



State of Pakistan's Climate in 2019

OVERVIEW

- Pakistan's annual rainfall 21% above normal
- Rainfall above normal for Sindh & Balochistan
- More than average rainfall during post-monsoon (OND) season, especially in November
- Close to average national mean temperature
- First non-warmest year happened in past five years
- Significant heatwaves in May and in June
- Jacobabad 51 °C on 1-2 June hottest days of the year
- The frequency of cyclones in Arabian Sea abnormally high in this year.
- Four cyclones were formed in Arabian Sea
- The cyclone "Vayu" reached close to Pakistan coast but dissipated before crossing coast
- One of the strongest positive Indian Ocean Dipole event
- El Niño–Southern Oscillation neutral throughout the year

RAINFALL

During the year 2019 the rainfall activity over the country as a whole was slightly above normal (+21.4 per cent of long term average 1981-2010). The regions of Sindh, Balochistan & Punjab received above normal rainfall of the order of +63%, +47% & +18% respectively whereas AJK, GB & KPK experienced close to normal annual rainfall.

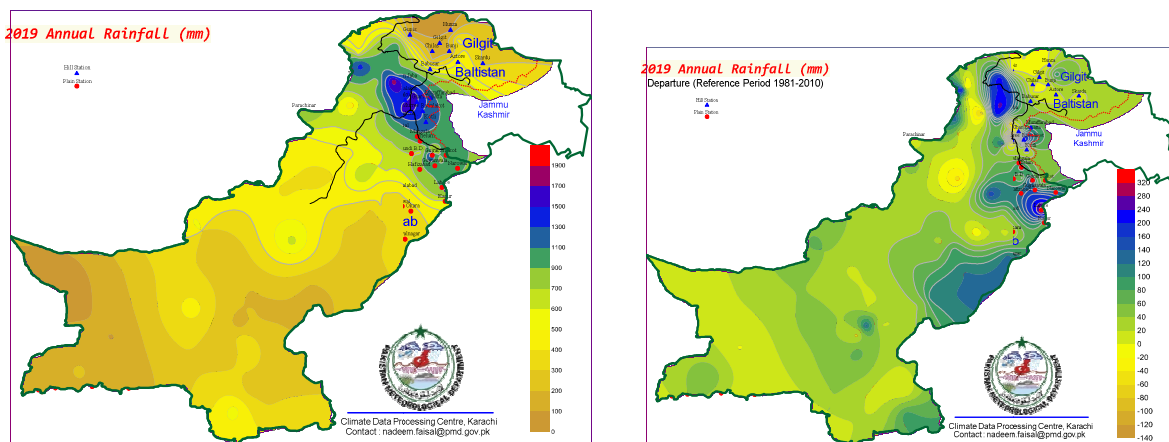


Figure 1. Spatial distribution of 2019 annual rainfall actual (left) & departure (right)

In the winter season (JFM) the rainfall activity over the country as a whole was moderately above normal (+37%). AJK (+7%) & KPK (+8%) received close to normal, Punjab (+37%) & GB (+34%) recorded moderately above normal and Balochistan (+59%) & Sindh (+210%) recorded largely above normal rainfall. In the pre-monsoon season (AMJ), rainfall activity over the country as a whole was more or less continuation of previous season, with moderately above normal rainfall (+27%). Variable pattern of rainfall was seen in the pre-monsoon season. Punjab (+42%) & Balochistan (+97%) received excessively above normal rainfall and KPK (+6%) received close to normal rainfall whereas AJK (-12%), GB (-20%) & Sindh (-53%) witnessed largely deficient seasonal rainfall

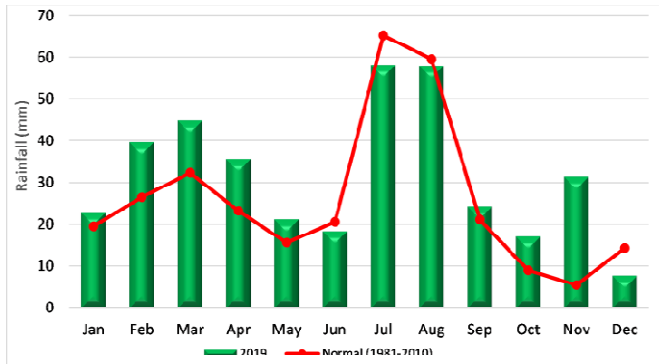


Figure 3. Monthly mean rainfall in 2019 compared with the corresponding long term average.

