



AGROMETEOROLOGICAL BULLETIN

*December 2021
1st 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

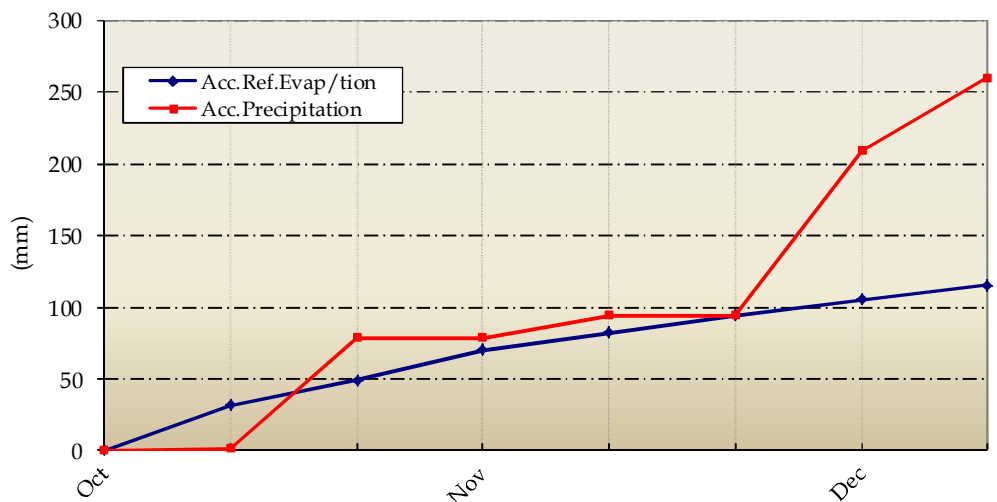
Web adresses of HNMS
www.emy.gr
www.hnms.gr
www.emy.gov.gr
www.meteo.gov.gr
www.meteohellas.gr

Alexandroupoli

1st 10-day period (1-10/12/2021)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	12.4	16.4	18.4	16.0	15.0	18.0	15.2	11.4	15.6	18.0	15.6	12.9	11.8
	Min	0.6	4.6	10.8	8.4	5.6	10.0	11.0	7.2	4.4	13.2	7.6	5.0	4.6
Relative Humidity	Max	83	84	91	93	97	93	95	91	94	91	91	90	91
	Min	43	55	75	83	76	76	83	75	55	57	68	64	62
Soil Temperature at 10 cm	06 UTC	8.0	8.8	11.0	12.4	10.4	12.6	12.8	11.4	9.2	12.8	10.9	9.1	8.6
	12 UTC	10.6	11.8	13.6	13.6	12.4	14.4	12.6	11.4	11.4	12.8	12.5	10.6	9.7
Sunshine Duration		7.0	6.6	5.3	1.6	3.9	4.5	0.0	0.0	6.2	2.7	3.8	3.6	3.4
Precipitation					15.0		1.2	23.7	6.9		4.5	51.3	45.0	21.8
Evaporation		3.1	0.7	0.8	4.1	1.1	1.4	1.3	1.0	1.9	1.7	17.1	12.3	10.5
Growing Degrees	5	1.5	5.5	9.6	7.2	5.3	9.0	8.1	4.3	5.0	10.6	66.1	43.7	34.5
	10	0.0	0.5	4.6	2.2	0.3	4.0	3.1	0.0	0.0	5.6	20.3	9.4	9.6

1st 10-day period (1-10/12/2021)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	10.3	9.6	7.5
Precipitation - Reference Evapotranspiration	41.0	35.4	14.3
Number of Rainy Days	5.0	5.0	2.8
Number of Dry Days	3.0	0.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

