



Republic of TURKEY
MINISTRY OF AGRICULTURE AND FORESTRY
TURKISH STATE METEOROLOGICAL SERVICE



State of the Climate in Turkey in 2019



Research Department

**January 2020
Ankara**

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in 2019**

RESEARCH DEPARTMENT

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1. Introduction

Turkey's annual mean temperature in 2019 was 14.7°C. This value is 1.2°C above from 1981-2010 normal (13.5°C). This made 2019 the fourth warmest year since 1971. In general, most of the country had above normal temperatures except Karabük and Bitlis. Temperature anomalies in some Anatolian locations were greater than 2.0°C.

Monthly mean temperatures of 2019 were below their normal in April and July and above in other months.

All the seasonal temperatures were above the normal (1981-2010). The autumn temperature anomalies were exceptionally above normal with 1.9°C.

Lowest minimum temperature in 2019 was in January with -28.1°C in Yüksekova while highest maximum temperature was observed in August with 46.8°C in Cizre. 63 centers broke their own records at the highest maximum temperatures and 1 center broke their own records at the lowest minimum temperatures.

Turkey annual mean areal precipitation in 2019 was 585.1 mm. This value is 1.9 % above from 1981-2010's normal (574 mm). Geographically, 2019 precipitation anomalies were above normal in most of the southern parts of the country while below it northern parts.

Monthly precipitations in 2019 were below from the 1981-2010's normal in February, March, May, September, October and November and above normal in the other months. January and December precipitations were exceptionally above their normal.

Winter precipitations were exceptionally high in southern parts of the country. Spring precipitation was good in South-eastern and Black Sea Region. Summer and autumn precipitation were below in the country except Black Sea Region.

The number of extreme events in 2019 reached 829. There is an increasing trend in extreme event occurrences especially during the last two decades (12events/year). Most hazardous extreme events recorded in 2019 were heavy rain and floods (36%) and wind storm (27%). The others were hail (18%), lightning (7%), snow (5%) and landslide (3%).

2. Temperature

Turkey's annual mean temperature in 2019 was 14.7°C. This value is 1.2°C above from 1981-2010 normal (13.5°C). This made 2019 the fourth warmest year since 1971 (Fig.2.3).

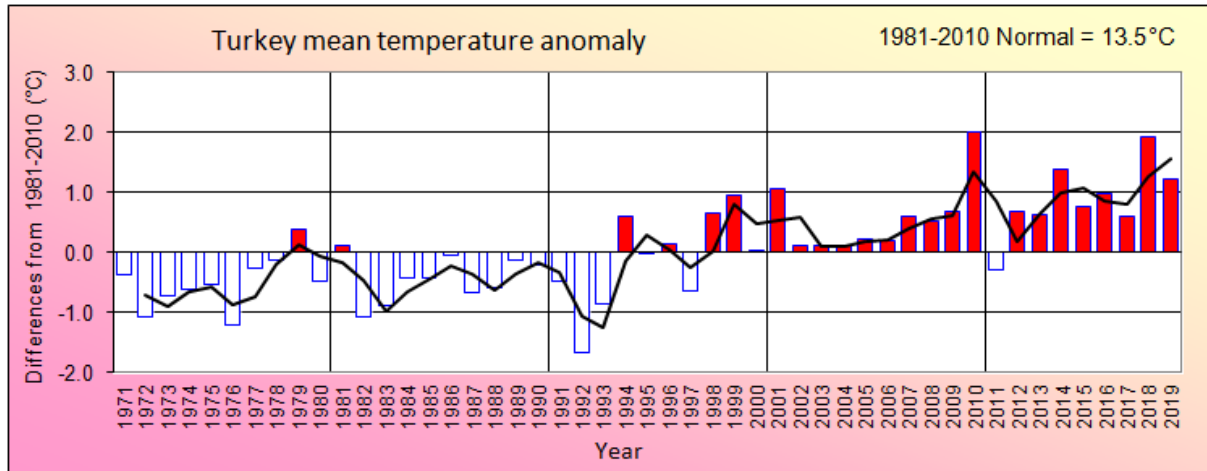


Figure 2. 1 Annual mean temperature anomalies in Turkey (URL 1)

Since 1998, there are consistent positive anomalies in Turkey's mean temperatures except year 2011. The first warmest year was 2010 with 2.0°C temperature anomaly (Fig.2.1).

