Supplementary Material for
"Landslide Susceptibility Mapping under Climate Change Impact. The case of Chania Prefecture, West Crete, Greece"

The pdf Supplementary Material for the manuscript includes:

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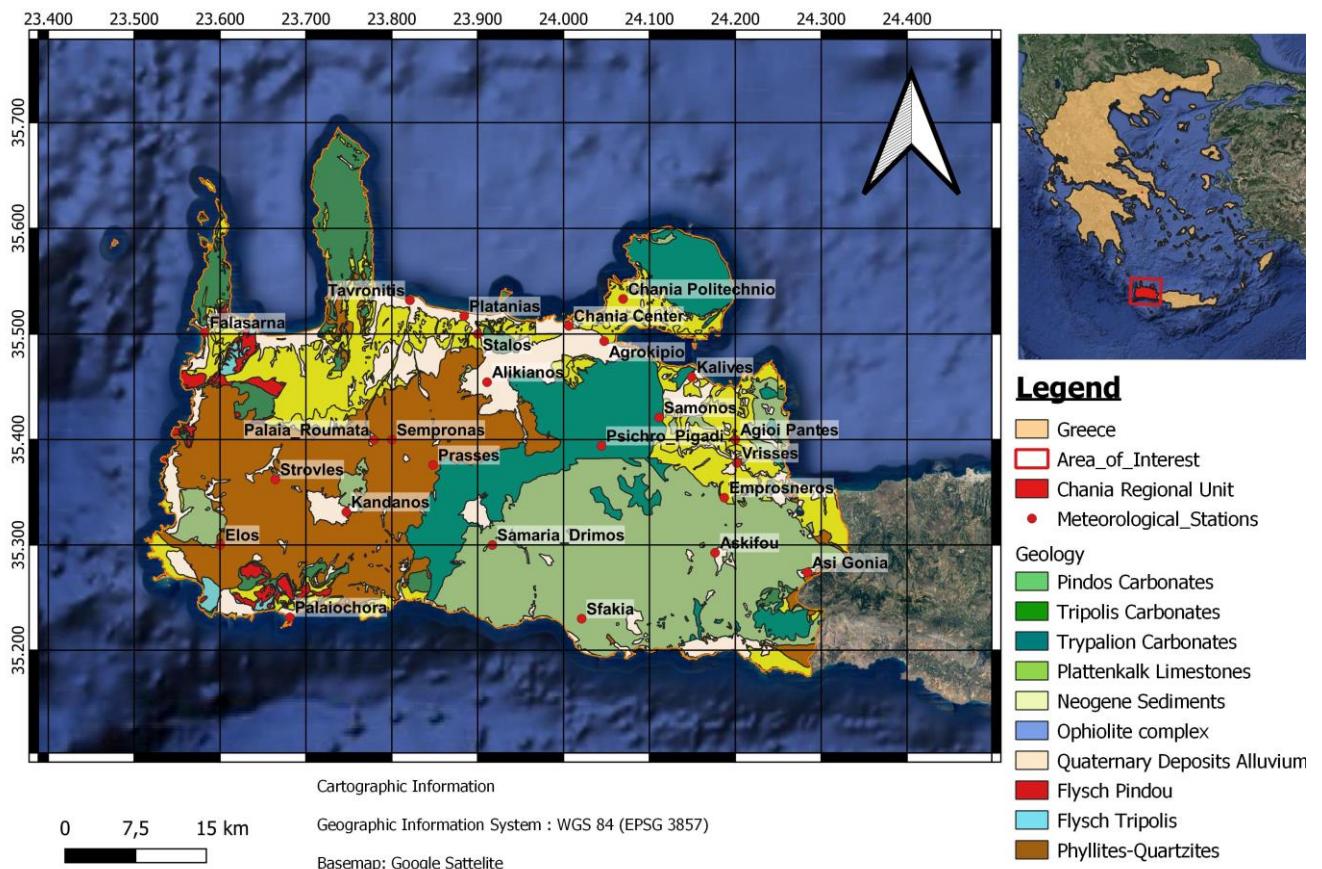

Figure S1. Geology of Chania Regional Unit.
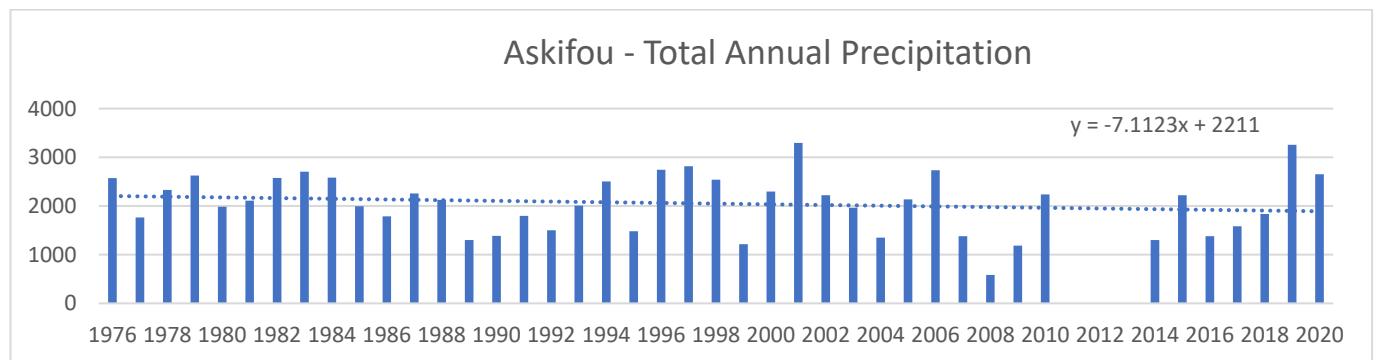
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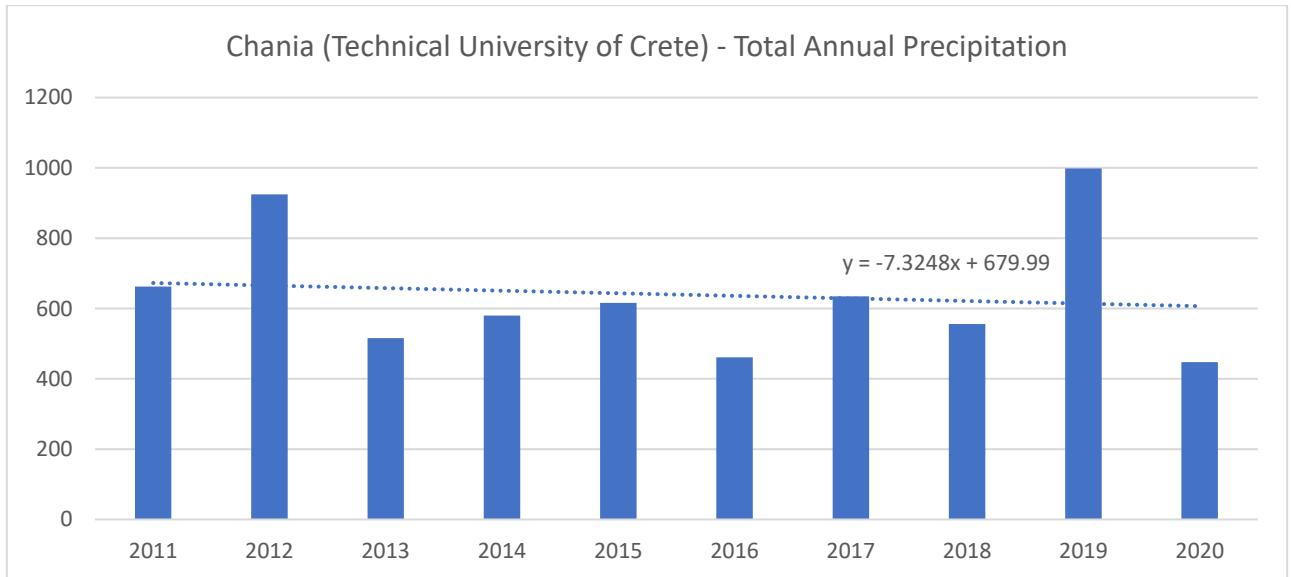
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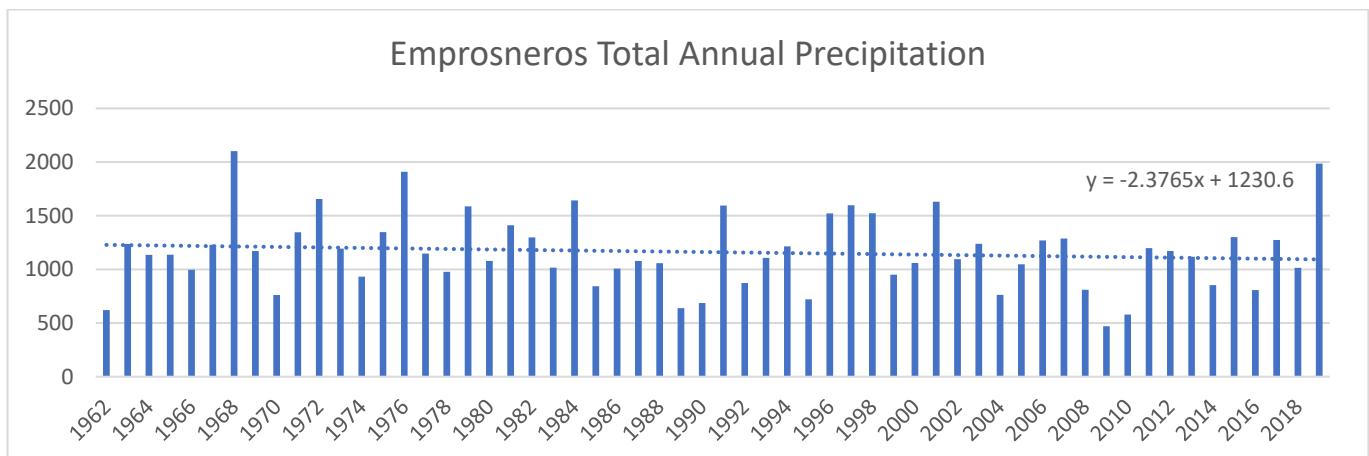

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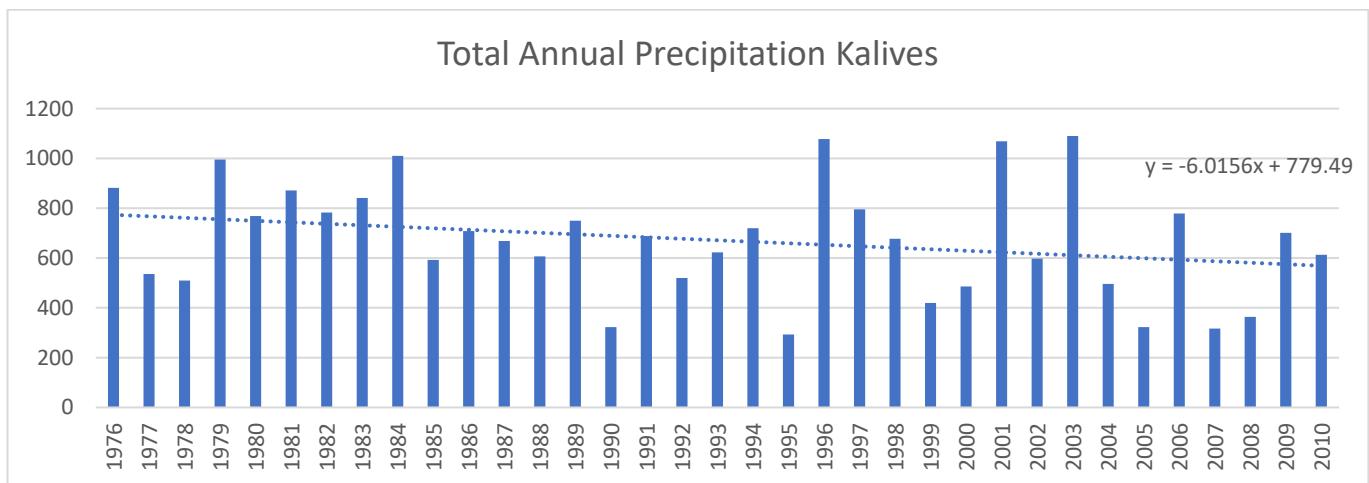

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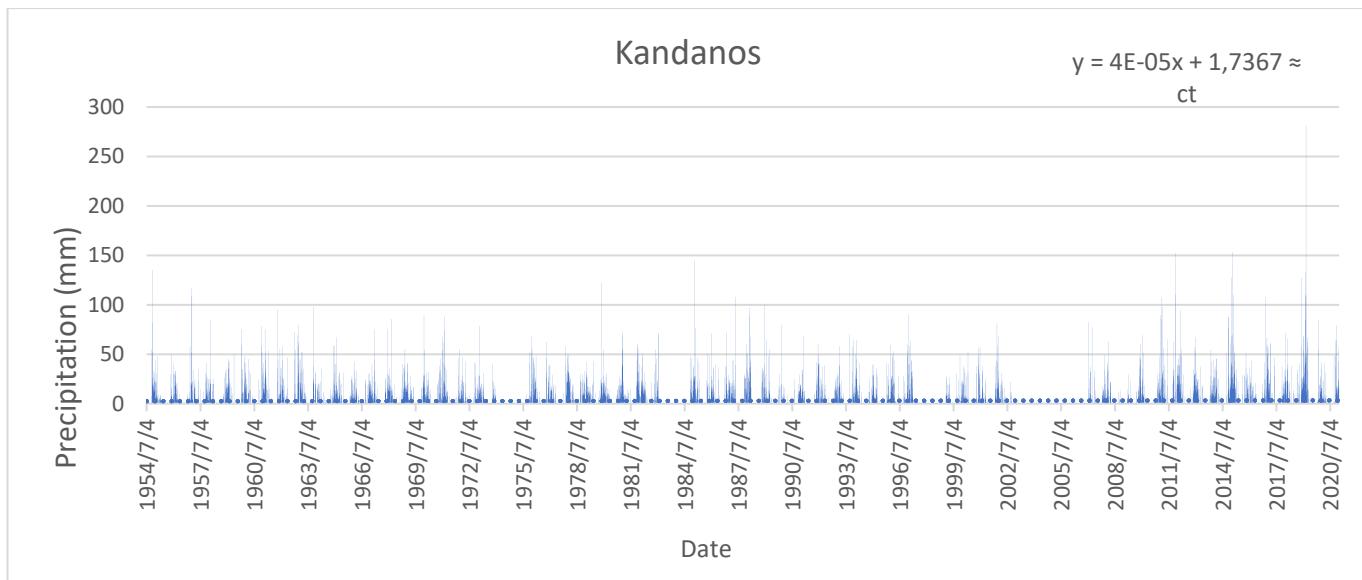
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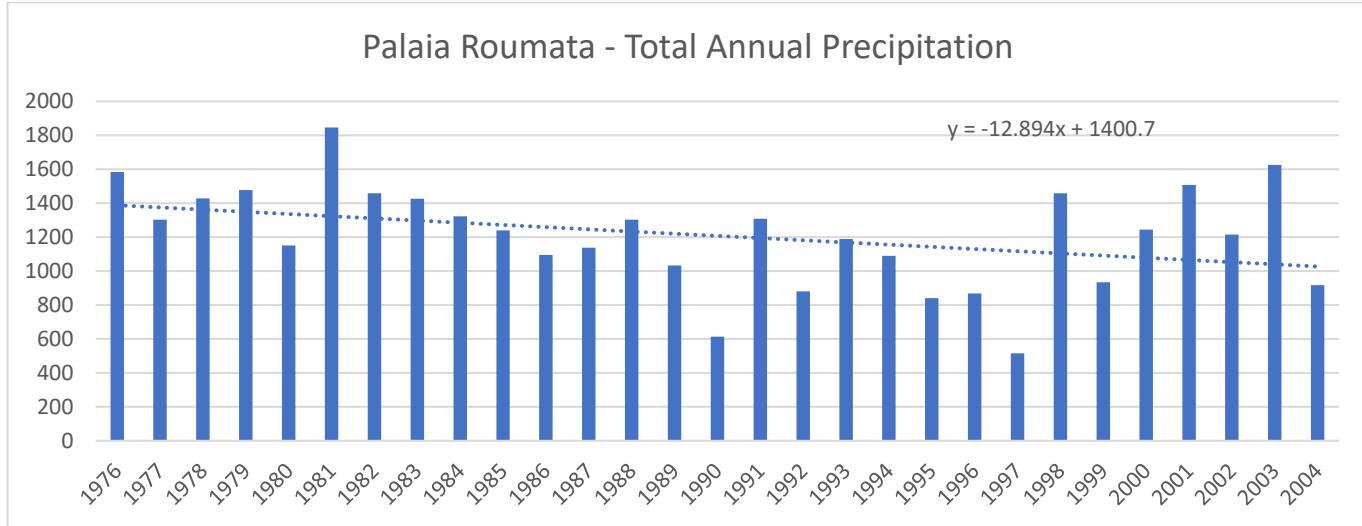

