



AGROMETEOROLOGICAL BULLETIN

December 2018
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



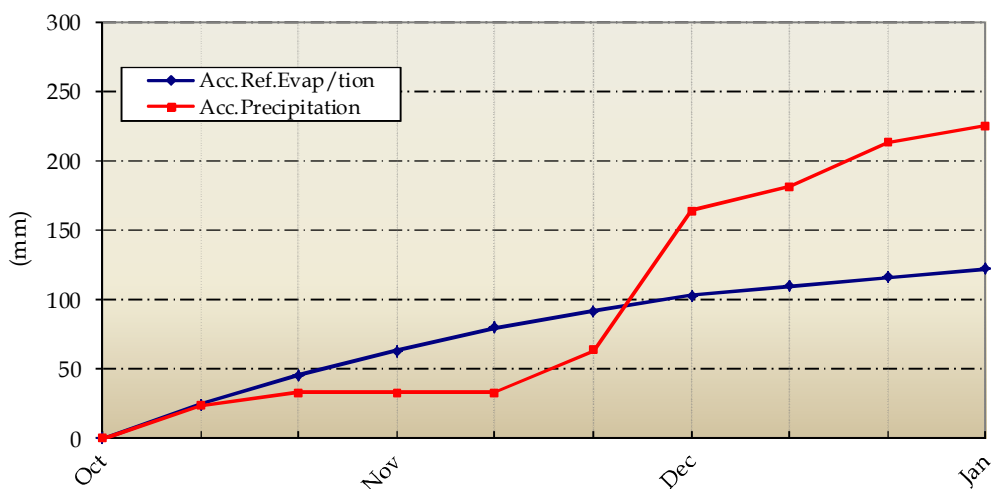
Hellenic National Meteorological Service
Division of Climatology-Applications
El. Venizelou Street 14, 16777
Helliniko, Athens

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

3rd 10-day period (21-31/12/2018)		21	22	23	24	25	26	27	28	29	30	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	8.0	12.8	13.8	14.6	14.0	7.6	8.8	9.4	11.0	9.0	10.4	10.9	11.0	9.8
	Min	-0.4	0.0	0.4	4.2	1.0	-2.0	-4.0	-3.6	1.6	-1.0	3.2	-0.1	2.9	2.4
Relative Humidity	Max	93	100	92	92	88	74	90	92	93	92	74	89	92	-
	Min	67	68	65	76	44	31	42	51	60	59	54	56	67	-
Soil Temperature at 10 cm	06 UTC	4.2	4.6	6.6	6.4	8.4	3.4	2.6	3.0	4.6	4.4	5.6	4.9	6.0	6.0
	12 UTC	5.8	7.2	8.6	9.2	7.2	5.2	4.4	4.8	6.6	6.2	6.6	6.5	7.3	7.2
Sunshine Duration		1.6	3.4	7.4	3.2	2.3	6.4	5.5	4.5	2.9	3.0	2.1	3.8	3.4	2.6
Precipitation						11.6				0.1			11.7	23.2	24.7
Evaporation		0.4	0.5	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	1.3	3.1	5.4	12.0
Growing Degrees	5	0.0	1.4	2.1	4.4	2.5	0.0	0.0	0.0	1.3	0.0	1.8	13.5	27.6	24.9
	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	2.7	4.2

3rd 10-day period (21-31/12/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	6.4	7.3	8.4
Precipitation - Reference Evapotranspiration	5.3	15.9	16.3
Number of Rainy Days	2.0	3.0	2.9
Number of Dry Days	6.0	8.0	-