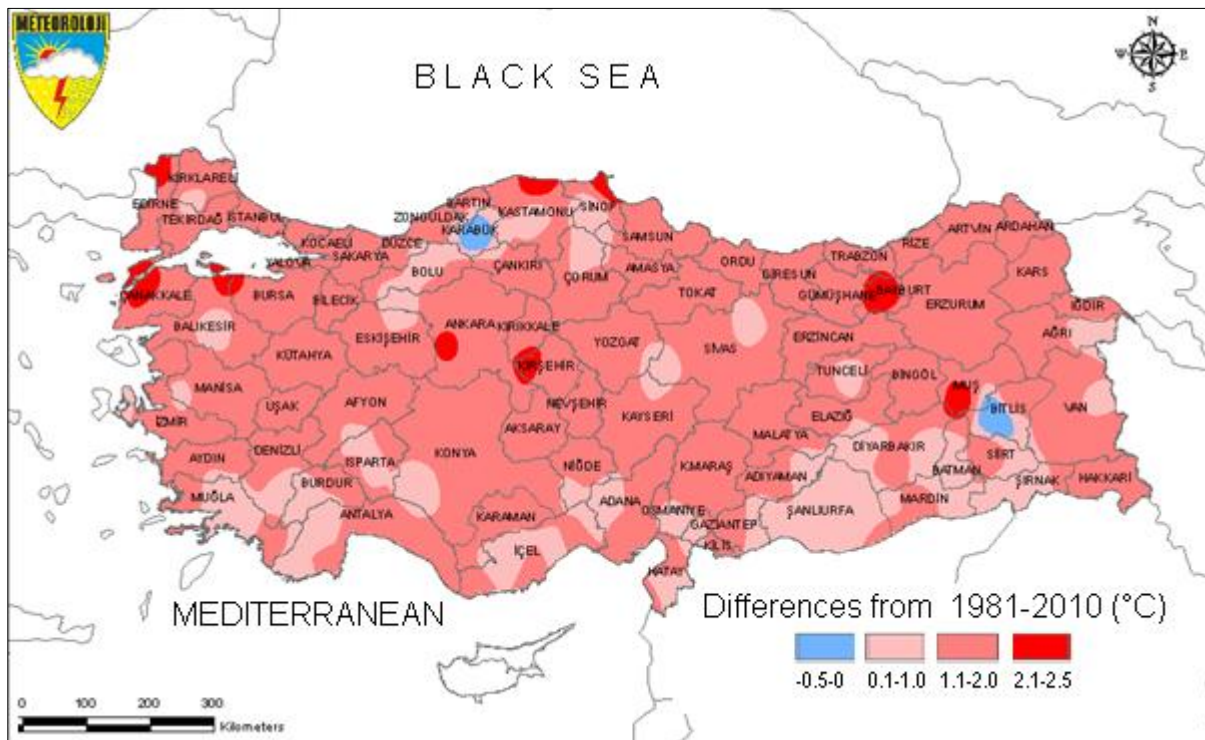


Figure 2. 2 Spatial distribution of mean temperature differences in Turkey in 2019 (URL 1).

In general, most of the country had above normal temperatures except Karabük and Bitlis. Temperature anomalies in some Anatolian locations were greater than 2.0°C (Fig.2.2).

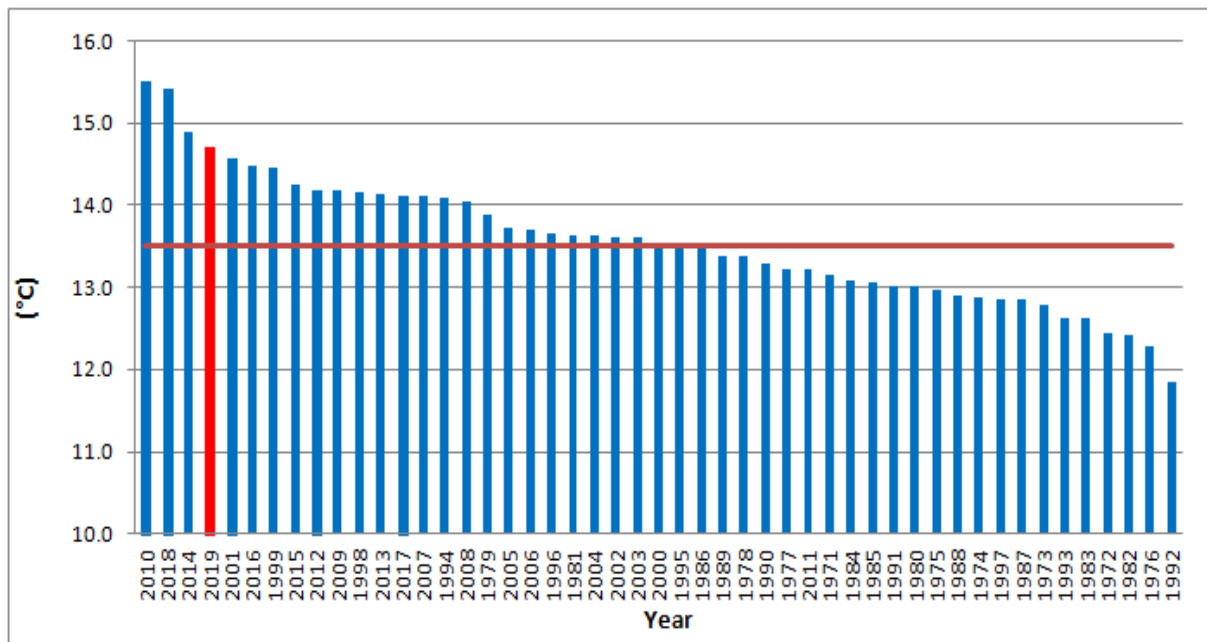


Figure 2. 3 Rank of warmest years to coldest (URL 1)

2019 has been fourth warmest year since 1971 (Figure 2.3).