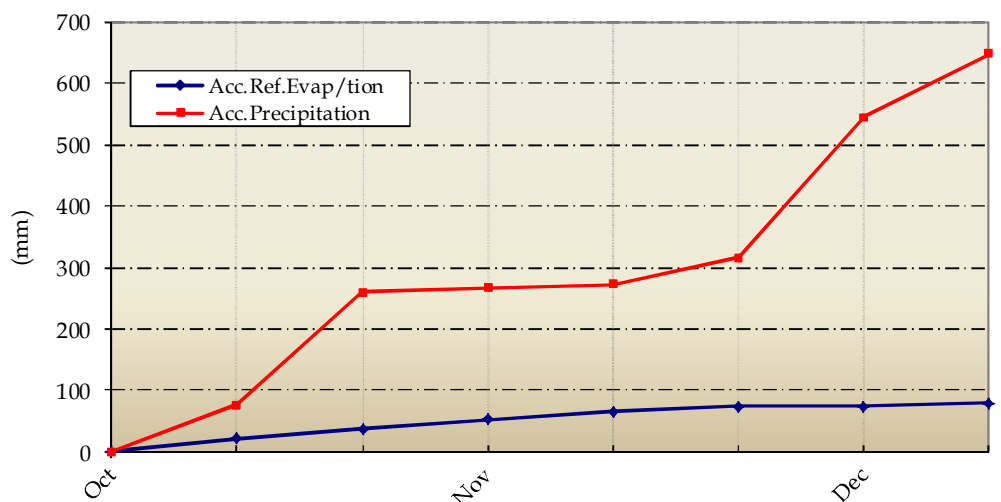


1st 10-day period (1-10/12/2021)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	15.4	18.0	18.0	17.8	17.2	18.6	14.2	13.6	18.9	17.0	16.9	18.8	16.4
	Min	6.7	8.6	13.2	9.6	8.2	12.1	8.9	8.0	7.7	10.0	9.3	9.3	7.9
Relative Humidity	Max	88	95	98	98	96	95	97	92	97	95	95	92	91
	Min	49	58	68	68	56	59	54	60	65	51	59	55	55
Soil Temperature at 10 cm	06 UTC	13.2	13.0	14.4	14.8	14.4	14.0	13.6	12.6	12.4	13.4	13.6	12.9	11.6
	12 UTC	13.6	15.6	13.8	15.0	14.0	16.2	15.6	12.8	13.0	13.2	14.3	13.9	13.6
Sunshine Duration		7.3	2.5	0.8	2.0	6.4	4.9	1.9	4.0	4.2	3.2	3.7	4.1	4.6
Precipitation		1.0	1.4	28.9	18.6	0.3	5.7	22.4	2.3	0.8	22.2	103.6	94.2	35.4
Evaporation		0.4	0.0	0.4	1.0	0.4	0.5	0.3	0.6	0.5	4.9	9.0	-	23.9
Growing Degrees	5	6.1	8.3	10.6	8.7	7.7	10.4	6.6	5.8	8.3	8.5	80.9	90.6	58.5
	10	1.1	3.3	5.6	3.7	2.7	5.4	1.6	0.8	3.3	3.5	30.9	40.6	20.1

1st 10-day period (1-10/12/2021)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.6	-	9.4
Precipitation - Reference Evapotranspiration	97.0	-	26.0
Number of Rainy Days	10.0	6.0	3.4
Number of Dry Days	0.0	4.0	-

The missing info in the tables are due to the absence of data.

