



# AGROMETEOROLOGICAL BULLETIN

*March 2019*  
*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



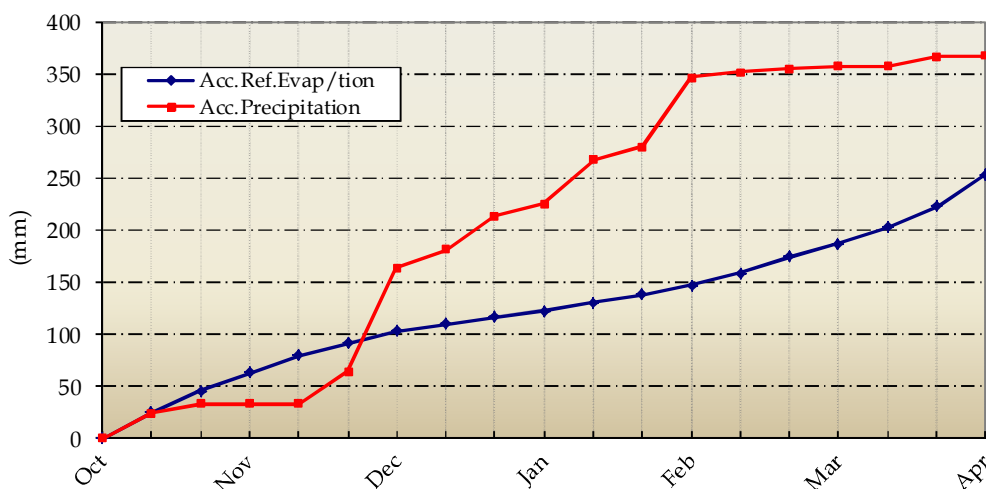
Hellenic National Meteorological Service  
Division of Climatology-Applications  
El. Venizelou Street 14, 16777  
Helliniko, Athens

*Web addresses of HNMS*  
[www.hnms.gr](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)

3rd 10-day period (21-31/03/2019)		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	18.0	20.0	17.4	16.0	21.2	16.2	14.8	12.8	15.0	18.2	17.0	14.3	14.1
	Min	8.2	5.2	1.0	4.2	0.6	1.4	7.0	6.0	4.0	4.0	3.2	4.1	5.4	4.9
Relative Humidity	Max	72	97	82	64	89	85	82	75	61	58	76	76	95	-
	Min	40	28	28	18	24	25	42	23	30	23	22	28	66	-
Soil Temperature at 10 cm	06 UTC	11.6	10.4	10.2	10.8	9.2	9.6	12.0	10.6	9.6	9.0	9.0	10.2	9.1	8.3
	12 UTC	16.0	16.2	15.6	16.6	15.6	16.4	14.4	14.2	13.6	14.2	15.6	15.3	11.4	11.0
Sunshine Duration		10.0	10.6	9.5	11.7	11.0	6.6	1.3	8.1	11.1	10.7	11.5	9.3	4.1	5.5
Precipitation								0.6					0.6	78.9	15.2
Evaporation		2.4	5.4	4.0	3.6	4.5	3.5	2.2	5.7	3.3	2.4	7.6	44.6	27.4	32.3
Growing Degrees	5	8.0	6.6	5.5	5.8	3.3	6.3	6.6	5.4	3.4	4.5	5.7	61.1	53.4	51.2
	10	3.0	1.6	0.5	0.8	0.0	1.3	1.6	0.4	0.0	0.0	0.7	9.9	9.5	11.3

3rd 10-day period (21-31/03/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	30.8	20.1	23.3
Precipitation - Reference Evapotranspiration	-30.2	58.8	-8.1
Number of Rainy Days	1.0	5.0	2.7
Number of Dry Days	13.0	1.0	-