2.1 Monthly temperature

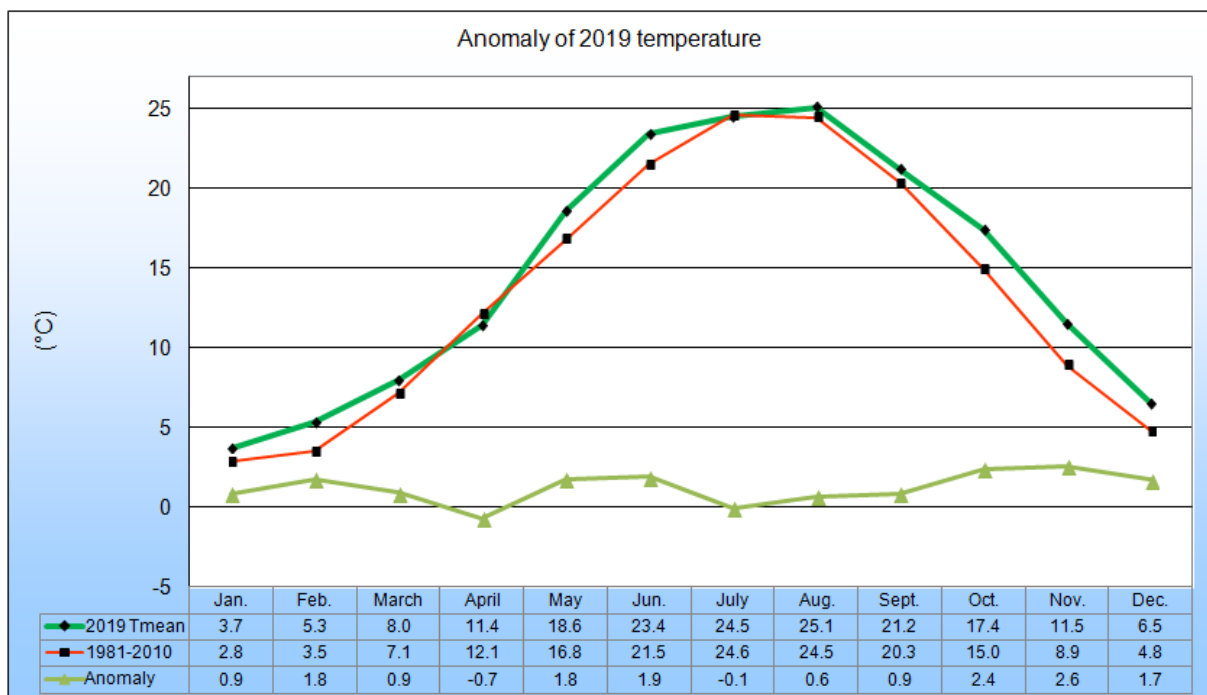
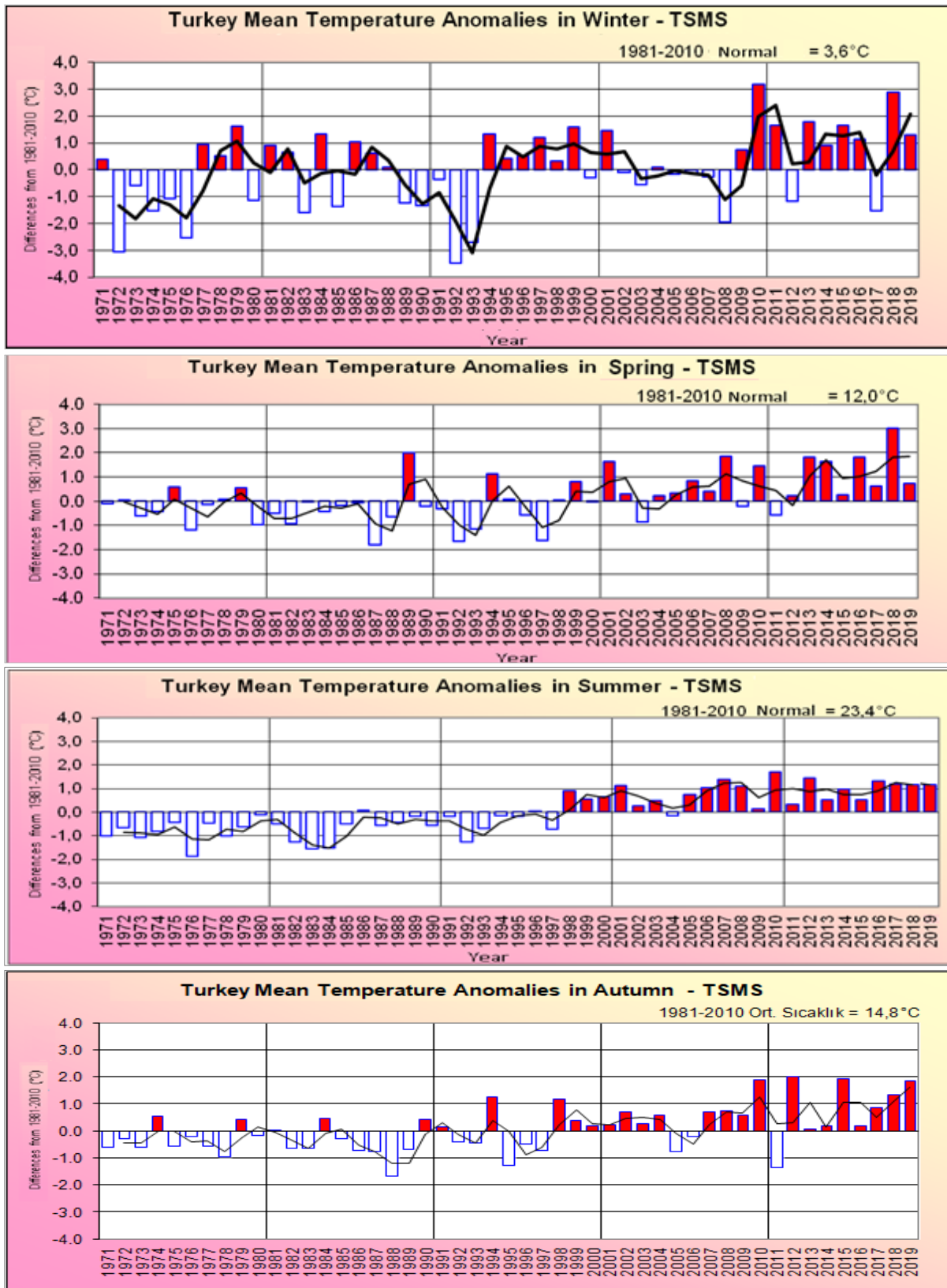


Figure 2. 4 Monthly mean temperature differences in Turkey in 2019 (URL 1)

Monthly mean temperatures of 2019 were below their normal in April and July and above in other months. (Fig. 2.4).