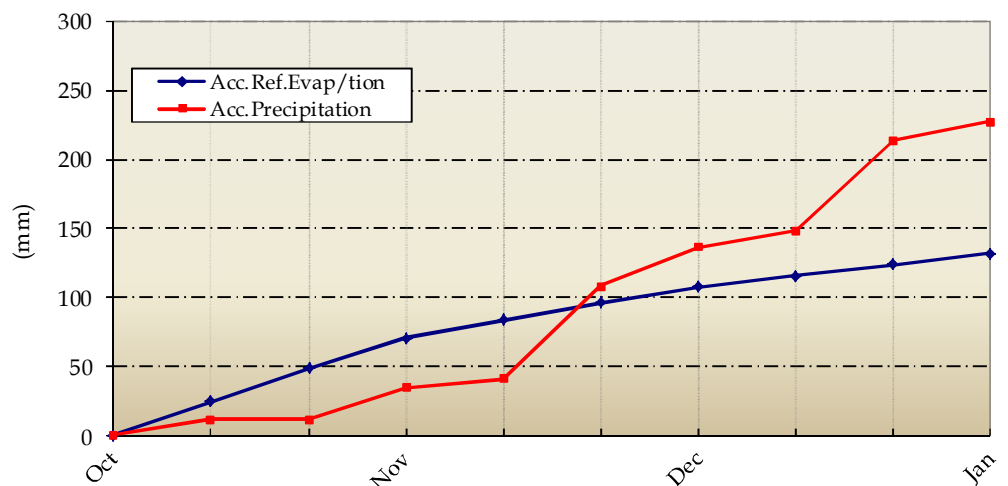
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-31/12/2018)		21	22	23	24	25	26	27	28	29	30	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	13.2	16.6	17.3	18.0	15.5	11.8	12.4	14.0	15.3	16.0	9.6	14.5	13.2	14.4
	Min	6.0	4.2	9.4	7.9	8.4	0.9	-0.8	-0.9	3.0	5.6	5.8	4.5	6.0	6.0
Relative Humidity	Max	98	100	98	96	92	88	89	90	86	96	98	94	89	-
	Min	69	57	58	62	59	34	34	34	56	51	58	52	53	-
Soil Temperature at 10 cm	06 UTC	10.4	10.0	11.0	11.6	13.0	8.2	8.8	8.2	8.6	9.2	10.0	9.9	9.7	9.0
	12 UTC	10.6	11.6	12.0	12.4	11.8	11.2	9.8	8.8	12.0	10.2	10.0	10.9	10.7	10.5
Sunshine Duration		0.0	2.5	6.4	3.1	2.8	6.3	6.5	6.8	5.2	5.8	0.0	4.1	3.2	4.0
Precipitation						0.6						13.1	13.7	100.6	44.5
Evaporation		2.6	1.2	1.8	1.8	0.6	1.0	1.2	1.9	2.2	1.8	3.0	19.1	29.1	21.9
Growing Degrees	5	4.6	5.4	8.4	8.0	7.0	1.4	0.8	1.6	4.2	5.8	2.7	49.6	50.7	57.7
	10	0.0	0.4	3.4	3.0	2.0	0.0	0.0	0.0	0.0	0.8	0.0	9.5	9.8	13.8

3rd 10-day period (21-31/12/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	8.3	10.0	9.5
Precipitation - Reference Evapotranspiration	5.4	90.6	35.0
Number of Rainy Days	2.0	6.0	4.8
Number of Dry Days	6.0	1.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