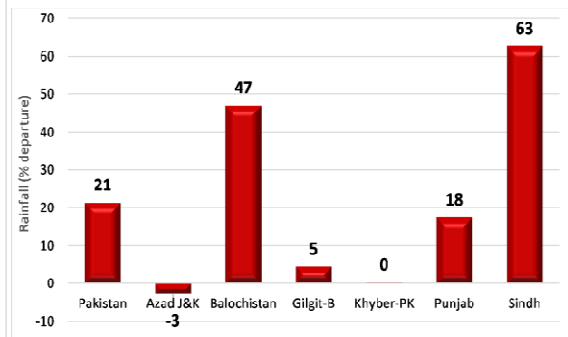


Figure 4. Distribution of 2019 annual rainfall over country & provinces.

During the monsoon season (JAS), rainfall over the country as a whole was close to normal (-4%). On spatial scale, the monsoon seasonal rainfall was observed slightly to moderately below normal over all the regions except Sindh where it was moderately above normal (+43%). During the post-monsoon season, (OND) rainfall over the country as a whole was largely in excess (+96%). Similar rainfall pattern was recorded in all regions of the country during the season.

TEMPERATURE

Pakistan 2019 annual mean land surface air temperature averaged was 22.69 °C, which is 0.07 °C below the 1981–2010 average, making 2019 the first non-warmest year happened in past five years. Anomaly in the mean temperature over most parts of the country was generally in the range of -0.5 to +0.5 C. However, some parts of southeastern region of the country were warmer by about 0.5°C to 1.0 °C.

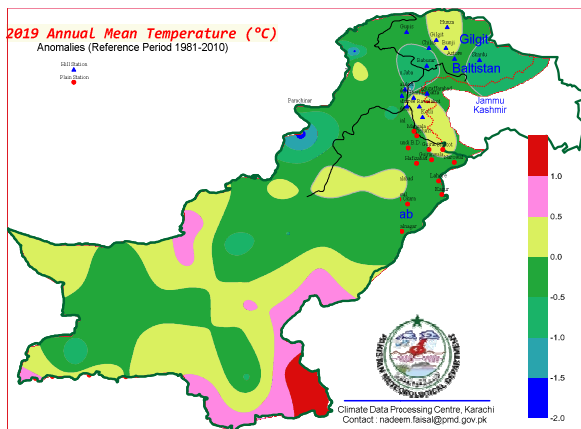


Figure 5. Spatial pattern of anomalies for 2019 annual mean temperature.

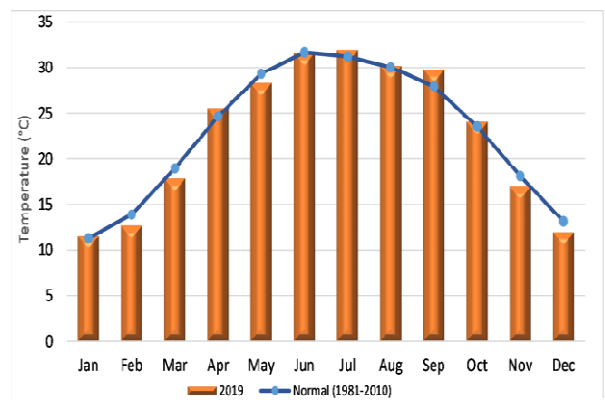


Figure 6. Monthly mean temperature in 2019 compared with the corresponding long term average