2.2 Seasonal temperature

All the seasonal temperatures were above the normal (1981-2010). The Autumn temperature anomalies were exceptionally above normal (Figure 2.5)



2. 5 (from top to bottom) winter, spring, summer and autumn temperature anomalies in Turkey in 2019 (URL 1)

2018-2019 winter mean temperature was 4.9°C, 1.3°C above their normal (3.6°C). 2019 mean spring temperature was 12.7°C, 0.7°C above their normal (12.0°C), summer mean temperature was 24.4°C, 1.0°C above their normal (23.4°C) and autumn mean temperature was 16.7°C, 1.9°C above their normal (14.8°C) (Figure 2.5).

2.3 Extreme temperatures in 2019

Lowest minimum temperature in 2019 was in January with -28.1°C in Yüksekova while highest maximum temperature was observed in August with 46.8°C in Cizre (Fig 2.6 and 7).

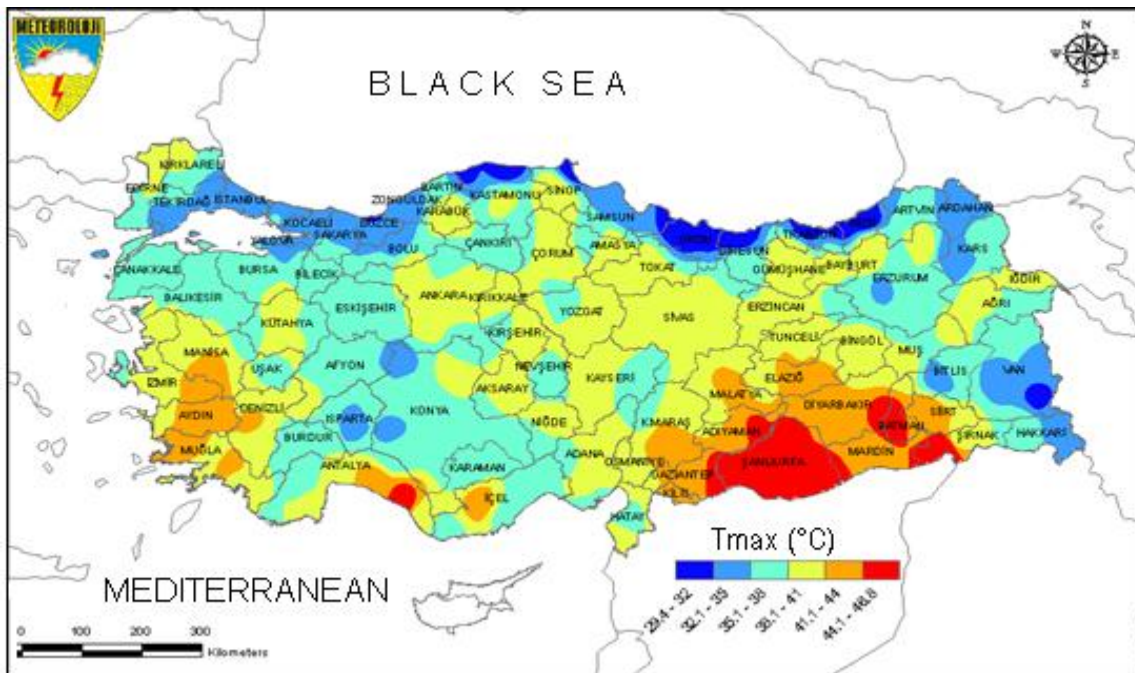


Figure 2. 6 Spatial distribution of maximum temperature in Turkey in 2019 (URL 1)