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



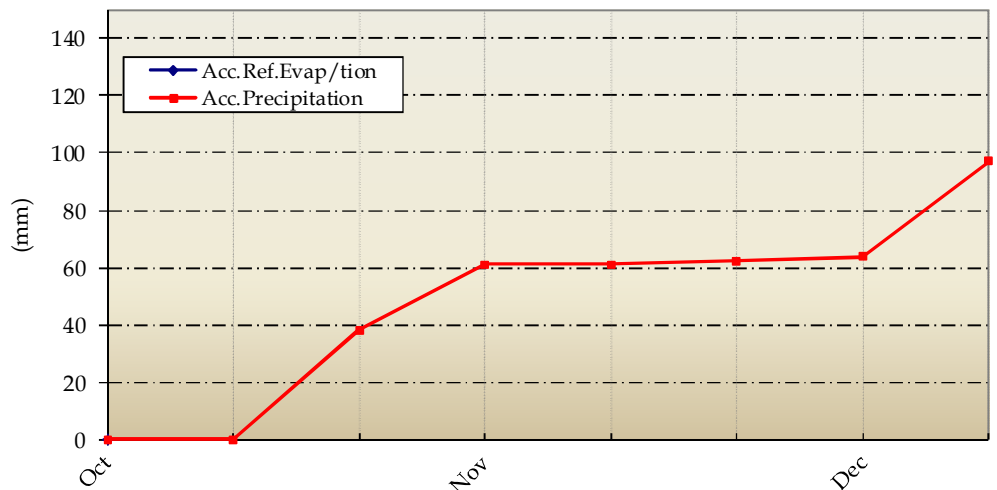
Iraklio

1st 10-day period (1-10/12/2021)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	16.8	21.0	19.0	20.2	18.4	17.2	16.0	16.2	20.4	20.0	18.5	18.9	18.2
	Min	13.8	10.0	14.2	14.4	11.0	13.4	12.0	11.0	10.0	16.0	12.6	12.5	12.1
Relative Humidity	Max	67	77	82	97	95	80	88	77	72	82	82	90	85
	Min	49	44	49	57	68	48	49	52	49	41	51	67	58
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		7.1	7.1	0.0	4.2	7.8	4.9	1.2	5.5	7.4	6.7	5.2	5.1	4.5
Precipitation					14.9	9.7	0.1	7.5	1.1		0.1	33.4	20.3	27.4
Evaporation		1.4	3.6	1.7	2.2	1.1	8.9	2.5	1.6	1.7	3.9	28.6	15.1	37.1
Growing Degrees	5	10.3	10.5	11.6	12.3	9.7	10.3	9.0	8.6	10.2	13.0	105.5	107.0	96.3
	10	5.3	5.5	6.6	7.3	4.7	5.3	4.0	3.6	5.2	8.0	55.5	57.0	49.0

1st 10-day period (1-10/12/2021)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	-	
Precipitation - Reference Evapotranspiration	-	-	
Number of Rainy Days	6.0	5.0	3.6
Number of Dry Days	3.0	0.0	-

The missing info in the tables and the graph are due to the absence of data.

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

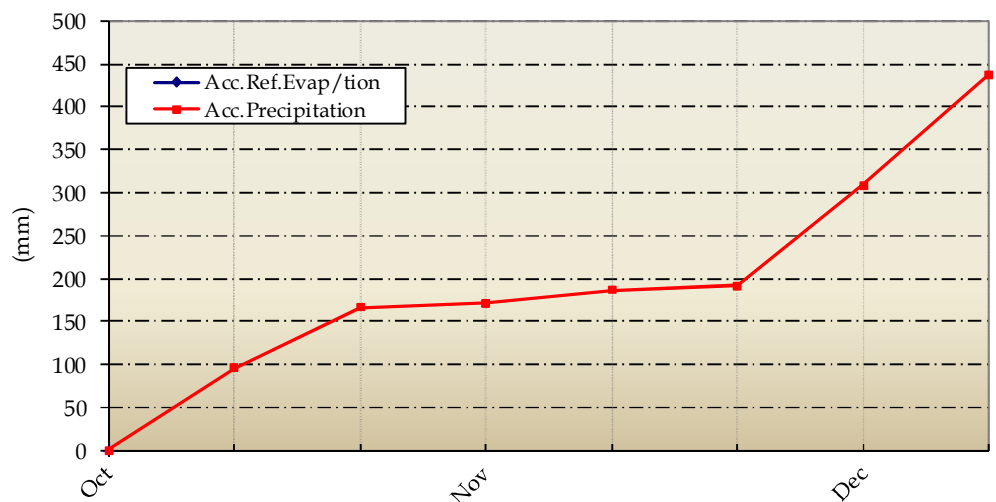


1st 10-day period (1-10/12/2021)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	8.0	11.2	11.2	13.5	11.7	10.1	9.2	10.1	13.0	6.8	10.5	13.8	11.2
	Min	-2.6	0.1	9.2	3.5	3.4	8.9	6.1	1.0	1.4	6.4	3.7	4.6	2.4
Relative Humidity	Max	98	96	99	99	100	99	99	98	100	100	99	98	98
	Min	81	83	80	75	73	91	72	47	84	79	76	65	67
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	6.4
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	6.9
Sunshine Duration		6.8	0.7	0.0	3.7	1.7	0.0	0.1	7.7	0.8	0.0	2.2	2.2	2.3
Precipitation			2.5	26.8	1.4	2.0	52.9	7.0		8.1	28.4	129.1	102.4	45.7
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	-
Growing Degrees	5	0.0	0.7	5.2	3.5	2.6	4.5	2.7	0.6	2.2	1.6	23.4	41.7	18.8
	10	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.3	2.3

1st 10-day period (1-10/12/2021)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	-	8.1
Precipitation - Reference Evapotranspiration	-	-	37.6
Number of Rainy Days	8.0	6.0	3.4
Number of Dry Days	1.0	2.0	-

The missing info in the tables and the graph are due to the absence of data.