NOTABLE WEATHER EVENTS IN 2019

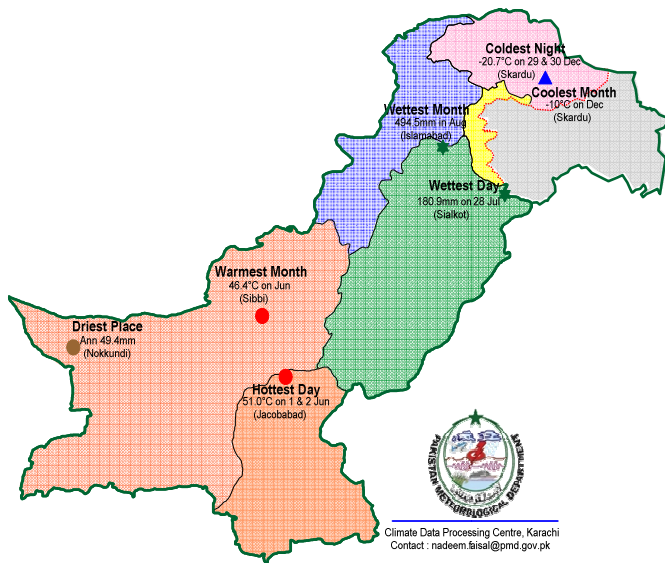


Figure 7. Extreme weather events in 2019

Table-1: Annual & Seasonal Rainfall

	Pakistan	AJK	Balochistar	GB	KPK	Punjab	Sindh
Annual							
Normal (mm)	312.3	784.3	173.6	231.5	757.2	408.4	174.8
Actual (mm)	379.1	763.3	255.2	242.0	759.5	479.9	284.4
Departure (%)	21	-3	47	5	0	18	63
Jan-Mar							
Normal (mm)	78.3	226.0	61.3	71.7	220.3	72.2	12.3
Actual (mm)	107.2	241.8	97.6	96.0	237.3	99.1	38.1
Departure (%)	37	7	59	34	8	37	210
Apr-Jun							
Normal (mm)	59.4	175.6	29.5	84.2	158.2	72.8	15.8
Actual (mm)	75.3	154.6	58.2	67.1	167.1	103.3	7.4
Departure (%)	27	-12	97	-20	6	42	-53
Jul-Sep							
Normal (mm)	145.8	291.3	62.1	45.7	300.1	238.9	137.0
Actual (mm)	140.4	226.9	56.0	30.2	250.4	221.1	195.9
Departure (%)	-4	-22	-10	-34	-17	-7	43
Oct-Dec							
Normal (mm)	28.8	91.4	20.7	29.9	78.6	24.5	9.7
Actual (mm)	56.3	140.0	43.4	48.7	104.8	56.4	43.0
Departure (%)	95	53	110	63	33	130	343

Tropical Cyclone “Vayu” (10-17 June 2019)

The frequency of cyclones Arabian Sea was abnormally high in this year. Four cyclones were formed in Arabian Sea; Vayu (10-17 June), Hikka (22-25 September), Kyarr (24 October - 2 November) and Maha (30 October 30 – 7 November). The cyclone Kyarr can be classified as super cyclone formed over the Arabian Sea since Super Cyclonic Storm Gonu in 2007. The cyclone “Vayu” was the only cyclone reached close to Pakistan coast but dissipated before crossing coast.

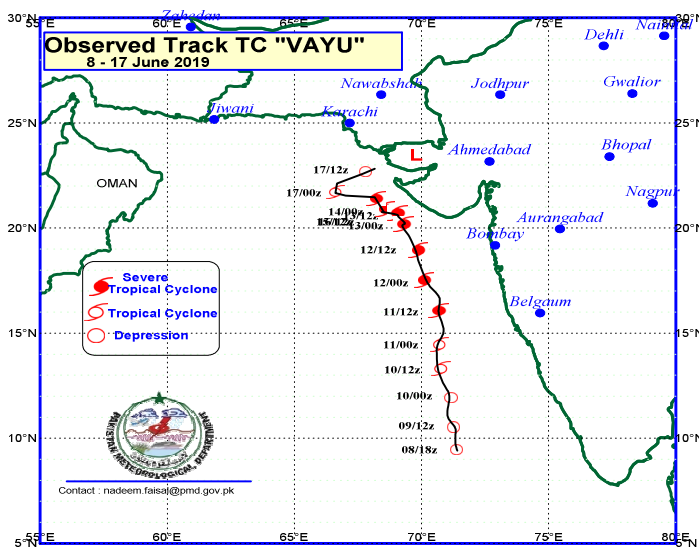


Figure 8: TC “VAYU” Track

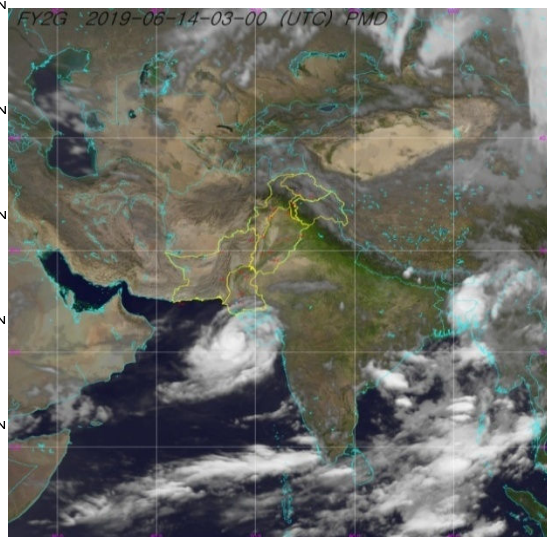


Figure 9: Satellite picture (14 June 0300 UTC)