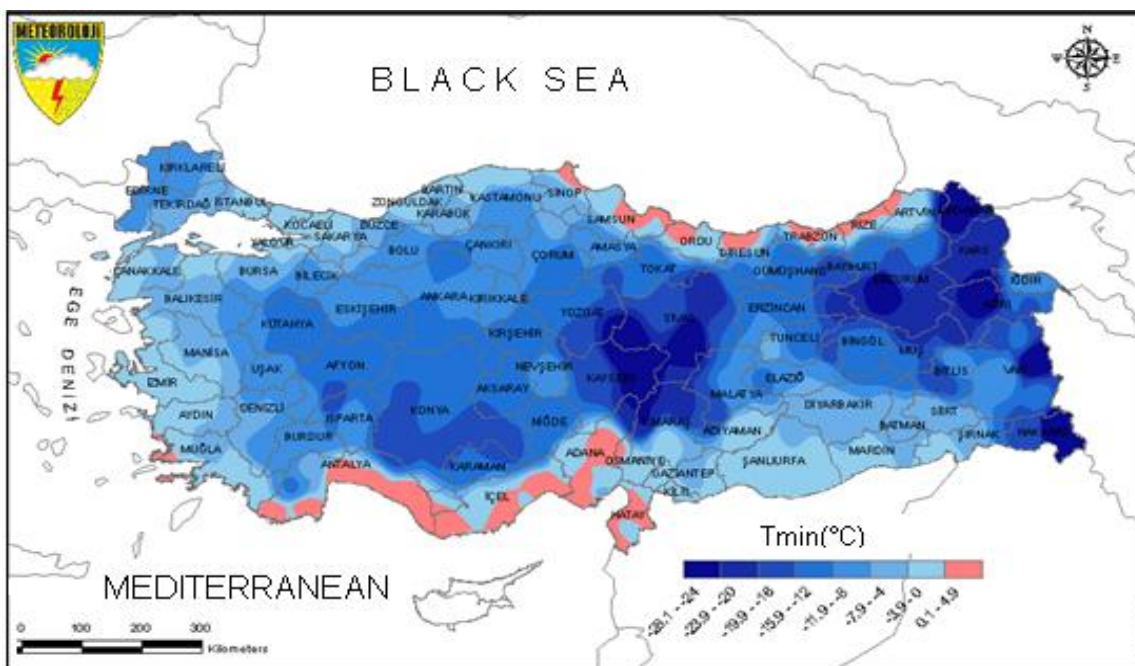


Figure 2. 7 Spatial distribution of minimum temperature in Turkey in 2019 (URL 1)

In 2019, 63 stations broke their own records at the highest maximum temperatures during the month given below tables (Table 1).

Table 1. New extreme maximum temperature records in 2019 (Url 1)

Day	Month	Station	2019 Maximum Temperature (°C)	Long Term Maximum Temperature (°C)
27	January	ELAZIĞ	13.0	12.4
28	May	UŞAK	33.2	32.1
28	May	DENİZLİ	37.8	37.0
28	May	SİMAV	33.6	33.0
28	May	GEDİZ	35.8	35.2
28	May	BURDUR	34.6	34.5
29	May	ISPARTA	33.6	33.0
30	May	KAHRAMANMARAŞ	39.3	38.0
29	May	SENİRKENT	33.6	32.8
30	May	GÖKSUN	31.2	30.4
29	May	EĞİRDİR	32.9	31.7
29	May	TEFENNİ	33.1	32.8
28	May	ELMALI	33.8	32.8
30	May	ISLAHIYE	40.5	39.4
29	May	KALE-DEMRE	37.7	35.6
29	May	KIRIKKALE	36.0	34.4
30	May	YOZGAT	31.4	30.9
29	May	AKSARAY	34.1	33.8
30	May	KAYSERİ	34.2	33.6
30	May	EREĞLİ	35.0	34.4
29	May	POLATLI	35.8	33.4
29	May	ÇİÇEKDAĞI	34.9	33.1
29	May	KULU	34.1	32.8
29	May	ILGIN	33.1	32.8
29	May	SEYDİŞEHİR	33.4	31.8

29	May	ÇUMRA	34.6	33.8
31	May	GÜMÜŞHANE	32.6	32.5
29	May	BEYPAZARI	35.6	35.1
18	May	ARDAHAN	26.6	26.4
30	May	DİVRİĞİ	33.1	32.8
30	May	ELBİSTAN	33.7	33.2
30	May	DOĞANŞEHİR	33.0	31.2
30	May	ŞANLIURFA	40.3	40.0
27	June	SOLHAN	35.3	34.8
26	June	DOĞANŞEHİR	36.8	36.0
26	June	GAZİANTEP	40.2	39.6

In 2019, 1 station broke their own records at the lowest minimum temperatures during the month given below tables (Table 2).

Table 2.2. New extreme minimum temperature records in 2019 (Url 1)

Day	Month	Station	2019 Minimum Temperature (°C)	Long Term Minimum Temperature (°C)
22	September	NALLIHAN	2.4	3.0

3. Precipitation

Turkey annual mean areal precipitation in 2019 was 585.1 mm. This value is 1.9 % above from 1981-2010's normal (574 mm) (Figure 3.1).

