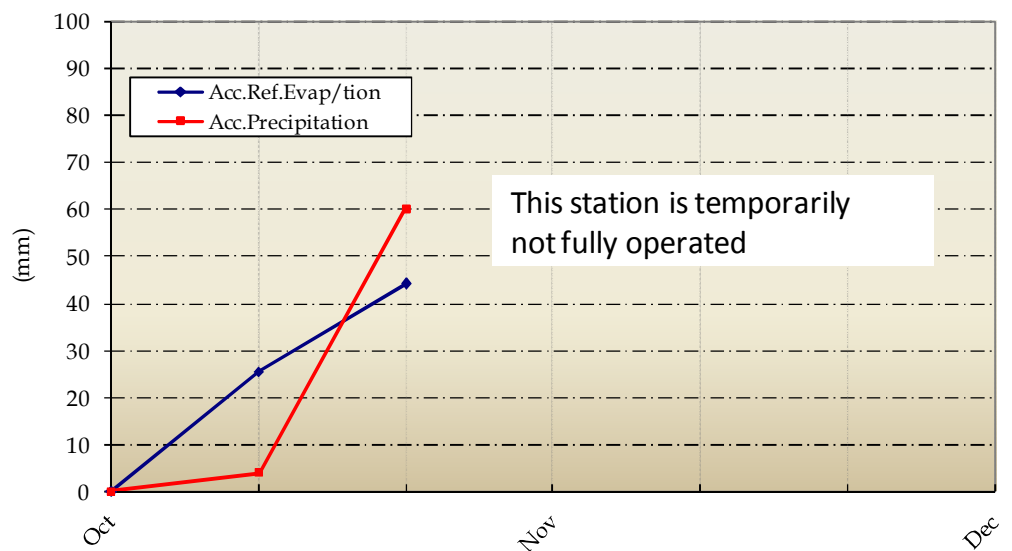


Pyrgela

2nd 10-day period (11-20/01/2010)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	-	-	-	-	-	-	-	-	-	-	-	15.0	14.4
	Min	1.0	4.8	2.2	8.0	6.0	9.0	7.8	7.0	1.6	0.4	4.8	4.8	2.4
Relative Humidity	Max	92	91	93	92	91	92	83	89	93	92	91	94	-
	Min	40	50	34	85	55	87	42	59	45	30	53	60	-
Soil Temperature at 10 cm	06 UTC	8.2	8.6	8.4	10.2	9.6	8.8	8.4	9.2	8.4	6.8	8.7	8.4	6.3
	12 UTC	11.0	11.6	11.0	11.0	11.0	10.8	11.4	11.0	10.2	9.0	10.8	10.2	9.4
Sunshine Duration		1.9	2.8	3.4	0.0	0.0	0.0	2.0	1.6	6.4	7.0	2.5	3.7	4.3
Precipitation					5.4		9.4	0.5		1.5		16.8	30.9	21.6
Evaporation		0.2	1.0	1.0	0.0	0.7	0.0	0.4	0.8	0.4	0.8	5.3	9.6	11.1
Growing Degrees	5	-	-	-	-	-	-	-	-	-	-	-	49.6	34.5
	10	-	-	-	-	-	-	-	-	-	-	-	9.4	3.5

2nd 10-day period (11-20/01/2010)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	7.4	8.0
Precipitation - Reference Evapotranspiration	-	23.5	13.6
Number of Rainy Days	4.0	2.0	2.5
Number of Dry Days	-	3.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

