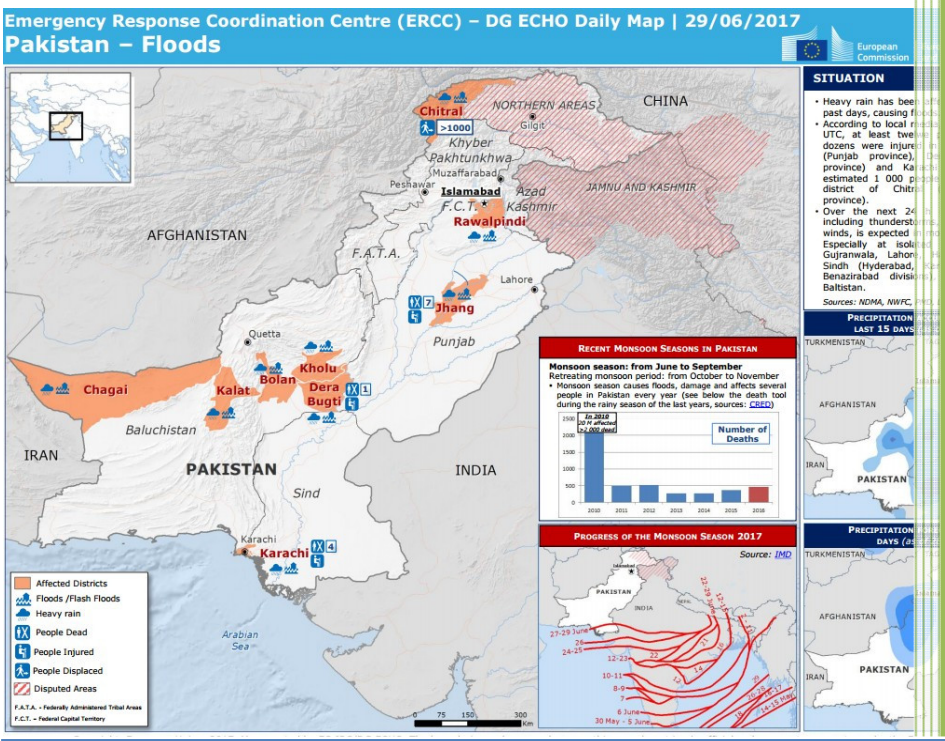
Pakistan Meteorological Department



2017

Climate of Pakistan (2017)

National Drought Monitoring Centre (NDMC)

Headquarters Office, Sector H-8/2, Islamabad

Tel : + (92-51) 9250598, Fax: + (92-51) 9250368, URL: http://www.pakmet.com.pk,

Climate of Pakistan in 2017

Prepared By

Ghazala Qaiser (Deputy Director)

National Drought Monitoring & Early Warning Centre,
Pakistan Meteorological Department,
Islamabad

Climate of Pakistan in 2017

1. Introduction

Temperature and precipitation are two major elements which determine the climate of any region. Any persistent change in both or one with respect to the long term mean or normal values leads to the climate change of that region. Highlights of the analysis for the climate of Pakistan in 2017 are listed below.

2. Temperature

Average Monthly Temperatures of Pakistan for the year 2017 are compared with Average Monthly Normal Temperatures (1981-2010) in figure 1.