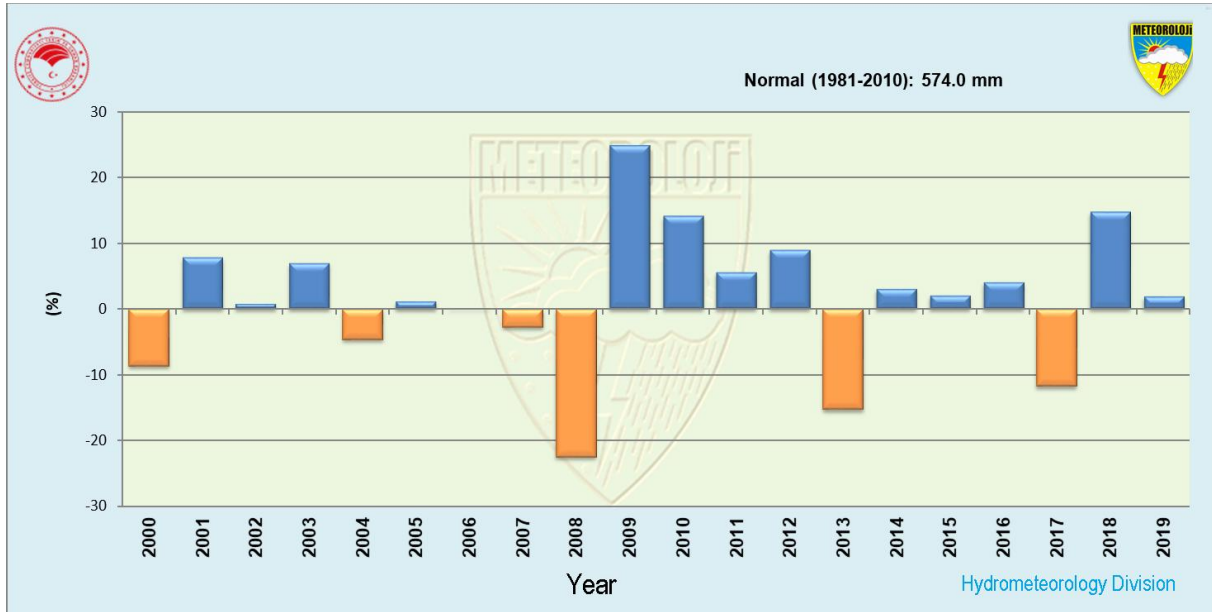


Figure 3. 1 Annual areal precipitation anomaly in Turkey (URL 2)

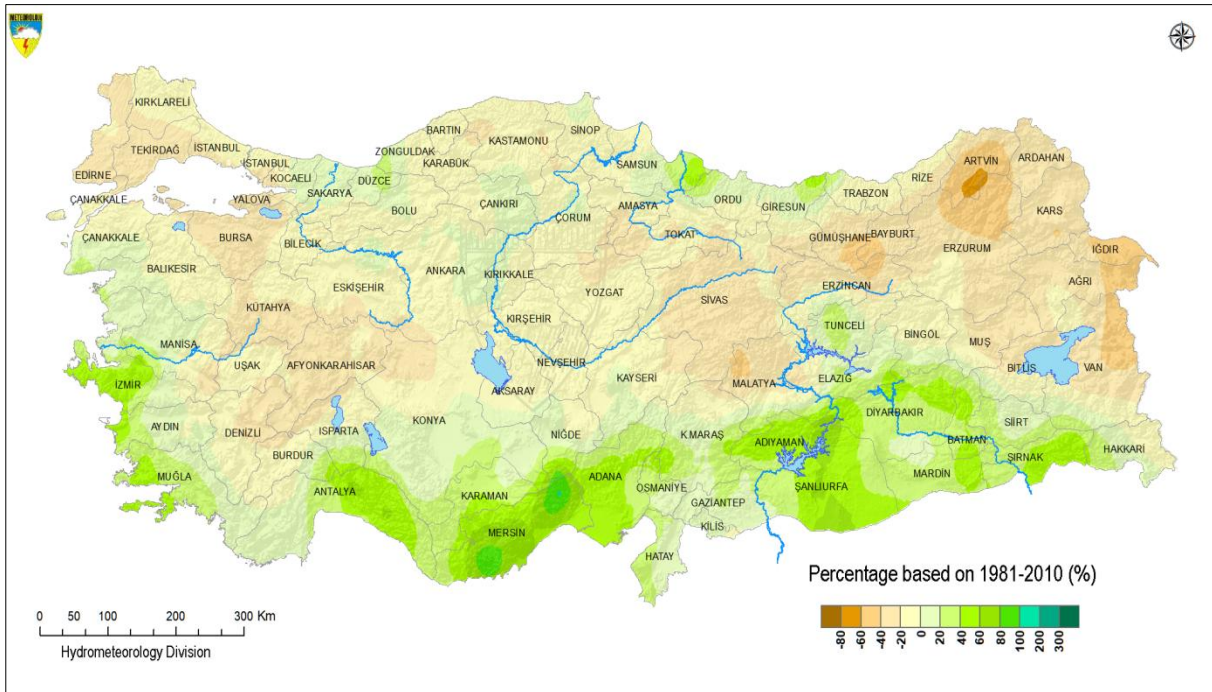


Figure 3. 2 Spatial distribution of mean precipitation anomalies in Turkey in 2019 (URL 2).

Geographically, 2019 precipitation anomalies were above normal in most of the southern parts of the country while below it northern parts (Figure 3.2).

3.1. Monthly precipitation

Monthly precipitations in 2019 were below from the 1981-2010's normal in February, March, May, September, October and November and above normal in the other months. January and December precipitations were exceptionally above their normal (Figure 3.3).



Figure 3. 3 Monthly areal rainfall in Turkey in 2019 (URL 2)