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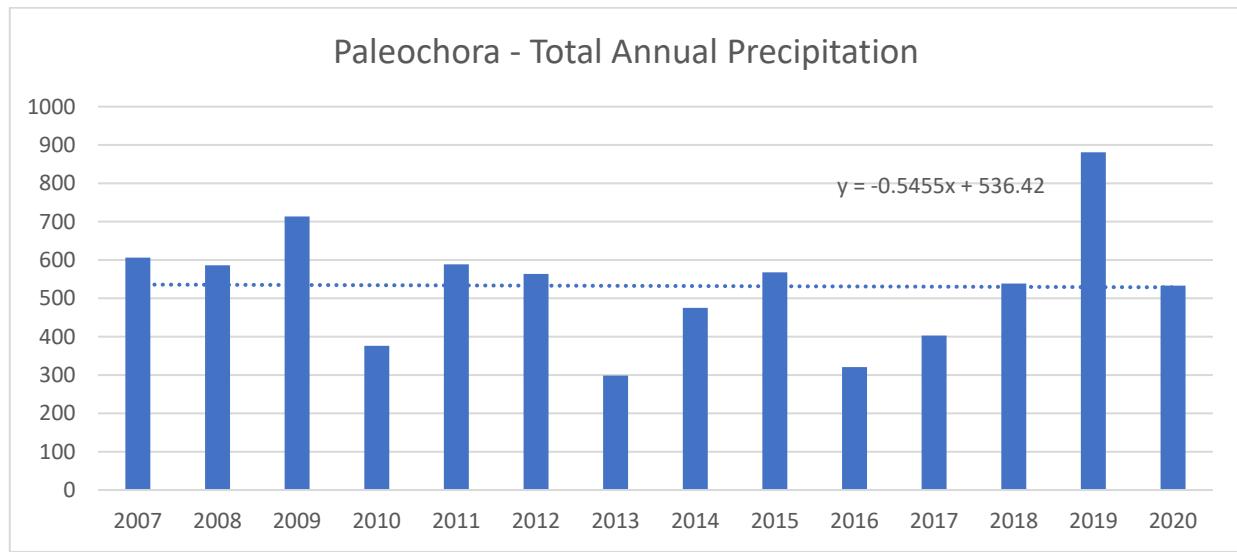
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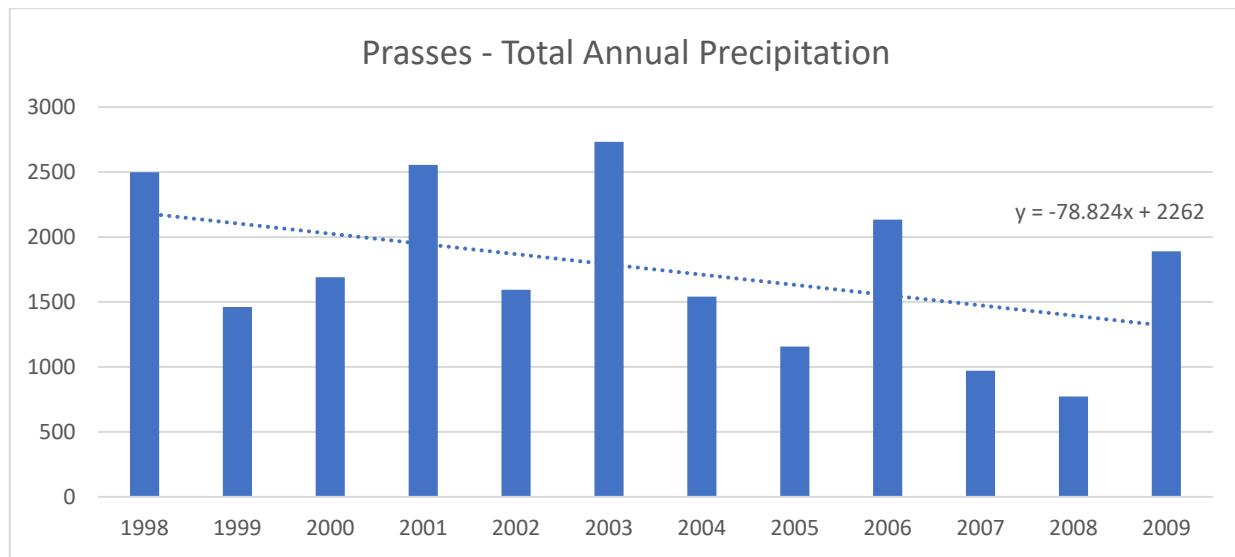
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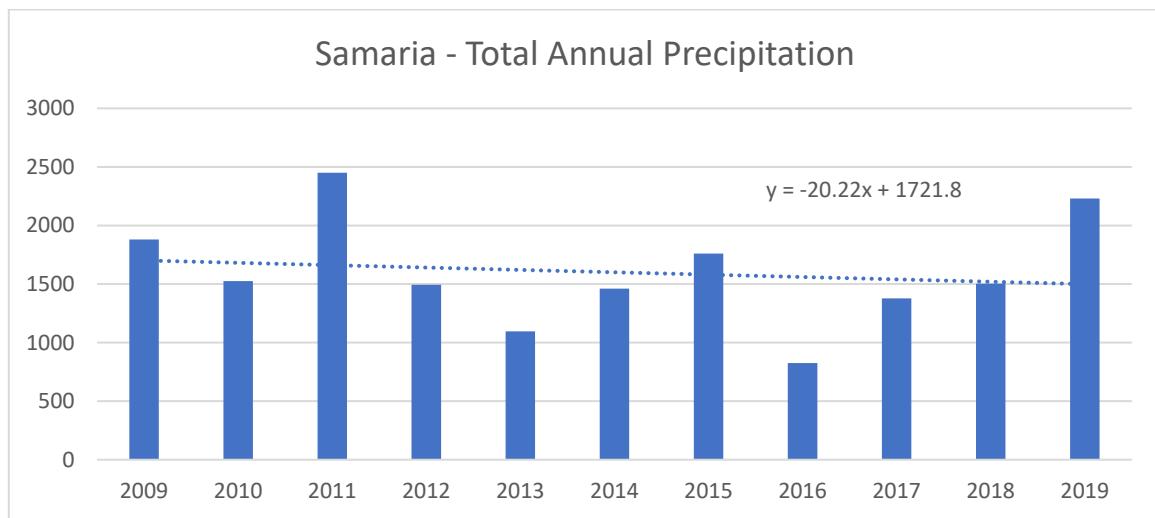
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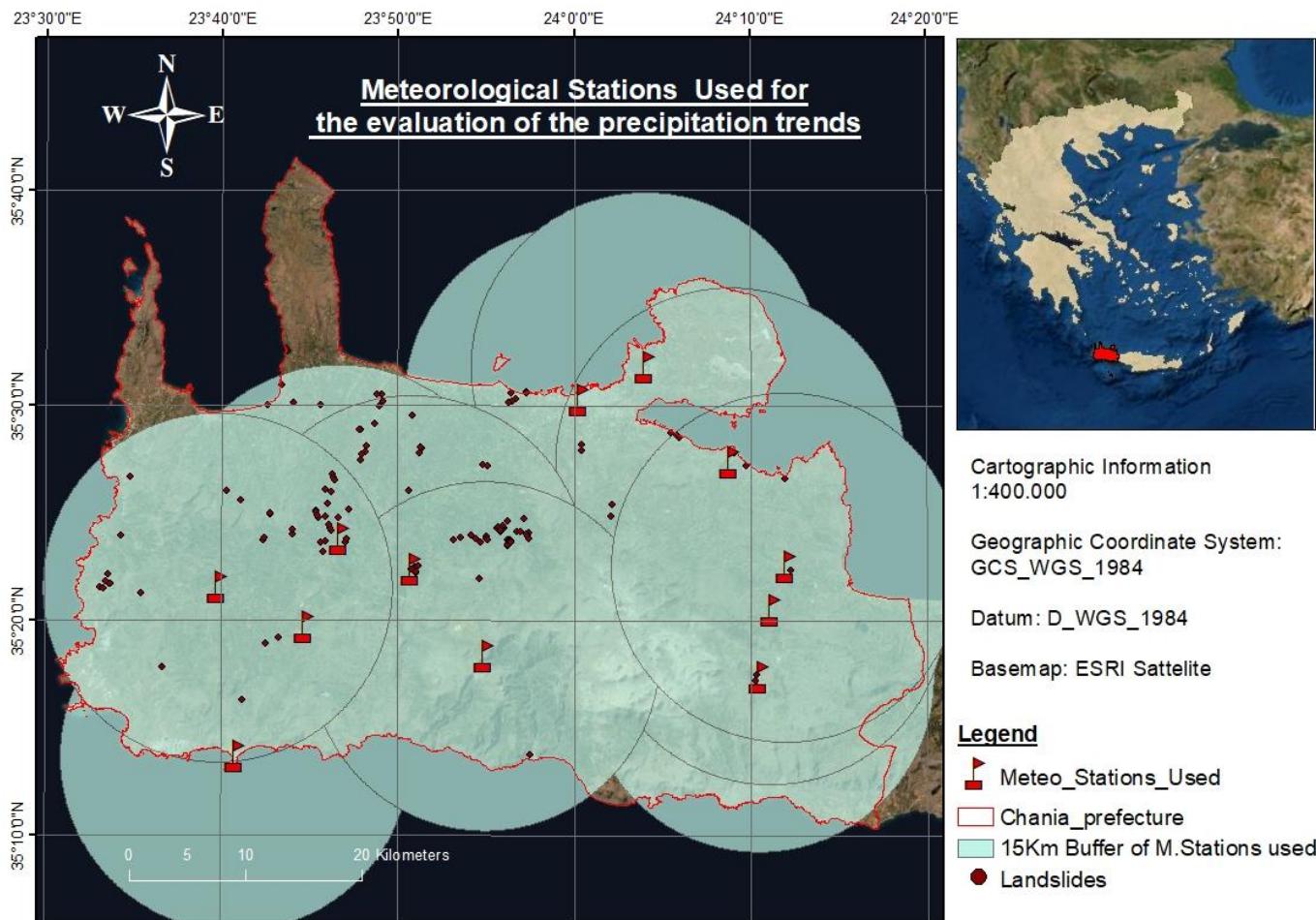
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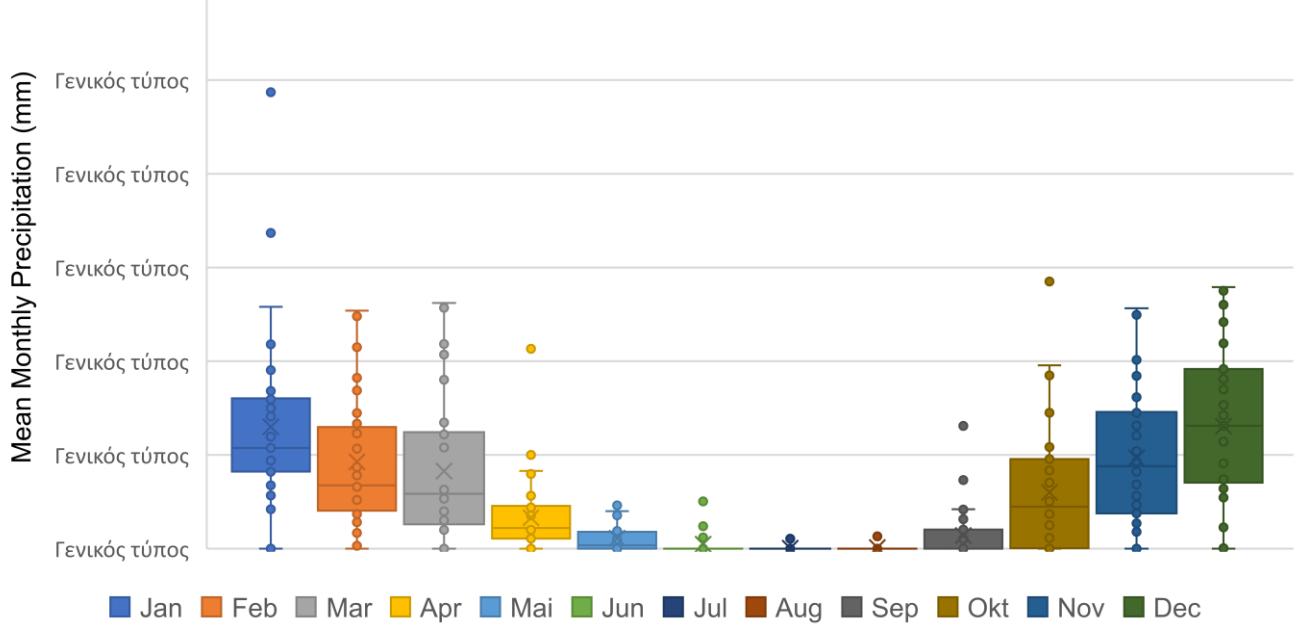
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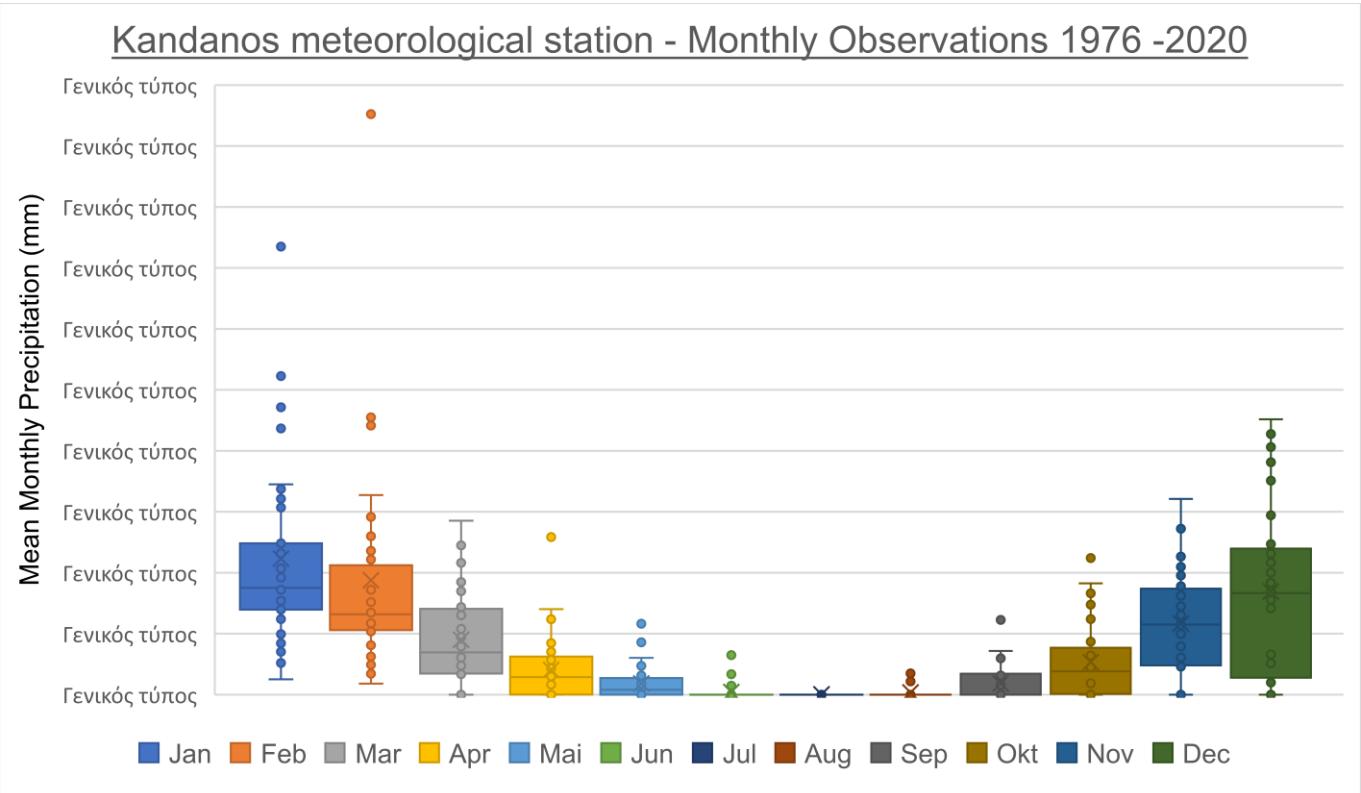
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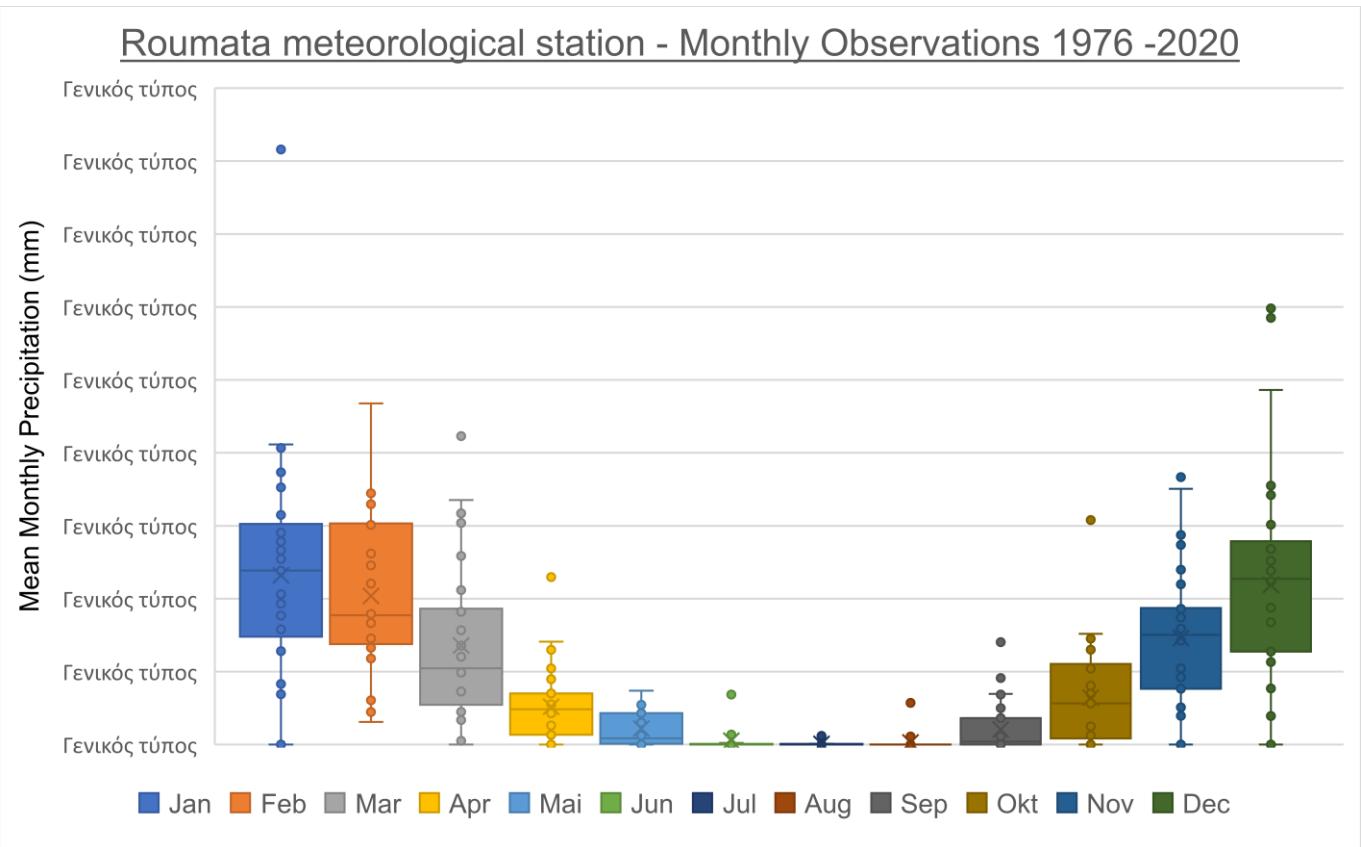
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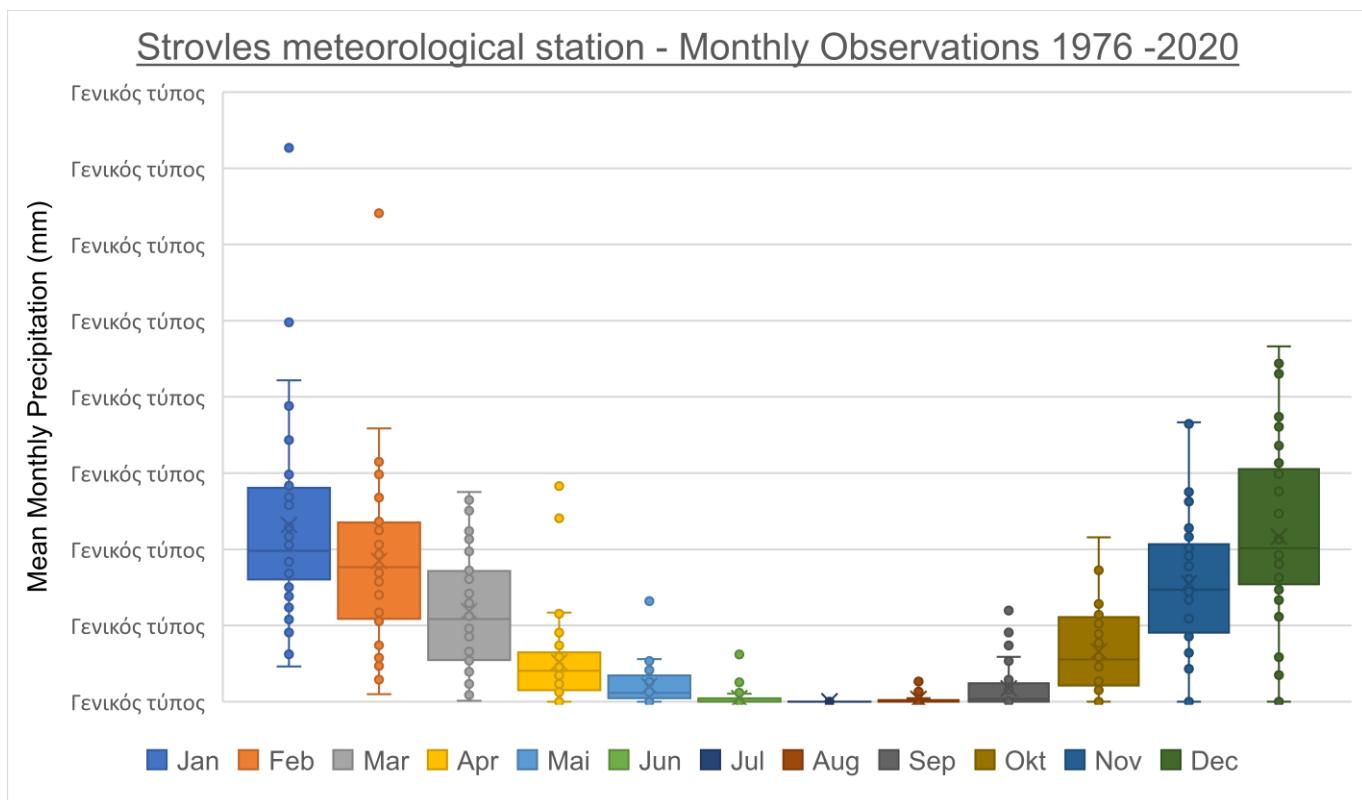
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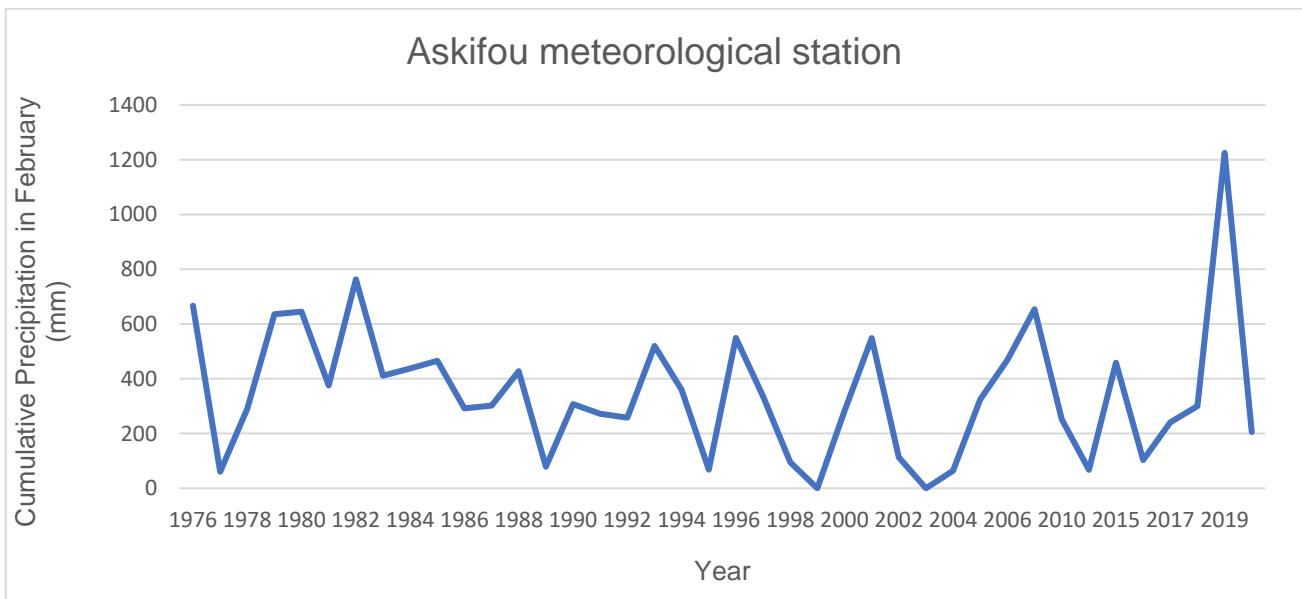
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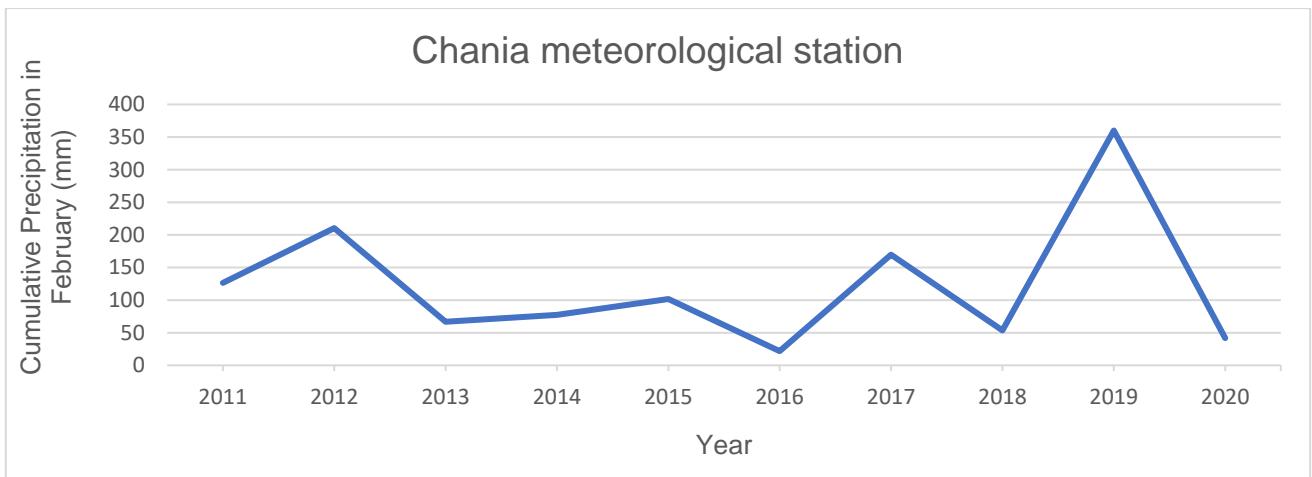
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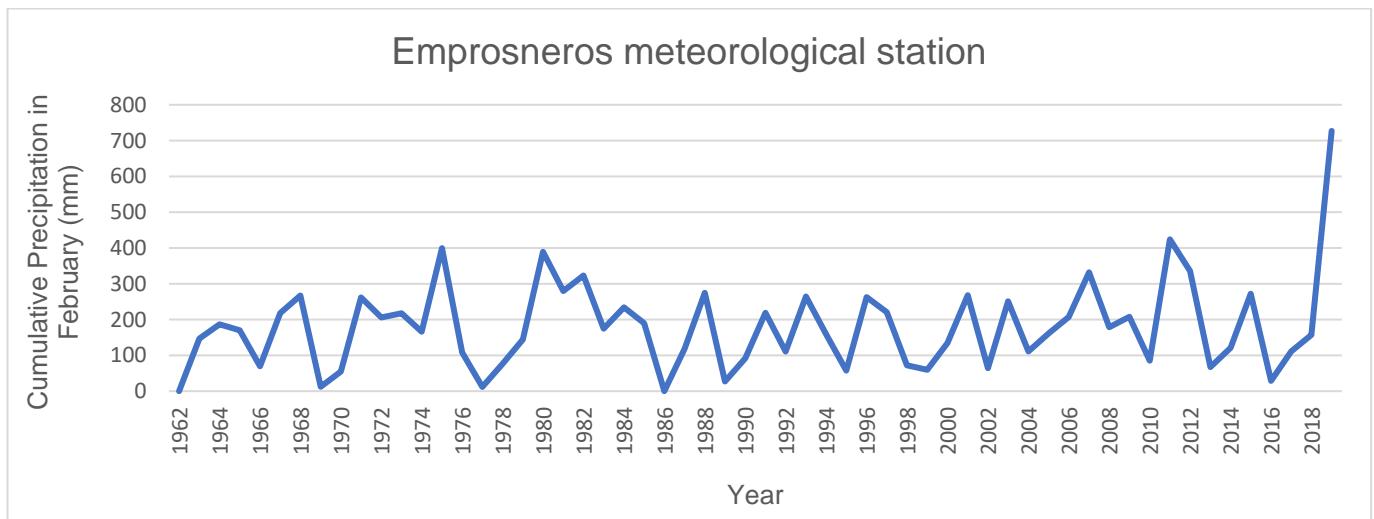