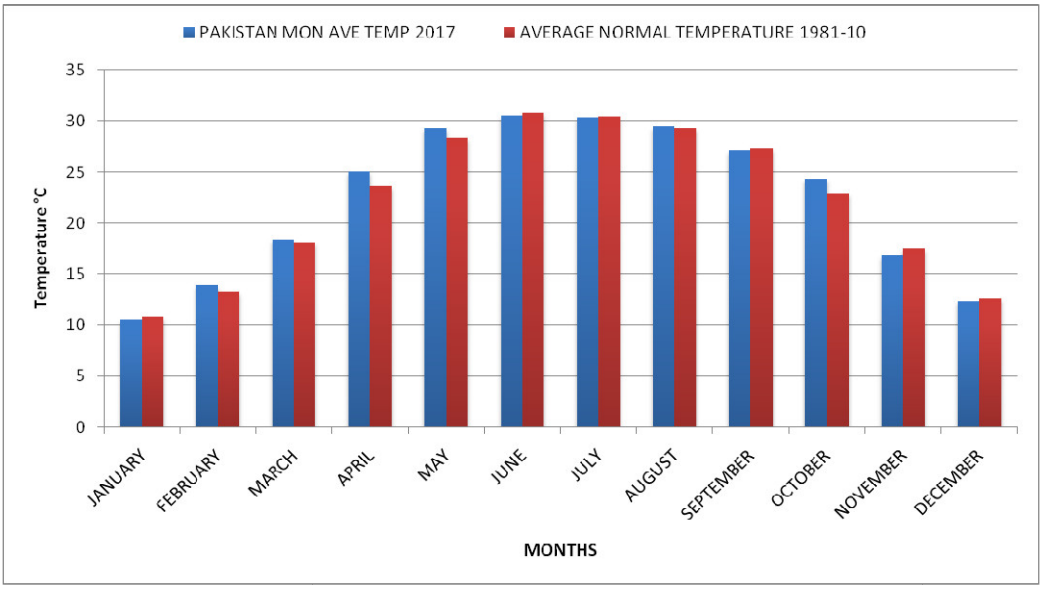


Figure 1: Departures of 2017 mean monthly temperatures from Normal (1981-2010)

Monthly mean temperatures of 2017 were above the 1981-2010's average normal temperatures in February, April, May and October. July, August and September temperatures were equal to normal while January, March, June and December were near to Normal. Whereas in November monthly mean temperatures remain slightly below normal (Fig. 1).

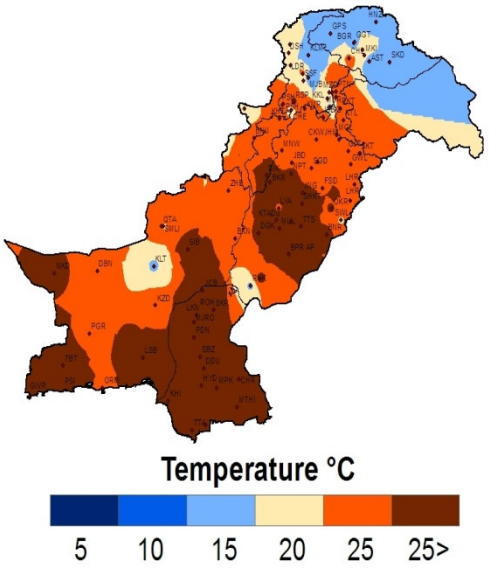


Figure 2: Spatial Distribution of Mean Annual Temperatures of Pakistan for 2017

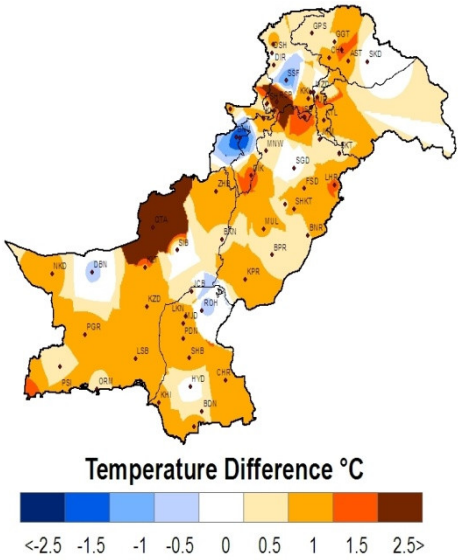


Figure 3: Mean Annual Temperatures (2017) Difference from Normal

Annual Mean Temperatures (actual) for 2017 remained on higher side in most of the country (Fig. 2). Whole Sindh remained above 25^0C, Punjab and major Portion of Baluchistan experienced temperatures ranging from 24^0C - 27^0C or even higher. Only parts of extreme Northern areas had temperatures ranging from 6^0C - 10^0C. Figure 3 above shows mean annual temperature departures from Normal 1981 - 2010. The maximum difference of the mean annual temperature from the normal was experienced in western parts of Pakistan including Quetta, Bannu, Peshawar and Risalpur.

3. Rainfall

In 2017, mostly districts of Balochistan and parts of Sindh suffered dryness due to well below normal rainfall. As shown in Figure 4, western parts of KP, most of Punjab, lower GB and AJK and coastal areas of Sind were near normal (1981-2010).

Upper parts of Sindh and most of Balochistan experienced mild to moderate drought like conditions during the year 2017.