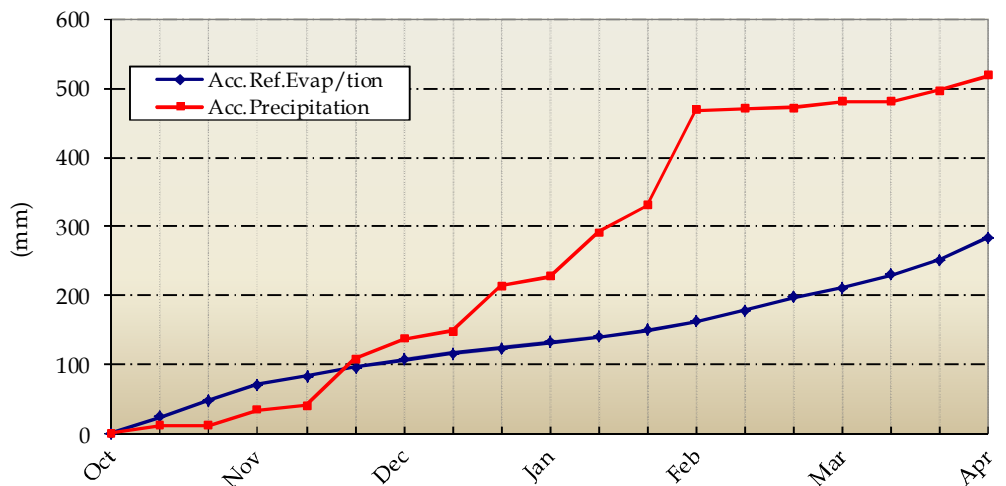
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-31/03/2019)		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	21.6	20.8	21.2	20.2	18.8	19.0	13.7	16.1	17.2	19.0	19.1	18.1	17.4
	Min	7.0	3.4	2.2	5.8	5.0	8.8	8.9	9.9	9.0	5.0	4.0	6.3	8.9	7.7
Relative Humidity	Max	100	85	81	85	92	95	100	100	71	78	85	88	87	-
	Min	27	27	26	28	38	58	51	34	27	27	29	34	48	-
Soil Temperature at 10 cm	06 UTC	13.2	11.8	12.4	12.8	13.2	13.2	13.4	14.6	12.4	12.0	12.4	12.9	14.0	11.5
	12 UTC	15.0	16.6	16.8	14.8	17.8	18.2	15.8	14.8	13.6	12.8	15.8	15.6	15.3	14.2
Sunshine Duration		10.1	10.3	10.7	10.3	10.8	10.2	2.6	0.0	8.9	11.6	11.4	8.8	5.2	6.8
Precipitation									21.0				21.0	38.6	19.5
Evaporation		6.2	6.0	6.8	3.0	3.0	9.0	2.5	4.1	6.2	6.0	7.0	59.8	32.7	33.3
Growing Degrees	5	9.8	7.5	6.5	8.5	7.6	8.8	9.0	6.8	7.6	6.1	6.5	84.6	93.4	83.1
	10	4.8	2.5	1.5	3.5	2.6	3.8	4.0	1.8	2.6	1.1	1.5	29.6	38.4	30.3

3rd 10-day period (21-31/03/2019)	Previous Year Value	Past Years Mean Value	
Reference Evapotranspiration	33.1	27.2	27.1
Precipitation - Reference Evapotranspiration	-12.1	11.4	-7.6
Number of Rainy Days	1.0	6.0	3.2
Number of Dry Days	12.0	2.0	-