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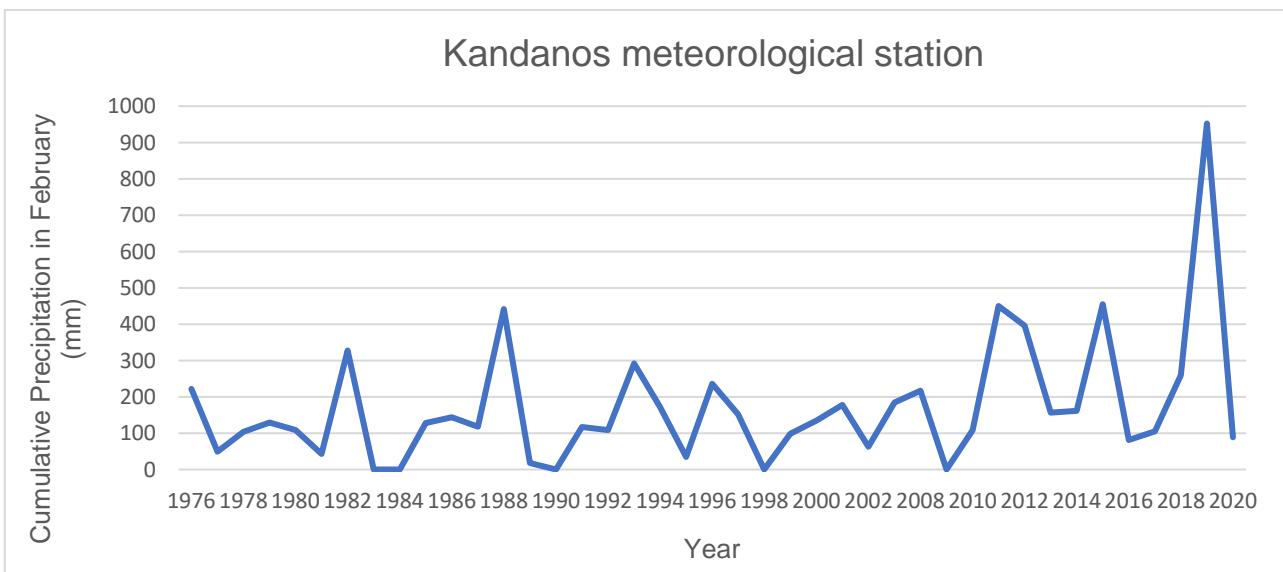
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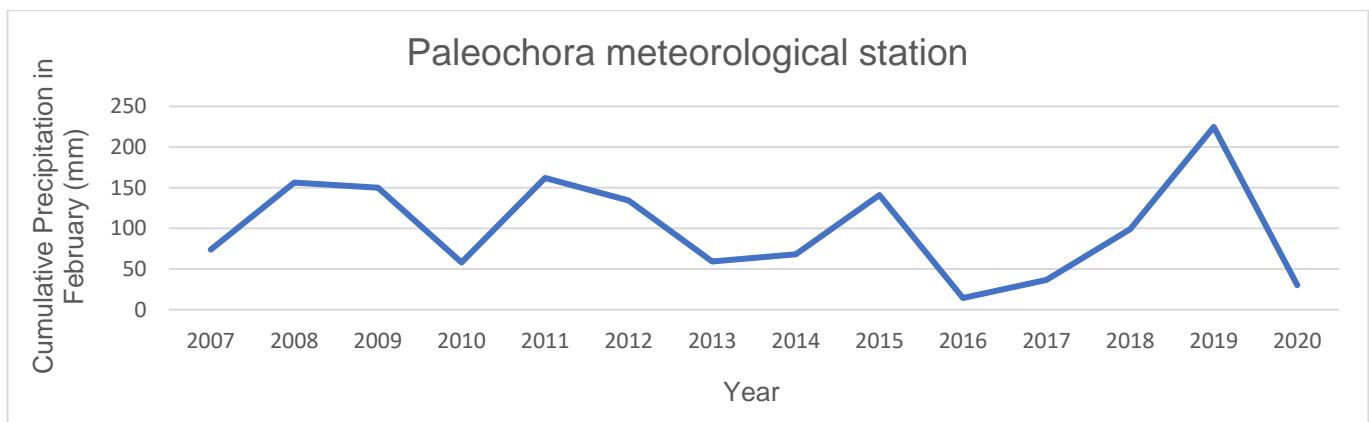
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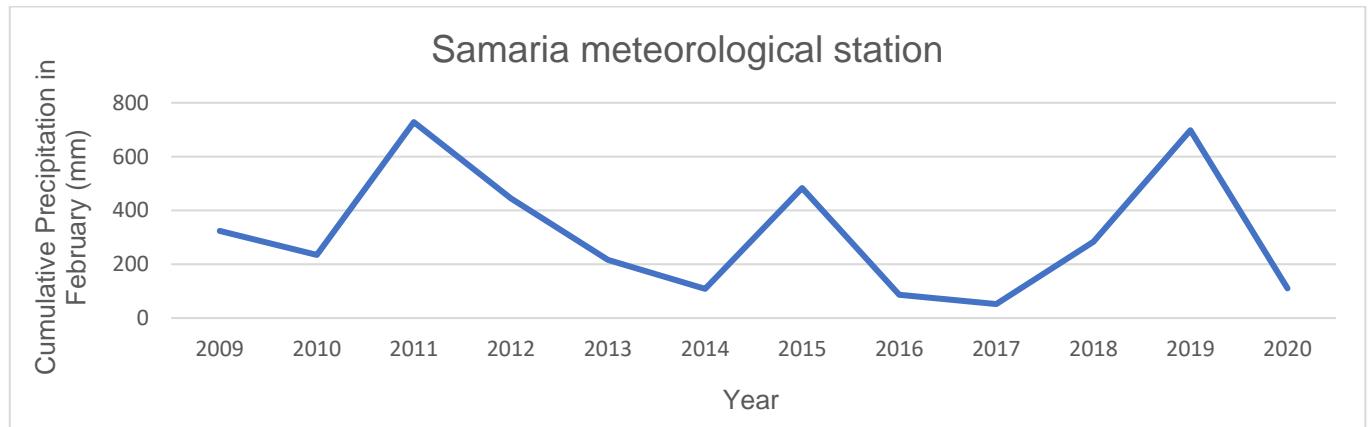
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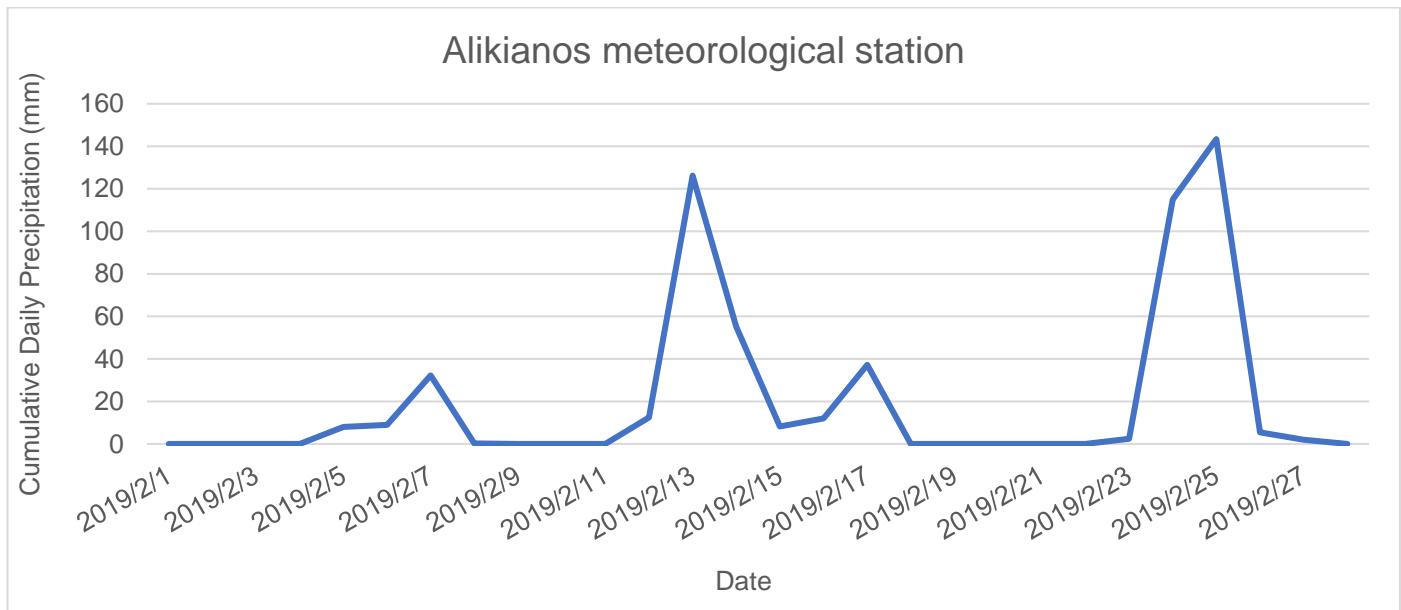
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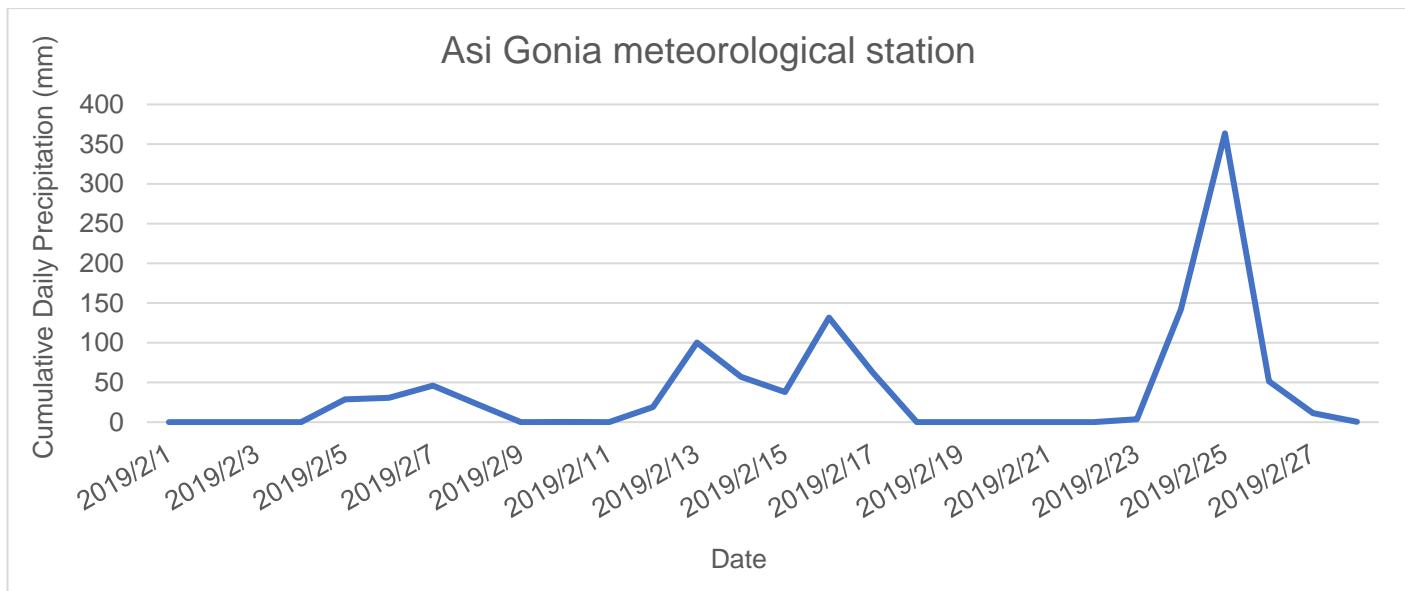
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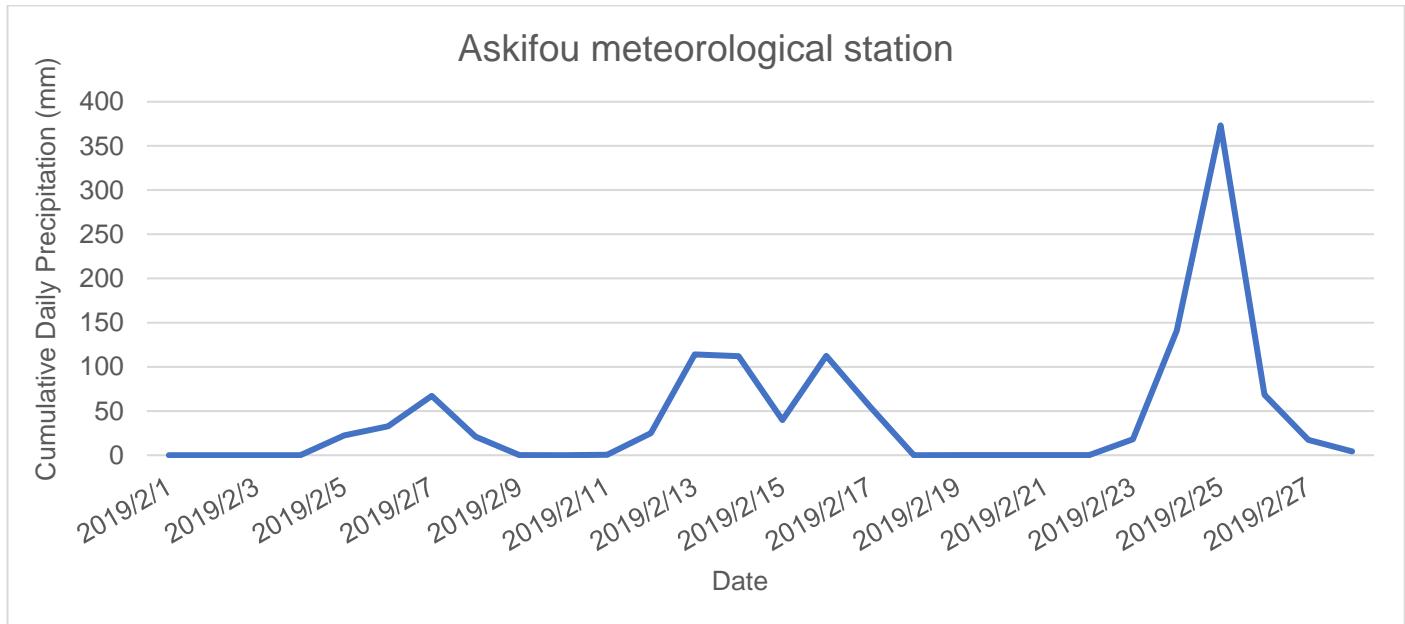
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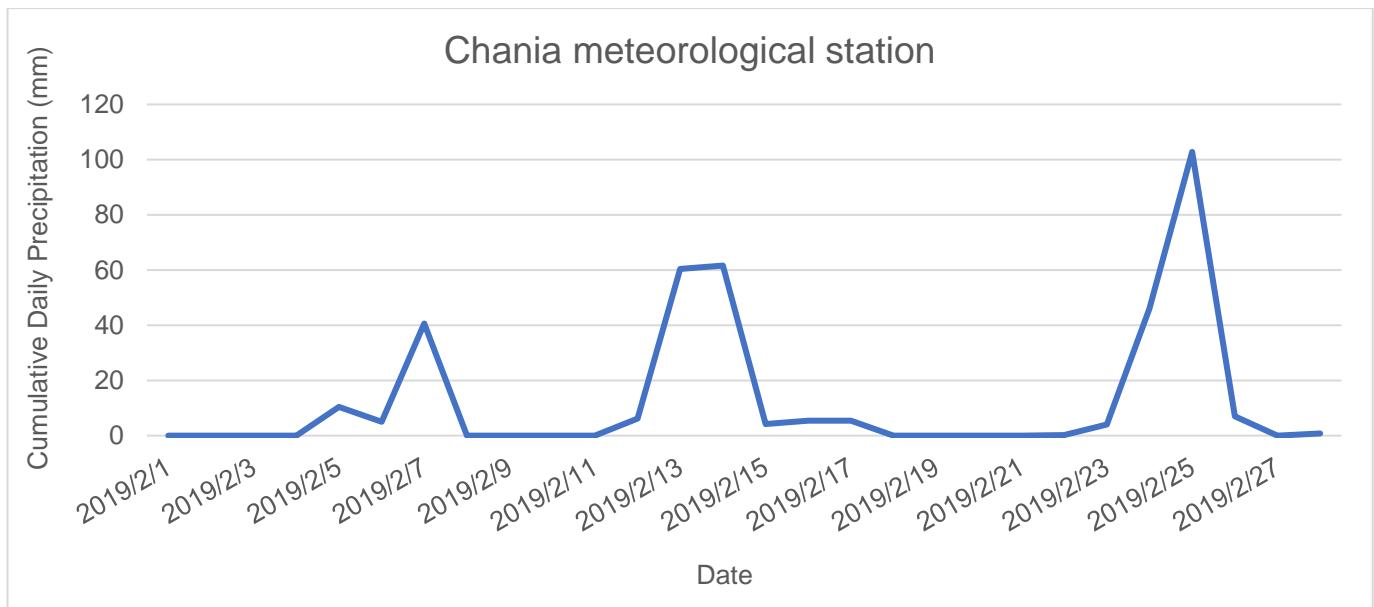
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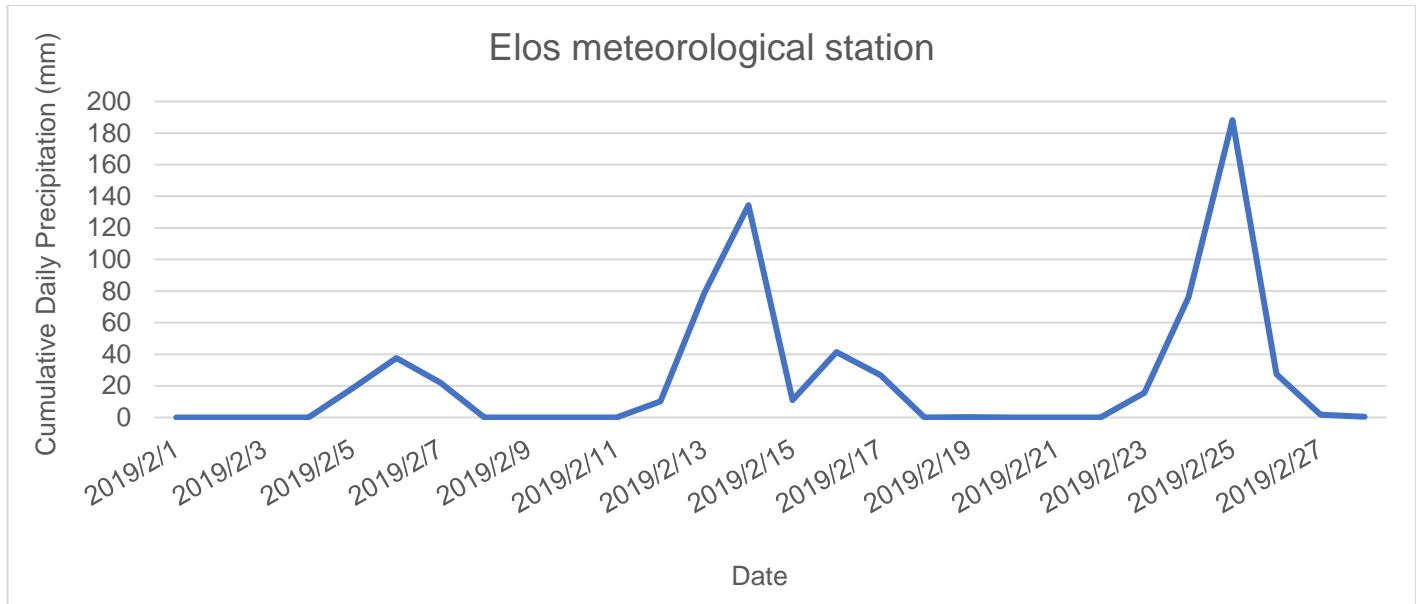
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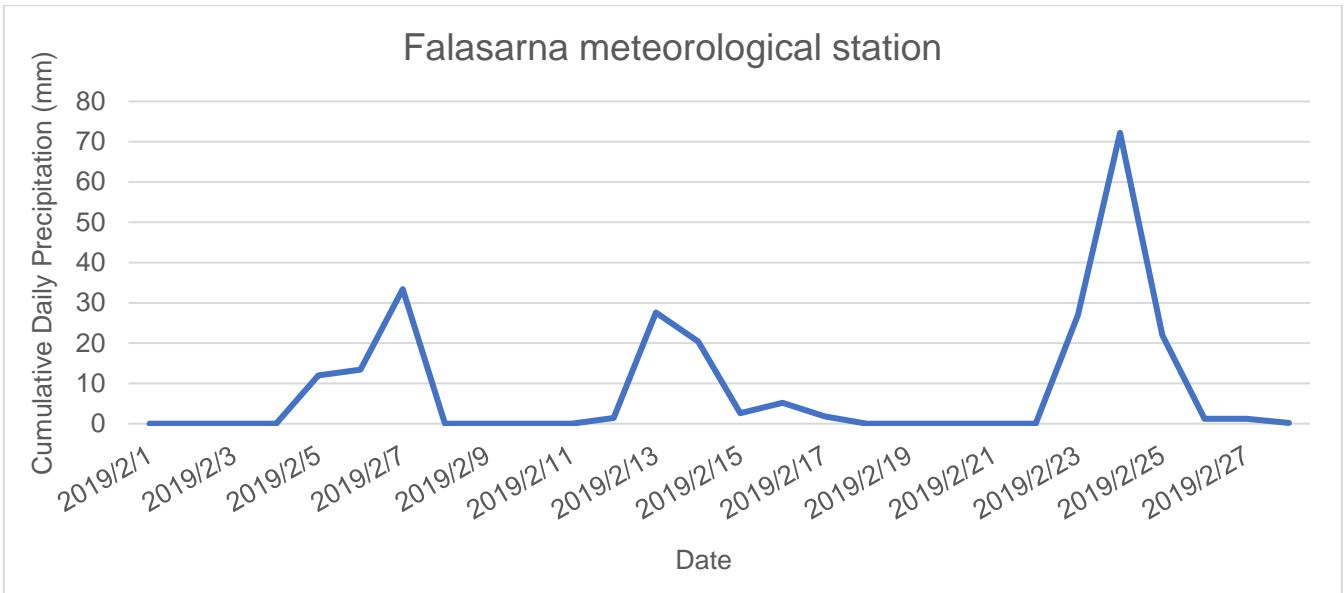
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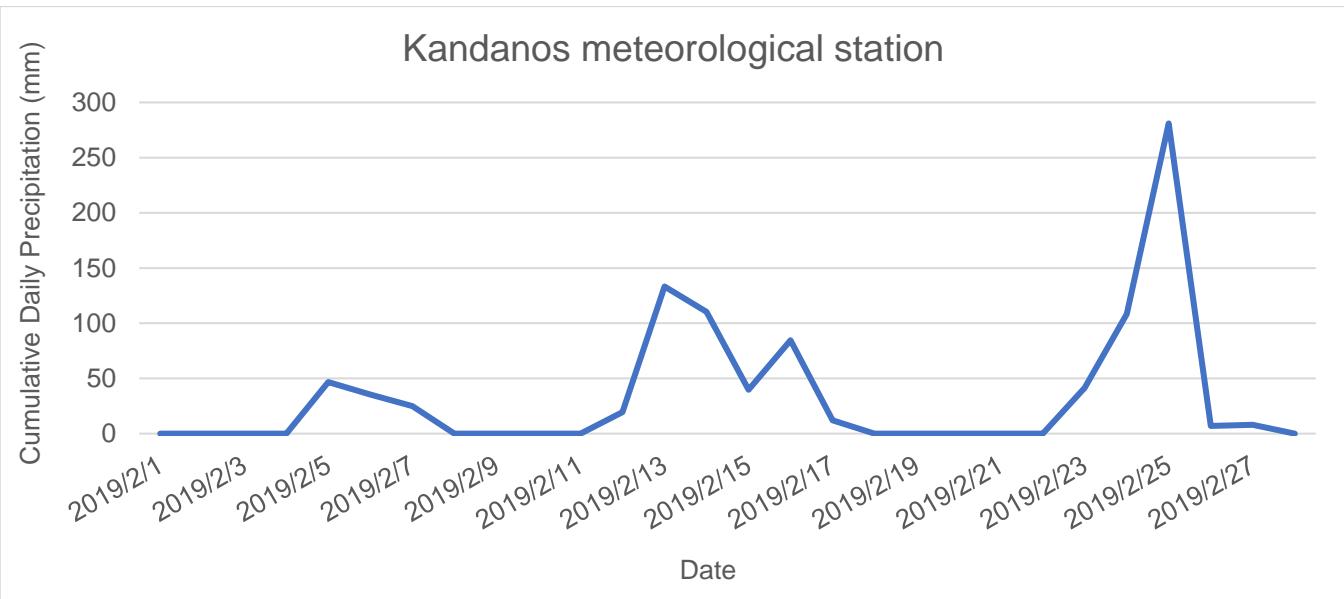
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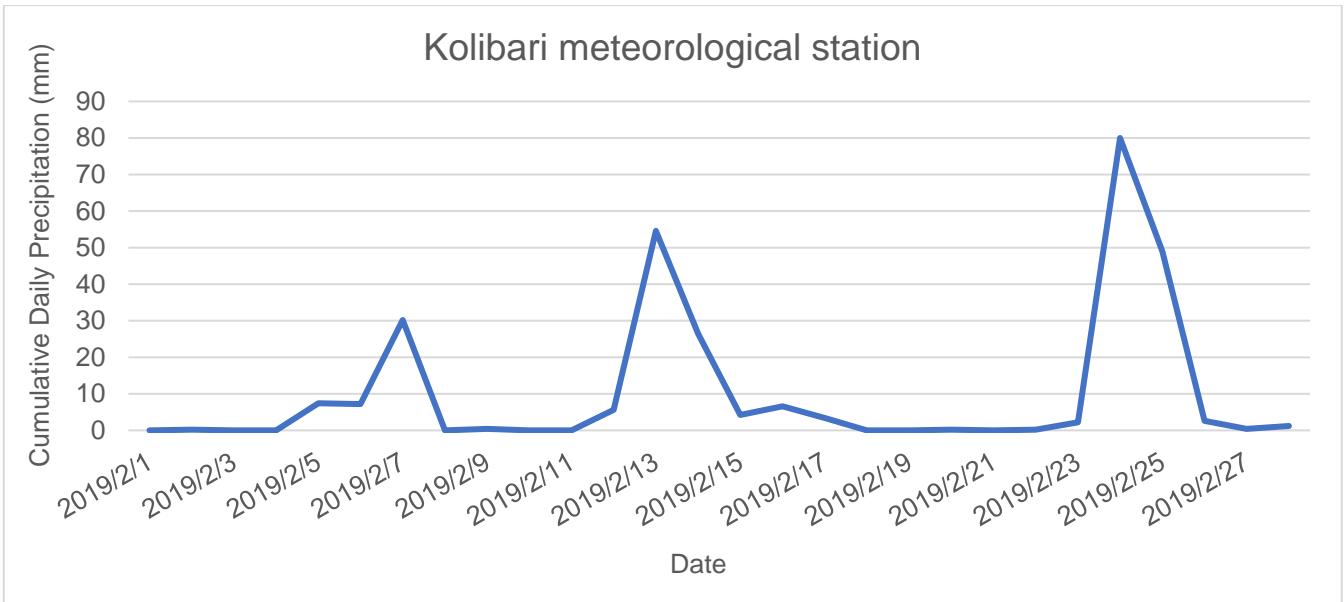