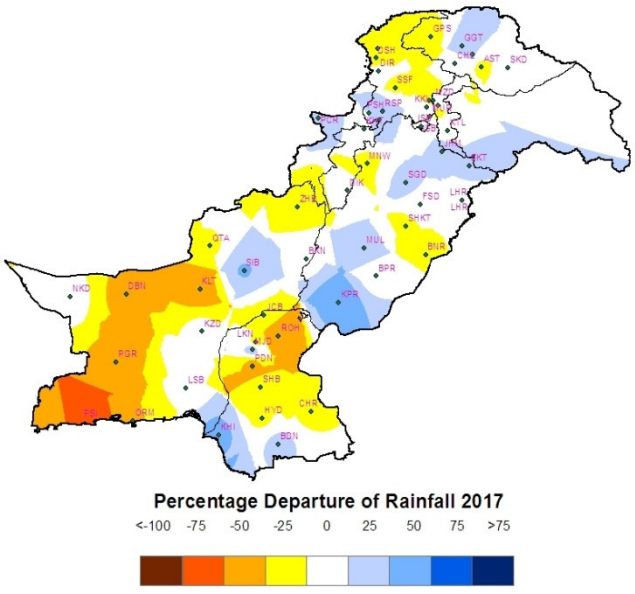


Figure 4: Percentage departure of 2017 Rainfall from Normal 1981-2010

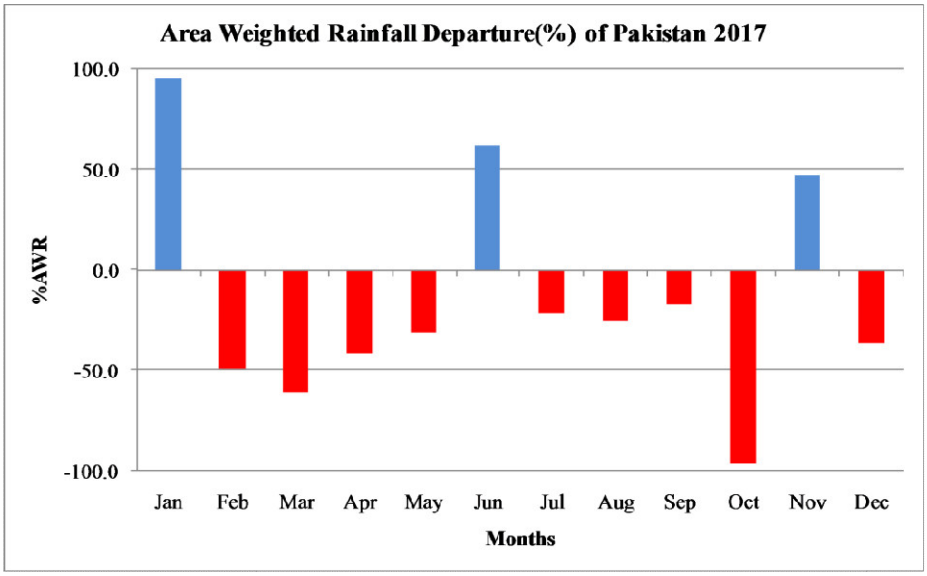


Figure 5: Percentage Departures from Normal of Rainfall 2017

Percentage area weighted departure of monthly rainfall of 2017 from normal monthly rainfall of 1981-2010 has been shown in figure 5. The analysis shows that 2017 was very dry year in Pakistan. The months of February, March, April, May, July, August, September, and December seen below normal precipitation. Amongst these dry months, October was the driest month with 96% below normal rainfall. In the months of January, June and November rainfall was above normal. January with 95% above normal precipitation was the wettest month, yet Jun and November also received well above normal rain (62% and 48% respectively).

Major parts of Pakistan received heavy rainfall in the month of January due to western disturbance, peculiar of winter season. The monsoon season was going dry from pre-monsoon, yet Jun received well above normal precipitation which provided some moisture relief to the soil. Again the dry spell continued from July till October and ended in November, however December again received below normal precipitation.

The country analysis shows well below normal rainfall (-96.26%) during October 2017. the provinces of Balochistan and Sindh experienced 100.0% below normal, whereas Gilgit-Baltistan and Kashmir, Punjab and KP received -97.27%, -96.81% and -88.85% of normal rains respectively.

Spatial distribution of total annual rain fall over Pakistan for 2017 depicts extreme rainfall over north Punjab, AJK and eastern KP (the monsoon belt) which exceeded 1000mm (Fig.6). It is obvious from fig. 5 that it happened in the months of January, June and November. Lower half of Baluchistan received very little rainfall ranging from 50 to 100 mm which is leading to meteorological drought conditions in most of the areas.