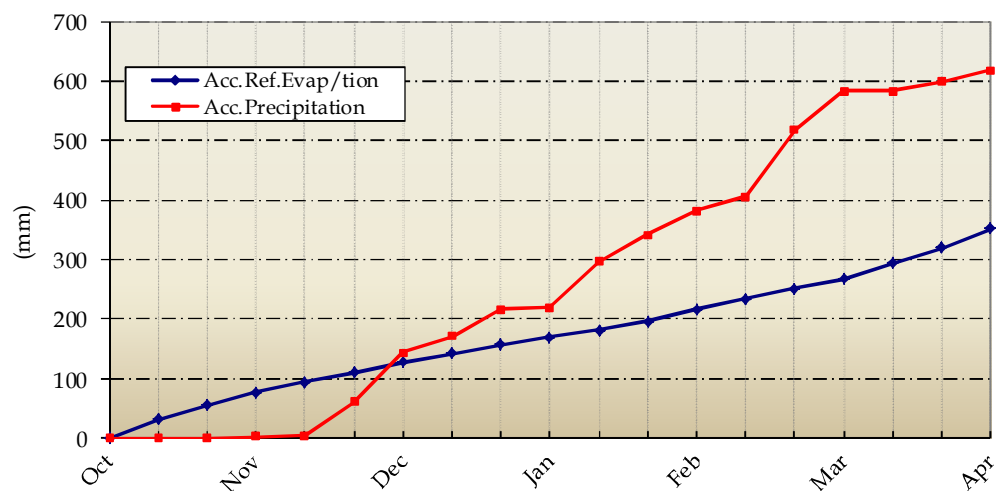
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-31/03/2019)		21	22	23	24	25	26	27	28	29	30	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	17.4	17.0	17.0	16.2	16.8	19.2	18.2	15.0	13.8	12.0	13.0	16.0	20.0	17.7
	Min	14.4	14.4	13.6	14.4	12.4	9.2	10.8	12.8	13.2	11.0	10.0	12.4	12.2	10.5
Relative Humidity	Max	87	80	73	72	67	90	90	95	92	89	76	83	85	-
	Min	70	60	59	39	46	47	64	75	58	53	56	57	47	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		4.2	9.0	8.9	10.5	10.6	10.8	10.0	0.0	0.0	0.8	1.6	6.0	5.1	6.6
Precipitation									3.4	11.8	2.7	1.4	19.3	7.5	15.8
Evaporation		2.3	3.2	5.5	5.7	3.5	2.3	2.3	0.1	1.6	1.6	2.6	30.7	41.9	48.5
Growing Degrees	5	10.9	10.7	10.3	10.3	9.6	9.2	9.5	8.9	8.5	6.5	6.5	100.9	122.2	100.1
	10	5.9	5.7	5.3	5.3	4.6	4.2	4.5	3.9	3.5	1.5	1.5	45.9	67.2	45.5

3rd 10-day period (21-31/03/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	32.0	34.6	-
Precipitation - Reference Evapotranspiration	-12.7	-27.1	15.8
Number of Rainy Days	4.0	3.0	3.0
Number of Dry Days	11.0	25.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

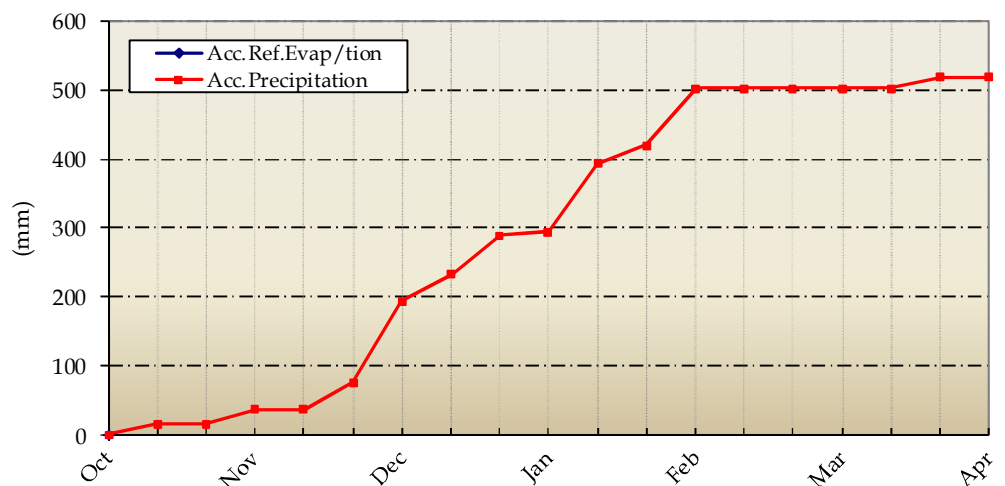


Ioannina

3rd 10-day period (21-31/03/2019)		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	17.0	18.2	22.4	21.2	19.6	19.6	11.8	14.0	15.6	20.6	17.9	14.5	15.1
	Min	12.6	11.2	12.4	12.4	2.0	4.2	5.8	4.4	5.2	7.8	3.8	7.4	5.2	4.4
Relative Humidity	Max	52	52	67	100	98	100	97	64	39	34	100	73	99	-
	Min	33	29	23	22	27	29	30	36	26	26	20	27	58	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	7.9
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	10.5
Sunshine Duration		8.3	8.4	8.5	8.9	8.5	6.5	5.4	3.0	9.0	10.0	9.5	7.8	3.1	4.7
Precipitation							0.0	0.0	0.0				0.0	99.9	32.3
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	-	28.9
Growing Degrees	5	9.8	9.1	10.3	12.4	6.6	6.9	7.7	3.1	4.6	6.7	7.2	84.4	53.3	50.7
	10	4.8	4.1	5.3	7.4	1.6	1.9	2.7	0.0	0.0	1.7	2.2	31.7	9.7	11.1