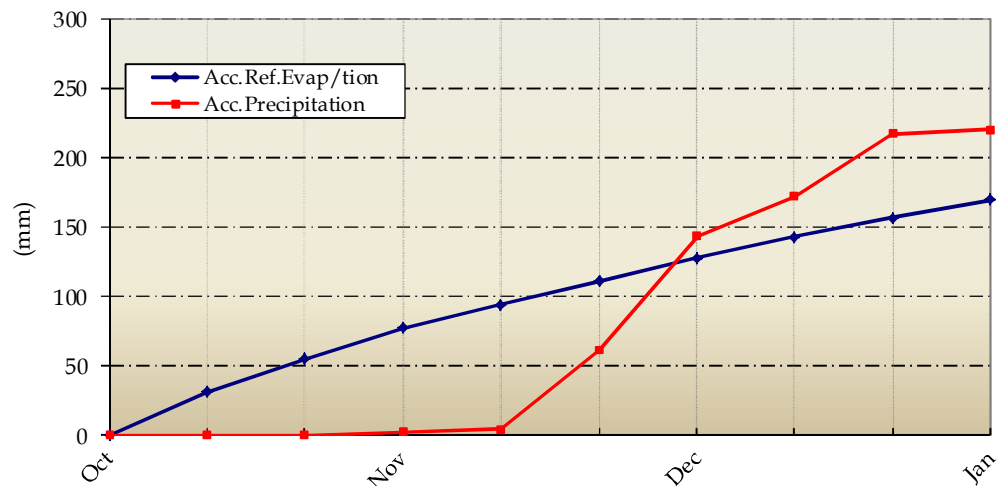


Iraklio

3rd 10-day period (21-31/12/2018)		21	22	23	24	25	26	27	28	29	30	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	15.2	18.2	16.8	17.4	21.0	11.6	11.2	12.2	14.8	15.4	13.8	15.2	15.7	15.9
	Min	11.4	8.8	13.4	9.2	11.4	10.0	8.8	10.4	11.0	8.2	7.4	10.0	11.1	10.0
Relative Humidity	Max	91	94	93	92	95	86	89	80	94	97	95	91	84	-
	Min	73	71	74	70	69	55	68	65	73	70	75	69	57	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sunshine Duration		6.4	7.3	1.3	8.1	5.7	1.2	0.2	0.0	7.2	4.2	0.7	3.8	3.1	3.8
Precipitation				0.0		7.5	4.0	0.0	0.0		0.6	3.0	15.1	34.5	34.5
Evaporation		1.8	3.5	0.8	2.2	4.0	1.4	2.8	3.6	0.3	1.7	5.2	27.3	20.9	28.1
Growing Degrees	5	8.3	8.5	10.1	8.3	11.2	5.8	5.0	6.3	7.9	6.8	5.6	83.8	92.4	87.3
	10	3.3	3.5	5.1	3.3	6.2	0.8	0.0	1.3	2.9	1.8	0.6	28.8	37.4	33.4

3rd 10-day period (21-31/12/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	13.4	18.4	-
Precipitation - Reference Evapotranspiration	1.7	16.1	34.5
Number of Rainy Days	4.0	6.0	4.5
Number of Dry Days	5.0	1.0	-

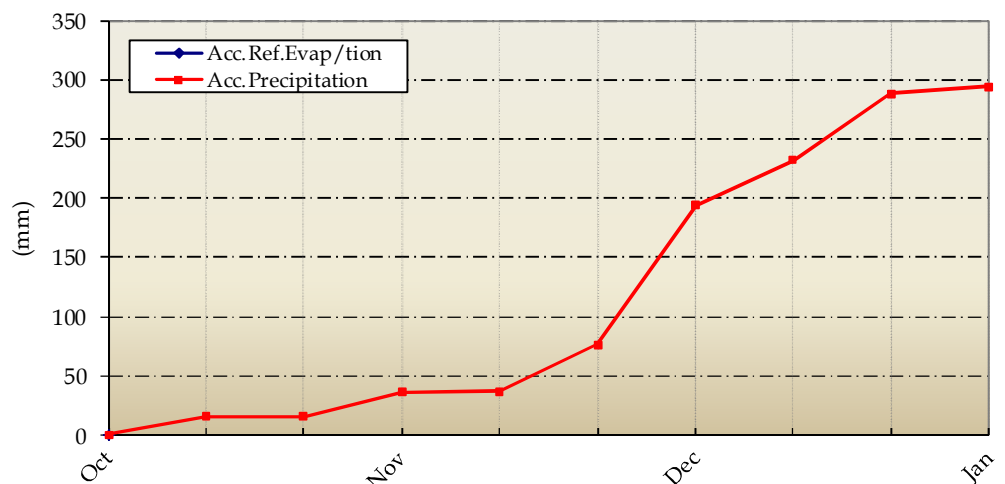
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-31/12/2018)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	9.0	9.0	11.4	8.2	9.4	8.2	6.8	7.4	8.2	9.0	6.6	8.5	8.5	8.8
	Min	2.8	2.0	4.0	1.2	2.0	-3.6	-5.0	-5.8	-4.0	-3.0	0.8	-0.8	-0.8	0.9
Relative Humidity	Max	100	100	100	100	97	92	92	97	100	100	92	97	98	-
	Min	91	94	68	94	33	32	33	42	32	63	65	59	63	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	4.0
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	4.7
Sunshine Duration		0.0	0.6	2.9	0.0	5.6	6.0	5.9	4.8	5.1	4.5	0.0	3.2	2.6	2.4
Precipitation		0.5			1.1	4.1							5.7	71.3	50.6
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	-	9.0
Growing Degrees	5	0.9	0.5	2.7	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	4.8	4.6	14.1
	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	0.0	0.9