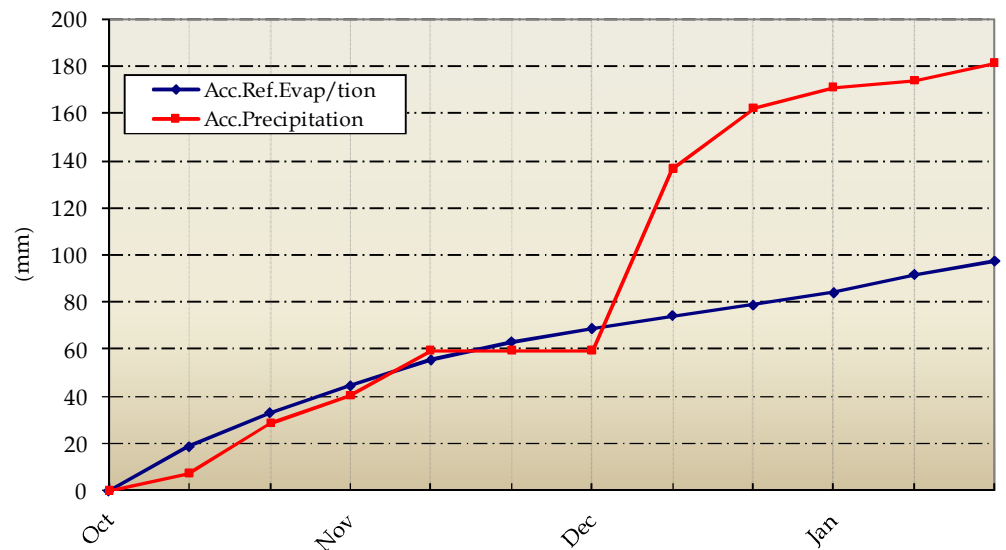


Series

2nd 10-day period (11-20/01/2010)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	15.8	10.4	9.8	9.4	7.4	8.0	7.0	11.6	8.2	5.4	9.3	8.6	7.4
	Min	4.0	3.4	4.0	3.0	3.4	3.0	1.2	1.4	-0.4	2.6	2.6	-0.6	-0.8
Relative Humidity	Max	80	94	94	97	91	97	89	93	93	87	92	92	-
	Min	34	58	69	68	85	68	66	54	59	74	64	66	-
Soil Temperature at 10 cm	06 UTC	7.6	7.2	7.8	7.0	7.2	7.2	6.8	7.2	5.6	5.8	6.9	3.8	3.1
	12 UTC	8.4	8.4	7.8	7.0	8.2	7.8	7.8	8.2	6.2	5.4	7.5	4.2	3.6
Sunshine Duration		5.0	0.0	0.2	1.8	0.0	0.0	0.8	3.8	1.1	0.0	1.3	2.7	3.0
Precipitation			0.8	5.9		0.7					0.2	7.6	20.8	9.4
Evaporation		0.4	0.0	0.3	0.0	0.0	1.0	0.4	0.5	0.0	0.0	2.6	-	2.1
Growing Degrees	5	4.9	1.9	1.9	1.2	0.4	0.5	0.0	1.5	0.0	0.0	12.3	10.1	6.0
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4

2nd 10-day period (11-20/01/2010)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	5.6	3.8	5.2
Precipitation - Reference Evapotranspiration	2.0	17.0	4.2
Number of Rainy Days	4.0	2.0	2.3
Number of Dry Days	6.0	4.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



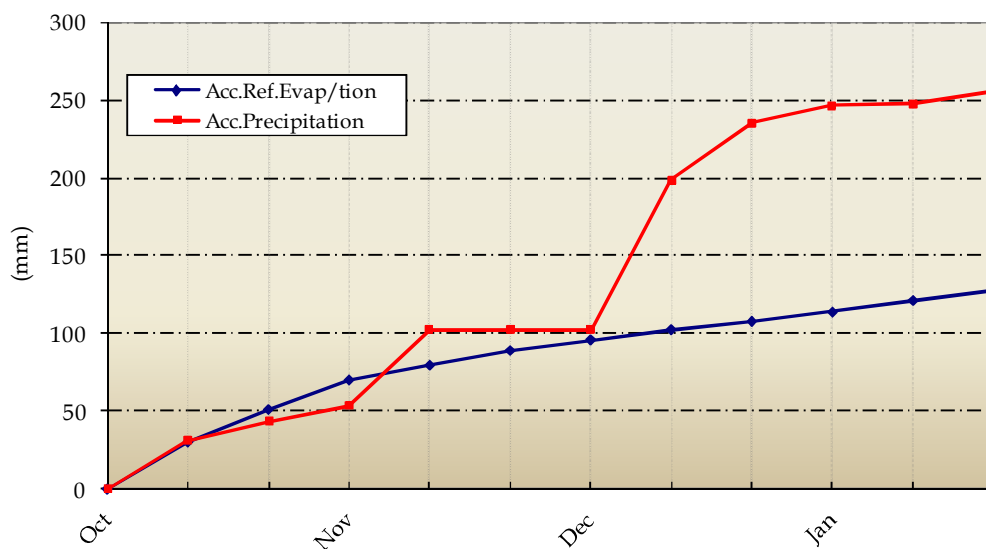


Trikala Imathias

2nd 10-day period (11-20/01/2010)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	15.0	10.0	10.8	10.0	8.0	7.0	6.2	9.4	8.2	7.8	9.2	10.1	9.1
	Min	5.8	6.4	4.0	5.4	6.0	4.6	4.2	4.4	-0.4	1.0	4.1	2.0	0.2
Relative Humidity	Max	73	94	96	95	95	99	93	94	88	90	92	96	-
	Min	39	77	58	55	88	88	79	65	44	38	63	72	-
Soil Temperature at 10 cm	06 UTC	8.2	8.0	8.6	8.4	8.4	7.4	7.8	7.6	5.6	6.2	7.6	4.8	4.9
	12 UTC	9.4	9.0	9.2	9.0	8.6	8.2	8.0	8.0	8.2	7.2	8.5	5.5	5.0
Sunshine Duration		5.1	0.0	7.0	0.0	0.0	0.0	0.0	0.2	6.1	3.1	2.2	2.7	3.9
Precipitation			3.5	0.3	0.2	0.9	1.8		0.7			7.4	14.6	11.7
Evaporation		1.6	0.6	1.7	0.7	0.2	0.9	0.5	0.6	1.1	0.9	8.8	3.9	2.7
Growing Degrees	5	5.4	3.2	2.4	2.7	2.0	0.8	0.2	1.9	0.0	0.0	18.6	-	10.8
	10	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	-	0.3