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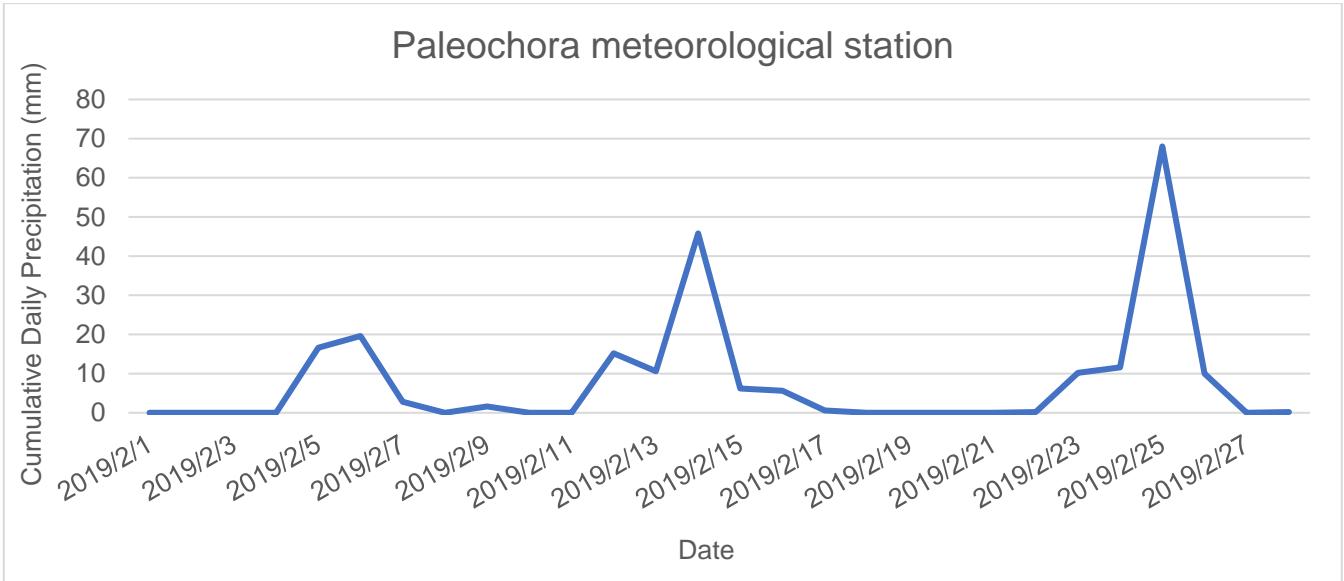
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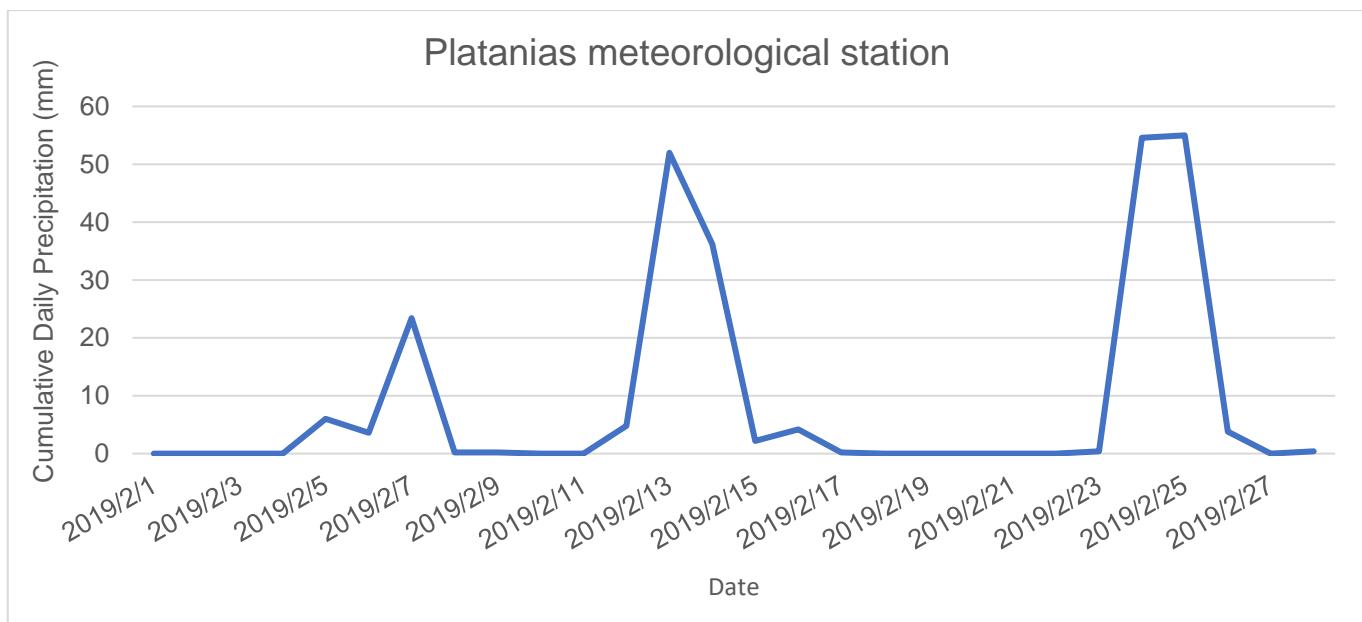
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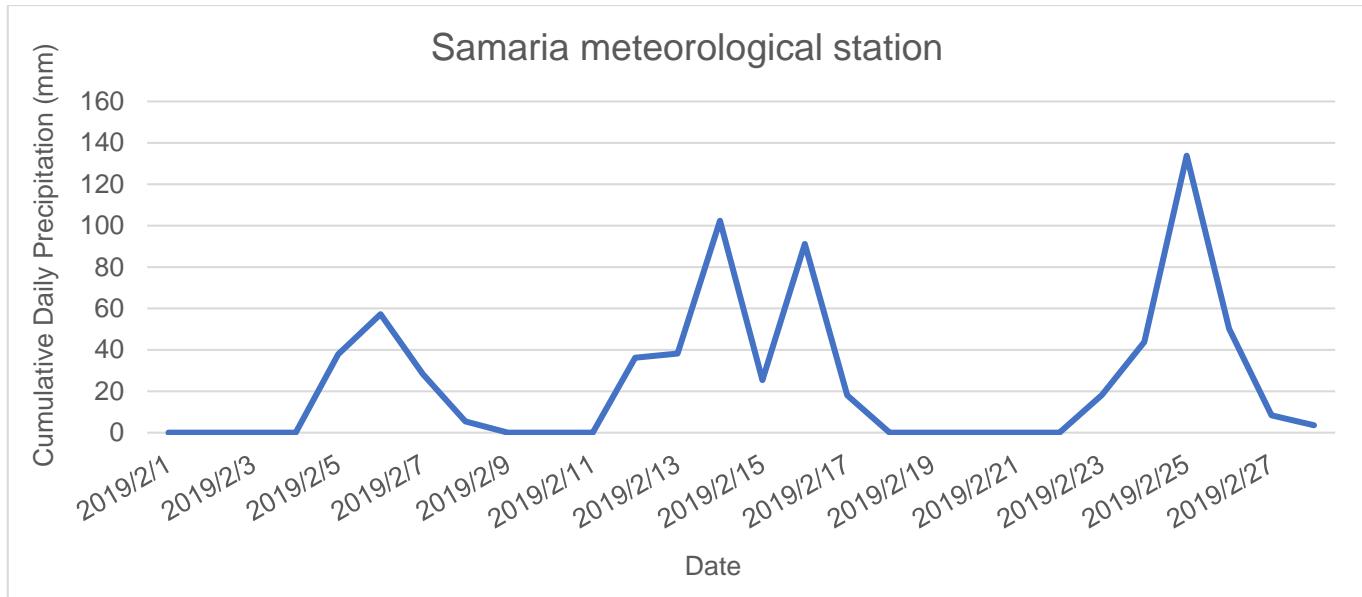
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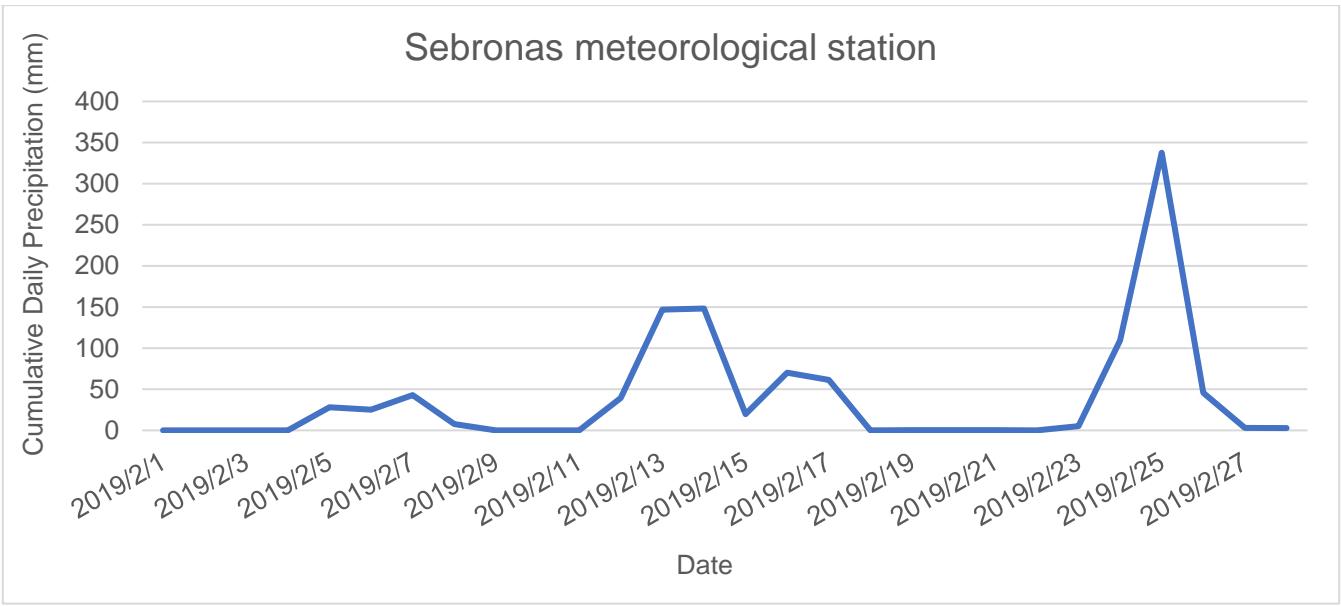
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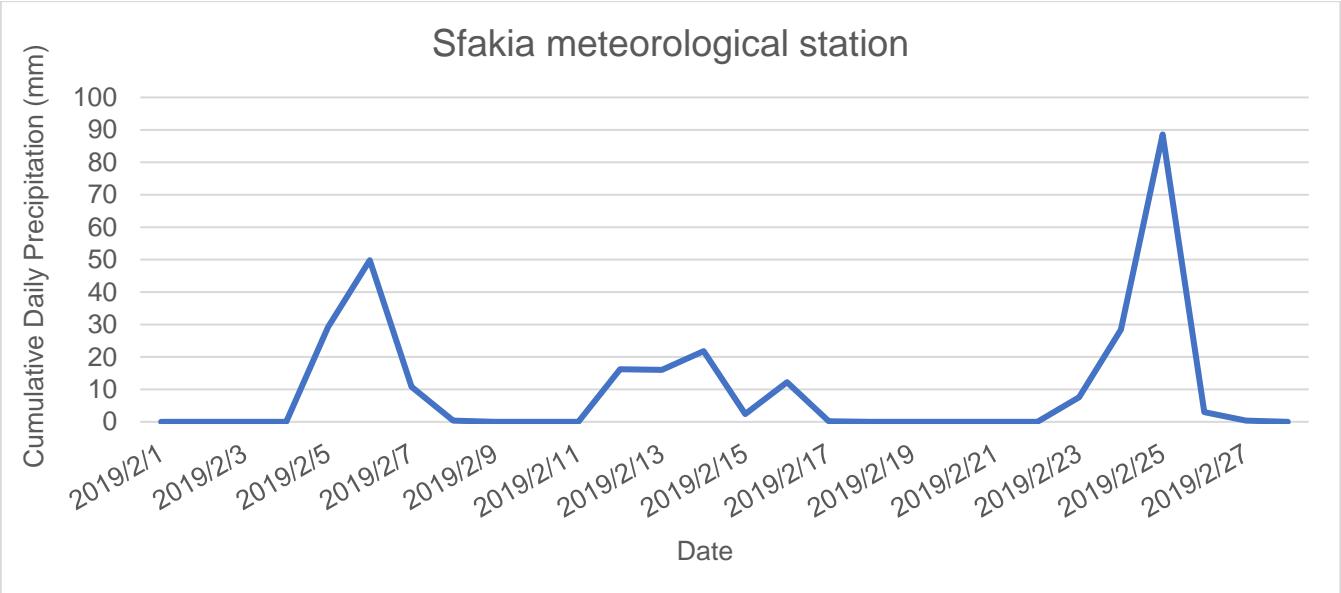
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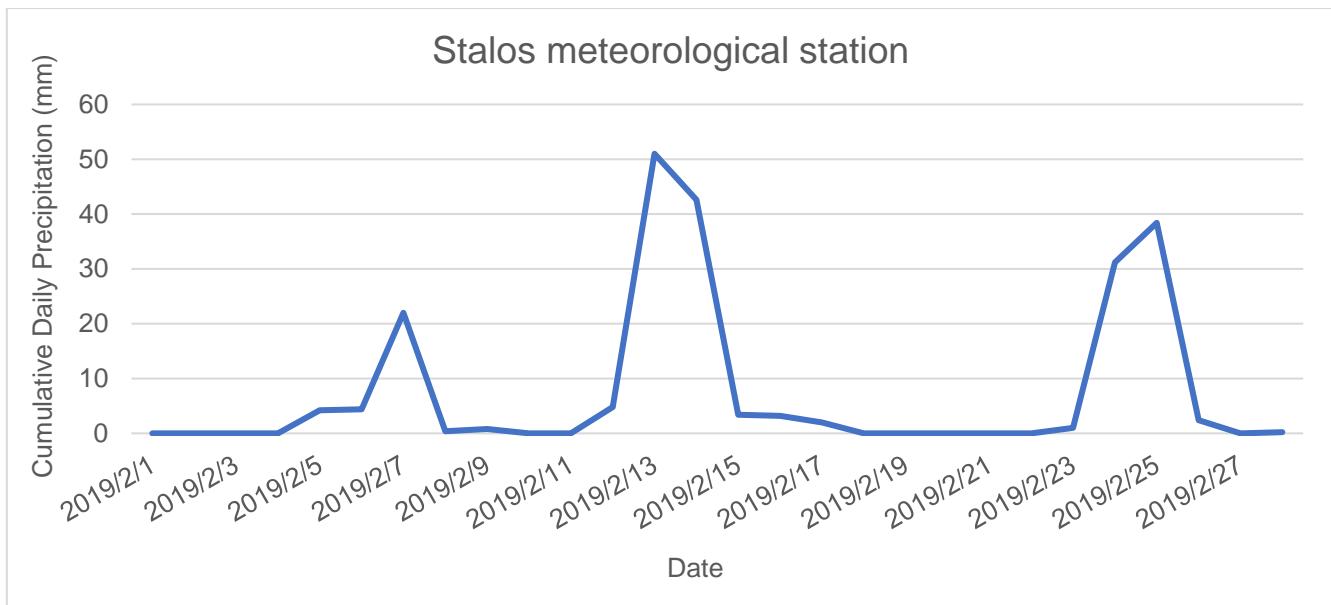
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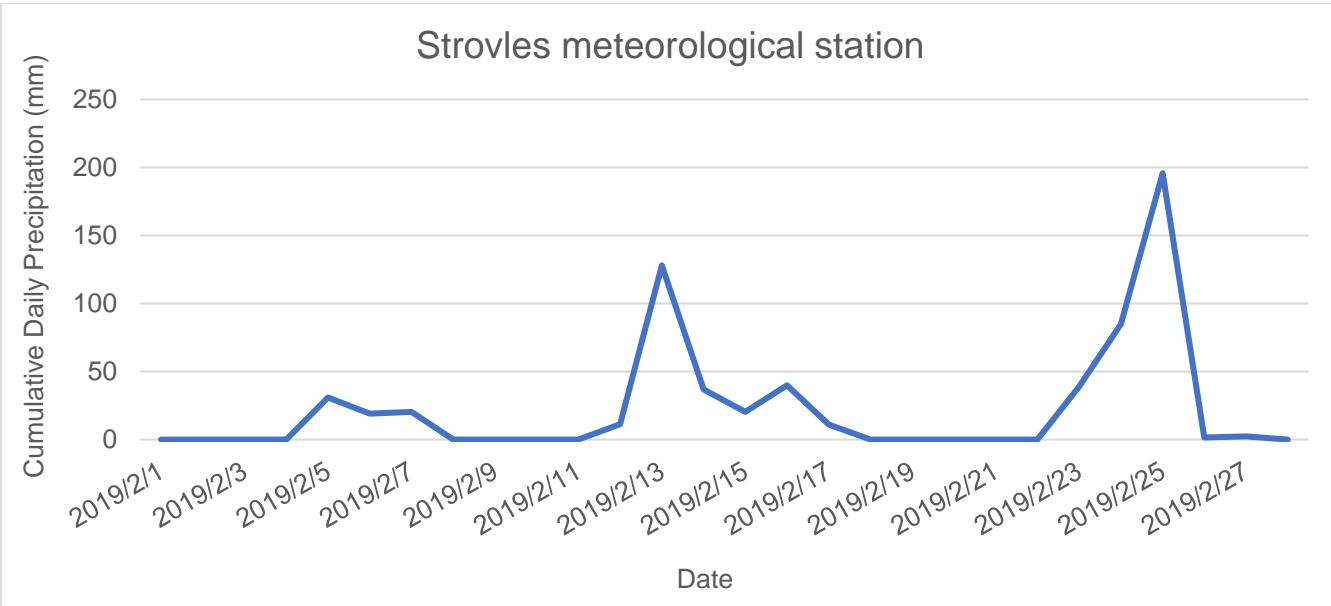
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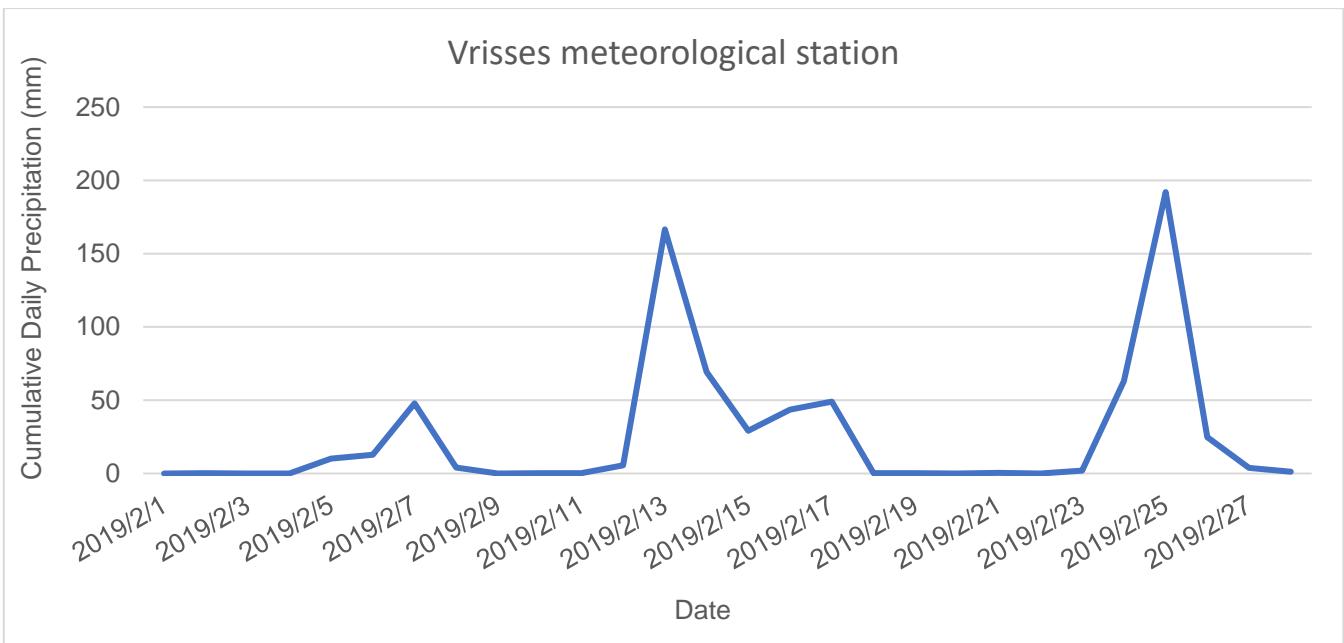
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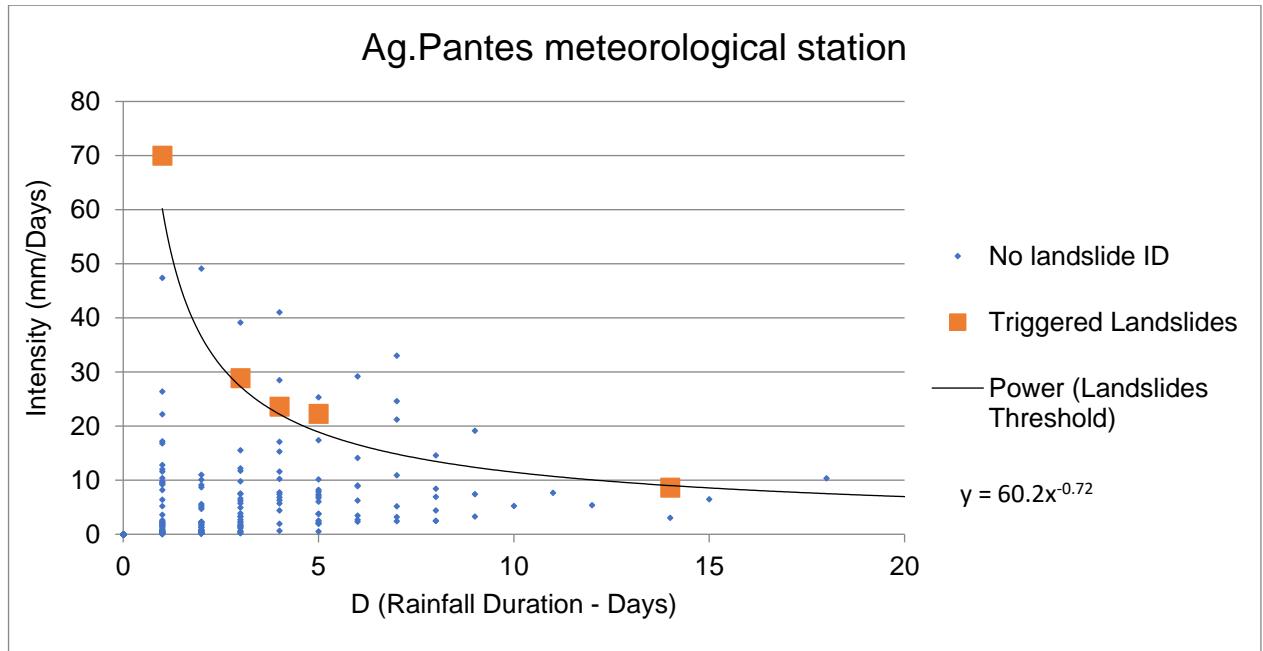
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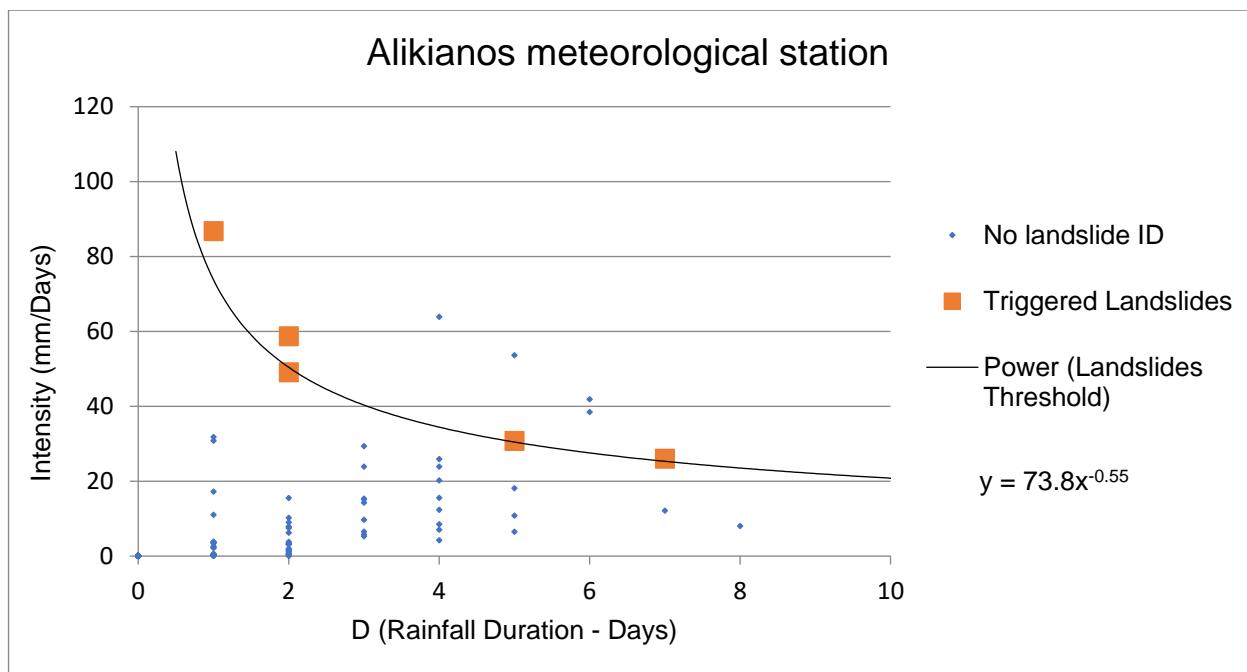
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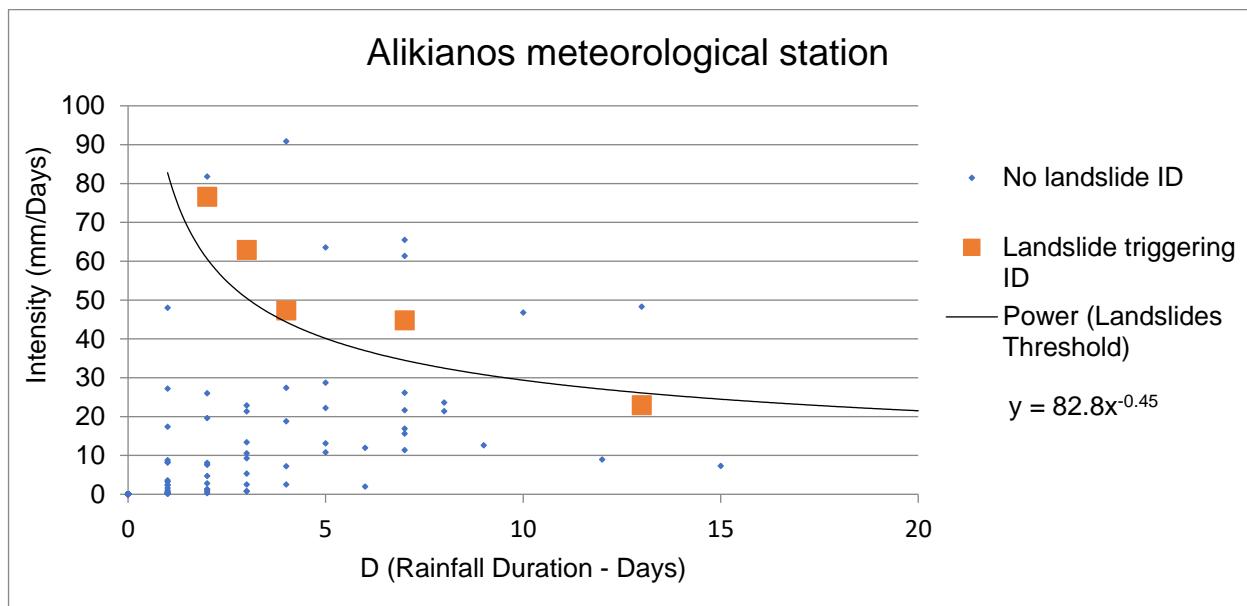