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

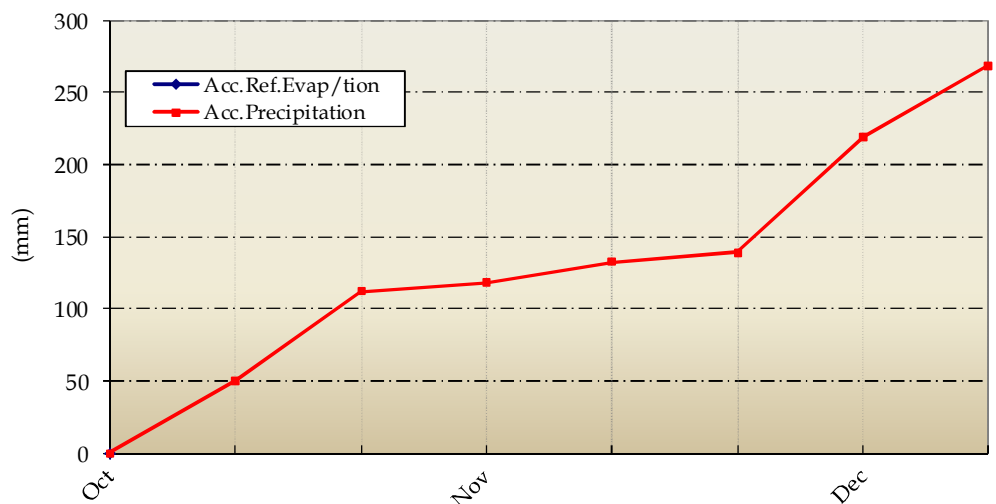


1st 10-day period (1-10/12/2021)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	15.4	17.5	19.4	18.3	18.7	19.0	16.1	14.8	19.5	17.6	17.6	18.6	17.6
	Min	4.2	7.4	8.7	11.7	7.6	9.3	9.4	5.0	8.9	10.3	8.2	8.4	7.5
Relative Humidity	Max	95	92	99	97	95	96	97	96	95	95	96	99	94
	Min	45	62	69	55	52	56	62	66	60	60	59	64	54
Soil Temperature at 10 cm	06 UTC	12.8	13.0	13.4	-	-	13.8	13.8	13.0	12.2	14.0	13.2	12.7	12.6
	12 UTC	13.2	13.4	14.2	15.0	-	14.5	14.2	13.2	13.6	14.0	13.9	13.7	13.5
Sunshine Duration		7.5	4.4	-	-	7.1	4.4	2.6	4.2	5.8	3.8	5.0	4.1	5.1
Precipitation		0.1	0.4	11.3	13.6		2.9	10.7	1.2	0.1	9.9	50.2	104.4	41.4
Evaporation		-	-	-	-	-	-	-	-	-	-	-	15.6	18.4
Growing Degrees	5	4.8	7.5	9.1	10.0	8.2	9.2	7.8	4.9	9.2	9.0	79.4	85.2	67.1
	10	0.0	2.5	4.1	5.0	3.2	4.2	2.8	0.0	4.2	4.0	29.7	35.2	23.7

1st 10-day period (1-10/12/2021)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	-	10.2
Precipitation - Reference Evapotranspiration	-	-	31.2
Number of Rainy Days	9.0	8.0	4.0
Number of Dry Days	0.0	0.0	-

The missing info in the tables and the graph are due to the absence of data.