3rd 10-day period (21-31/12/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	-	-	6.2
Precipitation - Reference Evapotranspiration	-	-	44.4
Number of Rainy Days	3.0	4.0	4.3
Number of Dry Days	2.0	7.0	-

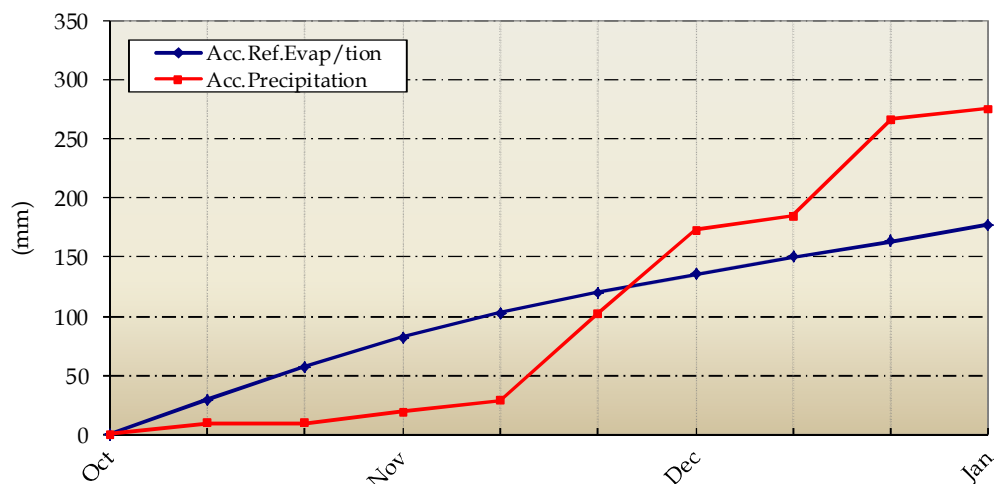
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-31/12/2018)		21	22	23	24	25	26	27	28	29	30	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	17.1	17.8	19.1	19.0	15.0	14.0	13.3	15.4	17.6	15.9	11.9	16.0	14.3	15.2
	Min	3.8	6.1	8.1	6.0	8.0	5.2	1.2	1.9	3.4	6.4	5.8	5.1	5.0	6.1
Relative Humidity	Max	92	93	88	91	94	74	81	84	83	90	92	87	89	-
	Min	45	46	45	49	57	38	30	43	42	54	52	46	53	-
Soil Temperature at 10 cm	06 UTC	10.4	11.2	11.6	11.6	13.0	11.4	9.8	9.4	9.4	10.0	10.0	10.7	-	10.0
	12 UTC	11.8	12.0	12.6	12.4	13.4	11.6	10.4	10.0	10.4	10.6	10.4	11.4	-	10.9
Sunshine Duration		5.1	7.2	6.9	7.1	1.1	6.8	8.0	7.5	7.8	6.5	0.0	5.8	3.5	3.9
Precipitation		0.3			0.1	1.9					0.8	6.0	9.1	57.9	41.5
Evaporation		1.8	3.4	1.6	1.2	2.7	1.6	1.4	1.0	1.6	1.7	0.6	18.6	13.5	22.7
Growing Degrees	5	5.5	7.0	8.6	7.5	6.5	4.6	2.3	3.7	5.5	6.2	3.9	61.0	50.9	62.1
	10	0.5	2.0	3.6	2.5	1.5	0.0	0.0	0.0	0.5	1.2	0.0	11.7	4.6	14.5

3rd 10-day period (21-31/12/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	14.6	12.4	11.8
Precipitation - Reference Evapotranspiration	-5.5	45.5	29.7
Number of Rainy Days	5.0	7.0	4.8
Number of Dry Days	2.0	2.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