2nd 10-day period (11-20/01/2010)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.3	7.2	6.4
Precipitation - Reference Evapotranspiration	1.1	7.4	5.3
Number of Rainy Days	6.0	1.0	2.3
Number of Dry Days	1.0	4.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

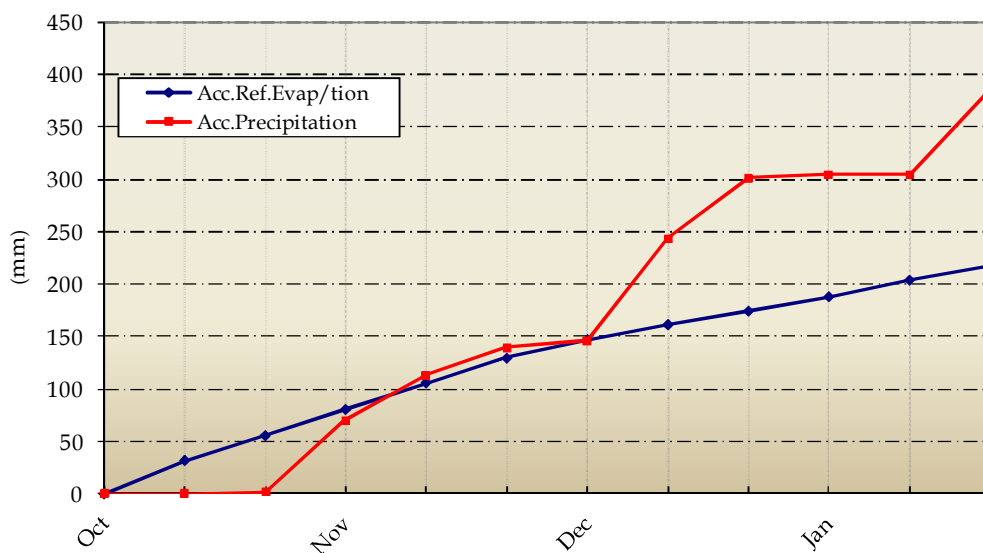


Tympaki

2nd 10-day period (11-20/01/2010)		11	12	13	14	15	16	17	18	19	20	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	16.6	17.2	16.4	17.0	18.4	17.6	16.6	17.0	15.0	15.4	16.7	17.6	15.6
	Min	8.4	10.4	9.2	11.2	9.2	11.6	11.4	10.2	8.0	6.0	9.6	9.0	7.0
Relative Humidity	Max	83	100	98	99	98	99	100	94	98	99	97	93	-
	Min	49	60	61	72	45	66	61	60	42	33	55	59	-
Soil Temperature at 10 cm	06 UTC	13.0	13.4	12.2	13.4	12.8	13.8	13.0	12.0	12.0	10.2	12.6	11.6	10.8
	12 UTC	15.6	15.6	15.4	15.6	15.8	15.6	13.0	13.8	14.2	12.6	14.7	14.1	12.6
Sunshine Duration		4.3	1.4	4.0	2.7	5.8	1.8	0.2	3.4	7.9	7.6	3.9	3.1	5.0
Precipitation		0.8	12.2	4.5	25.3		11.6	17.7	4.8	1.0	2.5	80.4	18.8	31.7
Evaporation		3.0	1.8	2.8	0.8	1.9	1.2	1.1	4.2	2.5	3.1	22.4	16.0	28.6
Growing Degrees	5	7.5	8.8	7.8	9.1	8.8	9.6	9.0	8.6	6.5	5.7	81.4	82.8	62.9
	10	2.5	3.8	2.8	4.1	3.8	4.6	4.0	3.6	1.5	0.7	31.4	32.8	16.1

2nd 10-day period (11-20/01/2010)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	13.6	12.4	14.8
Precipitation - Reference Evapotranspiration	66.8	6.4	16.9
Number of Rainy Days	9.0	5.0	3.2
Number of Dry Days	0.0	2.0	-

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<sub>n</sub> 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

© HELLENIC NATIONAL METEOROLOGICAL SERVICE

Reproduction is prohibited without written permission

El. Venizelou street 14, Zip Code 16777

Helliniko, Athens



ΕΘΝΙΚΗ  
ΜΕΤΕΩΡΟΛΟΓΙΚΗ  
ΥΠΗΡΕΣΙΑ

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)