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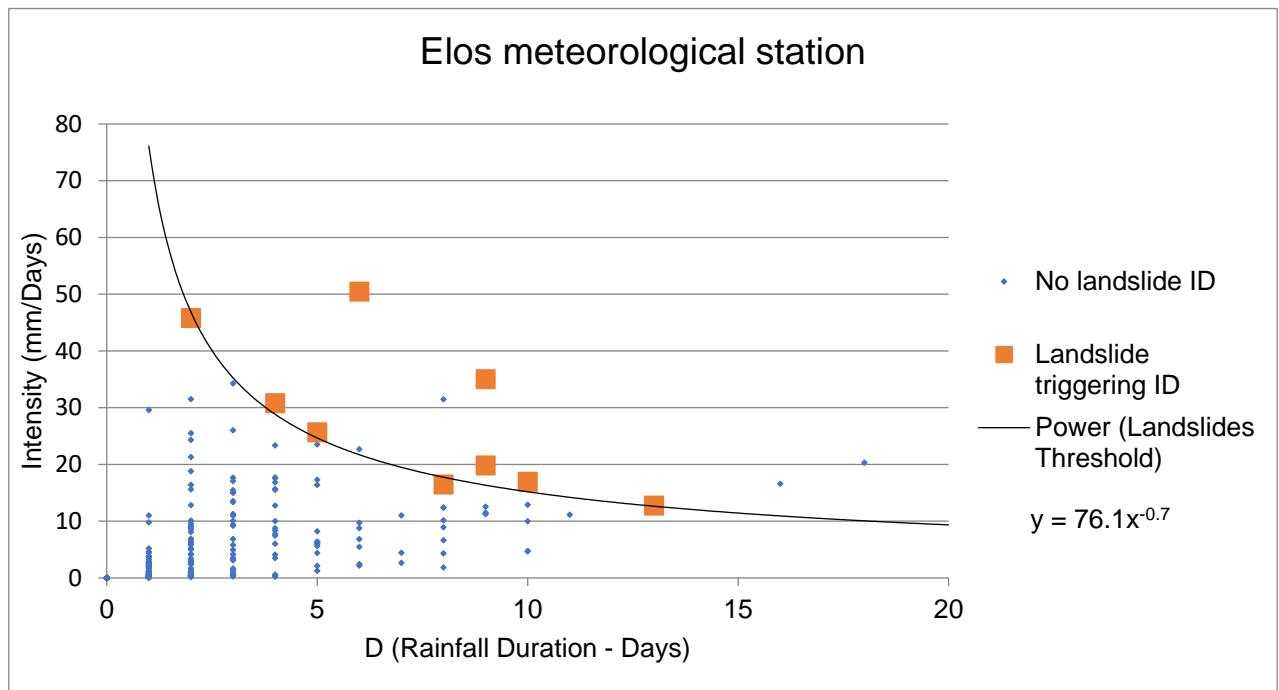
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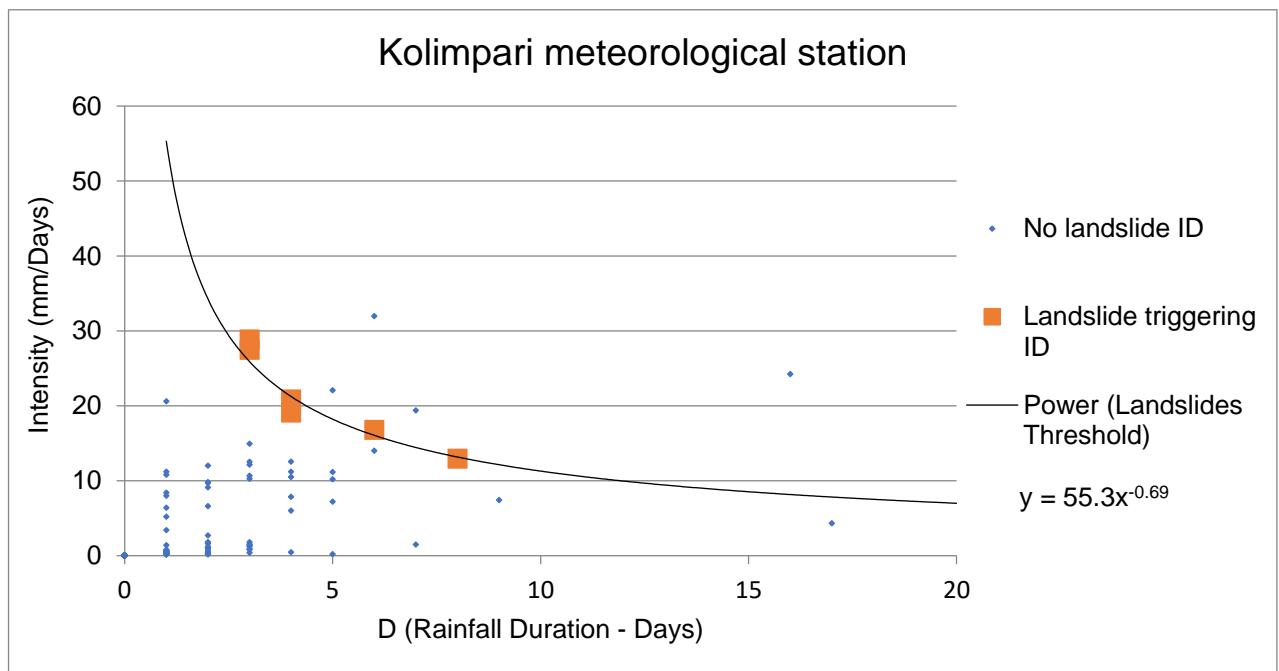
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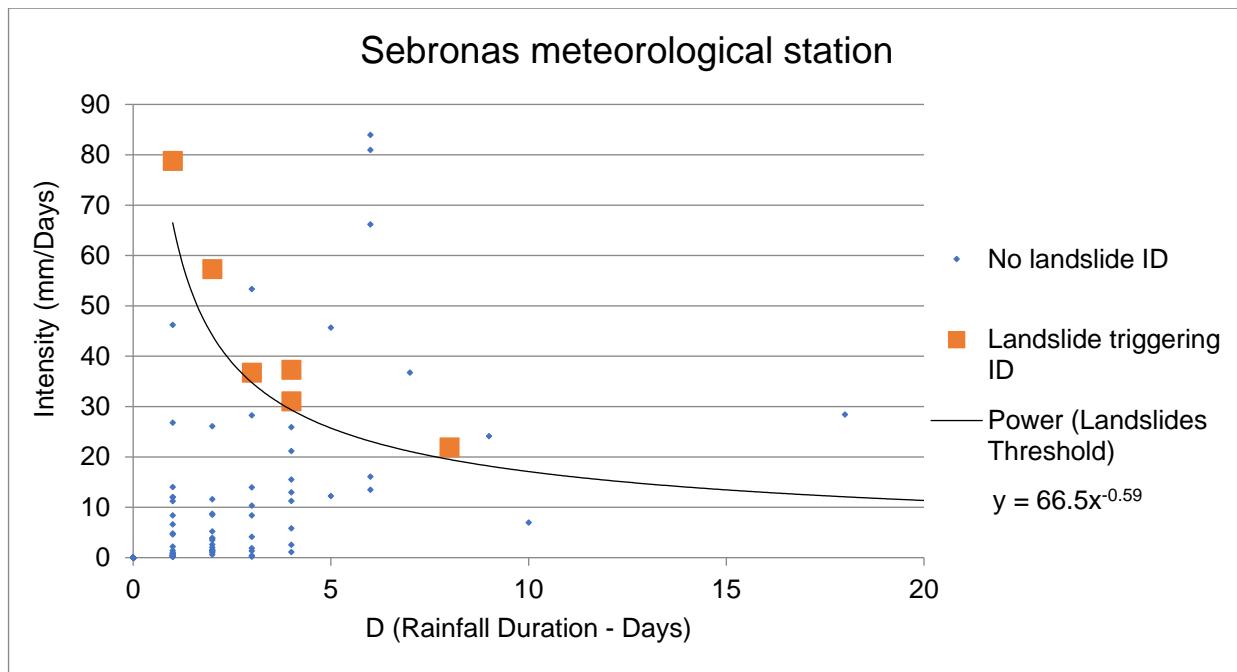
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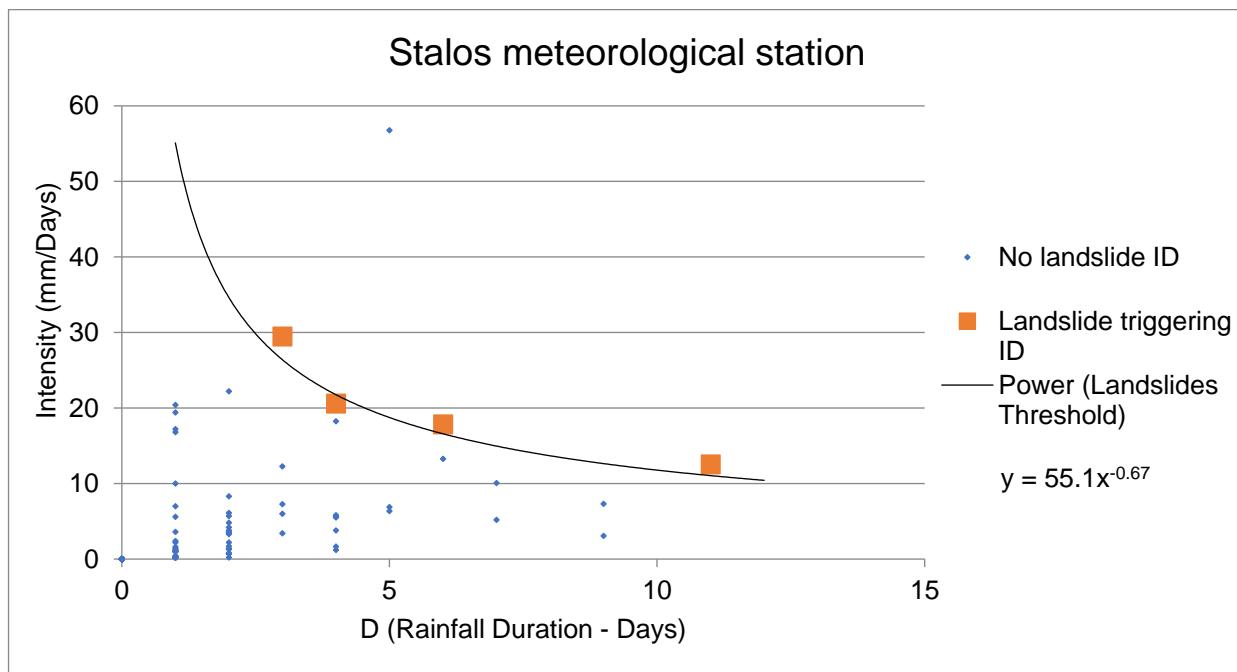
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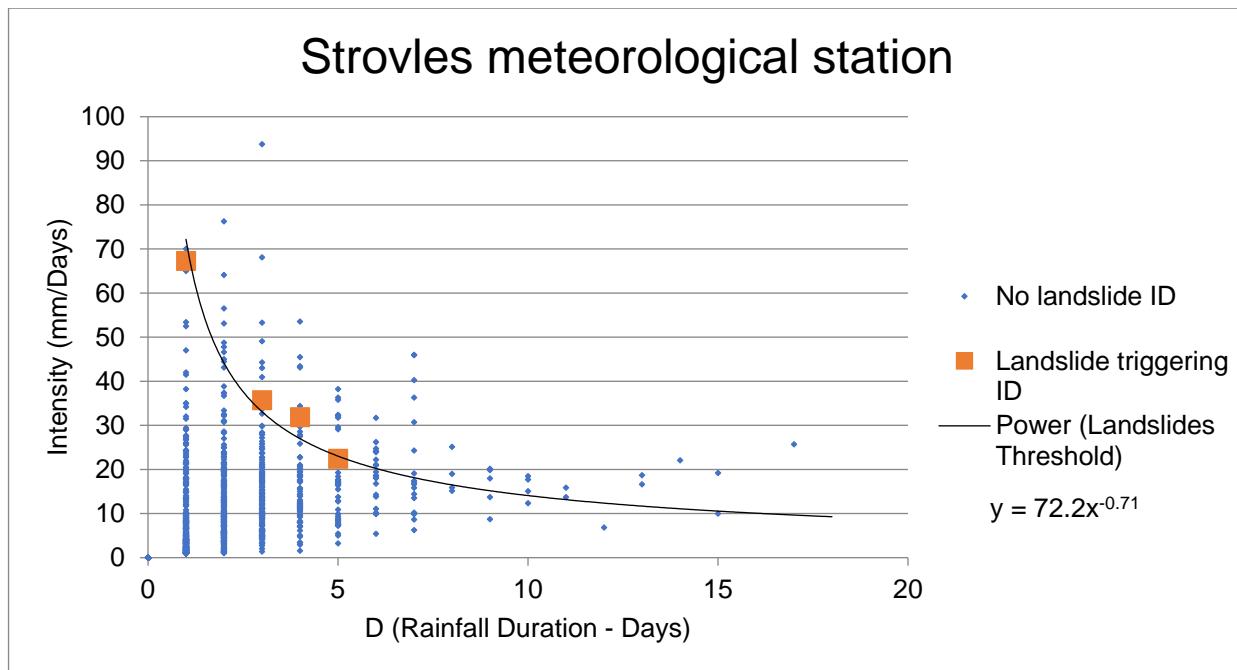
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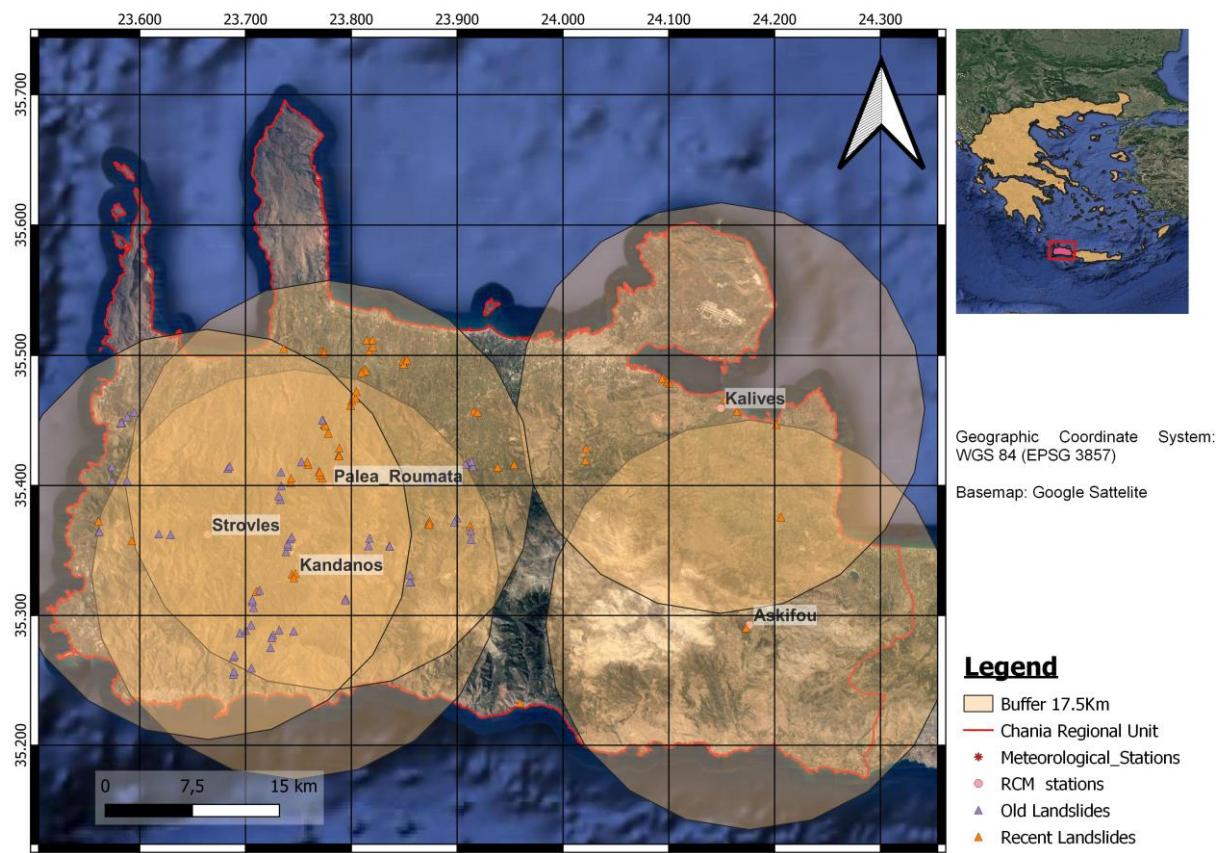
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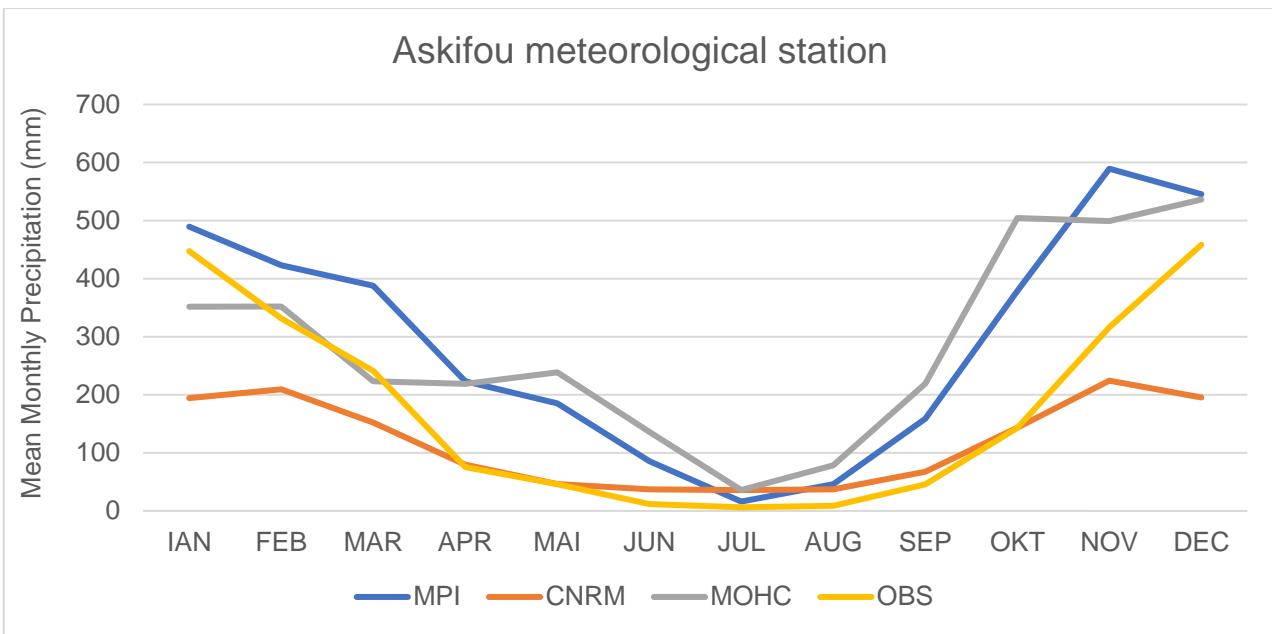
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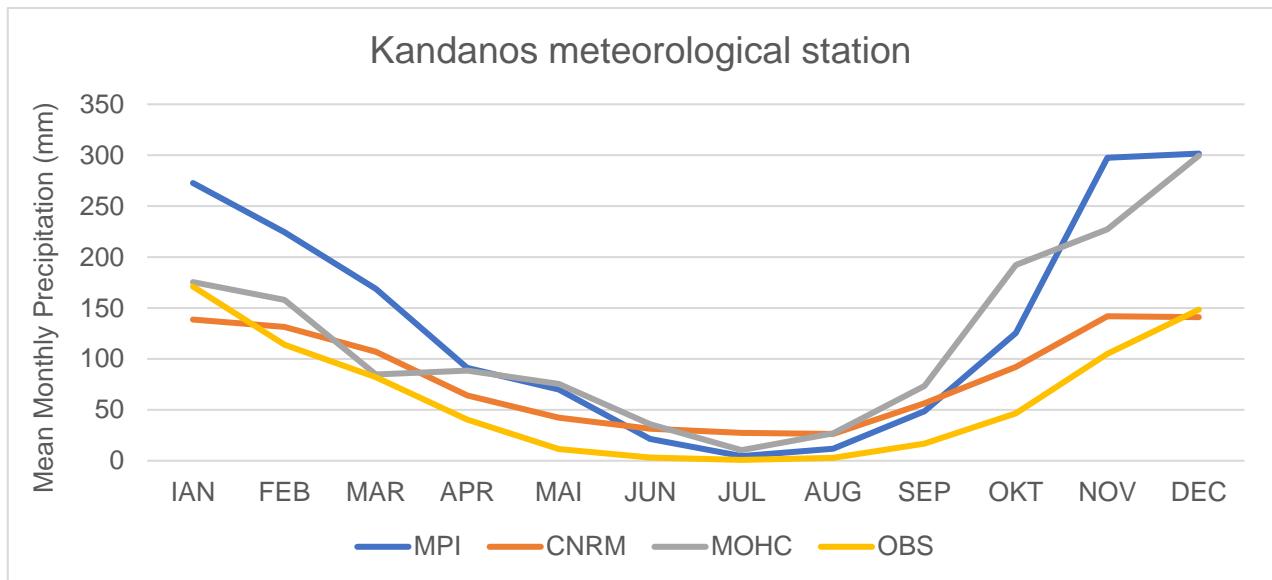
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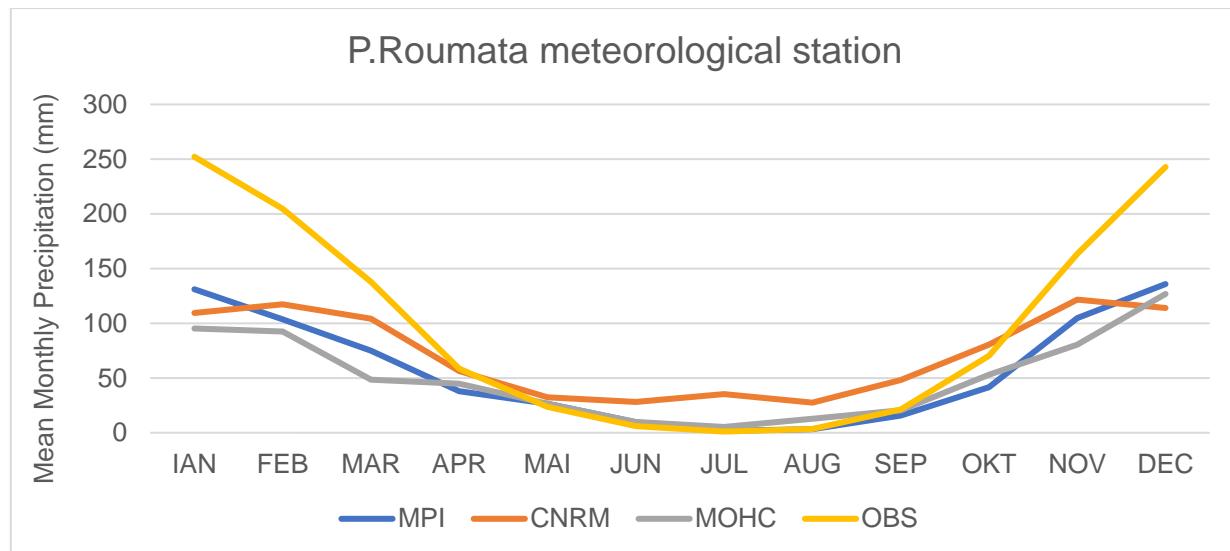
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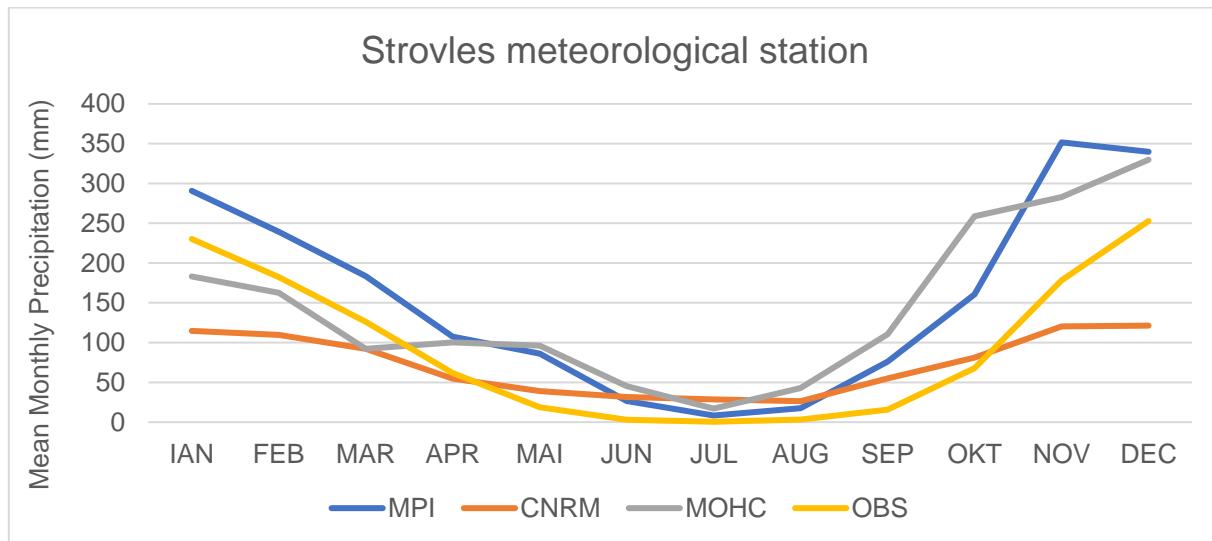
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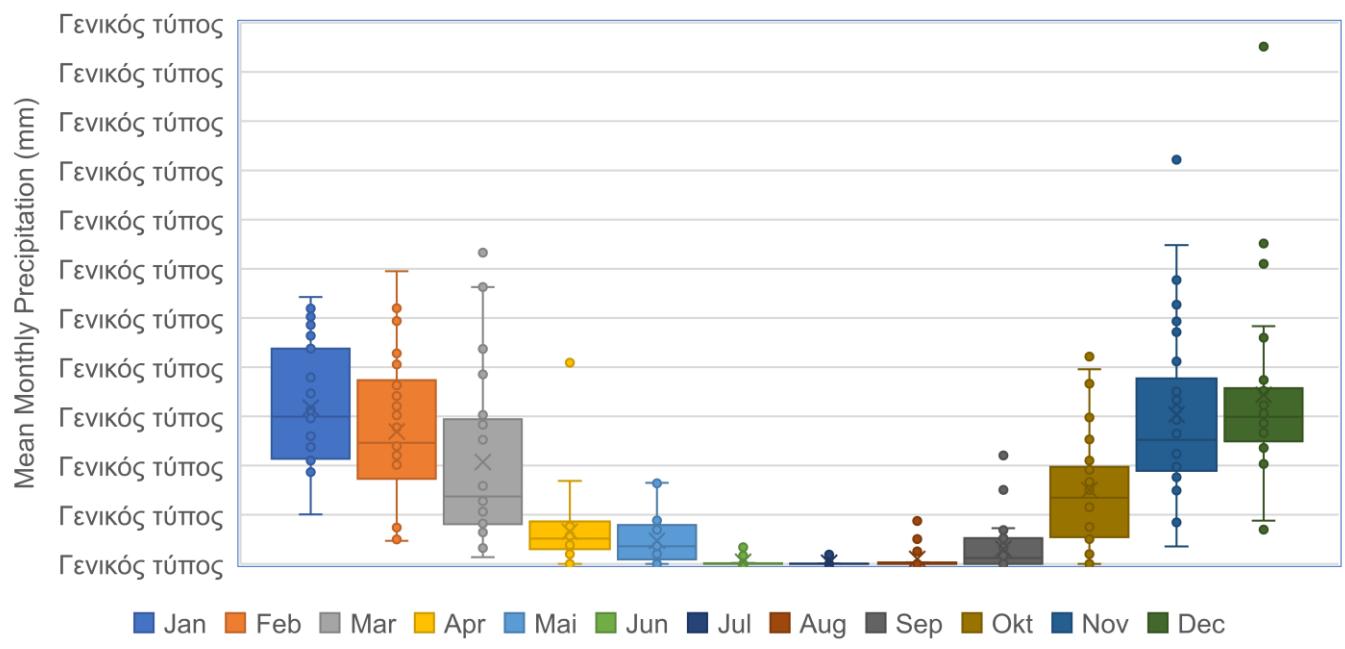