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



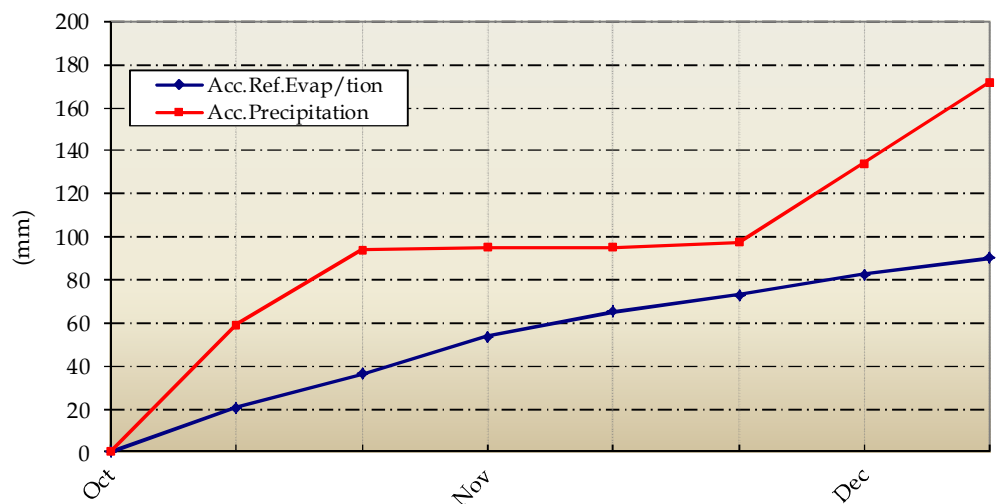
Larisa

1st 10-day period (1-10/12/2021)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	15.2	13.8	16.4	11.0	9.4	15.2	13.8	12.5	12.8	13.8	13.4	13.5	12.7
	Min	1.2	0.0	2.4	6.0	6.6	4.2	7.0	5.6	1.2	5.8	4.0	7.3	3.8
Relative Humidity	Max	91	94	100	100	100	100	100	97	98	100	98	98	97
	Min	41	46	61	88	88	73	51	45	57	62	61	75	61
Soil Temperature at 10 cm	06 UTC	8.4	7.8	3.4	10.4	10.8	9.4	10.0	8.0	7.6	9.8	8.6	-	9.4
	12 UTC	9.4	9.0	10.0	10.8	11.0	10.4	11.8	9.4	9.0	10.6	10.1	-	10.0
Sunshine Duration		8.7	6.7	3.4	1.9	0.1	1.9	2.1	8.0	5.2	3.8	4.2		3.6
Precipitation				11.3	7.5		3.8	11.3		0.0	4.0	37.9	24.3	15.6
Evaporation		1.0	1.8	0.2	1.0	1.0	1.0	8.1	2.8	0.7	0.2	17.8	3.3	10.9
Growing Degrees	5	3.2	1.9	4.4	3.5	3.0	4.7	5.4	4.1	2.0	4.8	37.0	54.3	31.2
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.4	10.1	5.8

1st 10-day period (1-10/12/2021)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.4	-	7.5
Precipitation - Reference Evapotranspiration	30.5	-	8.1
Number of Rainy Days	5.0	6.0	3.3
Number of Dry Days	2.0	0.0	-

The missing info in the tables are due to the absence of data.