3rd 10-day period (21-31/03/2019)	Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	22.4
Precipitation - Reference Evapotranspiration	-	9.9
Number of Rainy Days	0.0	3.9
Number of Dry Days	16.0	-

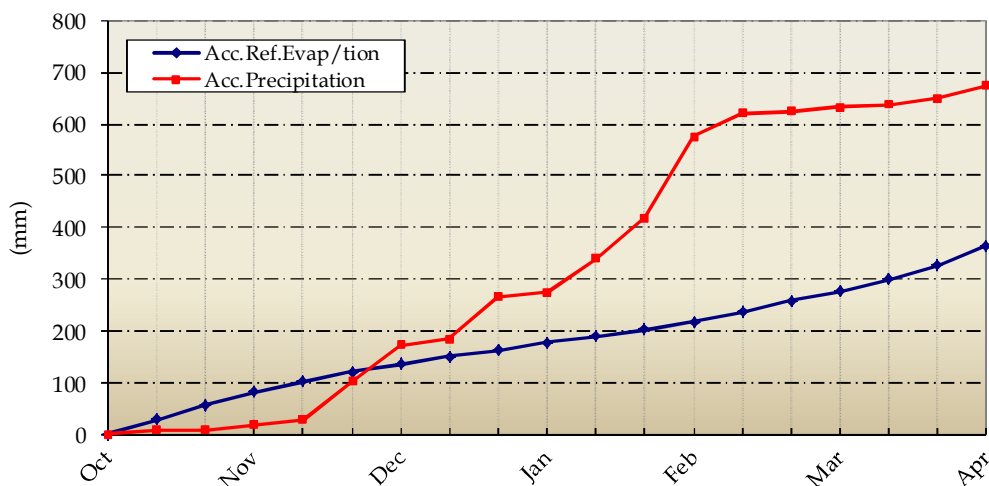
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-31/03/2019)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	21.6	22.2	19.6	22.0	19.1	20.2	17.9	15.0	16.1	17.8	20.2	19.2	18.6	17.8
	Min	9.3	12.8	7.8	1.0	4.6	6.2	6.0	9.6	10.2	4.3	3.6	6.9	8.0	6.9
Relative Humidity	Max	79	62	76	84	90	91	92	92	52	74	89	80	91	-
	Min	30	24	30	25	43	38	51	48	29	20	28	33	46	-
Soil Temperature at 10 cm	06 UTC	13.0	14.0	13.6	13.6	13.0	13.6	13.6	14.2	12.0	11.0	11.2	13.0	-	11.8
	12 UTC	15.5	16.5	16.0	15.5	15.6	16.0	15.4	13.6	13.0	13.2	13.5	14.9	-	14.2
Sunshine Duration		10.8	10.3	10.1	10.6	10.9	9.8	3.8	0.0	7.8	10.8	10.8	8.7	4.9	6.5
Precipitation							0.0	0.0	25.1	0.8			25.9	21.4	20.1
Evaporation		7.7	5.2	6.0	3.0	5.0	4.4	1.7	0.9	5.8	4.9	6.1	50.7	27.4	37.4
Growing Degrees	5	10.5	12.5	8.7	6.5	6.9	8.2	7.0	7.3	8.2	6.1	6.9	88.6	91.1	81.3
	10	5.5	7.5	3.7	1.5	1.9	3.2	2.0	2.3	3.2	1.1	1.9	33.6	36.1	28.3

3rd 10-day period (21-31/03/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	38.1	27.8	27.8
Precipitation - Reference Evapotranspiration	-12.2	-6.4	-7.7
Number of Rainy Days	2.0	4.0	3.3
Number of Dry Days	12.0	2.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