3.2. Seasonal precipitation

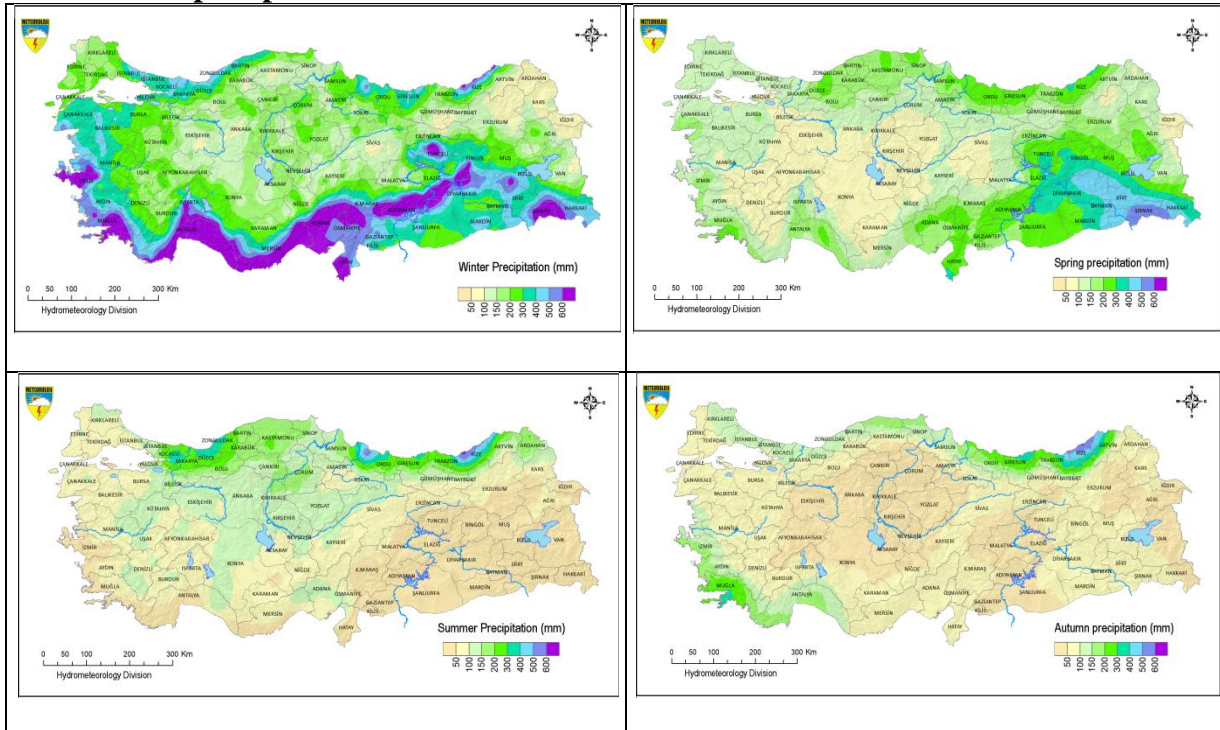


Figure 3.4 Seasonal areal rainfall in Turkey in 2019 (URL 2)

Winter precipitations were exceptionally high in southern parts of the country. Spring precipitation was good in South-eastern and Black Sea Region. Summer and autumn precipitation were below in the country except Black Sea Region (Url 2).

4. Extreme Meteorological Events

The number of extreme events in 2019 reached 935 (Fig. 4.1). There is an increasing trend in extreme event occurrences especially during the last two decades.

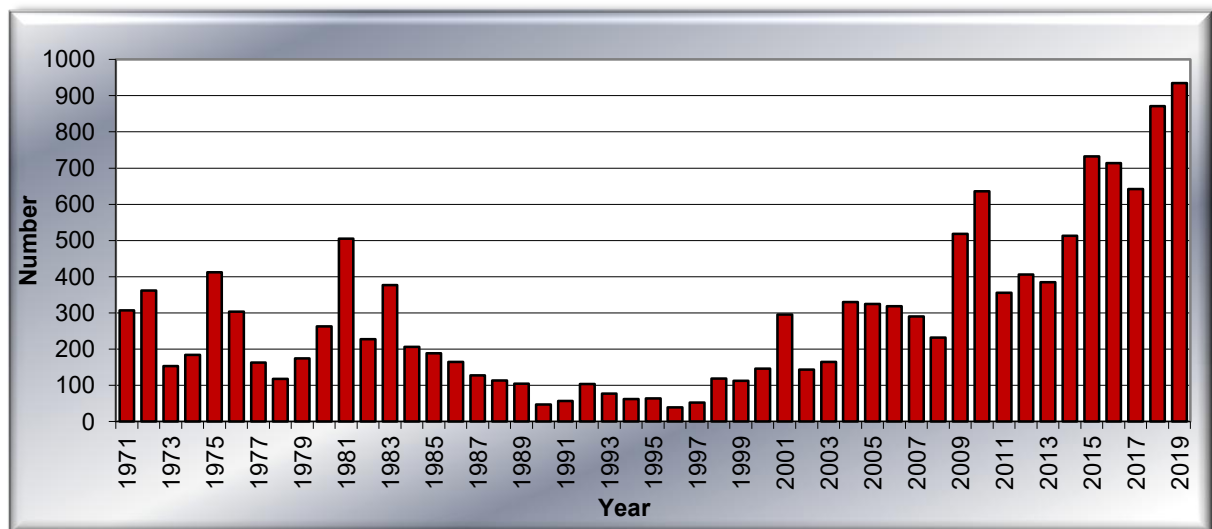


Figure 4. 1 Annual number of extreme events in Turkey in 2019 (URL 3)