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



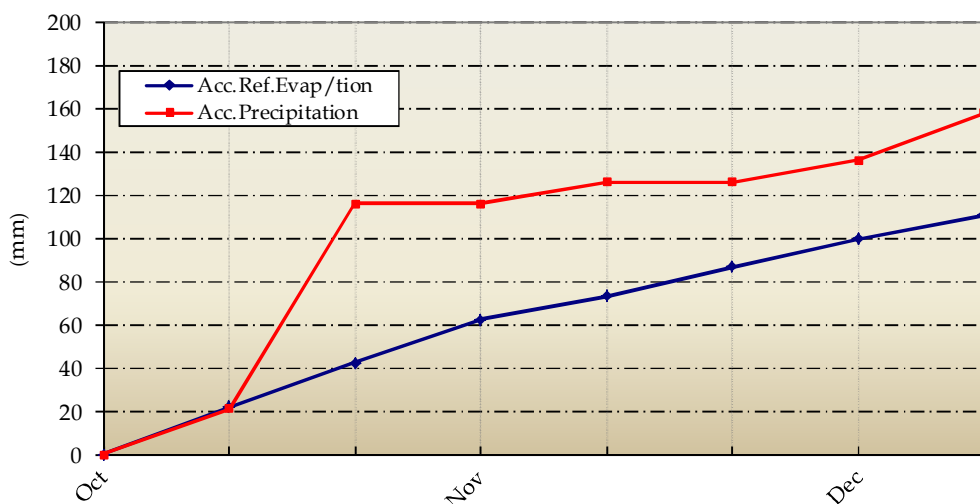
Mikra

1st 10-day period (1-10/12/2021)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	12.0	14.0	15.1	14.6	14.2	17.6	13.2	11.2	12.5	15.4	14.0	13.1	12.4
	Min	-0.7	1.0	6.6	8.0	4.6	8.8	7.4	6.8	2.0	7.9	5.2	8.3	5.2
Relative Humidity	Max	84	93	93	98	97	98	99	87	92	95	94	97	90
	Min	40	58	63	58	77	65	62	50	67	54	59	74	58
Soil Temperature at 10 cm	06 UTC	9.8	8.8	10.4	11.6	10.6	11.6	12.2	9.4	8.6	10.2	10.3	11.3	8.8
	12 UTC	10.0	10.0	11.2	12.0	15.6	12.8	12.4	9.4	9.4	10.6	11.3	12.0	10.7
Sunshine Duration		10.2	7.6	3.1	6.2	6.1	3.3	2.1	7.4	5.1	1.6	5.3	0.8	3.7
Precipitation				0.5	2.0		1.3	15.6			2.8	22.2	60.9	17.0
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	29.2
Growing Degrees	5	0.7	2.5	5.9	6.3	4.4	8.2	5.3	4.0	2.3	6.7	46.1	57.2	36.6
	10	0.0	0.0	0.9	1.3	0.0	3.2	0.3	0.0	0.0	1.7	7.3	14.4	7.3

1st 10-day period (1-10/12/2021)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	11.3	7.2	6.6
Precipitation - Reference Evapotranspiration	10.9	53.7	10.4
Number of Rainy Days	5.0	6.0	2.7
Number of Dry Days	2.0	0.0	-

The missing info in the tables are due to the absence of data.

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



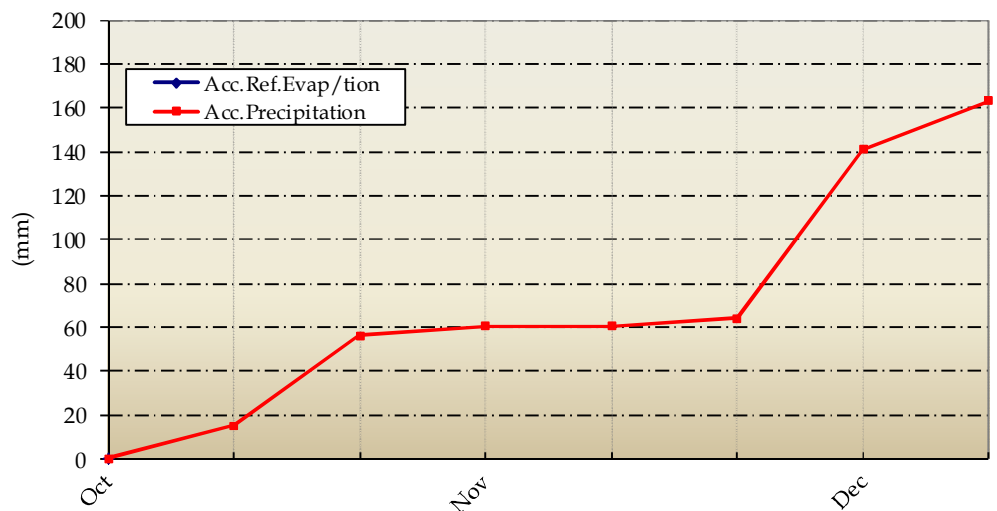
Tanagra

1st 10-day period (1-10/12/2021)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	14.8	17.0	19.0	17.4	17.9	18.7	14.8	13.5	18.4	15.0	16.6	15.7	14.4
	Min	-0.2	1.3	9.5	10.2	4.4	6.8	10.4	5.0	4.0	12.1	6.4	7.6	6.5
Relative Humidity	Max	83	95	99	100	100	79	98	98	82	82	92	99	93
	Min	42	34	43	53	43	43	54	44	49	48	45	58	53
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		7.7	7.2	1.8	2.3	7.5	5.8	3.0	7.5	7.2	3.5	5.4	3.5	4.3
Precipitation				3.1	8.3			6.4	1.5		2.6	21.9	36.9	23.2
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	23.8
Growing Degrees	5	2.3	4.2	9.3	8.8	6.2	7.8	7.6	4.3	6.2	8.6	65.0	66.2	47.2
	10	0.0	0.0	4.3	3.8	1.2	2.8	2.6	0.0	1.2	3.6	19.3	16.2	12.2