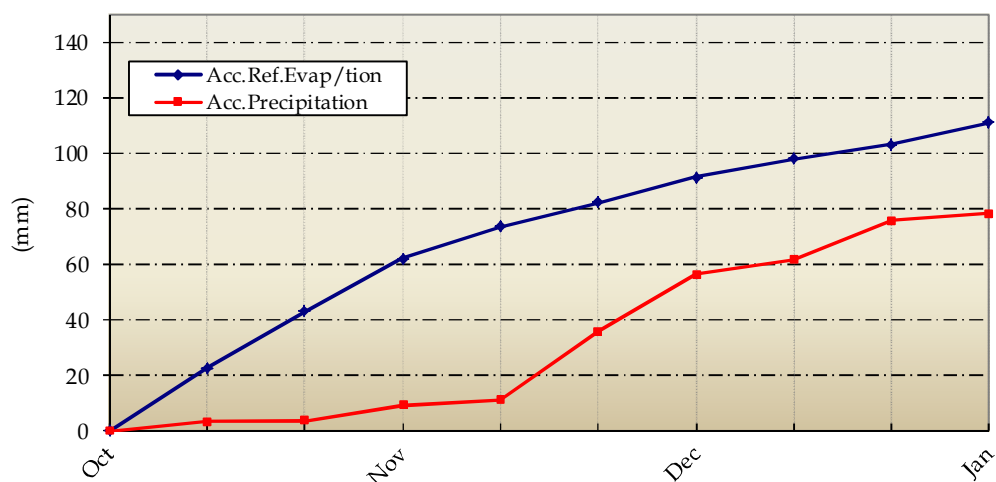


Larisa

3rd 10-day period (21-31/12/2018)		21	22	23	24	25	26	27	28	29	30	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	10.4	9.8	15.2	13.5	11.0	7.8	9.1	9.3	12.0	10.4	8.6	10.6	11.1	10.0
	Min	0.2	-1.9	-1.2	0.2	3.6	-1.4	-4.7	-4.4	-3.0	0.4	3.9	-0.8	-0.7	1.1
Relative Humidity	Max	98	99	100	100	88	89	92	95	96	83	89	94	100	-
	Min	64	72	57	68	43	39	44	47	39	42	52	52	63	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	5.7
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	6.1
Sunshine Duration		3.6	1.6	5.9	2.8	0.4	7.2	6.0	6.2	6.5	3.9	0.0	4.0	4.6	3.0
Precipitation						2.2						0.2	2.4	4.4	14.0
Evaporation		1.4	0.5	0.3	0.1	0.3	0.5	1.8	1.5	0.9	2.5	0.1	9.9	22.9	7.2
Growing Degrees	5	0.3	0.0	2.0	1.9	2.3	0.0	0.0	0.0	0.0	0.4	1.3	8.1	11.7	18.9
	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	0.0	2.2

3rd 10-day period (21-31/12/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.8	6.0	6.4
Precipitation - Reference Evapotranspiration	-5.4	-1.6	7.6
Number of Rainy Days	2.0	3.0	3.0
Number of Dry Days	6.0	2.0	-

Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration

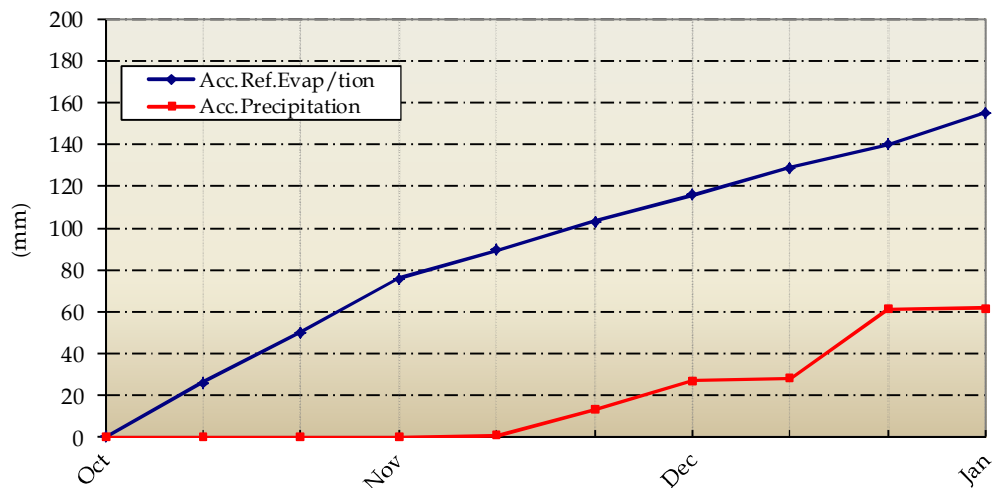


Mikra

3rd 10-day period (21-31/12/2018)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	9.5	9.4	15.4	13.8	13.0	8.4	9.9	9.5	12.9	10.0	8.6	10.9	11.4	10.2
	Min	1.0	0.2	0.6	3.1	4.9	2.1	4.9	-2.7	1.2	0.2	-1.3	1.3	2.9	2.2
Relative Humidity	Max	94	94	95	88	60	53	69	84	78	74	81	79	80	-
	Min	63	76	44	56	42	35	36	43	33	42	39	46	50	-
Soil Temperature at 10 cm	06 UTC	5.2	5.0	5.2	6.0	7.4	4.2	4.8	4.6	4.4	4.5	4.5	5.1	6.3	5.3
	12 UTC	5.8	5.8	5.2	7.8	7.2	5.8	5.8	4.6	7.0	6.0	9.6	6.4	7.3	6.8
Sunshine Duration		3.8	2.7	6.0	5.6	5.0	7.4	7.5	7.4	7.5	3.2	1.6	5.2	5.1	3.0
Precipitation						0.1							0.1	0.1	14.9
Evaporation		1.2	0.4	2.1	2.5	0.0	0.0	0.0	0.0	5.5	0.0	0.0	11.7	19.8	13.5
Growing Degrees	5	0.3	0.0	3.0	3.5	4.0	0.3	2.4	0.0	2.1	0.1	0.0	15.5	26.4	22.3
	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	3.0

3rd 10-day period (21-31/12/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	15.5	11.9	8.7
Precipitation - Reference Evapotranspiration	-15.4	-11.8	6.2
Number of Rainy Days	1.0	1.0	3.0
Number of Dry Days	5.0	9.0	-

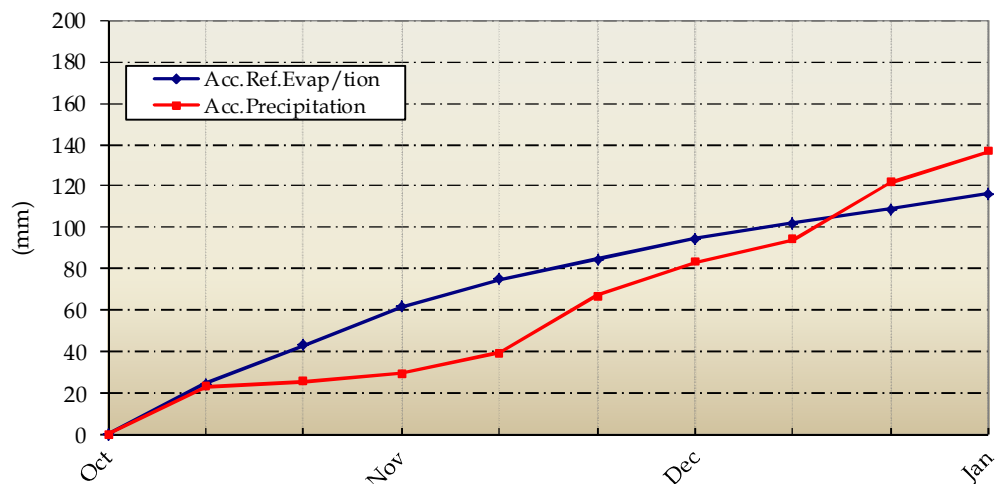
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-31/12/2018)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	13.2	15.8	17.8	17.5	8.2	5.7	9.5	10.8	14.2	10.2	7.4	11.8	11.8	13.1
	Min	0.7	1.3	4.3	3.0	8.0	4.9	0.7	3.3	0.1	4.4	5.0	3.2	3.3	4.6
Relative Humidity	Max	100	100	100	100	95	69	78	99	98	94	99	94	92	-
	Min	60	45	43	43	62	50	50	49	46	58	78	53	52	-
Soil Temperature at 10 cm	06 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	"
	12 UTC	-	-	-	-	-	-	-	-	-	-	-	-	-	"
Sunshine Duration		6.6	7.1	7.1	6.8	0.0	0.7	5.9	5.7	7.5	0.6	0.0	4.4	4.7	
Precipitation						8.5	0.0					6.3	14.8	66.3	24.3
Evaporation		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Growing Degrees	5	2.0	3.6	6.1	5.3	3.1	0.3	0.1	2.1	2.2	2.3	1.2	28.0	34.4	
	10	0.0	0.0	1.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	4.9	