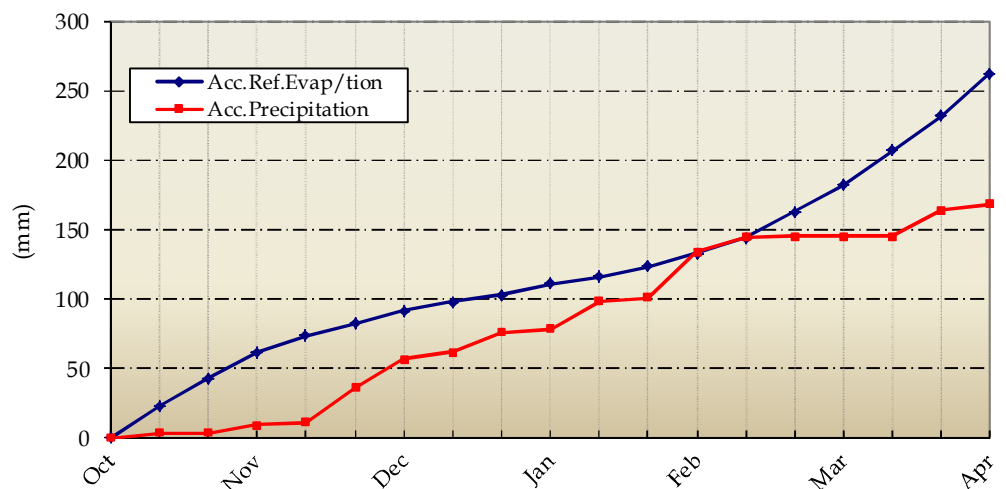


Larisa

3rd 10-day period (21-31/03/2019)		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	16.6	18.8	19.4	21.2	18.6	18.2	15.6	14.6	16.8	19.6	17.9	17.1	16.9
	Min	9.4	4.4	2.9	3.8	1.6	5.4	14.0	9.0	4.7	0.4	0.2	5.1	5.6	4.2
Relative Humidity	Max	88	92	95	86	95	72	80	90	77	95	80	86	94	-
	Min	44	47	38	42	41	68	22	54	35	31	60	44	48	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	10.0
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	11.4
Sunshine Duration		9.2	5.3	10.0	9.2	10.7	11.6	7.8	0.0	11.0	10.1	9.7	8.6	5.4	6.0
Precipitation							0.0	3.0	1.6				4.6	11.1	11.3
Evaporation		6.2	3.0	4.1	5.0	4.2	4.7	3.8	2.5	5.9	4.5	0.0	43.9	31.3	32.5
Growing Degrees	5	8.2	5.5	5.9	6.6	6.4	7.0	11.1	7.3	4.7	3.6	4.9	71.1	69.9	61.7
	10	3.2	0.5	0.9	1.6	1.4	2.0	6.1	2.3	0.0	0.0	0.0	18.0	15.2	16.3

3rd 10-day period (21-31/03/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	31.2	25.7	25.6
Precipitation - Reference Evapotranspiration	-26.6	-14.6	-14.3
Number of Rainy Days	2.0	4.0	3.1
Number of Dry Days	11.0	3.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