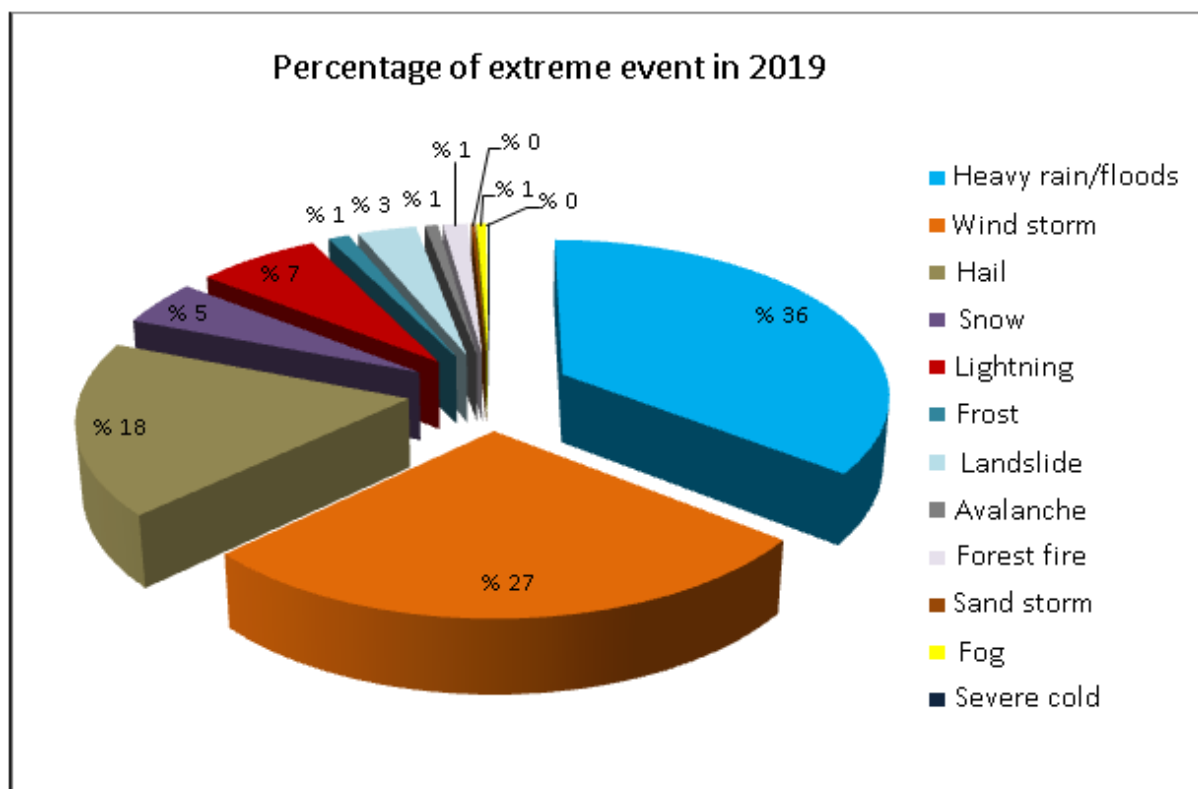


Figure 4. 2 Proportional distribution distribution of extreme events in 2019 (URL 3)

Most hazardous extreme events recorded in 2019 were heavy rain and floods (36%) and wind storm (27%). The others were hail (18%), lightning (7%), snow (5%), landslide (3%) and the others shown at the picture (Figure 4.2).

4.1. Heavy rain/floods

In 2019, daily maximum rainfall exceeding 100mm was observed in Rize, Artvin, Ordu, Zonguldak, Muğla, Antalya, Adana and Osmaniye (Fig. 4.3).

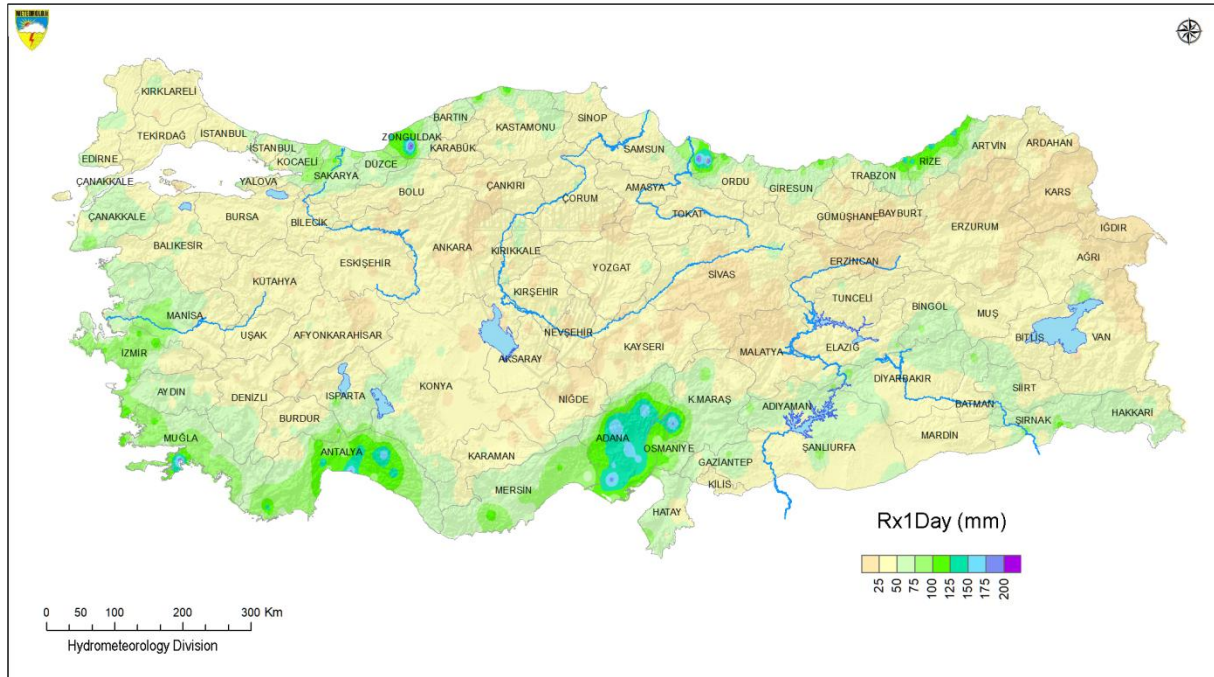


Figure 4. 3 Spatial distribution of daily maximum precipitation in 2019 (Url 2)

4.2. Wind storm



Figure 4. 4 Wind storm on 15 January 2019

The storm, seen in many parts of the country on January 15, blew the roof of houses in the Eastern Black Sea Region. In other parts of the country, life was negatively affected by the storm (Url 3).

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