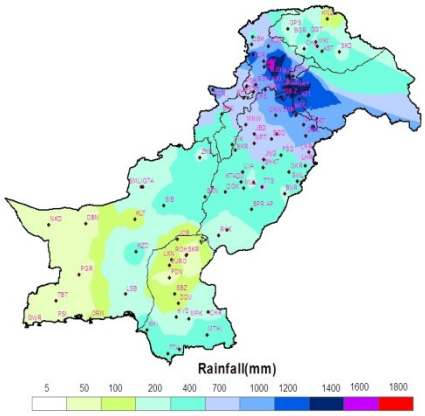


Figure 6: Spatial Distribution of Annual Total Rainfall over Pakistan for 2017

4. Extreme Events

Highest Maximum and lowest Minimum Temperatures of Province-wise cities of Pakistan during 2017 are shown in Figure 7(a-e).

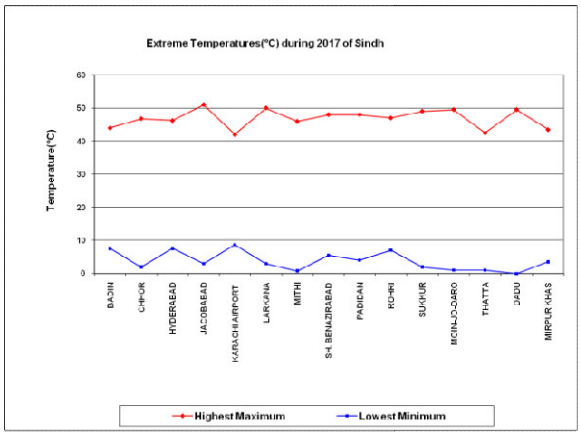


Figure 7 (a): Extreme Temperatures of Sindh

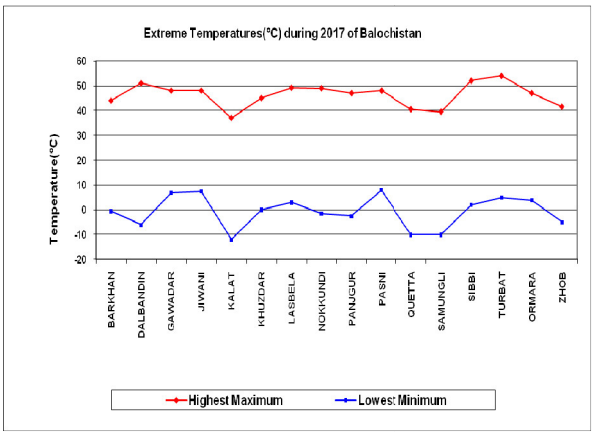


Figure 7(b): Extreme Temperatures of Balochistan

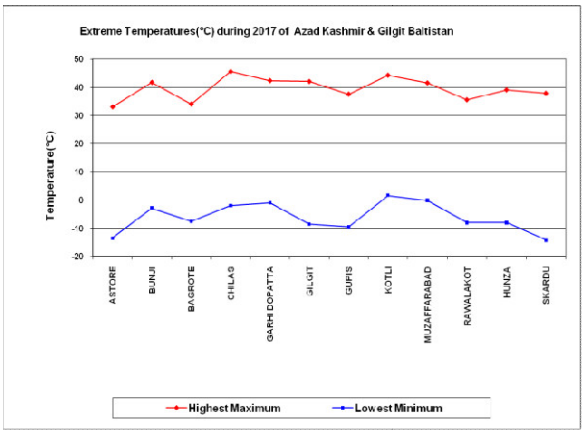


Figure 7 (c): Extreme Temperatures of AJK & GB

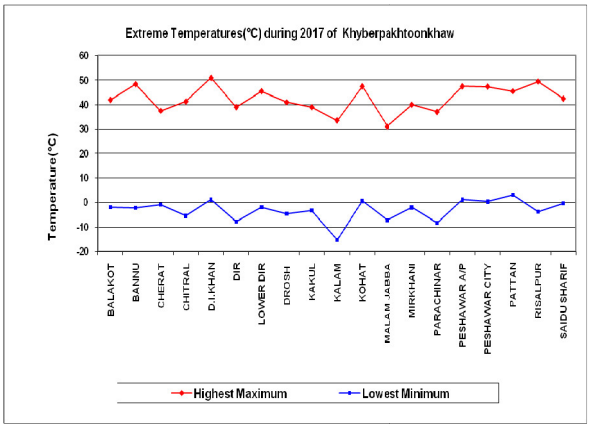


Figure 7 (d): Extreme Temperatures of KP

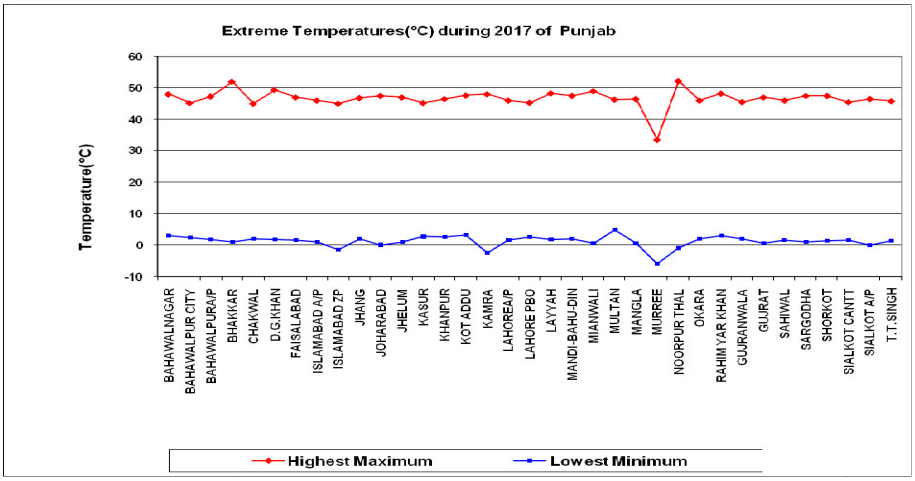


Figure 7 (e): Extreme Temperatures of Punjab

Highest daily rainfall in 2017 for different cities of Pakistan province-wise is given in figure 8(a-e).