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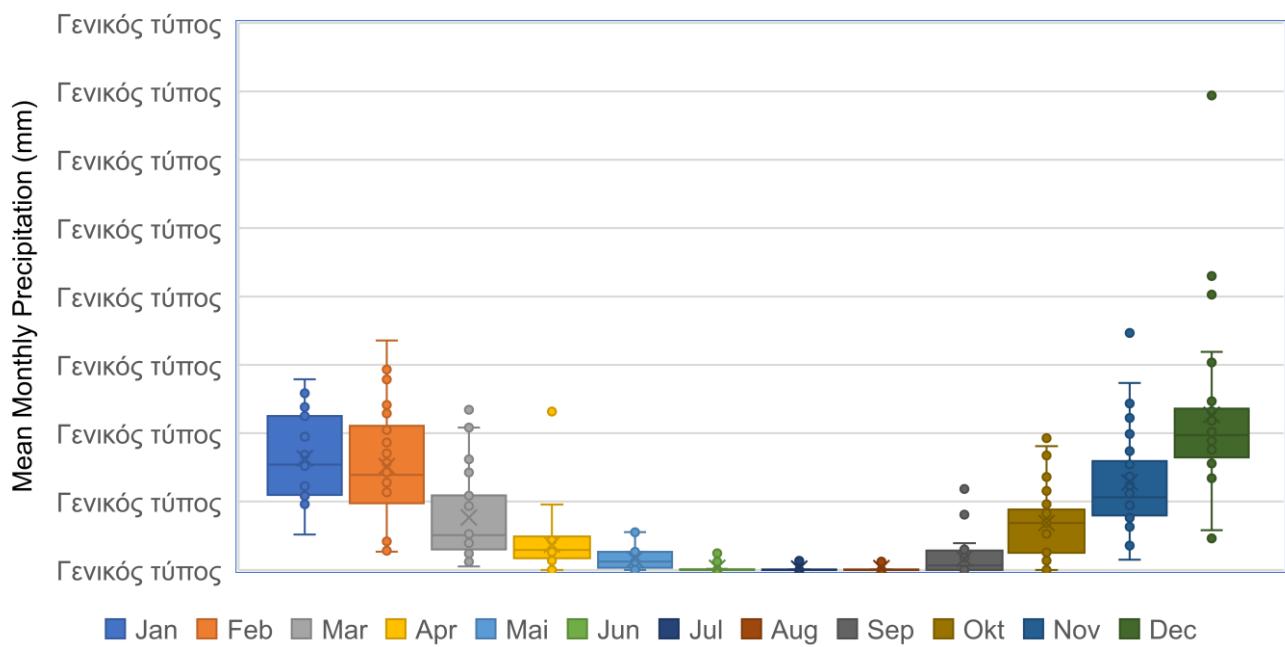
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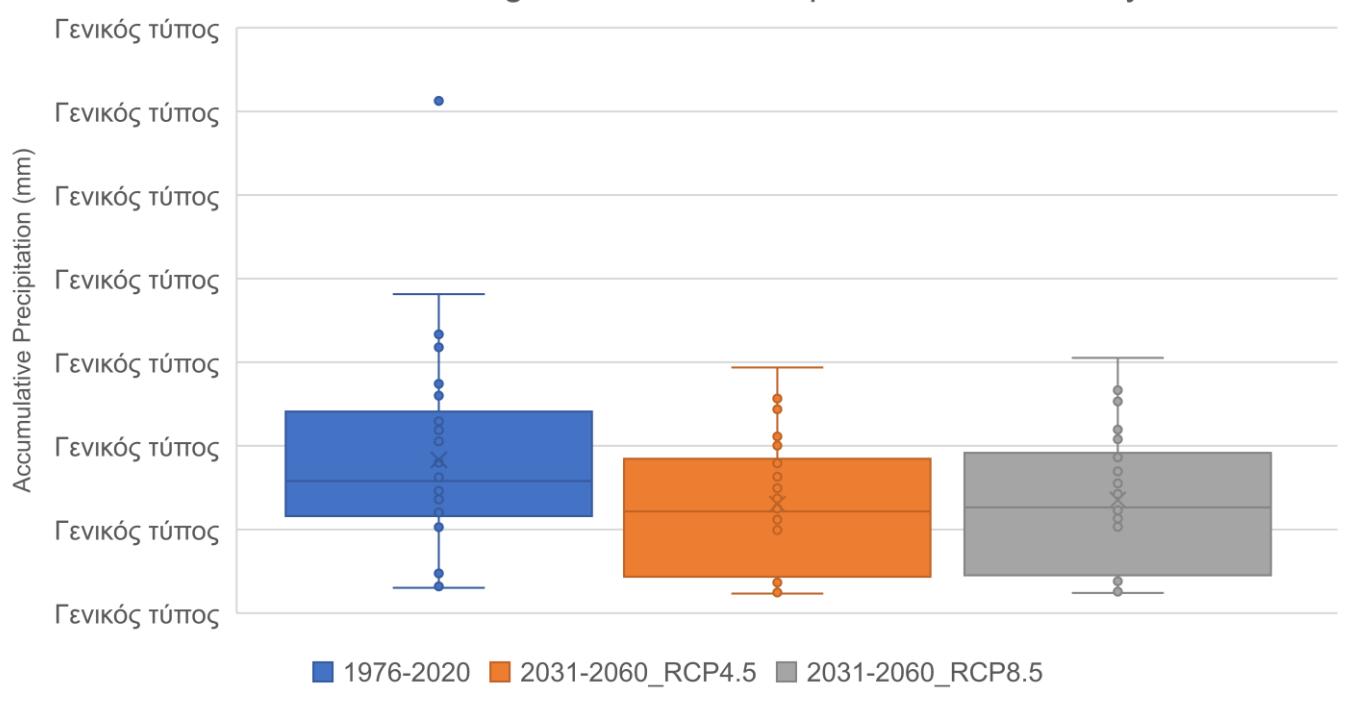
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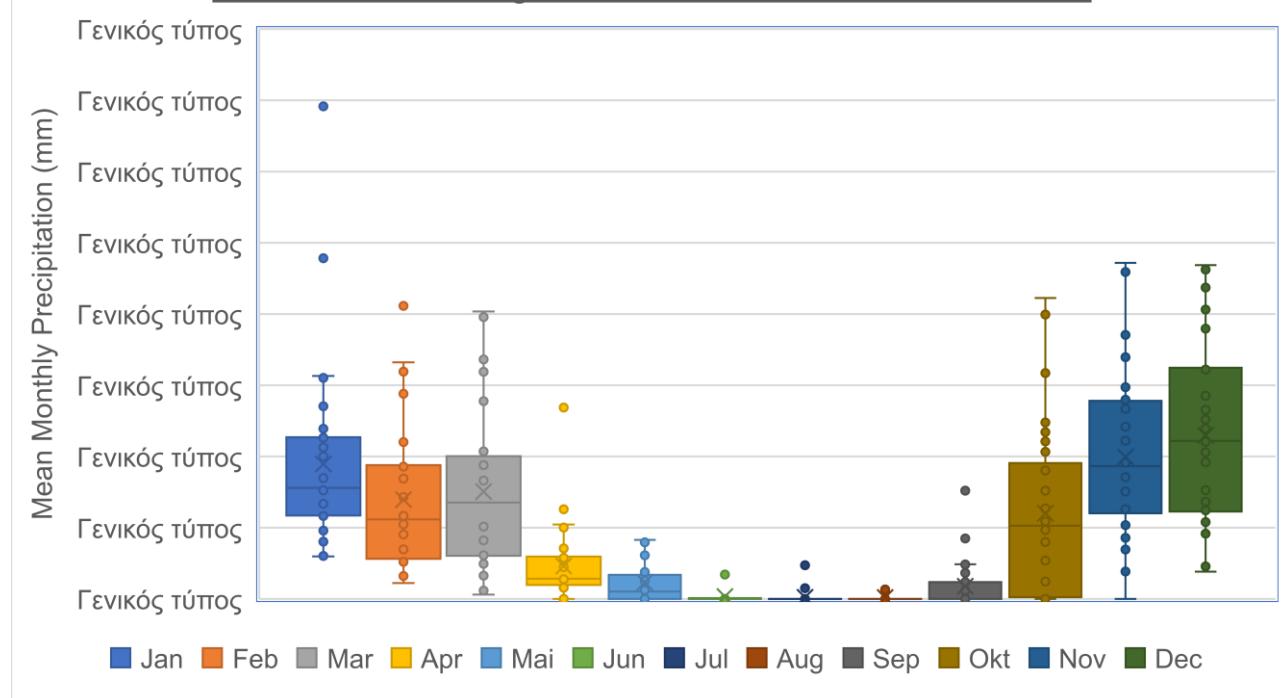
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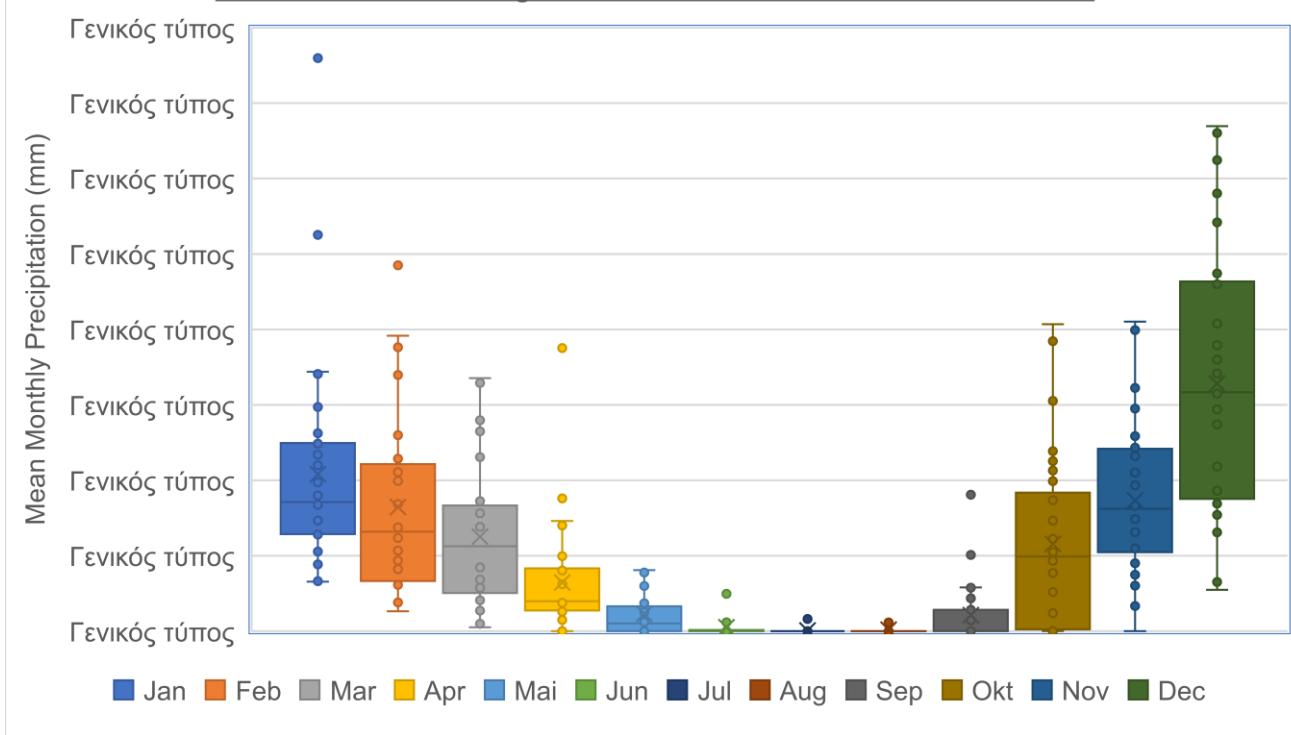
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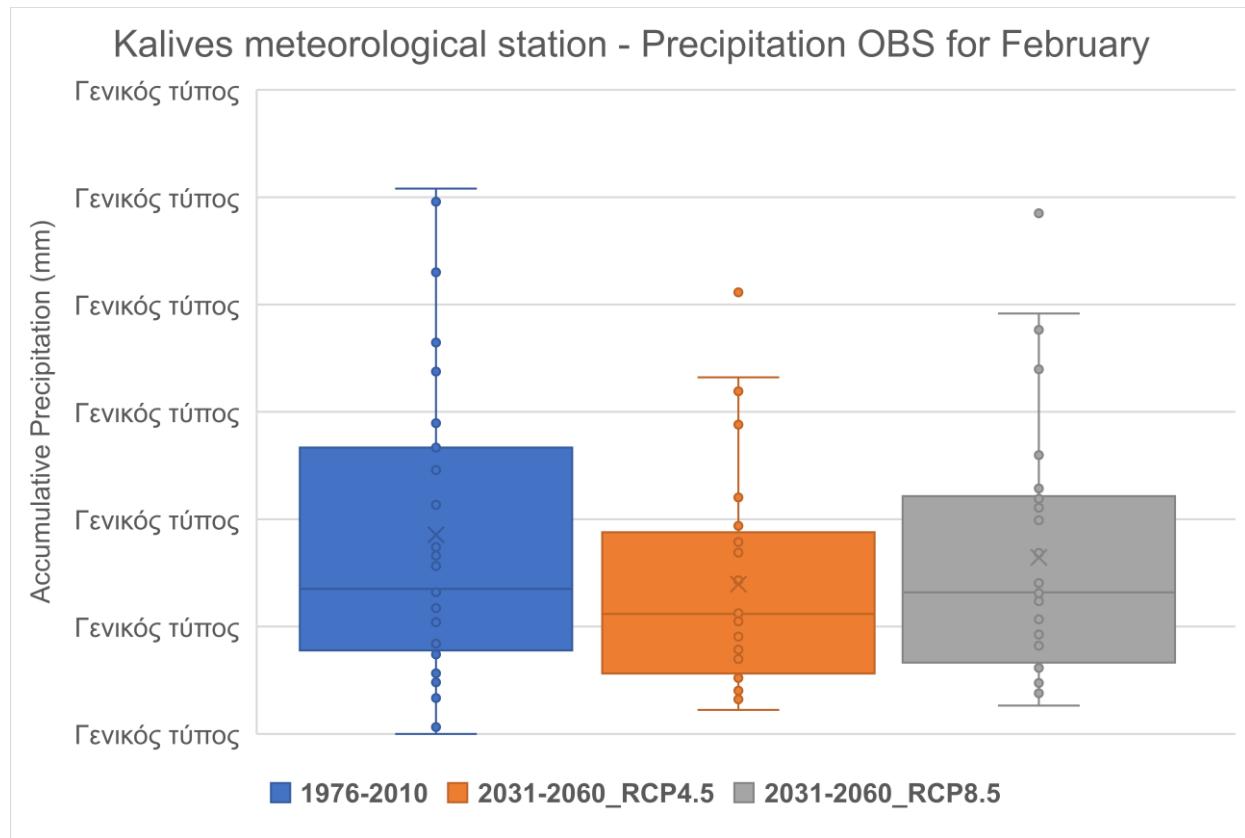
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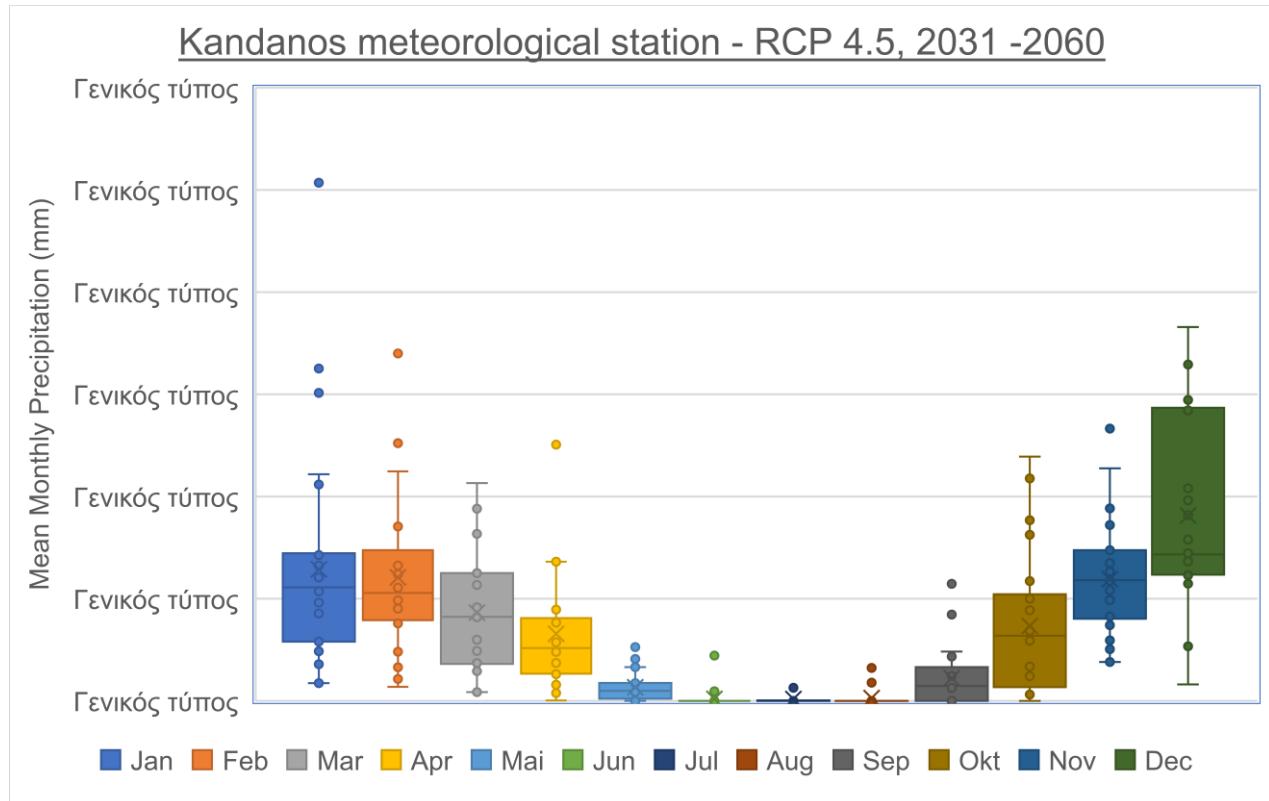
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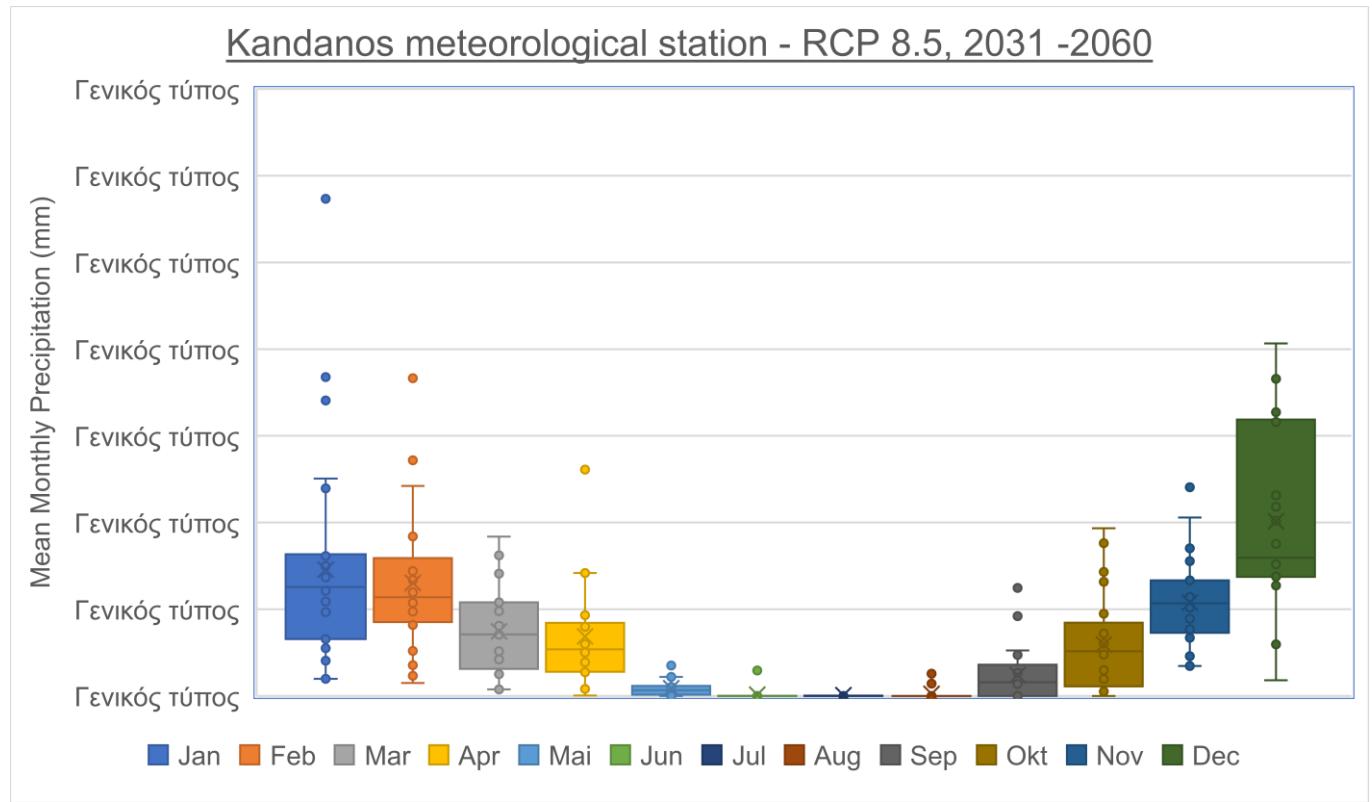
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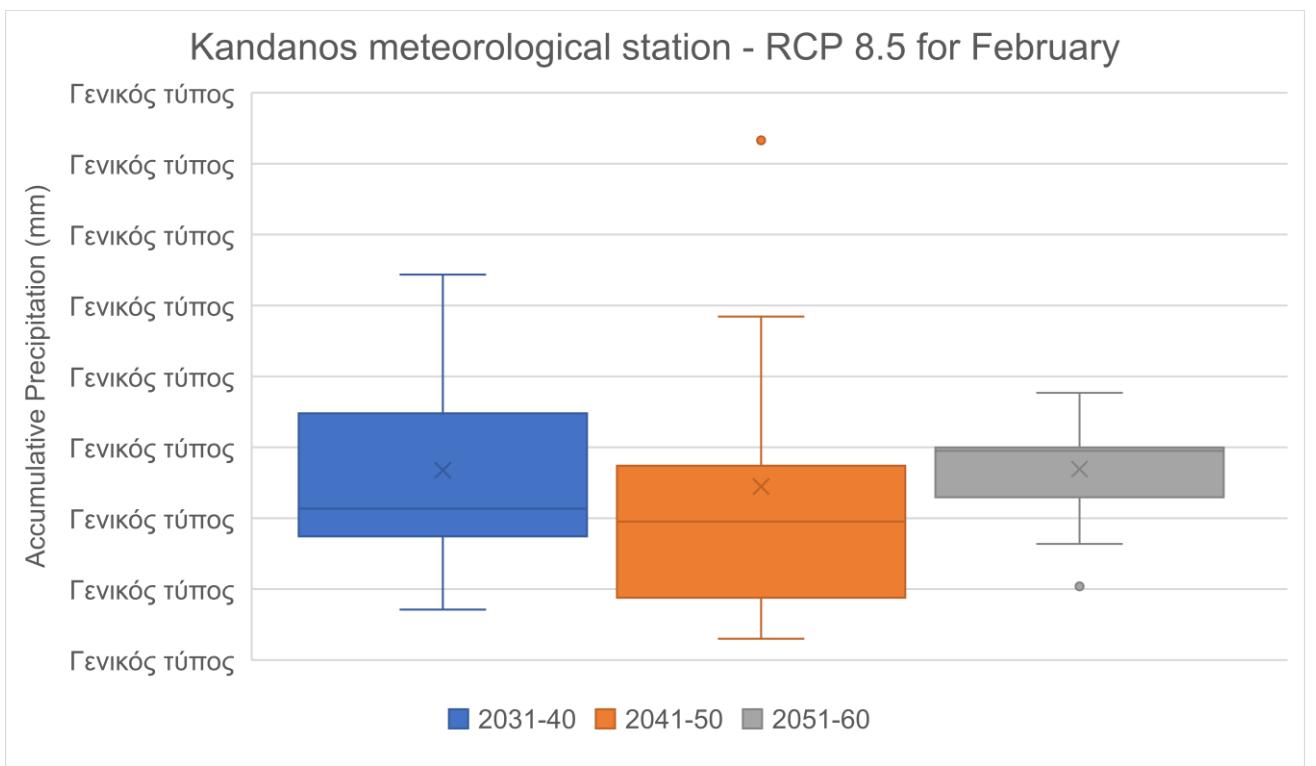
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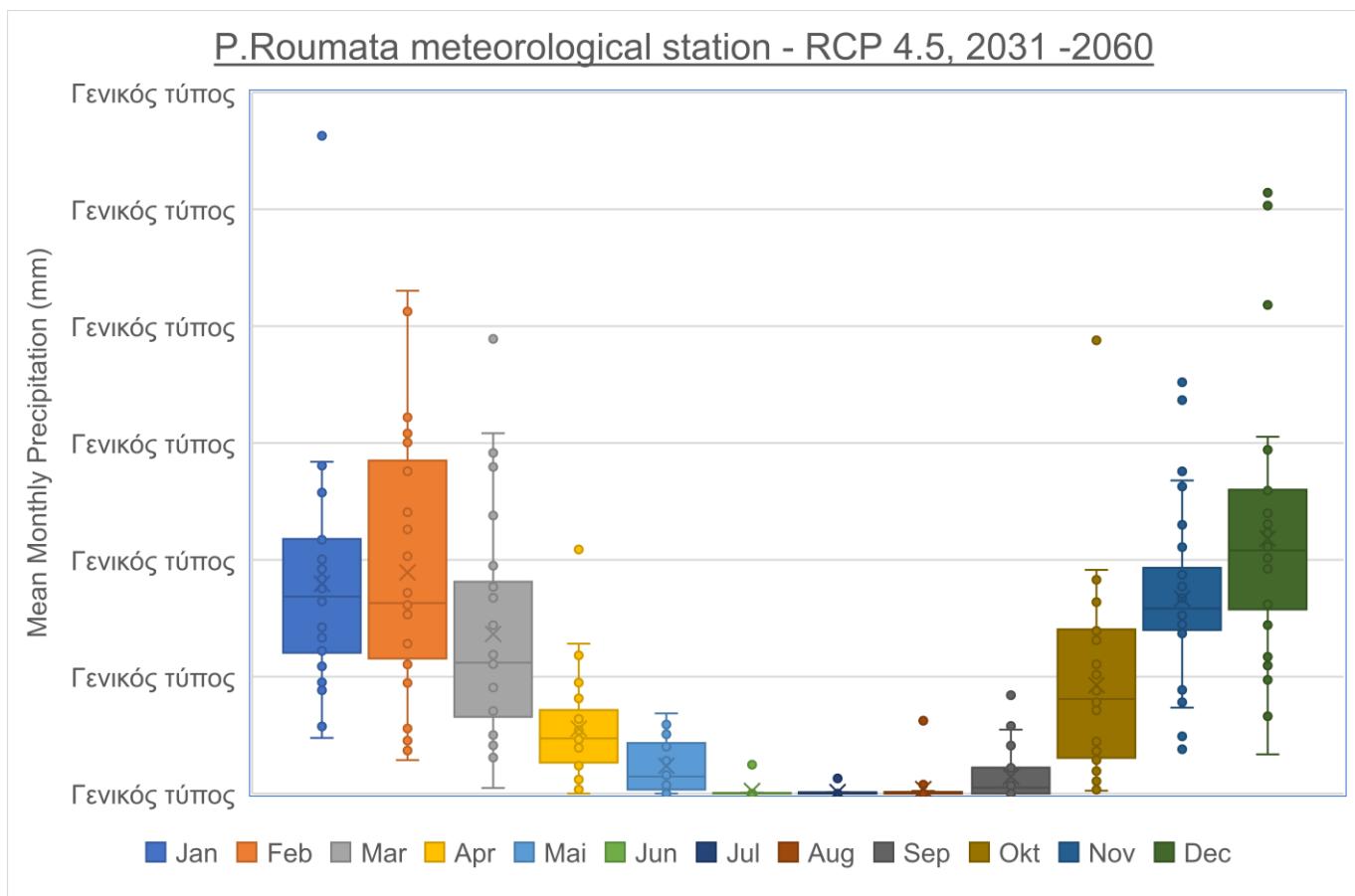
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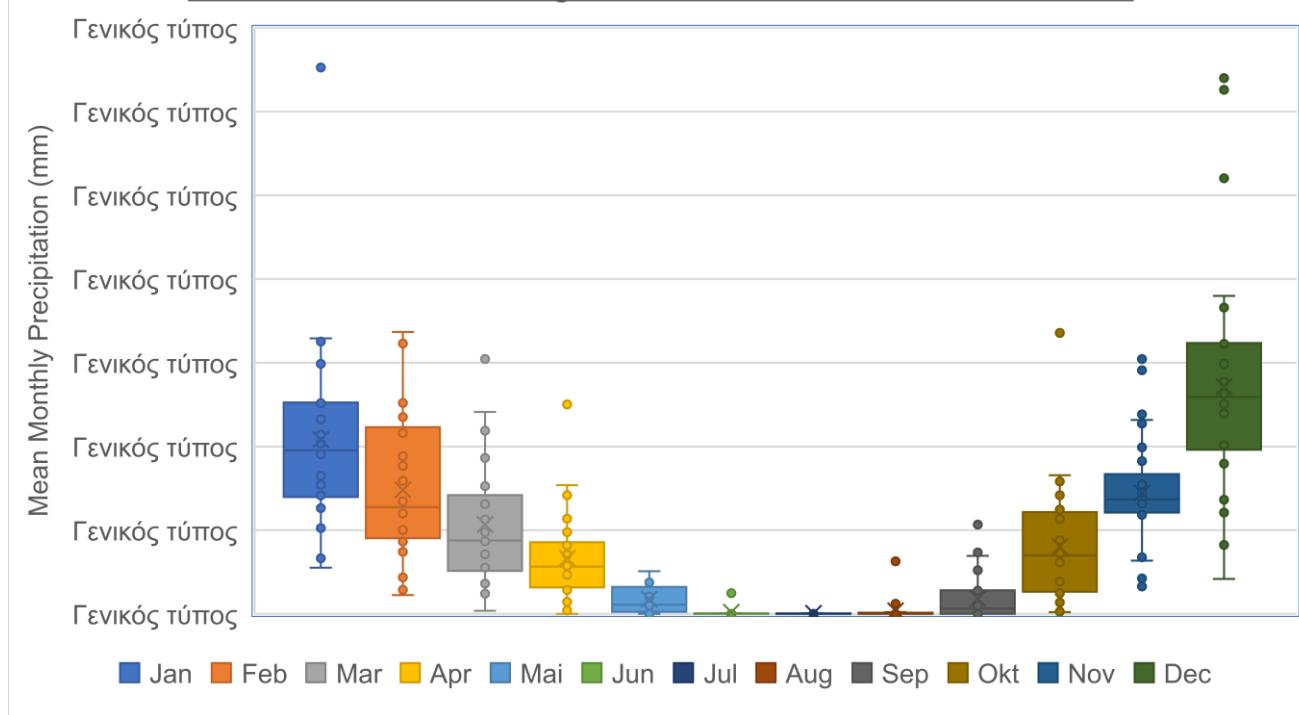
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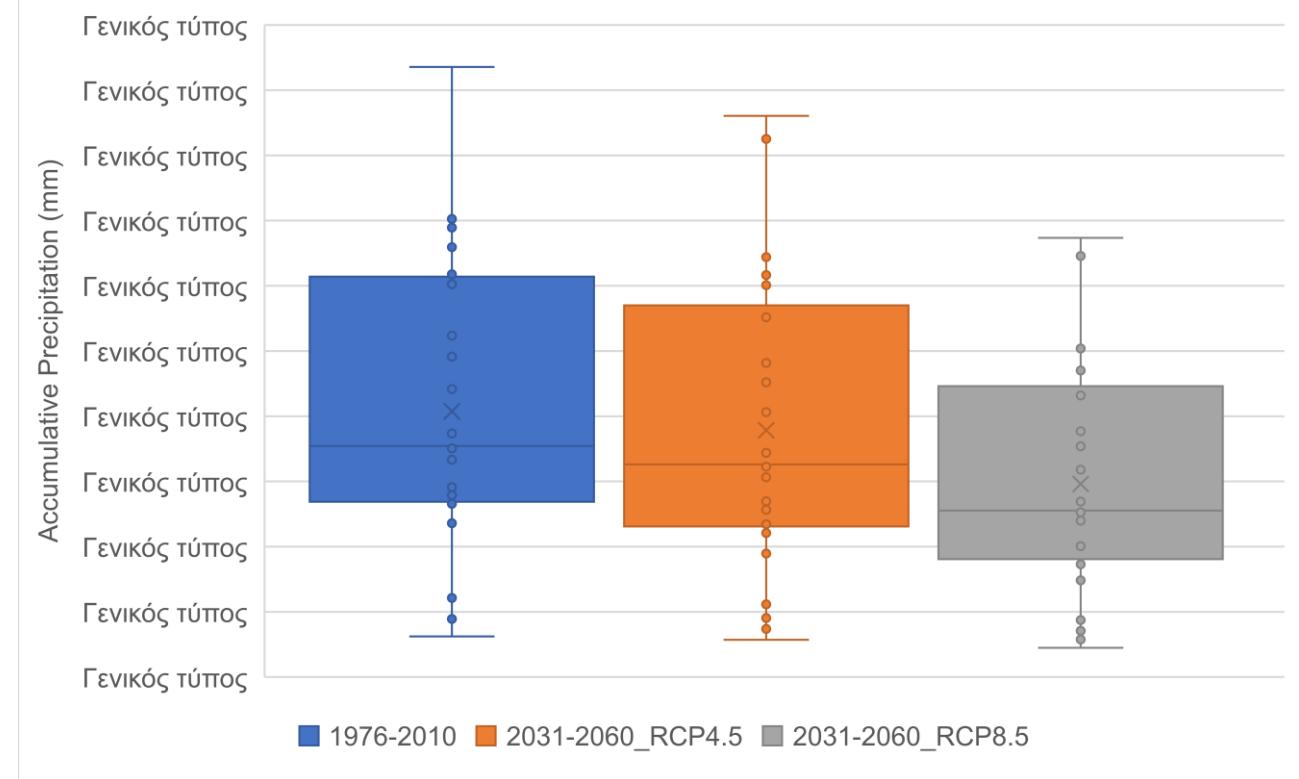