1st 10-day period (1-10/12/2021)	Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	-
Precipitation - Reference Evapotranspiration	-	-
Number of Rainy Days	5.0	4.0
Number of Dry Days	2.0	0.0

The missing info in the tables and the graph are due to the absence of data.

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



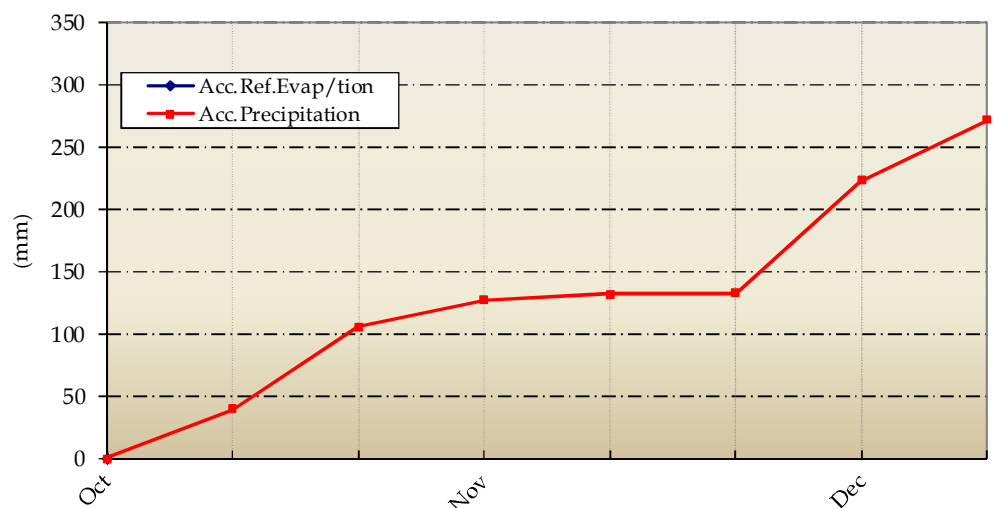
Tripoli

1st 10-day period (1-10/12/2021)		1	2	3	4	5	6	7	8	9	10	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	11.5	13.4	13.3	13.2	13.5	13.3	10.9	10.9	15.4	9.9	12.5	12.5	12.1
	Min	0.1	-0.1	8.4	7.1	1.0	6.7	5.8	0.8	2.8	6.5	3.9	5.3	2.3
Relative Humidity	Max	96	94	98	100	100	95	96	96	92	94	96	98	99
	Min	43	53	65	61	55	56	59	40	53	53	54	67	57
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	7.2
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	8.7
Sunshine Duration		7.4	4.8	1.2	2.4	7.0	3.9	3.1	6.6	6.3	2.5	4.5	2.6	4.6
Precipitation			0.0	1.5	18.9	0.0	3.1	7.3	0.2	0.0	17.3	48.3	56.5	24.8
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	39.5
Growing Degrees	5	0.8	1.7	5.9	5.2	2.3	5.0	3.4	0.9	4.1	3.2	32.2	39.2	21.9
	10	0.0	0.0	0.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	2.5

1st 10-day period (1-10/12/2021)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	8.1	7.1	5.3
Precipitation - Reference Evapotranspiration	40.2	49.4	19.5
Number of Rainy Days	6.0	6.0	3.4
Number of Dry Days	2.0	1.0	-

The missing info in the tables and the graph are due to the absence of data.

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.

Past Years Mean Values 1991-2020 (Evaporation, Reference Evapotranspiration, Max and Min Relative Humidity 2005-2020)

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

© HELLENIC NATIONAL METEOROLOGICAL SERVICE
 Reproduction is prohibited without written permission
 El. Venizelou street 14, Zip Code 16777
 Helliniko, Athens

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