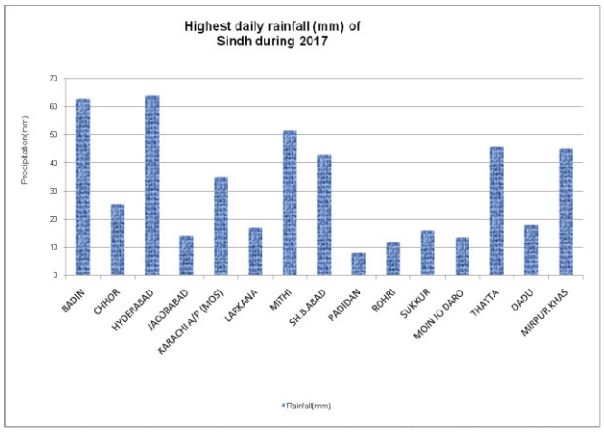


Figure 8 (a): Highest daily Rainfall of Sindh

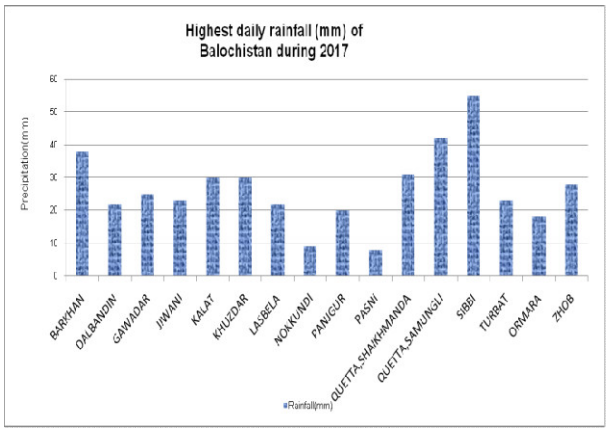


Figure 8 (b): Highest daily Rainfall of Balochistan

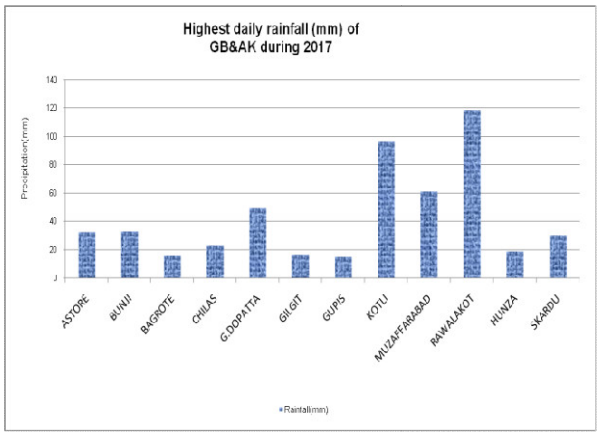


Figure 8 (c): Highest daily Rainfall of AJK & GB

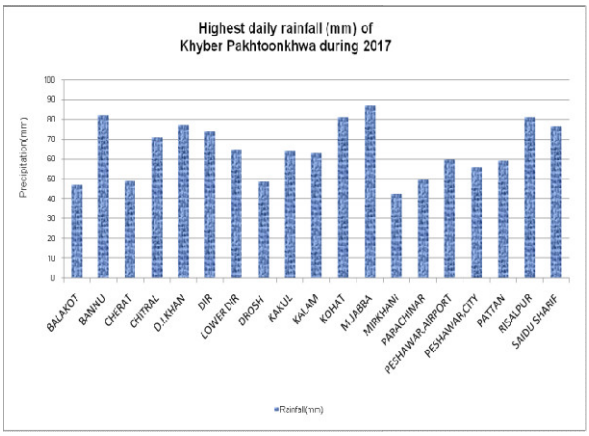


Figure 8 (d): Highest daily Rainfall of KP

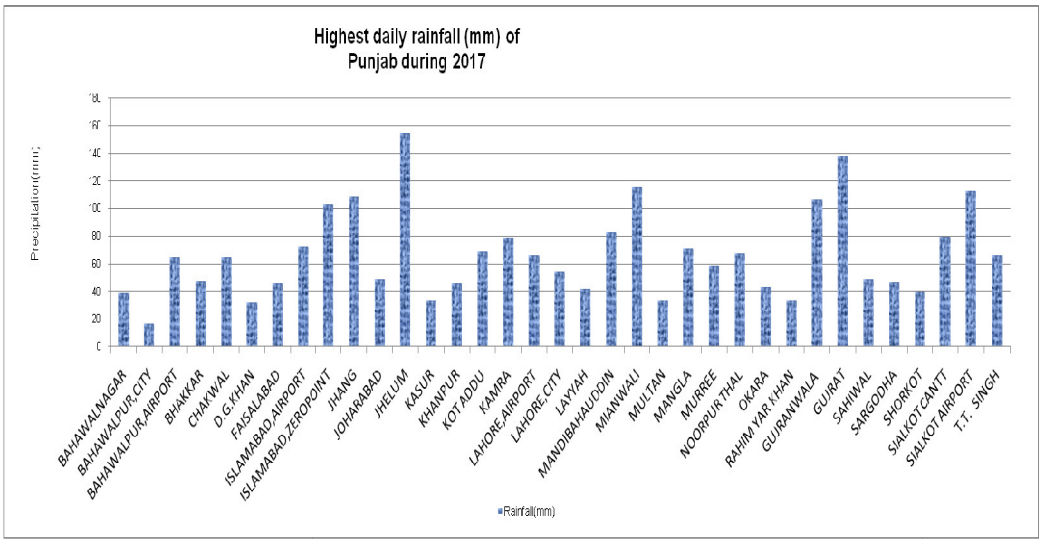


Figure 8 (e): Highest daily Rainfall(mm) of Punjab

5. Other extreme Events of 2017

(a) Heat Wave in Pakistan March and April, 2017

The definition of heat wave recommended by the World Meteorological Organization is when the daily temperature of more than five consecutive days exceeds the average maximum temperature by 5°C (9° F). Average maximum or Normal maximum temperature for Pakistan has been taken for the period from 1981 to 2010. An analysis of extreme temperatures during 1965-2009 shows that major parts of the country have been experiencing a warming trend. The frequency of extreme maximum temperature events are increasing significantly in Northern Areas, Southern Punjab, Sindh and Balochistan.

Two heat waves struck the country one in March and other in April 2017. In March the heat wave period was from 26th March to 31st March for most of the stations. These stations include from Punjab (Islamabad, Jehlum, Khanpur, Kamra, Lahore, Mianwali, Murree, Sargodha and Shorkot), Gilgit Baltistan and AJK (Astore, Bunji and Chilas), Khyber Pakhtunkhwa (Balakot, Cherat, Chitral, D.I.Khan,, Dir, Kakul, Kalat, Peshawar and Saidu Sharif), Sindh (Badin, Chhor, Hyderabad, Larkana, Sh. Benazirabad, Padidan, Rohri, Sukkur and Moin-Jo-Daro), and Baluchistan (Dalbandin, Kalat, Khuzdar, Lasbela, Nokkundi, Panjgur, Samungli, Sibbi, Turbat and Zhob). In April most of the country was under the grip of heat wave during 11th to 22nd with a few exceptions.

There was yet another heat wave experienced in a few locations of GB and AJK, Khyber Pakhtunkhwa and Balochistan from 25th to 30th May.

Karachi again suffered few very hot days (7th -13th October). Although these hot days charged death toll there (as reported by some news agencies), but these do not satisfy the definition of heat wave.