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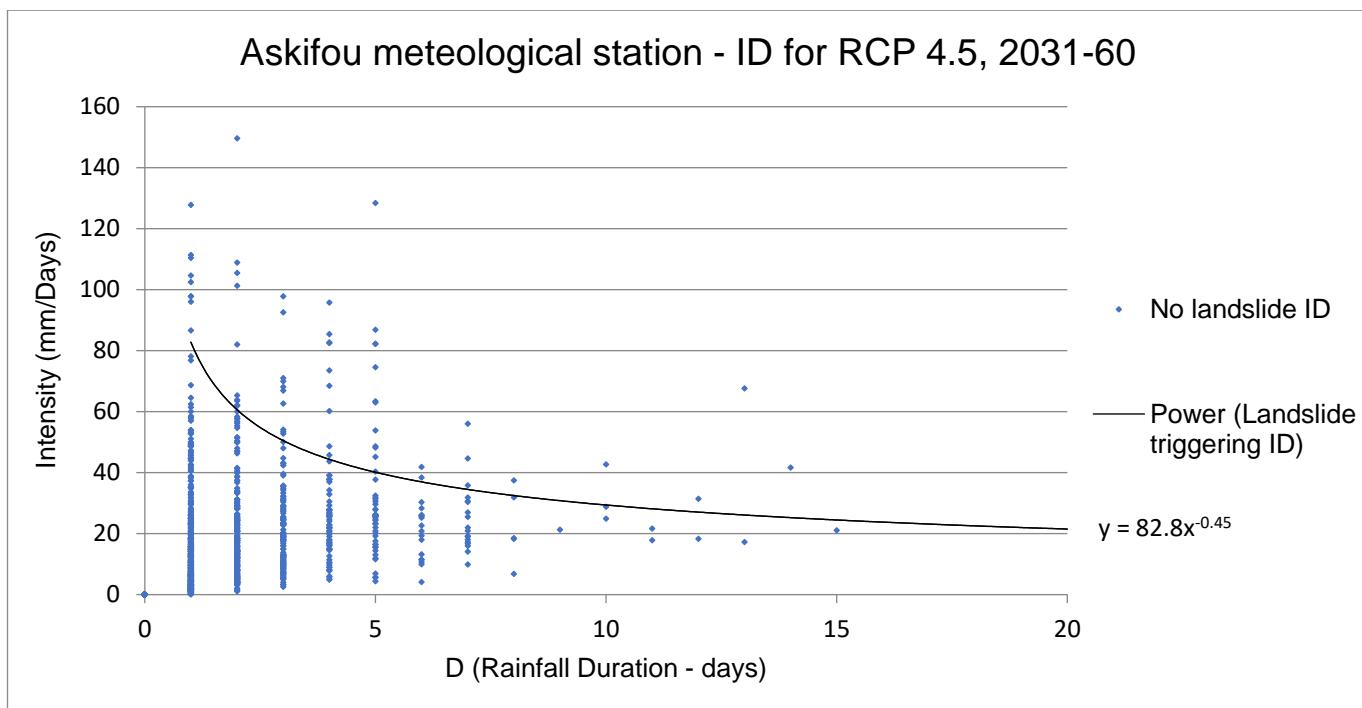
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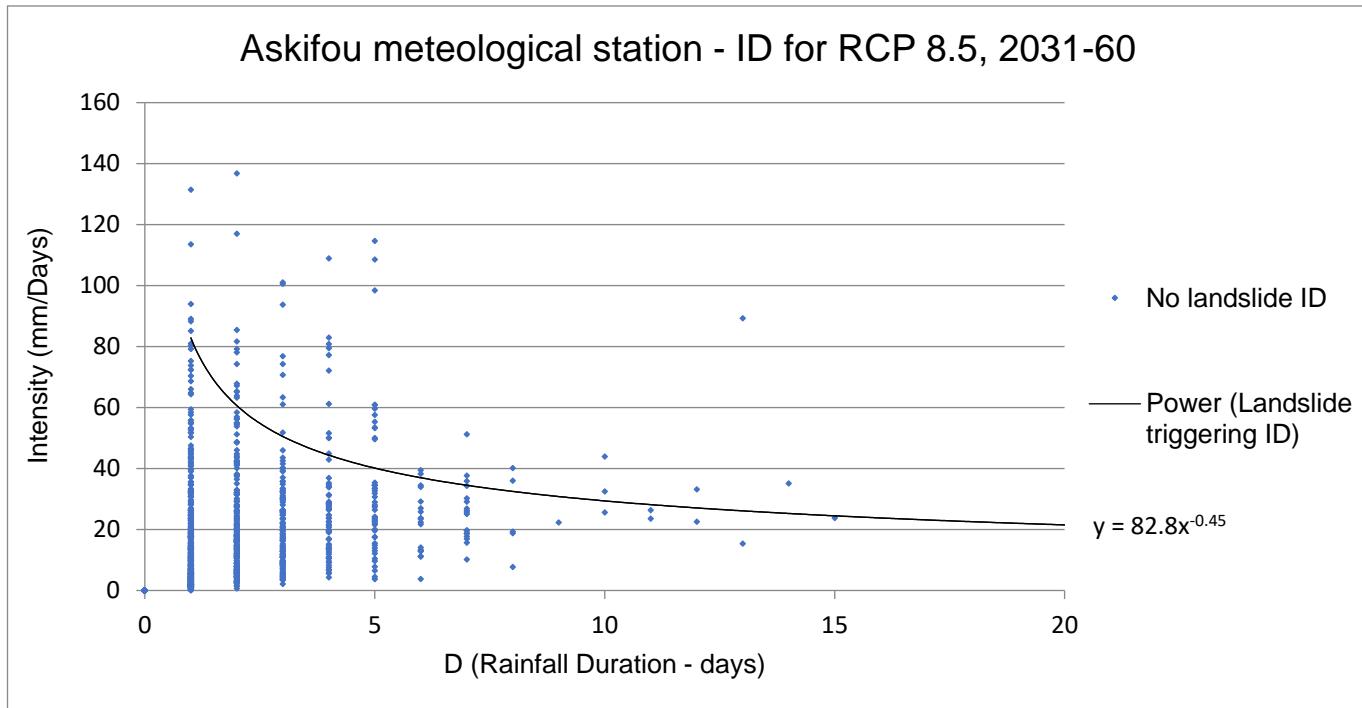
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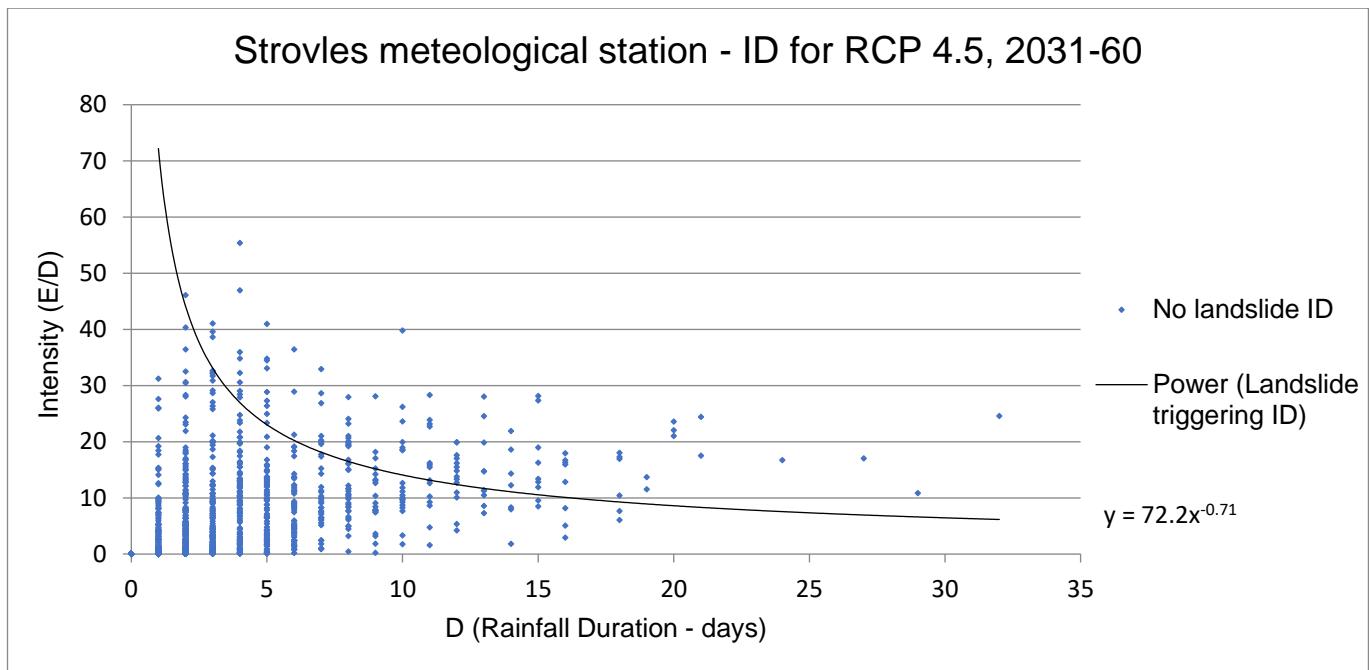
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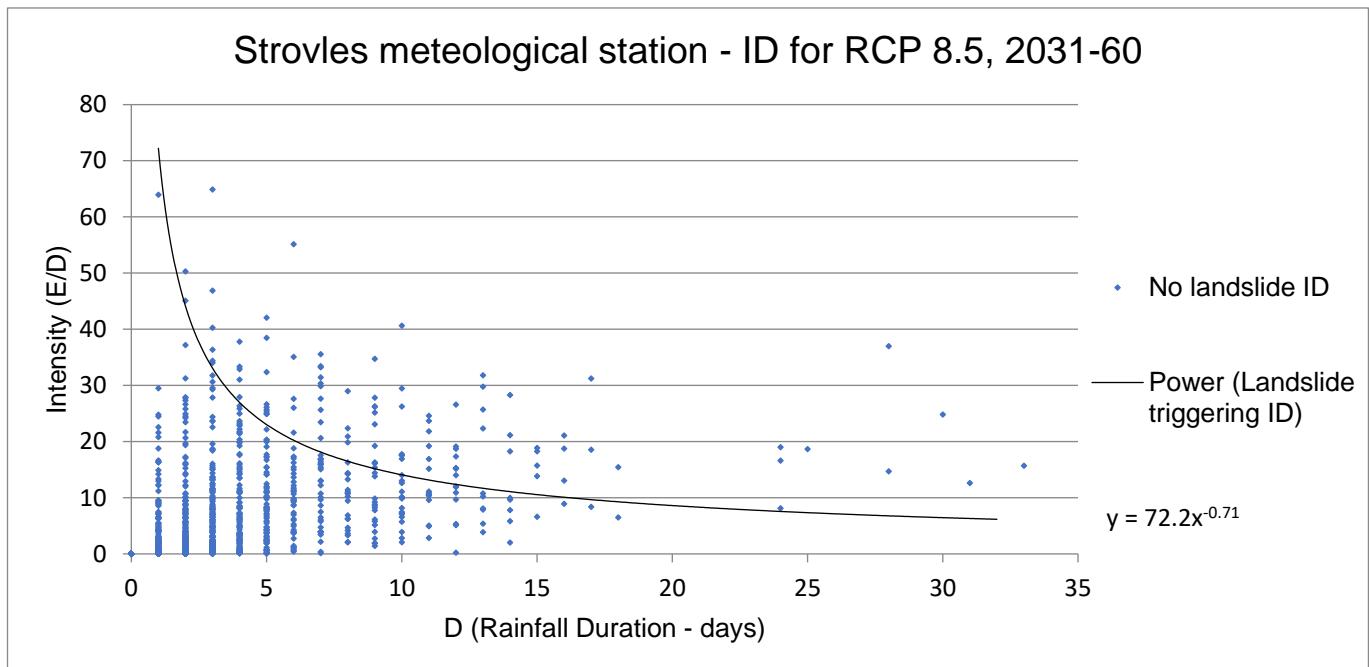
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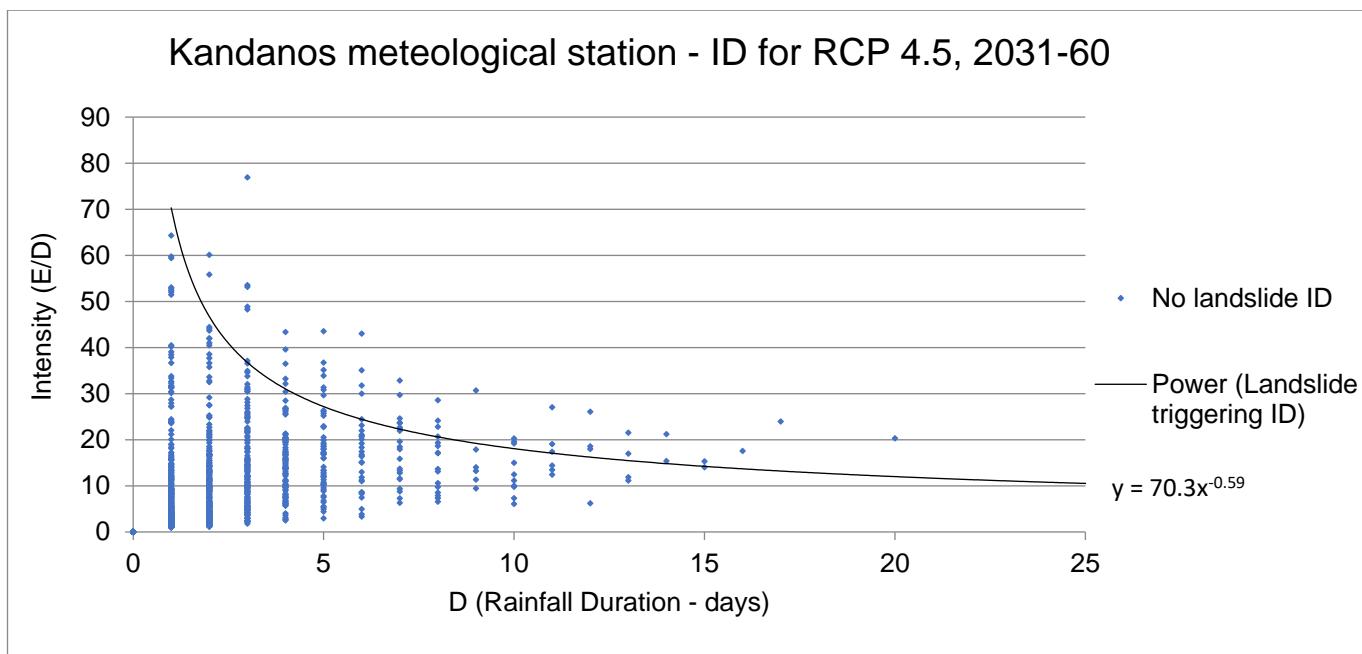
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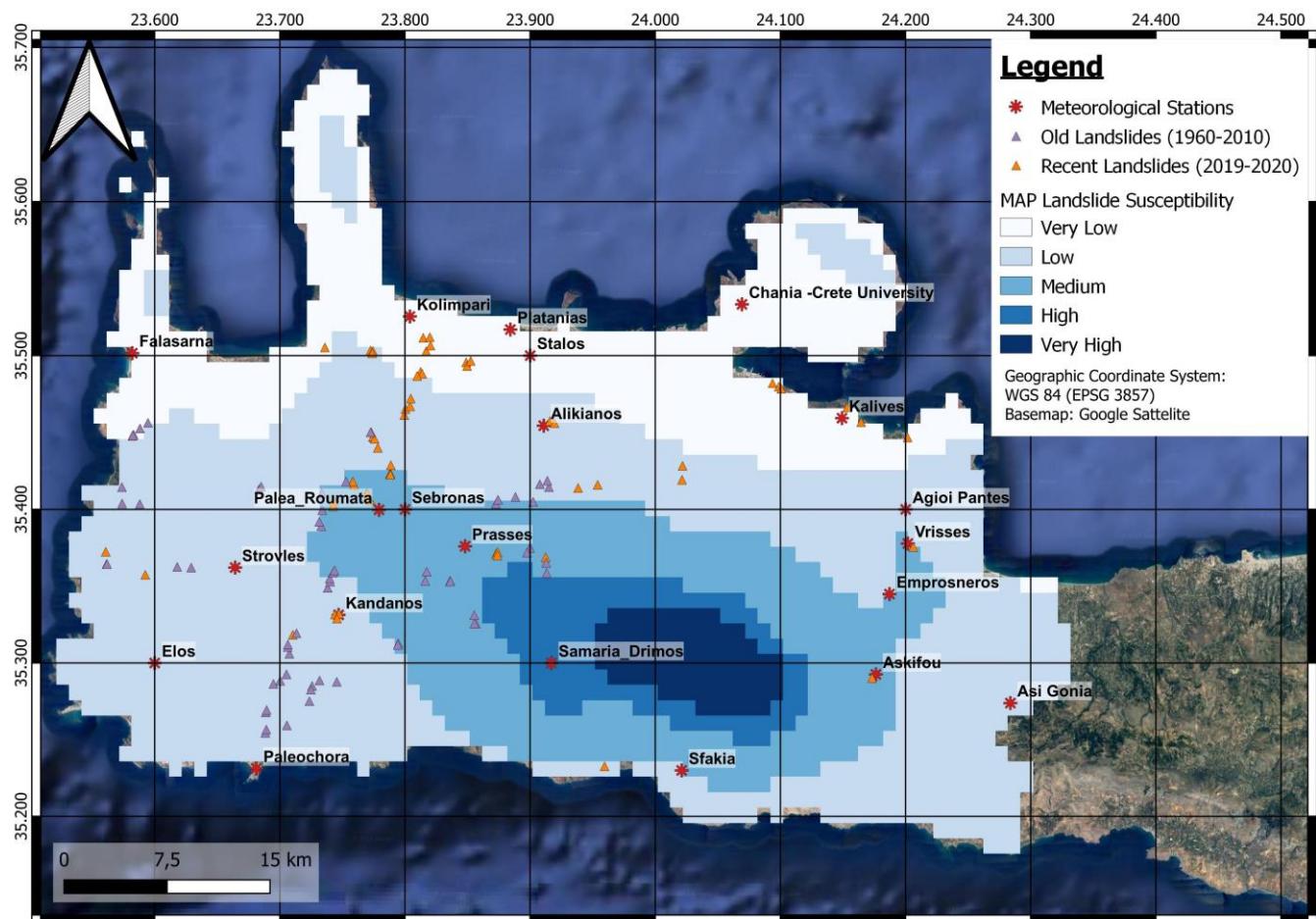
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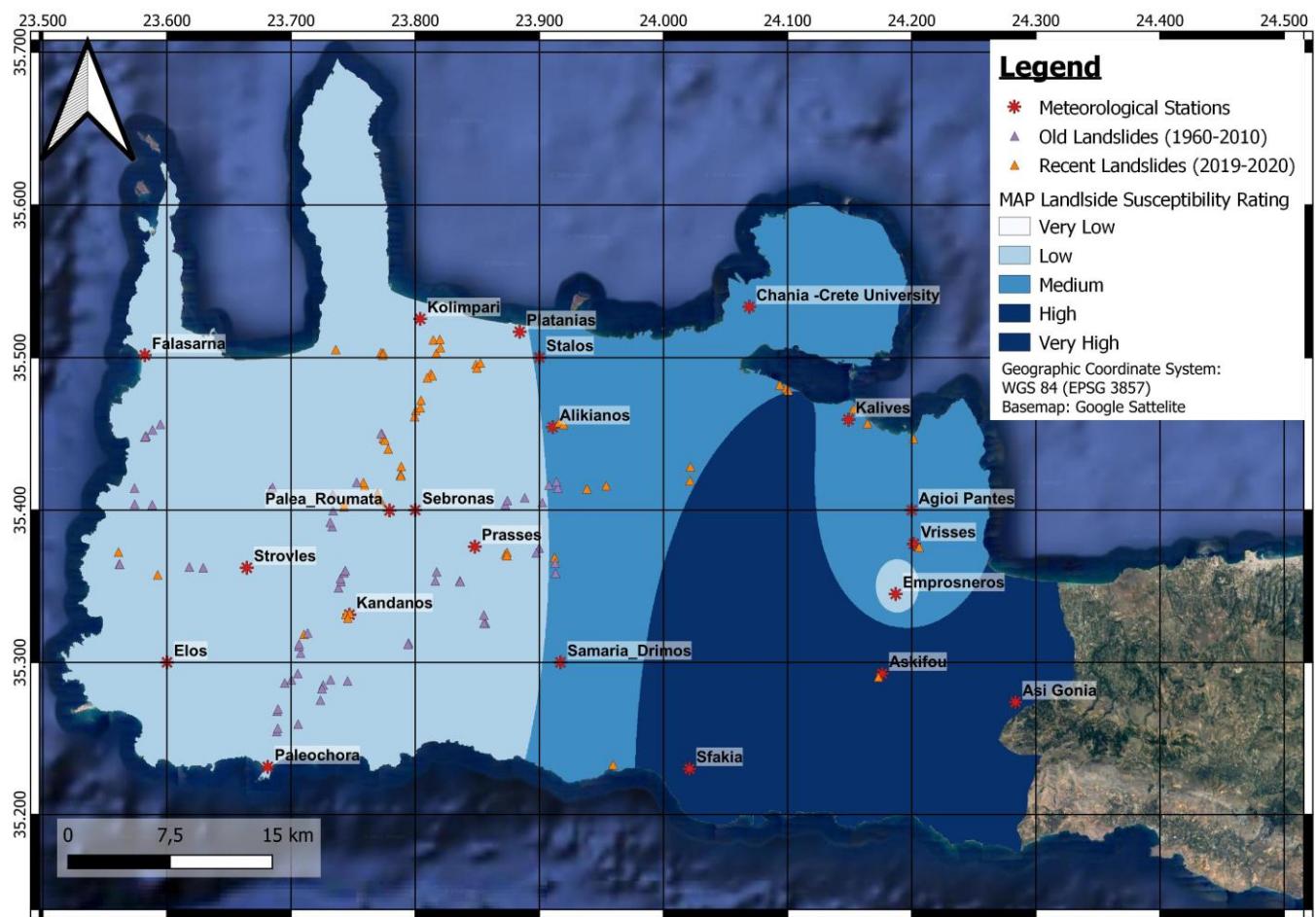
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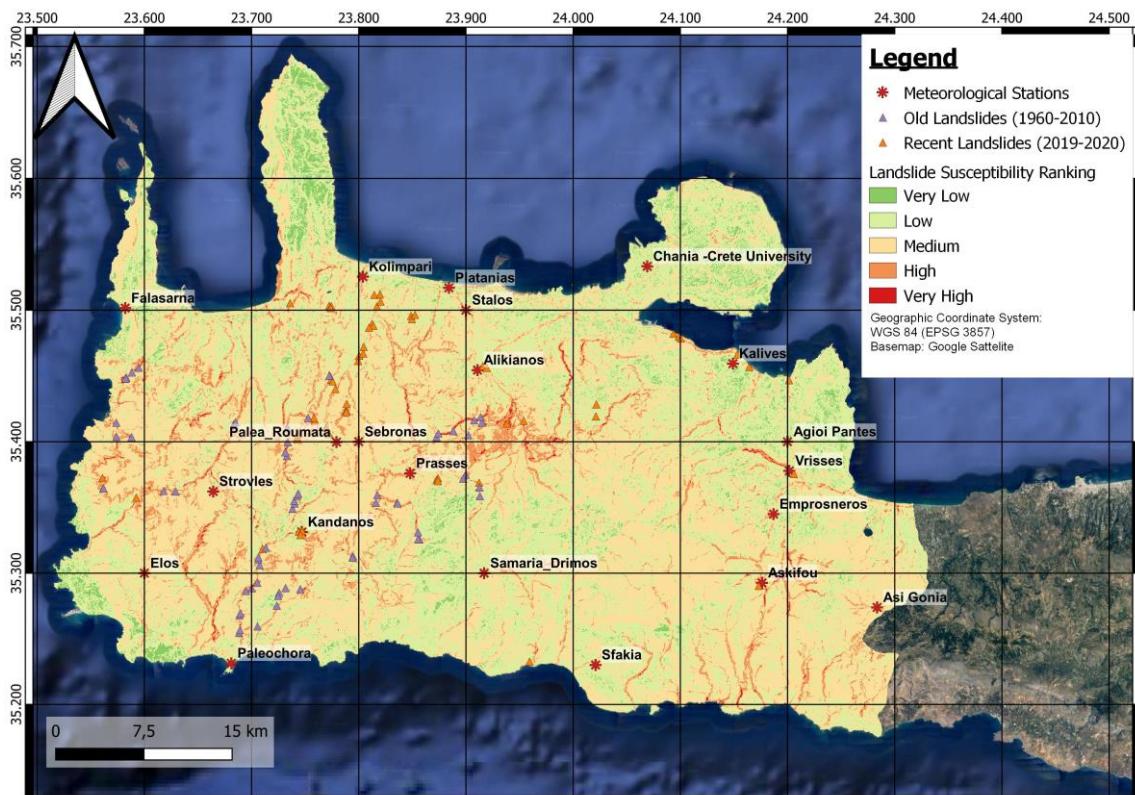
Figure S70. Total Landslide Susceptibility Map (LSM) for Chania regional unit, (using MAP-30).
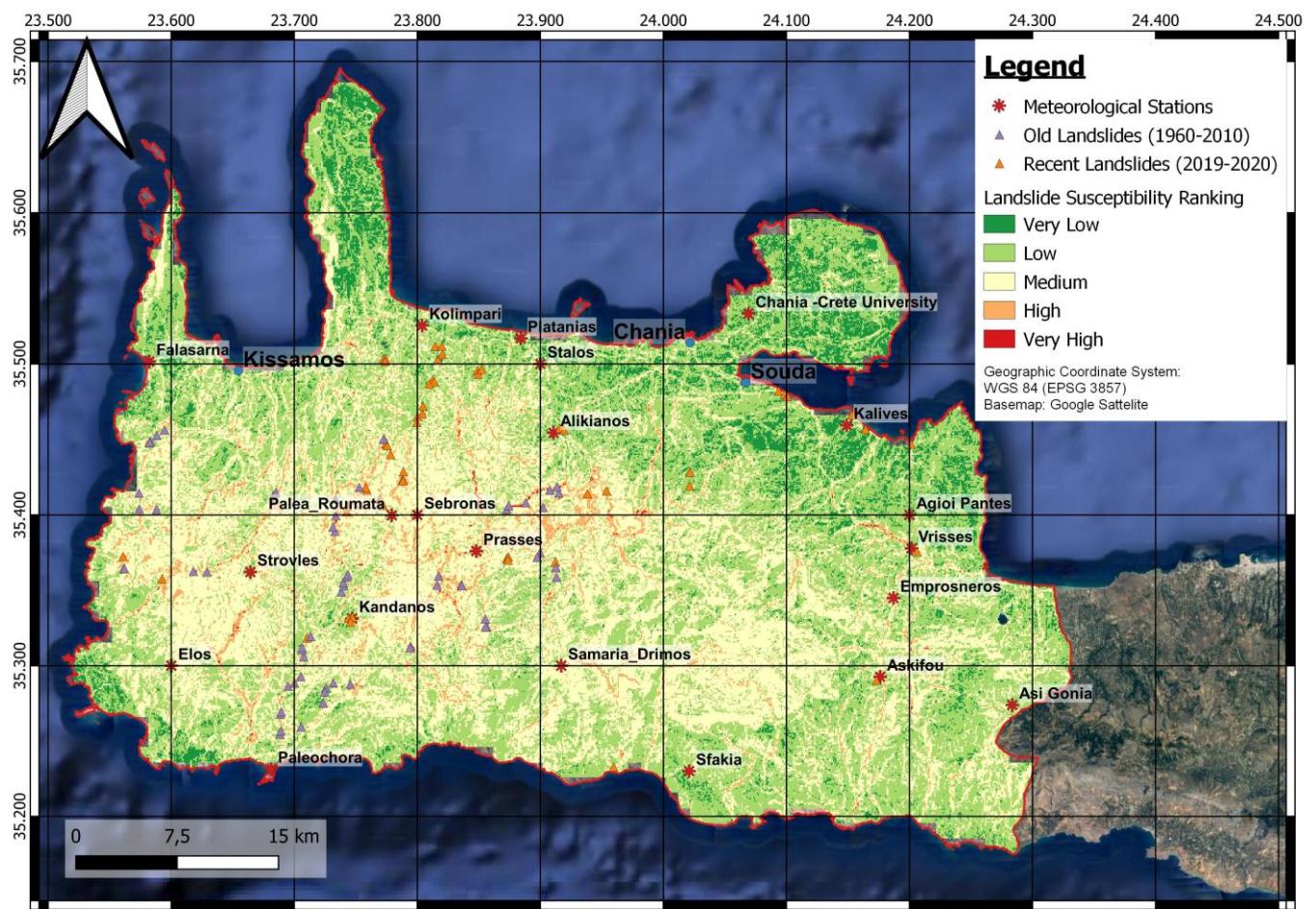
Figure S71. Total Landslide Susceptibility Map (LSM) for Chania regional unit, (using MAP-CP).