On 10th June 2019, a deep depression system over the southeastern Arabian Sea strengthened into the tropical cyclone, and was named as “Vayu”. The tropical cyclone continued to steadily strengthen and further upgraded to a severe tropical cyclone tracking towards north. TC-Vayu began to weaken on 14 June as it tracked slowly westward, away from the Gujarat coastline. Tropical cyclone further weakened into a deep depression and then into depression on 17 June. Soon after, TC-Vayu degenerated into a well-marked low-pressure area, just before crossing the Gujarat coast near the India–Pakistan border.

Hot spell in eastern and central Pakistan

Persistent hot conditions affected large parts of the country in May and June. Initially, the heating initiated over relatively small part of the country in late-May. Later in June, the heat extended over a much larger area and peaked on 1-3 June. During the month of June, there were run of 8-12 consecutive days of temperature of 45 °C or above on number of stations with extended duration of the heat, monthly average temperatures were also very high. Over the first week of June maximum temperatures were 6 °C to 7 °C above average over many parts of country.

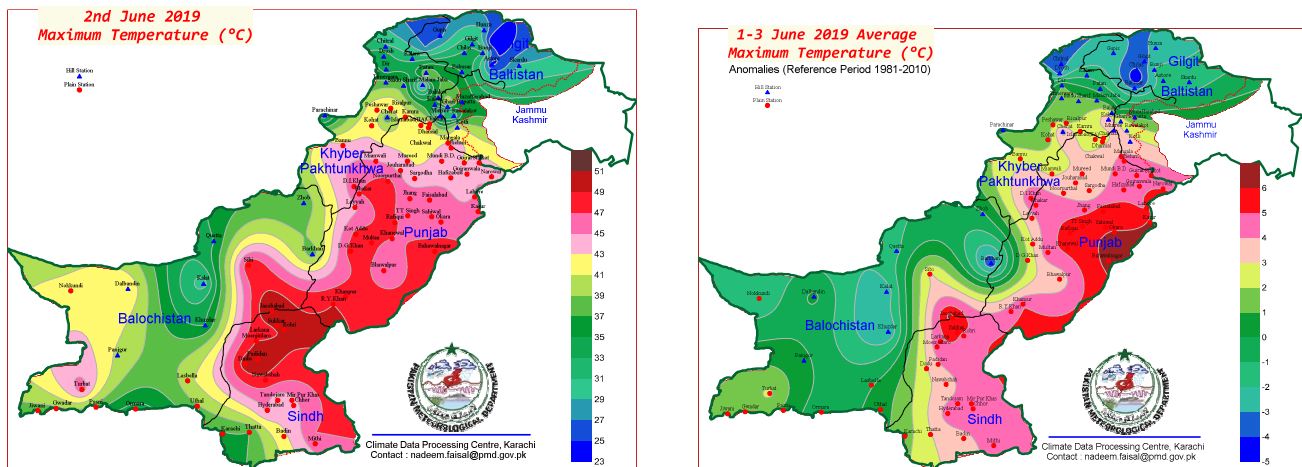


Figure 10. Spatial distribution of peak maximum temperatures occurred on 2nd June, 2019 (left) and anomalies of three days average 1-3 June 2019 (right)

The State of Pakistan’s Climate in 2019 is produced by Pakistan Meteorological Department, Climate Data Processing Centre, Karachi to provide informative overview of the temperatures, rainfall and significant weather events in Pakistan for the year. Some of the information is based on real time data and/or electronic reports therefore, the results contained above can be considered only preliminary. If you have any comments or suggestions, please contact us:

Director, Climate Data Processing Centre,
 Pakistan Meteorological Department, Meteorological Complex, University Road, Karachi-75290,
<http://www.pmd.gov.pk/cdpc/home.htm>; info.cdpc@pmd.gov.pk

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