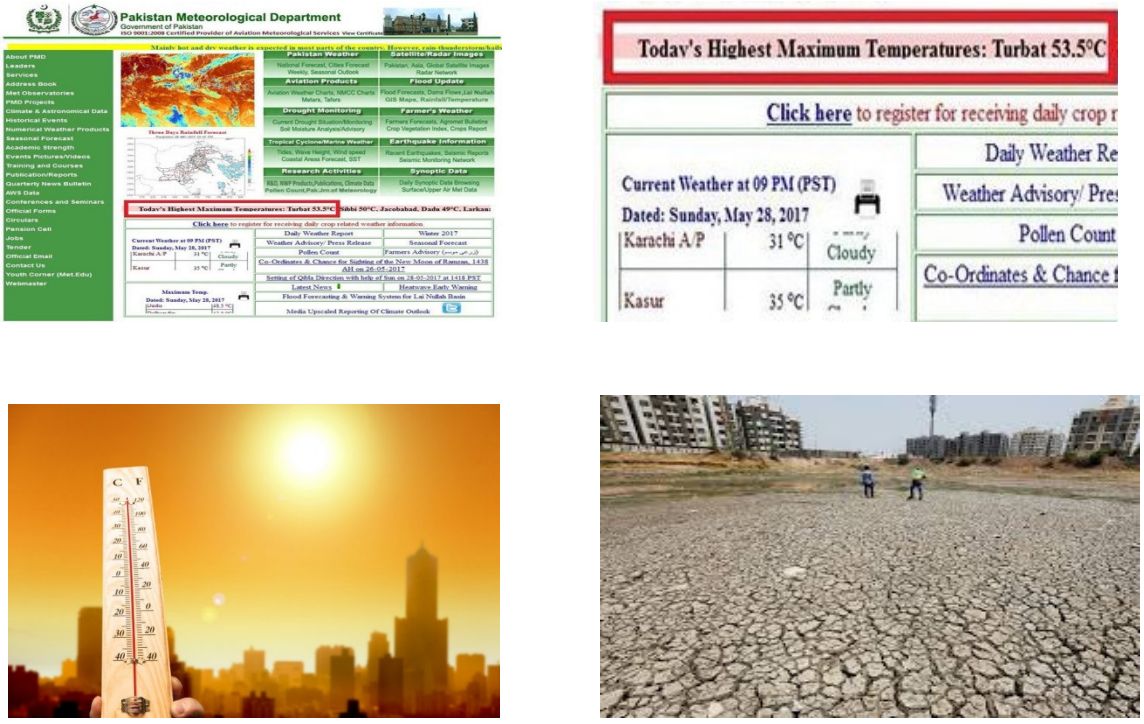


Figure 11: Glimpses of hot summer in Pakistan during 2017

(b) Flash Flood / Flood in 2017

This year country received heavy rainfall in January (95.42% above normal). Other wet months were June and November while rest of the year experienced below normal precipitations. These extreme rainfall events in January caused flash flood and land slide in mountainous areas and generated flood like situation in a few districts of Balochistan, KP, GB and AJK.

During June 2017, amount of rainfall was well above normal in Sindh (197.2 %), Balochistan (112.4%) and Punjab (54.40%) whereas it was below normal in Gilgit-Baltistan / Kashmir (-48.2%). Badin and Karachi (Sindh) received 58.4% and 48.1% above normal rainfall respectively. Barkhan and Khuzdar Districts (Balochistan) received 81.0% and 33.5% above normal rainfall in June 2017 respectively. This early monsoon rain again caused flooding in low lying areas of Sindh and Balochistan

The whole country received well above normal rainfall (47.52%) during November. In Khyber Pakhtunkhwa a few stations received heavy downpour in a couple of days (15th to 16th November, 2017). These include Bannu 48 mm (+48.9%), Cherat 75 mm (+60.4%), Peshawar 69 mm (+55.2%), and Risalpur 52 mm (+38.4%).

Figure 12: Glimpse of flash flood/flooding in Pakistan during 2017

(c) Severe dust storm in Punjab, June 2017

A severe dust storm hit south-eastern Punjab (Bahawalnagar and associated districts) on June 08, 2017. Maximum wind speed of the storm was reported as 195 Km/h.

News media reported 7 casualties along with 65 injured.