3rd 10-day period (21-31/12/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.6	9.6	
Precipitation - Reference Evapotranspiration	7.2	56.7	24.3
Number of Rainy Days	2.0	6.0	
Number of Dry Days	5.0	2.0	-

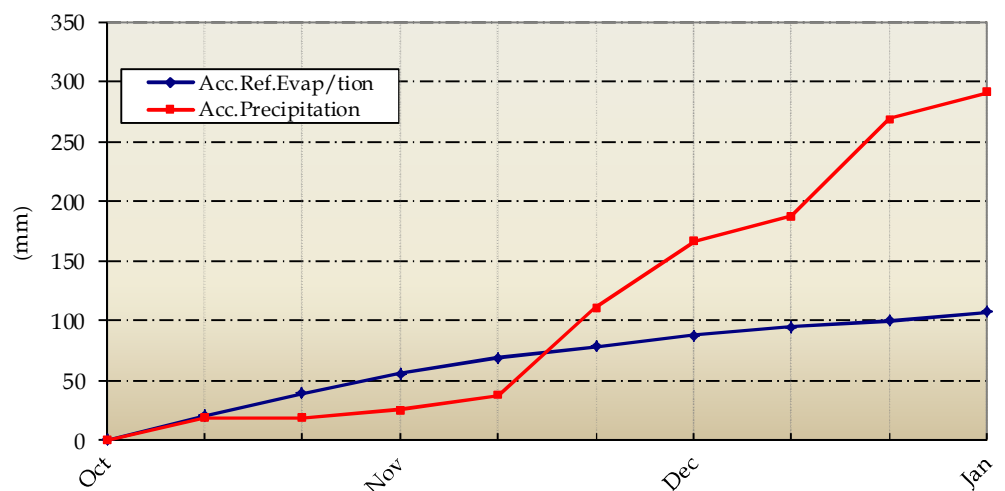
Diagram of Accumulated Precipitation and Accumulated Reference Evapotranspiration



3rd 10-day period (21-31/12/2018)		21	22	23	24	25	26	27	28	29	20	31	Mean Value or Sum	Previous Year Value	Past Years Mean Value
Temperature	Max	12.2	13.6	15.6	14.0	11.4	4.7	8.5	10.7	13.4	9.0	4.3	10.7	8.6	9.8
	Min	-3.6	-2.1	3.5	-1.8	2.3	-0.5	-5.9	-5.6	-4.0	1.8	1.7	-1.3	-0.7	1.5
Relative Humidity	Max	100	100	100	100	100	98	99	99	100	100	100	100	99	-
	Min	55	48	43	52	73	48	31	41	43	73	87	54	60	-
Soil Temperature at 10 cm	06 UTC	-	-	-	4.6	8.4	5.6	2.4	2.0	2.0	4.0	5.4	4.3	4.4	5.3
	12 UTC	-	-	-	-	-	-	4.0	3.6	-	-	-	3.8	5.4	6.0
Sunshine Duration		5.2	-	7.3	5.2	0.0	5.7	6.2	6.7	6.7	1.5	0.0	4.4	3.6	3.7
Precipitation		0.0	0.0		0.3	6.3	0.2				2.6	12.5	21.9	78.0	36.8
Evaporation		0.0	-	-	0.1	0.4	0.0	0.0	0.0	0.0	0.3	0.1	-	-	9.0
Growing Degrees	5	0.0	0.8	4.6	1.1	1.9	0.0	0.0	0.0	0.0	0.4	0.0	8.7	4.6	18.6
	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	0.0	1.8

3rd 10-day period (21-31/12/2018)		Previous Year Value	Past Years Mean Value
Reference Evapotranspiration	7.2	6.1	8.4
Precipitation - Reference Evapotranspiration	14.7	71.9	28.4
Number of Rainy Days	5.0	7.0	4.5
Number of Dry Days	5.0	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_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.

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