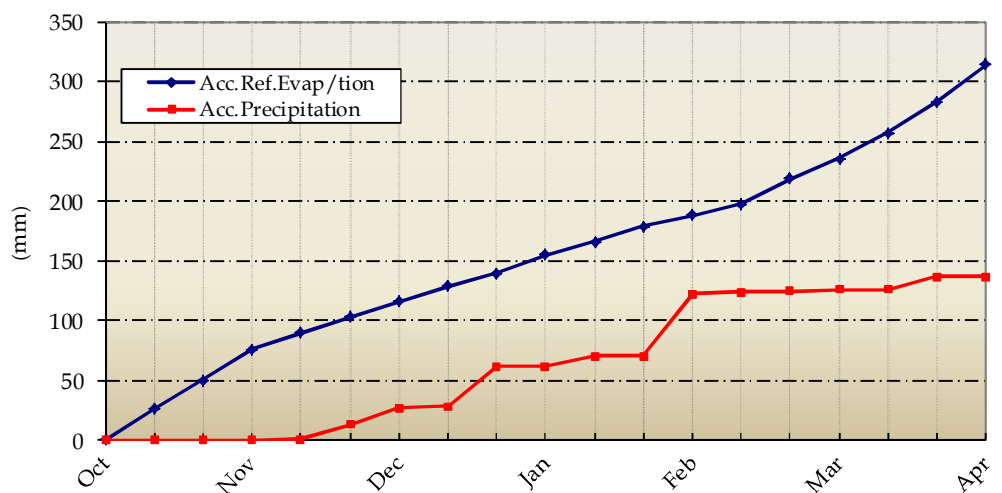


Mikra

3rd 10-day period (21-31/03/2019)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	19.0	17.6	19.4	17.6	19.0	17.8	15.8	14.4	15.8	16.0	19.6	17.5	15.2	16.0
	Min	12.0	10.0	6.2	7.0	5.4	6.0	11.8	8.0	5.0	4.0	4.0	7.2	7.0	5.7
Relative Humidity	Max	80	84	88	87	85	85	90	86	74	76	84	84	87	-
	Min	46	46	33	52	37	35	42	36	26	38	30	38	53	-
Soil Temperature at 10 cm	06 UTC	13.6	14.0	12.0	12.4	12.0	12.0	12.8	12.6	11.0	10.6	10.6	12.1	11.2	9.6
	12 UTC	17.0	16.0	15.4	15.0	15.0	14.2	14.4	13.5	14.4	13.8	14.2	14.8	12.7	12.9
Sunshine Duration		9.5	6.0	9.6	10.1	10.5	3.7	3.7	0.0	10.8	10.6	10.8	7.8	4.8	5.4
Precipitation							0.0						0.0	32.8	11.2
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	27.9	35.2
Growing Degrees	5	10.5	8.8	7.8	7.3	7.2	6.9	8.8	6.2	5.4	5.0	6.8	80.7	66.8	64.3
	10	5.5	3.8	2.8	2.3	2.2	1.9	3.8	1.2	0.4	0.0	1.8	25.7	14.0	17.2

3rd 10-day period (21-31/03/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	31.4	23.2	25.7
Precipitation - Reference Evapotranspiration	-31.4	9.6	-14.5
Number of Rainy Days	0.0	7.0	2.7
Number of Dry Days	18.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

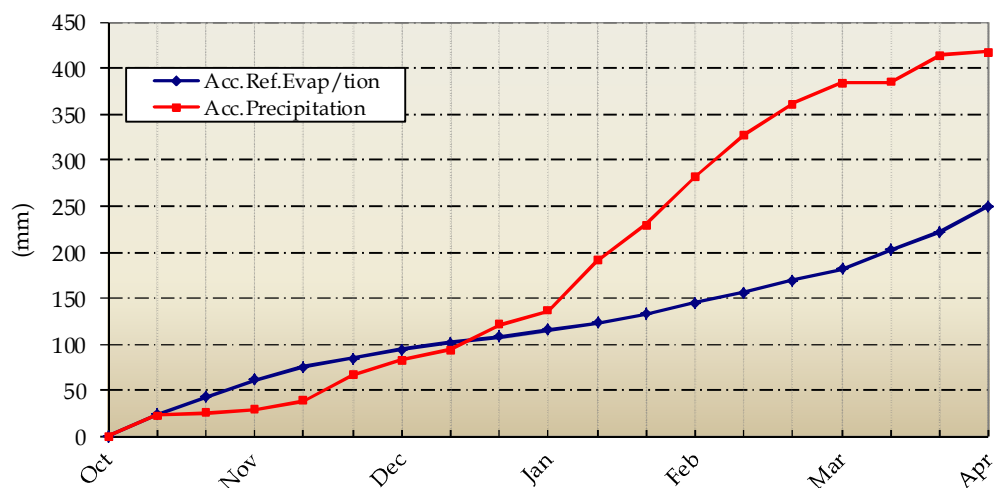




3rd 10-day period (21-31/03/2019)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	14.8	14.8	16.2	14.6	18.7	19.8	16.0	12.0	11.5	12.1	14.6	15.0	17.8	16.7
	Min	8.1	5.4	4.0	6.2	1.1	5.1	5.4	8.0	8.2	7.6	9.4	6.2	7.1	5.4
Relative Humidity	Max	83	94	94	82	91	95	97	97	58	59	63	83	93	-
	Min	49	45	41	45	29	40	53	44	44	35	35	42	41	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		8.4	10.0	10.2	9.5	10.8	7.0	4.4	0.0	5.2	10.3	9.2	7.7	5.4	
Precipitation									4.0				4.0	1.8	12.3
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Growing Degrees	5	6.5	5.1	5.1	5.4	4.9	7.5	5.7	5.0	4.9	4.9	7.0	61.8	81.7	
	10	1.5	0.1	0.1	0.4	0.0	2.5	0.7	0.0	0.0	0.0	2.0	7.2	27.3	