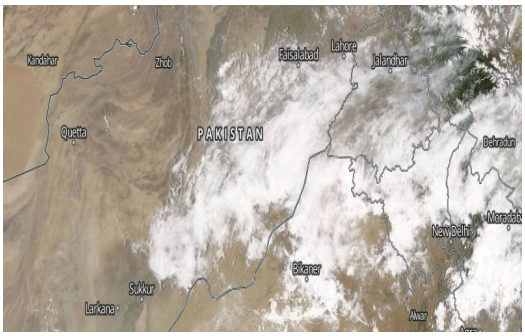


Figure 13: Dust Storm in Punjab

(d) Flash Flood in Baluchistan, June 2017

In Lasbela district of Baluchistan a flash flooding was reported in Tehsil Hub on June 29, 2017.

A death toll of 14 persons was reported by District Administration.

Figure 14: Lasbela, Baluchistan

(e) Torrential Rains/Urban Flooding in Sindh, June 2017

A few districts of Sindh experienced vey heavy rainfall during 24 hours period between 29th and 30th June. These include Diplo (70 mm), Badin (52 mm) and Karachi (62mm).

Torrential rain reported at different locations of Karachi during the two days (48 hours) was:

Faisal Base (71mm), Masroor (67 mm), Landhi (56 mm), Gulshan-e Hadeed (73 mm), North Karachi (95 mm), Nazimzbad (74mm), Saddar (59 mm) and University Road (39 mm).

Figure 15: Urban Flooding, Karachi

6. Drought Monitor

National Drought Monitoring Centre of PMD monitors drought events on fortnightly basis; according to in 2017 there were normal to slightly wet and mild drought conditions in most parts of Punjab, KP,GB & AJK. Whereas most of Balochistan alongwith adjoining southern parts of Sindh experienced mild moderate drought. Yet a little area including Pasni experienced severe drought conditions. Figure 16 below shows the drought conditions of whole Pakistan for 2017.

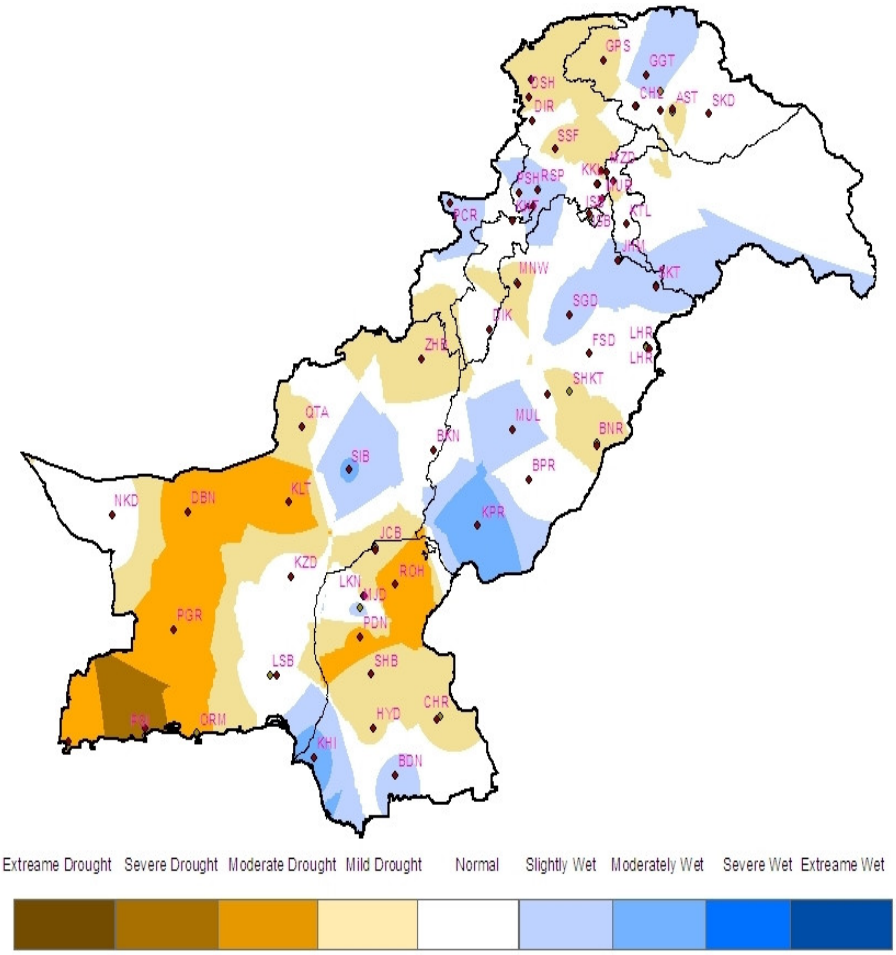


Figure 16: Drought analysis for Pakistan for the year 2017