TABLES

Table S1. Meteorological Station used during this research study.

ID	Meteorological Station's Name	φ	λ	Elevation (m)	Institution- Organization responsible for the administration	Period Covered
1	Agioi Pantes	35.3988	24.1530	148	National Observatory of Athens	1/10/2015-31/12/2020
2	Alikianos	35.4544	23.9108	95	National Observatory of Athens	1/9/2012-31/12/2020
3	Asi Gonia	35.2739	24.2837	380	National Observatory of Athens	1/9/2017-31/12/2020
4	Askifou	35.2926	24.1762	734	Hellenic Ministry of Rural Development and Food	1/9/1973-31/12/2020
5	Chania Technical University of Crete	35.53330	24.06920	137	Technical University of Crete	1/1/2011-31/12/2020
6	Elos	35.3641	23.6385	520	Hellenic Agricultural Organization "Demeter"/ Institute of Olive tree, Subtropical Plants and viticulture	1/12/2014-31/12/2020
7	Emprosneros	35.3449	24.1870	272	Hellenic Ministry of the Environment, Energy and Climate Change	1/10/1962-30/9/2019
8	Falasarna	35.4924	23.5820	10	Prefectural Administration of Chania	1/4/2010 – 31/2012 & 1/1/2016-31/12/2020
9	Kalives	35.45935	24.14912	26,50	Hellenic Ministry of Rural Development and Food	1/1/1976-31/8/2010

10	Kandanos	35.3313	23.7470	437	Hellenic Ministry of the Environment, Energy and Climate Change	1/1/1955-31/12/2020
11	Kolimpari	35.5248	23.7988	40	National Observatory of Athens – TERRA CRETA	1/11/2016-31/12/2020
12	Palea Roumata	35.39975	23.77927	385,30	Hellenic Ministry of Rural Development and Food	1/1/1976-30/8/2010
13	Paleochora	35.2313	23.6812	3	National Observatory of Athens	1/10/2006 - 31/12/2020
14	Platanias	35.5169	23.8842	12	National Observatory of Athens	1/7/2015 – 31/12/2020
15	Prasses	35.3760	23.8480	520	Prefectural Administration of Chania	1/9/1997-31/8/2010
16	Samaria	35.3092	23.9170	1250	National Observatory of Athens	1/8/2008-31/12/2020
17	Sebronas	35.3743	23.8214	640	National Observatory of Athens	1/6/2015-31/12/2020
18	Stalos	35.5029	23.9347	93	Technical University of Crete – National Observatory of Athens	1/11/2018 – 31/12/2020
19	Strovles	35.3621	23.6643	515	Hellenic Ministry of the Environment, Energy and Climate Change	1/6/1954-30/9/2019
20	Sfakia	35.2302	24.0179	770	National Observatory of Athens	1/3/2013 – 31/12/2020
21	Vrisses	35.3643	24.2296	58	National Observatory of Athens	1/1/2017-31/12/2020

Table S2. Trendlines of the Meteorological Station that provide data for over a decade.

ID	Name	Elevation (m)	Trendline's Equation
1	Askifou	734	y = -7.1123x + 2211
2	Chania Technical University	137	y = -7.3248x + 679.99
3	Emprosneros	272	y = -2.3765x + 1230.6
4	Kalives	26,50	y = -6.0156x + 779.49
5	Kandanos	437	no significant change
6	Palea Roumata	385,30	y = -12.894x + 1400.7
7	Paleochora	3	no significant change
8	Prasses	520	y = -78.824x + 2262
9	Samaria	1250	y = -20.22x + 1721.8
10	Strovles	515	y = -5.4303x + 1214.7

Table S3. Recent Landslide Events.

FID_	DESCRIPTION	YEAR	MONTH	DAY
0	Agia Roumeli, Sfakia	2019	1	27
1	Platani	2019	2	24
2	Gerolakkos	2019	4	15
3	Keramies	2019	4	15
4	Askifou	2019	2	6
5	VOAK – Souda	2020	1	5
6	Highway Chania- Rethimnon	2019	1	1
7	Calami Chania	2019	2	24
8	Calivia Road	2019	12	30
9	Fotokado 1	2019	2	26
10	Fotokado 2	2019	12	30
11	Fotokado 3	2019	3	8
12	Voucolies	2019	12	30
13	Road Tavrovitis -Neratz1	2019	2	26
14	Road Tavrovitis -Neratz2	2019	2	26
15	Polemarchi Chanion	2019	1	1

16	Geraciana Chanion	2019	12	30
17	Mesavlia Chanion	2019	12	30
18	Road Cacopetros- Mesavlia	2019	2	26
19	Road Tavronitis- Paleochora1	2019	11	11
20	Cacopetros Chanion	2019	12	30
21	Regional road Chanion – Kissamos -Pl	2019	3	10
22	Regional road Tzivera-Prasses1	2019	2	24
23	Regional road Mesavlia-Paleochora	2019	2	26
24	Regional road Foupnes – Lacoi	2019	2	26
25	Regional road Fournes-Meskla	2019	2	26
26	Regional road Platanos-Sfinari	2019	1	1
27	Regional road Ceramoti - Amigdalo	2019	12	30
28	Regional road Kissamos - Ceramoti	2019	12	30
29	Roumata Chanion 1	2019	12	30
30	Roumata Chanion 2	2019	12	30
31	Roumata Chanion 3	2019	12	30
32	Roumata Chanion 4	2019	12	30
33	Regional road Tavronitis – Paleochora2	2019	1	1
34	Almirida Apocoronou	2019	12	30
35	Highway Chania-Rethimnon, Agi	2019	2	26
36	Regional road Voukolies-Cacopetra	2019	2	26
37	Regional road Voukolies - Fotocado	2019	2	26
38	Voucolies 1	2019	12	30
39	Voucolies 2	2019	12	30
40	Regional road Tavronitis – Neratz3	2019	2	26
41	Regional road Tavronitis – Neratz4	2019	2	26
42	Ciparissos1	2019	1	1
43	Alikianos	2019	11	13
44	Regional road Alikianos – Fourne	2019	2	26
45	Regional road Voucolies-Paleochora1	2020	1	5
43	Regional road Vathi-Elafonisos	2019	12	31
46	Regional road Skines-Anatolico	2019	2	26
47	Regional road Voucolies-Paleochora2	2020	1	5
49	Regional road Tavronitis – Paleochora 3	2019	1	1
50	Regional road Tavronitis-Paleochora 4	2019	1	1

48	Regional road Voucolies – Paleochora	2020	1	5
51	Ciparissos2	2019	1	1
52	Ciparissos3	2019	1	1
53	Geraciana1	2019	12	30
54	Geraciana1	2019	12	30
55	Regional road Tavronitis – Neratz5	2019	2	26
56	Regional road Tavronitis – Neratz6	2019	2	26
57	Regional road Tavronitis-Paleochora 5	2020	11	7
58	Fotokado 4	2019	3	8
60	Regional road Tzivera-Prasses2	2019	2	24
61	Regional road Tzivera-Prasses3	2020	12	15

Table S4. Ratio of precipitation during (13-17Feb19) and (23- 29Feb19), in relation to the monthly (Feb 2019) precipitation.

ID	Name	Precipitation (mm) during 13-17 Feb 19	Precipitation (mm) during 23-26 Feb 19	Total Precipitation (mm) in Feb 2019	Percentage (%) of the precipitation's sum from the 2 periods to the total Precipitation in Feb 2019
1	Agioi Pantes	169,8	227,4	457,2	86,88%
2	Alikianos	238,8	266,2	568,8	88,78%
3	Asi Gonia	389	560,8	1108,8	85,66%
4	Askifou	433	600,6	1225	84,38%
5	Chania Technical University	137	159,8	360	82,44%
6	Elos	292,6	307,2	690,4	86,88%
7	Emprosneros	342	267	727	83,77%
8	Falasarna	57,6	122,4	241,6	74,50%
9	Kandanos	379,8	437,9	952,3	85,87%
10	Kolibari	95,2	133,8	282	81,21%
11	Paleochora	68,8	99,8	224,8	75,00%
12	Platanias	94,8	113,8	247,2	84,39%
13	Samaria	275,2	246	698	74,67%
14	Sebronas	446,4	497,8	1093,6	86,34%
15	Sfakia	52,6	127,6	287	62,79%
16	Stalos	102,2	73	212	82,64%
17	Strovles	236,1	321	641,1	86,90%
Average					81,95%

Table S5. Percentage change of the extreme precipitation events.

ID	Name	Number of the Extreme Precipitation Events for the last 5 Year period	Frequency of the Extreme Precipitation Events for the whole period	Frequency of the Extreme Precipitation Events for the last 5 Year period	Increase of the Extreme Precipitation Events (%)
1	Askifou	105	0.060	0.060	-
2	Chania Technical University of Crete	21	0.01177	0.0115	-
3	Emprosneros	66	0.033	0.036	9.09%
4	Falasarna	87	0.032	0.048	50.00%
5	Kandanos	68	0.021	0.037	76.19%
6	Paleochora	12	0.00615	0.00657	-
7	Samaria	86	0.0471	0.0471	-
8	Strovles	61	0.028	0.033	17.86%

Table S6. Scales for pair-wise comparisons Saaty, (1987).

Scales	Degree of preferences	Descriptions
1	Equally	Two activities contribute equally to the objective
3	Moderately	Experience and judgment slightly to moderately favor one activity over another
5	Strongly	Experience and judgment strongly or essentially favor one activity over another
7	Very strongly	An activity is strongly favored over another and its dominance is showed in practice
9	Extremely	The evidence of favoring one activity over another is of the highest degree possible of an affirmation
2, 4, 6, 8,	Intermediate values	Used to represent compromises between the preferences in weights 1, 3, 5, 7 and 9

Table S7. AHP – Pair-wise comparison matrix.

Factor	Lithology	Landuse/ Landcover	Road Network	Stream Network	Slope Angle	Relative Relief	Slope Aspect	Rainfall
Lithology	1.00	2.00	2.00	2.00	1.00	3.00	3.00	0.33
Landuse/ Landcover	0.50	1.00	1.00	1.00	0.50	1.00	1.00	0.50
Road Network	0.50	1.00	1.00	1.00	2.00	1.00	1.00	0.50
Stream Network	0.50	1.00	1.00	1.00	2.00	2.00	1.00	0.50
Slope Angle	1.00	2.00	0.50	0.50	1.00	2.00	2.00	1.00
Relative Relief	0.33	1.00	1.00	0.50	0.50	1.00	1.00	0.33
Slope Aspect	0.33	1.00	1.00	1.00	0.50	1.00	1.00	0.33
Rainfall	3.00	2.00	2.00	2.00	1.00	3.00	3.00	1.00
Total	7.17	11.00	9.50	9.00	8.50	14.00	13.00	4.50

Table S8. AHP – Evaluating Relative Weight and Consistency Measure.

Factor	Lithology	LU/LC	Road Network	Stream Network	Slope Angle	Relative Relief	Slope Aspect	Rainfall	Total	Average	Consistency Measure
Lithology	0.14	0.18	0.21	0.22	0.12	0.21	0.23	0.07	1.39	0.174	8.43
LU/LC	0.07	0.09	0.11	0.11	0.06	0.07	0.08	0.11	0.70	0.087	8.43
Road Network	0.07	0.09	0.11	0.11	0.24	0.07	0.08	0.11	0.87	0.109	8.56
Stream Network	0.07	0.09	0.11	0.11	0.24	0.14	0.08	0.11	0.94	0.118	8.53
Slope Angle	0.14	0.18	0.05	0.06	0.12	0.14	0.15	0.22	1.07	0.133	8.44

											8.38
Relative Relief	0.05	0.09	0.11	0.06	0.06	0.07	0.08	0.07	0.58	0.072	8.38
Slope Aspect	0.05	0.09	0.11	0.11	0.06	0.07	0.08	0.07	0.63	0.079	8.39
Rainfall	0.42	0.18	0.21	0.22	0.12	0.21	0.23	0.22	1.82	0.227	8.65
Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		λmax	8.48
										CI	0.07
										RI	1.41
										C.R.	**0.04824**

Table S9. Random Consistency Index (RI) (Wang et al. (2017)).

n	RI
1	0
2	0
3	0.58
4	0.90
5	1.12
6	1.24
7	1.32
8	1.41
9	1.45
10	1.49
11	1.51

EQUATIONS

$$CR = \frac{CI}{RI} \quad (1)$$

Equation S1

CI stands for Consistency Index and is calculated from the following Equation 2 – Wang et al. (2017):

$$CI = \frac{\lambda max - n}{n-1} \quad (2)$$

Equation S2

λ_{max} is the max eigenvalue of the matrix and n is the number of the elements of the rows/columns of the matrix. In the examined scenario, from Table 7, λ_{max}= 8.20 and n=8, so CI = 0.03.

RI (Random Index) is the Consistency Index and derives from the SM -Table 9 – Wang et al. (2017)