3rd 10-day period (21-31/03/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	27.7	25.9	
Precipitation - Reference Evapotranspiration	-23.7	-24.1	12.3
Number of Rainy Days	1.0	4.0	3.6
Number of Dry Days	12.0	2.0	-

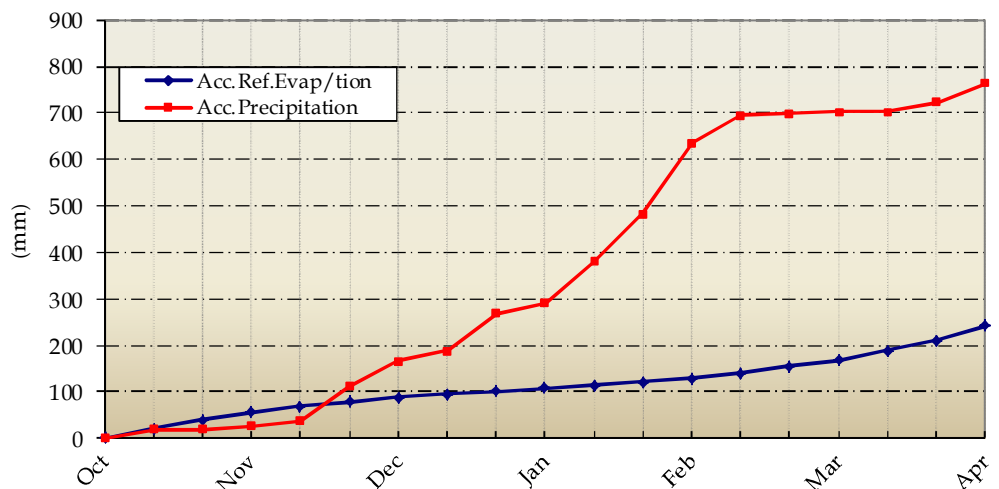
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-31/03/2019)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	16.0	14.4	14.9	14.6	19.9	18.3	15.3	9.3	8.8	10.9	14.0	14.2	15.0	14.8
	Min	8.5	6.0	4.8	7.3	0.3	2.5	1.0	3.4	4.5	4.7	4.0	4.3	4.5	3.1
Relative Humidity	Max	76	71	54	79	86	88	96	99	70	67	80	79	96	-
	Min	32	38	31	33	25	23	48	53	44	29	30	35	46	-
Soil Temperature at 10 cm	06 UTC	9.4	8.8	8.4	-	-	-	9.8	10.2	7.0	6.6	-	8.6	10.1	7.9
	12 UTC	13.8	13.4	-	-	-	-	14.0	8.6	-	-	-	12.4	12.6	9.5
Sunshine Duration		10.4	10.8	11.3	10.2	-	0.0	5.1	0.0	8.0	10.5	10.6	7.7	4.6	6.3
Precipitation								6.0	35.0	0.4		0.0	41.4	29.7	22.9
Evaporation		4.4	4.5	-	-	-	-	0.9	0.4	4.7	-	-	-	-	26.8
Growing Degrees	5	7.3	5.2	4.9	6.0	5.1	5.4	3.2	1.4	1.7	2.8	4.0	46.7	51.8	45.6
	10	2.3	0.2	0.0	1.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	3.9	7.5	7.9

3rd 10-day period (21-31/03/2019)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	32.8	22.0	25.6
Precipitation - Reference Evapotranspiration	8.6	7.7	-2.7
Number of Rainy Days	3.0	6.0	3.9
Number of Dry Days	11.0	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 :

Papakrivou Anastasia

The present bulletin was designed and implemented under the support of Water Resources Management Division of Agriculture University of Athens